NEW YORK STATE OF OPPORTUNITY. | Department of Environmental Conservation

AMENDED FINAL PHASE III WATERSHED IMPLEMENTATION PLAN

New York Chemung and Susquehanna River Basins

~~February~~ October 2020

DIVISION OF WATER
BUREAU OF WATERSHED RESOURCE MANAGEMENT

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Executive Summary

The United States Environmental Protection Agency (EPA) established the Chesapeake Bay Total Maximum Daily Load (TMDL) in December 2010 to address ongoing water quality problems caused by excessive nutrients and sediment. Seven jurisdictions (Delaware, Pennsylvania, Maryland, New York, Virginia, Washington D.C., and West Virginia) comprise the Chesapeake Bay watershed and are covered by the TMDL. As part of the TMDL, EPA assigns each jurisdiction pollution reduction targets for nitrogen, phosphorus, and sediment. In 2014, the seven jurisdictions in the watershed, the Chesapeake Bay Commission and the United States signed the Chesapeake Bay Watershed Agreement, a voluntary agreement joining the signatories in the current Chesapeake Bay Program Partnership to protect and restore the Bay. The Chesapeake Bay Program Partnership finalized an updated set of nitrogen and phosphorus reduction targets for each jurisdiction in July 2018. Final sediment targets were approved by the Chesapeake Bay Program Partnership in January 2020. All targets are expected to be met by 2025.

Each jurisdiction is responsible for developing and implementing watershed implementation plans (WIP) that describe the contributions each state will make towards achieving the targets. The New York State Department of Environmental Conservation (NYS DEC) submitted the final Phase I WIP in December 2010 and the final Phase II WIP in January 2013[1]. This document is New York's Phase III WIP, which was required to be developed and submitted in draft form to EPA by April 12, 2019 and final form by August 23, 2019. Final sediment targets were added to the ~~final draft~~ document and published in February 2020. This October 2020 amendment is being made to (1) include a more accurate projection of delivered wastewater loads in 2025, thereby improving New York's wastewater input deck to the Chesapeake Bay Watershed Model, (2) calculate New York's nutrient loading using an updated version of the Chesapeake Bay Assessment Scenario Tool (CAST-19), and (3) employ a phosphorus to nitrogen nutrient exchange ratio permitted by the TMDL (Section 6.4) which provides New York with a credit of 220,000 pounds of nitrogen per year in exchange for lowering the phosphorus target by 94,0000 per year.

The following source sector chapters (*Agriculture*, *Wastewater, Developed*, *and Other Remaining Sectors*) represent New York's Amended Phase III WIP for the Chesapeake Bay

[1] New York's final Phase I WIP and final Phase II WIP are available for download on NYS DEC's website: [HYPERLINK "http://www.dec.ny.gov/lands/33279.html"]

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TMDL. The source sector chapters document how nutrient and sediment reductions will be achieved and maintained. They may be modified based upon: federal funding criteria; application of adaptive management stemming from lessons learned through the two-year milestone process; the needs and priorities of local communities in the Chemung and Susquehanna watersheds; changes to EPA's Chesapeake Bay Watershed Model, including New York specific data inputs to the model; and/or updated projections of loads related to climate change and growth.

New York may update the programmatic and/or numeric commitments made in this document during the 2019-2025 timeframe, as appropriate, through the two-year water quality milestone process. Like the Phase II WIP, load reduction targets were developed for each sector based on balancing the amount of opportunity available to reduce loads from each sector, cost to implement practices in each sector, and achieving equity between sectors. NYS DEC expended considerable effort to determine the best balance of load reductions among sectors.

NYS DEC and its partners are committed to executing a consistent level of implementation achieved during the Phase II WIP period. ~~It is believed~~NYS DEC believes that this level of effort is practical and reasonable considering current available funding, technical staff, time, and cooperation for implementation. New York's amended Phase III WIP fully meets the 2025 targets for nitrogen, phosphorus, and sediment as agreed upon by the Chesapeake Bay Program Partnership. New York will continue to demonstrate our commitment to meeting these targets through annual reporting and the two-year milestone process. ~~NYS DEC has identified a gap between the implementation scenario that is believed to be reasonable and achievable with current resources and the implementation scenario needed to meet the 2025 nitrogen targets. It is expected that the lack of growth in New York will largely offset this gap, based on projections provided by EPA.~~

Section 1: Introduction

Section 1.1: New York's Connection to the Chesapeake Bay

New York's portion of the Chesapeake Bay watershed is made up of the Chemung and Susquehanna River watersheds. Together, these two watersheds form the northern headwaters of the Chesapeake Bay. The New York portion of the Bay watershed covers 6,250 square miles and approximately 642,000 people reside within this part of the state.[2]

The Susquehanna River begins at the outlet to Otsego Lake in Cooperstown, New York and flows 444 miles south to the northern end of the Chesapeake Bay in Maryland. The Chemung River flows across the western portion of the Southern Tier and joins the Susquehanna River in northern Pennsylvania. The Susquehanna River is the Bay's largest tributary.

In total, some or all of 19 New York counties are in the Chesapeake Bay watershed: Allegany, Broome, Chemung, Chenango, Cortland, Delaware, Herkimer, Livingston, Madison, Oneida, Onondaga, Ontario, Otsego, Schoharie, Schuyler, Steuben, Tioga, Tompkins, and Yates ([REF _Ref3817231 \h]).

[2] Population estimate based on 2010 U.S. Census data.

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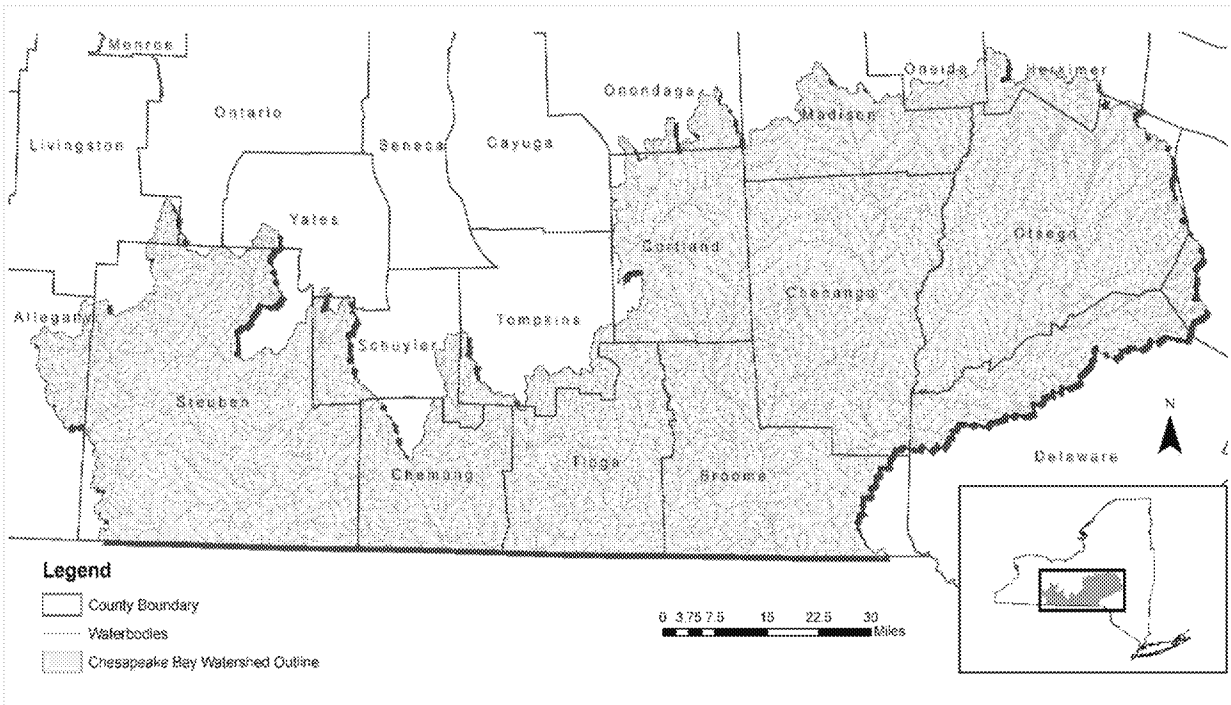

Figure [SEQ Figure * ARABIC]. Chesapeake Bay Watershed boundary in New York

Section 1.2: Chesapeake Bay Watershed Model

Section 1.2.1: Phase 6 Watershed Model

Using a combination of models, EPA predicts the total amount of nitrogen, phosphorus and sediment that the Chesapeake Bay and its tidal tributaries can receive while still attaining water quality standards for dissolved oxygen, water clarity/submerged aquatic vegetation, and chlorophyll-*a*. The models used to predict changes to nutrient and sediment loading from the environment include a Land Use change model, an Airshed Model, and additional data inputs. The Land Use model predicts changes in land use, sewered areas, and individual onsite septic systems. The Airshed Model predicts changes in atmospheric deposition of nitrogen. Additional data inputs include data from the U.S. Census of Agriculture, U.S. Population Census, and best management practices (BMPs) reported by each jurisdiction. Altogether, these models are referred to collectively as the Chesapeake Bay Watershed Model (Phase 6 ~~Watershed~~ Model). Results from the ~~Watershed Model~~Phase 6 are input into an Estuary Model, which predicts how the tidal estuary system will be impacted by changes on the landscape ([REF _Ref52882875 \h]

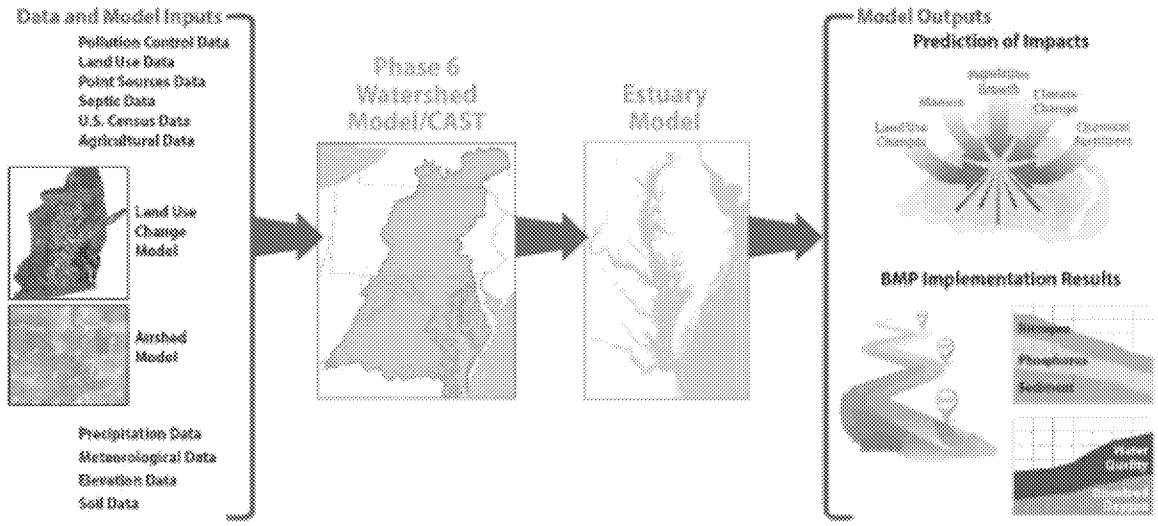

Figure [SEQ Figure * ARABIC]. Visual Representation of Chesapeake Bay Watershed Model[3].

The Watershed Model calculates the amount of pollutant load discharged "edge of stream" and the proportion of that pollutant load that reaches the Chesapeake Bay at "edge of tide". For the purpose of this document, "edge of stream" loading will be referred to as "discharged" load, while "edge of tide" loading will be referred to as "delivered" load.

~~Revisions to the Watershed Model (Phase 5.3.2) were finalized prior to the Phase III WIP development process. The newest version of the model (Phase 6 Watershed Model) incorporates the latest science and data.~~ Within the Phase 6 model, t~~T~~he overall watershed area is divided into smaller geographic units called land-river segments. Each land-river segment is assigned a unique delivery factor. Changes to the model included updating the delivery factors used to calculate the proportion of the discharged load that is delivered to the Chesapeake Bay. For New York, ~~the~~ changes to the delivery factors in the ~~updated model~~ Phase 6 model had significant impact to the amount of delivered nitrogen load estimated to be reaching the Chesapeake Bay from New York, particularly in the Chemung River watershed. The changes in the delivery factors for phosphorus were negligible ~~between the two phases of the model~~ for New York. [REF _Ref3817282 \h] [REF _Ref3817252 \h]and [REF _Ref52884619 \h][REF _Ref3817266 \h] depict the change in the delivery factors for both nitrogen and phosphorus. ~~between the two phases of the Watershed Model.~~

[3] Chesapeake Bay Program, "Modeling the Chesapeake Bay Watershed" available online at: [HYPERLINK "file:///C:/Users/latownle/Downloads/Model_Fact_Sheet_v3_6-14-18%20(1).pdf"]

Figure [SEQ Figure * ARABIC]. Percent Change in Nitrogen Delivery Factor by Land-River Segment

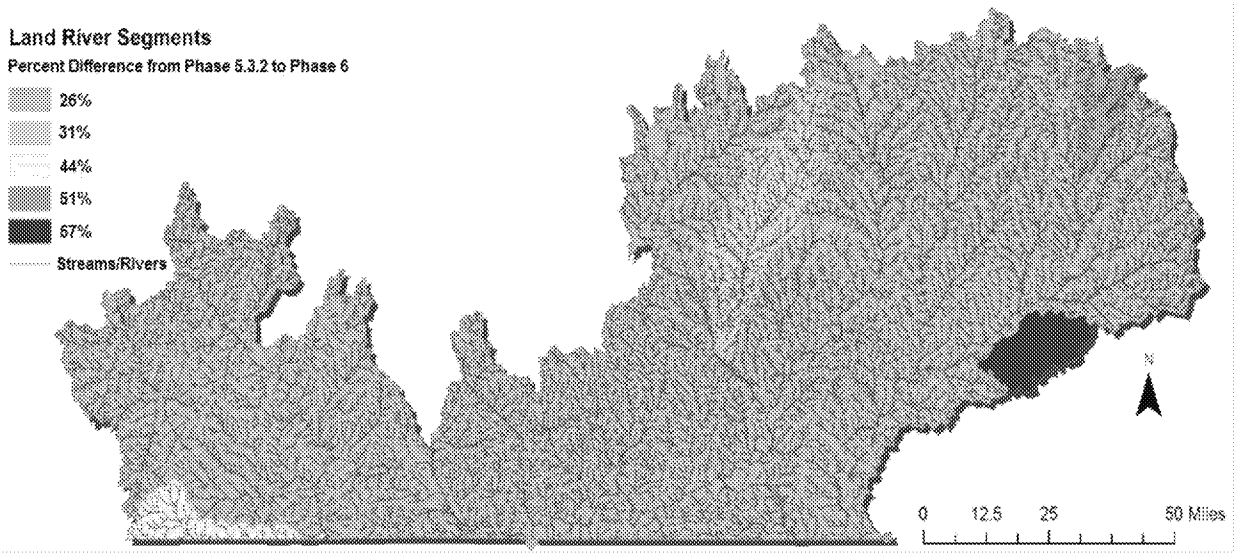

Figure [SEQ Figure * ARABIC]. Percent Change in Phosphorus Delivery Factor by Land-River Segment

The ~~Watershed Model~~Phase 6 Model is able to predict changes in loads resulting from management actions occurring on the landscape. Nitrogen, phosphorus, and sediment reductions resulting from implementation of BMPs are simulated in the ~~Watershed~~ Phase 6 Model in several ways:

- Efficiency values: An efficiency value is assigned to most BMPs, which is the percentage of a pollutant that is removed after a BMP is installed. Efficiency values are determined for each BMP through an expert panel process. Expert panels are convened to determine BMP effectiveness by reviewing relevant research. Expert panel reports are then approved by the Chesapeake Bay Program Partnership's Water Quality Goal Implementation Team (WQGIT).

- Load Source change: BMPs may convert one load source to another. Load sources are typically land use or land cover. Load source changes typically result in a lower load from a geographic area, such as converting pasture to forest by planting trees.
- Load Source change with efficiency value: Some BMPs receive both an efficiency value and also convert a load source. Examples of these BMPs include riparian buffers and rehabilitated wetlands.
- Load source input reduction practices: These BMPs are modeled as a removal of pounds of nitrogen, phosphorus, and/or sediment. Examples of these BMPs include stream restoration and storm drain cleaning.
- Animal BMPs: These BMPs are applied to animal manure for specific animal types. These practices relocate or reduce manure from one load source to another, such as waste management systems that store manure away from feeding spaces for use on fields.

Section 1.2.2: Chesapeake Bay Assessment Tool (CAST)

The suite of modeling tools for the Phase 6 Model can be accessed online using the Chesapeake Assessment Scenario Tool (CAST). CAST is used to run model simulations of different implementation scenarios and to estimate corresponding nutrient and sediment reductions. Each implementation scenario uploaded to CAST requires a land, animal, manure, and wastewater data set or "input deck" that lists the amount, location, and load source of selected BMPs or discharges. More information on New York's selected BMPs for the agricultural and developed sectors can be found in [HYPERLINK \l "_Section_5.5:_NYS"] and [HYPERLINK \l "_Section_7.7:_NYS"].

Each jurisdictions' final Phase III WIP was developed using the version of CAST called CAST-17. CAST is updated every two years to include updated agricultural, land use, and population data and any new BMPs approved by the Chesapeake Bay Program.[4] An updated version of CAST, CAST-19, was approved by the Chesapeake Bay Program Partnership in July 2020.

Based on the updated agricultural and land use data ~~data included~~~~input deck~~ in CAST-19, New York is expected to deliver 179,000 pounds of nitrogen and 586 pounds of phosphorus less per year than previously estimated in CAST-17 ([REF _Ref52884673 \h] The majority of nutrient reductions are due to loss of agricultural acres (row crops, hay, and other agricultural acres). More information regarding the decline in the agricultural sector in New York can be found in Section 5 of this document.

As part of this Amended Phase III WIP, New York updated baseline information throughout the document to reflect the changes resulting from CAST-17 to CAST-19. In the sections of this document that reference baseline conditions, an updated reference to CAST-19 was noted.

[4] "Chesapeake Bay Program [HYPERLINK "https://cast.chesapeakebay.net/FileBrowser/GetFile?fileName=Understanding_Chesapeake_Bay_Modeling_Tools.pdf"]" available online at [HYPERLINK "file:///C:/Users/latownle/Downloads/Understanding_Chesapeake_Bay_Modeling_Tools.pdf"]

Table [SEQ Table * ARABIC]. Change in load source loads between CAST-17 and CAST-19.

Load Source	Unit	Change in units between CAST-17 to CAST-19	Change in Nitrogen Load (lbs. Edge of Tide)	Change in Phosphorus Load (lbs. Edge of Tide)	Change in Sediment Load (lbs. Edge of Tide)
Feeding Space	acres	101	96,202	2,454	77,775
Hay	acres	-29,312	-170,109	-2,600	-42,991
Other Ag.	acres	-39,371	-64,081	-9,940	-172,782
Pasture	acres	-5,638	-6,020	2,374	-8,044
Riparian Pasture	acres	-	28,042	5,628	1,888,273
Row Crops	acres	-29,398	-240,959	-847	6,789,236
Construction	acres	1,096	13,293	1,128	441,801
Impervious Developed	acres	7,041	56,376	1,722	4,048,713
Pervious Developed	acres	11,325	53,560	1,037	2,044,581
Forest	acres	98,364	66,037	2,243	500,858
Non-Tidal Water Deposition	acres	2,528	7,587	740	-
Open Space	acres	-25,140	-23,492	-3,504	-6,713,457
Stream	miles	-	-12,291	-1,198	4,222,535
Wetland	acres	8,404	4,486	176	35,512
Septic	systems	-3,143	11,979	0	-
Total			**-179,390**	**-586**	**13,112,011**

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Section 1.3: Ambient Water Quality Monitoring

In addition to the Watershed Model, ambient water quality monitoring data collected from a network of United States Geological Survey (USGS) stream stations are used to determine water quality trends and to measure the success of implementation efforts. Five USGS stream stations located in New York are used to measure water quality trends in the Chemung and Susquehanna basins, and one station located in Towanda, Pennsylvania is used to measure trends of the whole New York portion of the watershed ([REF _Ref3817282 \h]).

Figure [SEQ Figure * ARABIC]. USGS Water Quality Stations in the Upper Susquehanna basin

Trends in water quality loads measured at the stream stations are tracked over long-term (1985-2016) and short-term (2007-2016) trend periods[5]. Five stream stations in New York have been tracked over the short-term trend period, while the Towanda, PA station has been tracked over both the short-term and long-term trend periods. Trends are summarized as “improving”, “degrading” or having “no trend”. Overall, short-term trends show improving water quality at all but one station in New York ([REF _Ref3817308 \h]). Long-term trends at Towanda, PA show improving conditions ([REF _Ref52884815 \h * MERGEFORMAT]), while no trend has been observed in the short-term.

[5] Information on methods of data compilation and analysis for water quality trends can be found online at: [HYPERLINK "https://cbrim.er.usgs.gov/summary.html"]

Table [SEQ Table * ARABIC]. Summary of ambient water quality trends for nitrogen, phosphorus, and sediment

Station Location	Trend Period	Parameter	Change in Load (%)	Load Trend
Unadilla River at Rockdale, NY	Short-term	Nitrogen	-9.77	Improving
		Phosphorus	-28.7	Improving
		Sediment	-0.629	No Trend
Susquehanna River at Conklin, NY	Short-term	Nitrogen	-27.9	Improving
		Phosphorus	-29.5	Improving
		Sediment	-14.1	Improving
Susquehanna River Near Waverly, NY	Short-term	Nitrogen	-11.1	Improving
		Phosphorus	-12.1	Improving
		Sediment	-31.4	Improving
Cohocton River Near Campbell, NY	Short-term	Nitrogen	8.47	Degrading
		Phosphorus	-13.7	Improving
		Sediment	39.2	Degrading
Chemung River at Chemung, NY	Short-term	Nitrogen	-2.07	No Trend
		Phosphorus	-20.1	Improving
		Sediment	-17.6	Improving
Susquehanna River at Towanda, PA	Short-term	Nitrogen	-0.624	No Trend
		Phosphorus	-1.91	No Trend
		Sediment	14.3	No Trend
Susquehanna River at Towanda, PA	Long-term	Nitrogen	-44.1	Improving
		Phosphorus	-16.7	Improving
		Sediment	-26.5	Improving

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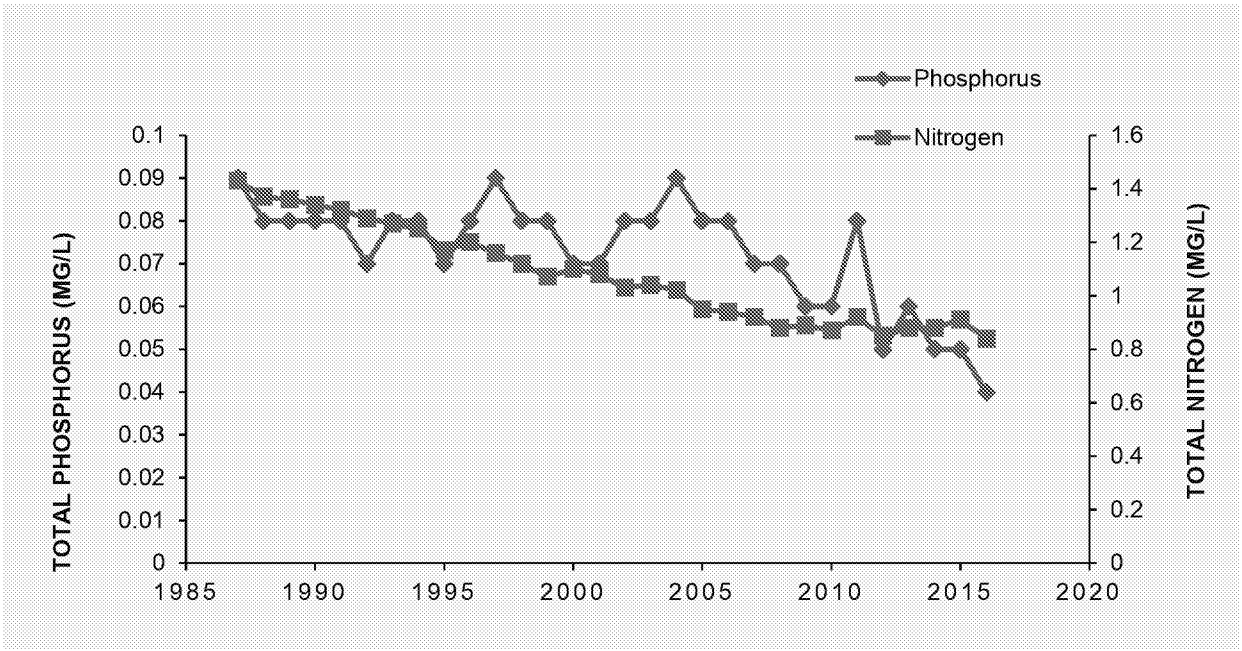

Figure [SEQ Figure * ARABIC]. Long-term trend of nitrogen and phosphorus concentrations at Towanda, PA[6]

NYS DEC also maintains an inventory of the state's water resources called [HYPERLINK "https://www.dec.ny.gov/chemical/36730.html"]. The WI/PWL summarizes general water quality conditions, tracks the degree to which waterbodies support a range of uses and monitors progress toward the identification and resolution of water quality problems, pollutants and sources.

Section 1.4: Land Use and Land Ownership

As represented in ~~the Phase 6 Watershed Model and CAST-179,~~information obtained from CAST-19, ~~the Watershed Model,~~ New York's portion of the Chesapeake Bay watershed is dominated by "natural" land use, including forests, wetlands, and streams. Approximately 70~~67~~% of the watershed acres are classified as natural and represent high percentages in each land-river segment ([REF _Ref16848637 \h * MERGEFORMAT]).

[6] Data obtained from USGS at: [HYPERLINK "https://cbrim.er.usgs.gov/datarequest_email.html"]

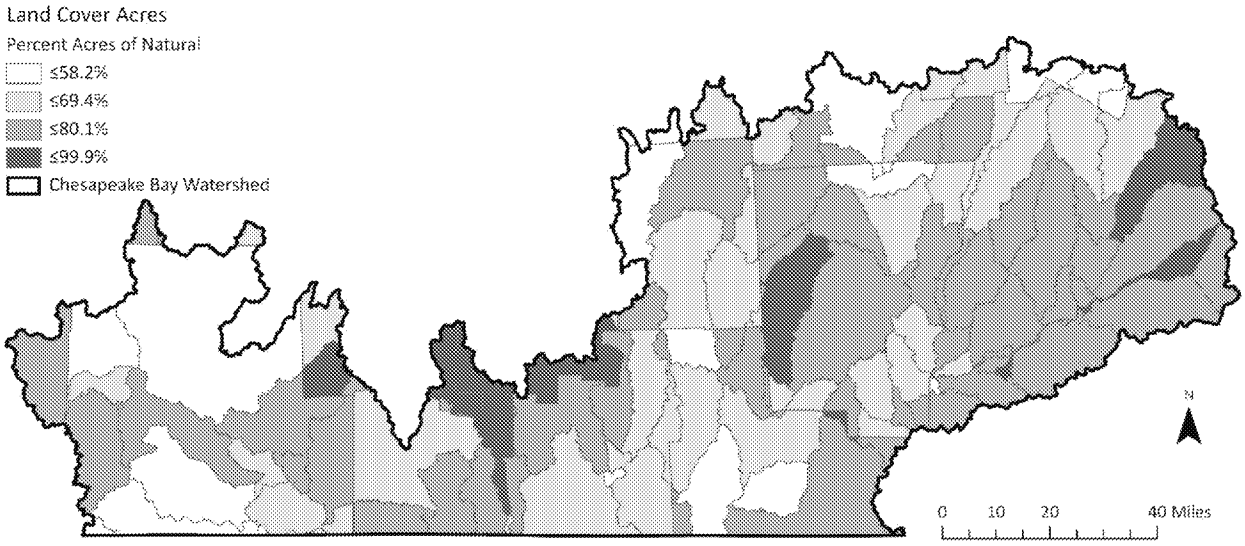

Figure [SEQ Figure * ARABIC]. Percent of natural land cover acres by land-river segment.

Agriculture represents the next dominate land use type, with approximately 2122% of the watershed acres being classified as crop, hay, pasture, feeding space, and agricultural open space. Agriculture acres are concentrated in much of Steuben County and portions of Otsego, Chenango, and Madison Counties ([REF _Ref16848655 \h * MERGEFORMAT]).

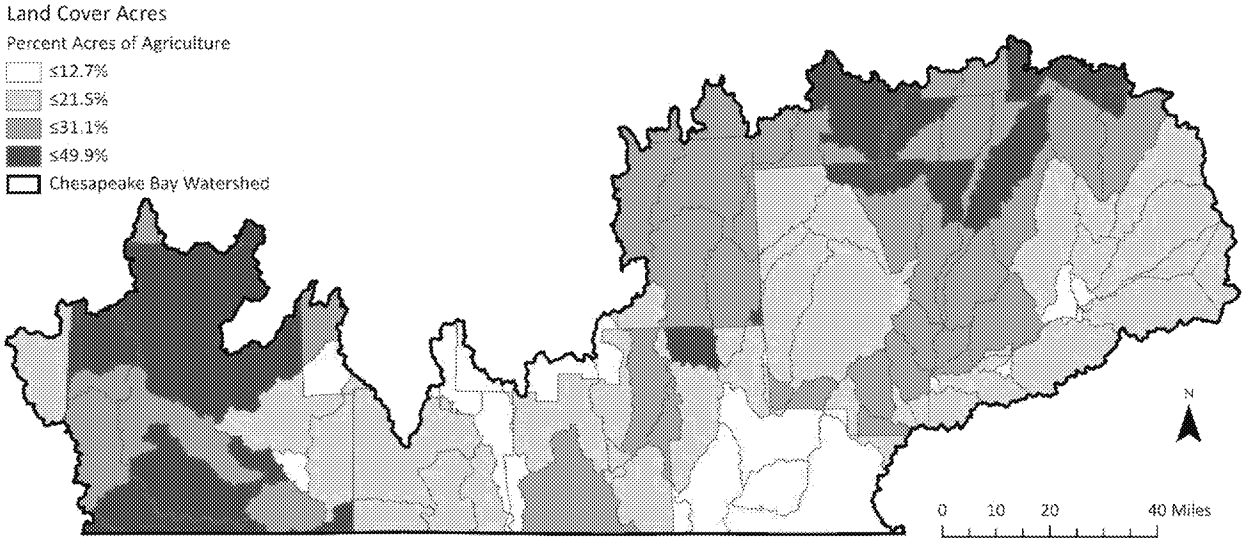

Figure [SEQ Figure * ARABIC]. Percent of agricultural land use acres by land-river segment.

Overall, the New York portion of the Chesapeake Bay watershed is rural and not heavily developed. Exceptions include City of Binghamton in Broome County and City of Elmira in Chemung County ([REF _Ref16848670 \h * MERGEFORMAT]). Less than 910% of the watershed acres are developed.

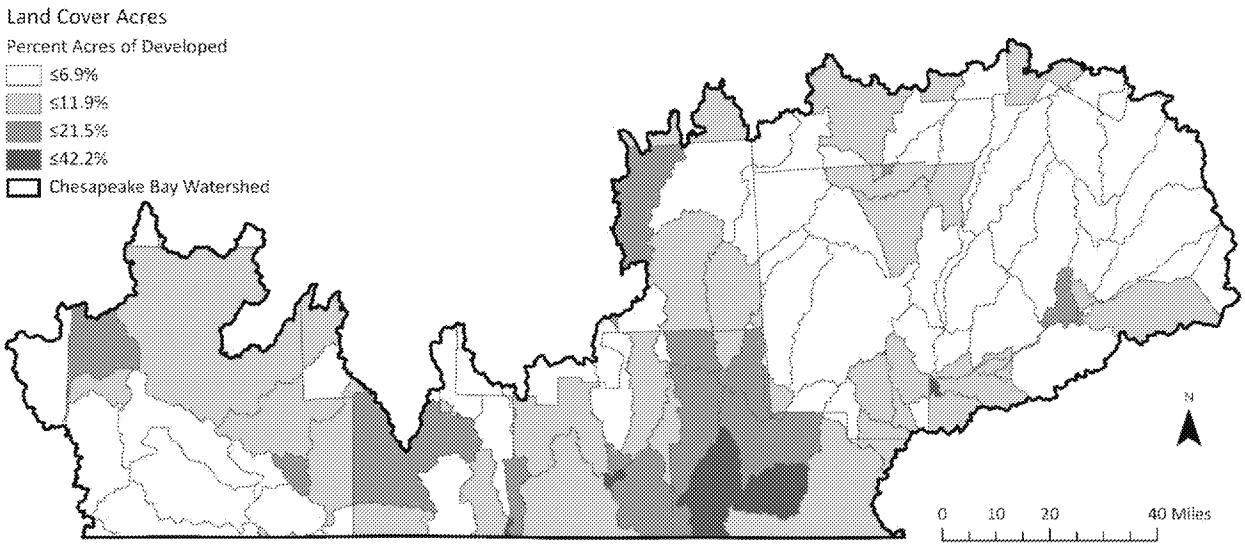

Figure [SEQ Figure * ARABIC]. Percent of developed land cover acres by land-river segment.

Land ownership is also an important factor that will influence implementation planning and associated programs. The New York portion of the Chesapeake Bay watershed is dominated by private land ownership ([REF _Ref16848684 \h]). New York State owns and manages approximately 387,759 acres within the watershed and 71,740 acres are owned by municipal government.

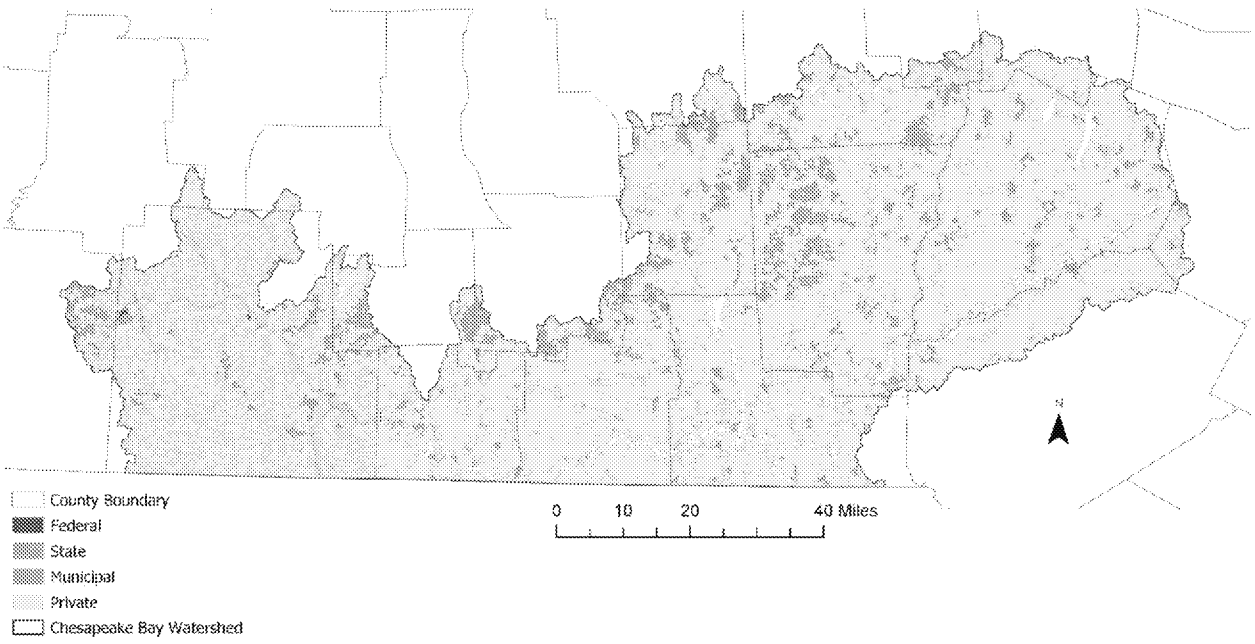

Figure [SEQ Figure * ARABIC]. Property ownership within the Chesapeake Bay watershed

Section 1.5: October 2020 Amendment to New York's Final Phase III WIP

Since New York's final Phase III WIP was submitted to EPA in August 2019, New York has identified additional reductions that will almost completely close the nitrogen "gap" that existed between New York's final Phase III WIP and the 2025 target. The remainder of the nitrogen gap will be closed utilizing an exchange between excess phosphorus reductions for an additional nitrogen allocation. The nutrient exchange will be done pursuant to the approved method set forth in the TMDL[7].

The Amended Phase III WIP includes the following: (1) a more accurate projection of delivered wastewater loads from Bay-Significant facilities in 2025 (Section 6.3); (2) re-calculation of New York's nutrient loading using an updated version of the Chesapeake Bay Assessment Scenario Tool (CAST-19), which along with the updated wastewater loads, overachieves on New York's phosphorus allocation by 94,000 pounds per year; (3) employ the phosphorus to nitrogen nutrient exchange ratio permitted by the TMDL, which provides New York with a credit of 220,000 pounds of nitrogen per year in exchange for a reduction of 94,000 pounds of phosphorus per year (Appendix G). Based on these changes, New York is now on track to fully achieve its nitrogen target under the Chesapeake Bay partnership by 2025.

New York submitted a technical proposal to EPA in September 2020 (Appendix H), which summarizes the amendments to New York's final Phase III WIP.

Section 2: Current Progress and Sub-Allocations to Major Source Sectors

Section 2.1: Current Progress and Sector Contributions

EPA divides the total amount of predicted pollutants among the major river basins in the Chesapeake Bay watershed. After on-going discussions between the seven jurisdictions and EPA, EPA provided an updated set of final watershed nutrient target loads in July 2018 that New York will be expected to achieve by 2025. New York received one set of allocations at the major river basin scale because all pollutant loads from New York are conveyed to Chesapeake Bay by the Susquehanna River.

Sediment loads are managed in the Chesapeake Bay TMDL to specifically address the water clarity/submerged aquatic vegetation (SAV) water quality standards. Research has shown that the water clarity/SAV water quality standard is generally more responsive to nutrient load reductions than it is to sediment load reductions. This is because algae fueled by nutrients can block as much, or more, light from reaching SAV as suspended sediments.

The sediment targets developed for the Phase III WIPs, as they have been for previous WIPs, will be formed on the basis of the sediment load delivered to the Chesapeake Bay associated with management actions taken to address the Phase III WIP nitrogen and phosphorus targets.

[7] Chesapeake Bay TMDL, Section 6.4: Establishing the Basin-Jurisdiction Allocations for Nitrogen and Phosphorus available online at: [HYPERLINK "https://www.epa.gov/sites/production/files/2014-12/documents/cbay_final_tmdl_section_6_final_0.pdf"]

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In other words, BMPs that are identified in this WIP to meet the Phase III WIP nitrogen and phosphorus targets will be run through the Chesapeake Bay Program Partnership's Phase 6 suite of modeling tools, and the resulting sediment loads will form the basis for the Phase III WIP sediment targets. These sediment loads will be adjusted proportionally to account for any overshooting or undershooting of the Phase III WIP nitrogen and phosphorus targets. An additional 10% allowance will be added to the calculated Phase III WIP sediment target in each major basin. The Phase III WIP sediment targets will not affect the BMPs called for in the WIP and are not intended to be the driver for implementation moving forward.

[REF _Ref16686200 \h]Table 3 depicts the modeled delivered loads from New York in 20182019, the updated 2025 nutrient and sediment targets received from EPA, agreed to by the Chesapeake Bay Program Partnership in July 2018 (nitrogen and phosphorus) and February 2020 (sediment) and the revised amended nitrogen and phosphorus targets that reflect the nutrient exchange (October 2020). and the remaining reductions needed to meet the 2025 nutrient and sediment targets. [REF _Ref16686226 \h] describes the current delivered nutrient and sediment load from each major source sector category, based on loads obtained from CAST-19. For the purposes of this document, the major source sectors are agriculture, wastewater, developed, (known as "urban runoff" in the Phase II WIP), septic, and natural (known as "forest" in the Phase II WIP).

Table [SEQ Table * ARABIC]. New York Nutrient Progress and Targets

	Nitrogen	Phosphorus	Sediment
2018 2019 Progress	14.2713.87	0.6290.631	658.61685.04
2025 TMDL Watershed Target (July 2018)	11.53	0.587	532.70
Amended 2025 TMDL Watershed Target (October 2020)	11.75	0.493	532.70
Remaining Reductions	2.742.582.522.12	0.0420.1090.1360.138	125.91152.34
Values are delivered million pounds per year. All values are outputs of the Phase 6 Watershed Model and CAST-19.			

Table [SEQ Table * ARABIC]. 2018 2019 Nutrient and Sediment Contributions from Sector Sources

	Nitrogen	Phosphorus	Sediment
Agriculture	6,423,9996,285,722 (45%)	167,359167,415 (27%)	137,933,010150,467,819 (2122%)
Wastewater	2,577,5572,192,45 (1618%)	143,960143,733 (23%)	2,770,0402,799,895 (0%)

Developed	2,000,5712,091,431 (1415%)	72,99975,283 (12%)	110,455,063117,781,261 (17%)
Natural	3,094,5213,108,401 (22%)	244,689244,315 (39%)	407,450,090413,955,736 (6260%)
Septic	176,359188,645 (1%)	0 (0%)	0 (0%)
Total	14,273,012213,866,648	629,008630,746	658,608,204685,034,710
Values are delivered million pounds per year. In parentheses is the percent of the total. All values are outputs of the Phase 6 Watershed Model and CAST-19.			

Section 2.2: Midpoint Assessment

The Chesapeake Bay TMDL called for an assessment in 2017 to evaluate progress towards meeting nutrient and sediment load reduction goals. Jurisdictions committed to having practices in place to achieve 60% of the necessary pollution reductions by 2017. Each jurisdiction was evaluated individually to determine if midpoint goals were met. Below is a chart[8]. with the midpoint progress for each of New York's major sectors as of 2017 ([REF _Ref52888275 \h]).

Table [SEQ Table * ARABIC]. Midpoint Progress by Sector

Source Sector	Nitrogen Midpoint Target	Phosphorus Midpoint Target	Sediment Midpoint Target
Agriculture	Did not achieve	Achieved	Did not achieve
Wastewater	Did not achieve	Within 5% of achieving	N/A
Developed	Did not achieve	Within 5% of achieving	Achieved
All Sources	Did not achieve	Achieved	Did not achieve

Overall, New York did not achieve the 60% reduction target in any sector for nitrogen. Midpoint targets were achieved or almost achieved in all sectors for phosphorus, while only the developed sector met the midpoint target for sediment. This information was taken into consideration when selecting updated sector-specific 2025 targets as described in the section below.

Section 2.3: Amended 2025 Sector Targets

Based on several factors, including technical feasibility, implementation capacity, and nutrient and sediment control costs, New York divided its watershed targets among the major source

[8] Chart adapted from the Chesapeake Bay Foundation's Blueprint Progress: Tracking Milestones webpage: [HYPERLINK "https://www.cbf.org/how-we-save-the-bay/chesapeake-clean-water-blueprint/blueprint-progress-tracking.html"]

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categories ([REF _Ref52889193 \h][REF _Ref3817412 \h]). The sector targets are adjusted in this amended Phase III WIP based on the revisedamended nitrogen and phosphorus targets that reflect the nutrient exchange. New York expects to meet the -amended phosphorus target and reduce both nitrogen and phosphorus beyond the required targets by 2025.

Table [SEQ Table * ARABIC]. Major Source Category Nutrient Targets

	Nitrogen		Phosphorus		Sediment	
Sector	2018 2019 Load	Revised Amended 2025 Sector Target (October 2020)	2018 2019 Load	Revised Amended 2025 Sector Target (October 2020)	2018 2019 Load	RevisedAmended 2025 Sector Target (October 2020)
Agriculture	6.426.29	4.925.59	0.167	0.1210.151	137.93150.5	125.81130.87
Wastewater	2.572.19	2.191.36	0.144	0.1150.068	2.772.80	N/A
Developed	2.002.09	1.391.52	0.073075	0.0480.052	110.43117.78	69.8774.48
Natural	3.093.11	2.852.93	0.2450.244	0.2130.221	407.40413.96	337.01322.49
Septic	0.180.19	0.180.19	N/A	N/A	N/A	N/A
Total Total	14.2713.87	11.5311.7596	0.6290.631	0.4930.496	685.53685.03	532.7527.84
Values are delivered million pounds per year. In parentheses is the percent of the total. All values are outputs of the Phase 6 Watershed Model and CAST-19.						

Section 3: Local Engagement Strategies

Section 3.1: Phase III WIP Development and Outreach

New York's Phase III WIP was developed in partnership with federal, state and local agencies. Organizations and agencies that participated in the WIP development process included the New York State Agriculture and Markets (NYS DAM), New York State Soil and Conservation Committee (NYS SWCC), Upper Susquehanna Coalition (USC), county Soil and Water Conservation Districts (SWCD), New York Farm Bureau, the United States Department of Agriculture - Natural Resource Conservation Service (USDA-NRCS), Southern Tier 8 Regional Planning Board, Southern Tier Central Regional Planning Board, Chemung County Stormwater Coalition, Otsego County Conservation Association (OCCA), Syracuse University Environmental Finance Center, and Binghamton University.

A series of WIP planning meetings were held with partners on 10/10/18-10/11/2018, 11/26/2018, 12/14/2018 and 1/8/2019. Presentations regarding the draft Phase III WIP were given by NYS DEC staff during the USC's bi-monthly partner meetings on 8/17/2019, 10/19/2019, and at the USC's partner retreat on 1/24/2019. A presentation was also given by NYS DEC staff at the Upper Susquehanna Watershed Forum held in Oneonta, NY on 10/18/2018. Outreach and communication with individual wastewater facility operators, engineers, and municipal officials regarding Chesapeake Bay permit requirements is performed on an on-going basis by NYS DEC staff. Individual meetings were offered to every facility in order to communicate permit changes that will result from the completion of the Phase III WIP. Individual meetings were held over a course of several weeks in March 2019. Five public meetings in locations distributed across the watershed were held the week of April 9, 2019 and were focused on agricultural sector implementation.

Section 3.2: Local Planning Goals

For the Phase III WIP, EPA expected jurisdictions to work with local and regional partners to establish measurable local planning goals below the state-major river basin scale. Jurisdictions had the option of choosing the geographic scale in which the local planning goals would be applied. Options included:

- Locality jurisdictional boundaries (city, town, county, borough, township) or collections of such sub-state political subdivisions;
- Federal facilities;
- State facilities;
- Soil & Water Conservation District (Conservation District) boundaries;
- Regional entity boundaries (e.g. planning district commissions; regional river basin commissions; and utility districts);
- Watershed or sub-watersheds of Chesapeake Bay tributaries;
- Targeted areas with high nitrogen, phosphorus, or sediment yields (loadings);
- Bay segment-sheds as depicted in the 2010 Chesapeake Bay TMDL;
- Any area (e.g., MS4), entity, or political subdivision based on an identified need for pollutant load reductions for a given source sector or sectors; and

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- Some combination of the above.

In addition, jurisdictions were given the flexibility to select the measurable outcomes that will be tracked and reported to EPA. Options included:

- Percentage of BMP Implementation on land uses defined in the Phase 6 Watershed Model;
- Quantifying implementation goals for particular BMPs;
- Programmatic goals (i.e. ordinances with provisions for erosion and sediment control, urban nutrient management, post-construction performance standards) that include specific implementation, oversight, and enforcement requirements;
- Numeric nitrogen, phosphorus, and sediment as expressed as reductions or maximum load goals;
- Numeric load goals for one or more pollutants (e.g. delivered load of 300 lbs. phosphorus);
- Numeric reduction goals for one or more pollutants (e.g. reduce loads by 4000 lbs. nitrogen);
- Yield based goals for one or more pollutants (e.g. 0.41 lbs. phosphorus/acre/year from developed lands);
- Pace of implementation over a certain time frame;
- Percent reduction of existing loads over a certain time frame; and
- Percent of flow in certain tributaries/runoff captured – flow-based targets.

Through a series of planning meetings, New York has chosen to develop local planning goals for the major nonpoint source sectors (agriculture and developed). Due to a regional and consistent approach to setting wastewater permit limits, no local planning goals will be assigned to the wastewater sector. Federal facilities were also excluded from local planning goals due to the small number of facilities and negligible loading associated with these facilities.

For the agricultural sector, the sub-watershed level was chosen as the geographic scale and the numeric implementation goals for BMPs will be tracked as a measurable outcome. For the developed sector, the county level was chosen as the geographic scale and a percent reduction of existing loads will be tracked as the measurable outcome. Refer to [HYPERLINK \l "_Section_5.6:_Local"] and [HYPERLINK \l "_Section_7.8:_Local"] for more detailed information.

Local planning goals will be tracked using CAST and reported as part of New York's two-year milestones and/or annual progress reporting as required by EPA.

Section 3.3: Ongoing Engagement for Implementation

It is important for New York to maintain the same collaborative approach used to develop the Phase III WIP throughout the upcoming WIP implementation period. NYS DEC may update the programmatic and/or numeric commitments made in this document during the 2019-2025 timeframe based on engagement with local partners and stakeholders. New York continues to

focus on the overall message that actions taken to improve and protect local water quality will benefit our downstream neighbors in the Chesapeake Bay.

NYS DEC will continue to utilize a variety of communication tools to engage local, regional, and federal stakeholders. These tools include mailings, emails, webinars, in-person workshops and trainings, and larger conferences or watershed-wide forums. NYS DEC's Division of Water maintains a weekly newsletter, called [HYPERLINK "https://www.dec.ny.gov/public/51547.html"], regarding water issues in New York. Over 10,000 people in New York subscribe to this newsletter. Information regarding upcoming events and meetings regarding Chesapeake Bay are routinely distributed using this newsletter. In addition, NYS DEC maintains a [HYPERLINK "http://www.dec.ny.gov/lands/33279.html"].

In the Agricultural Sector, the USC hosts bi-monthly meetings for member SWCDs, state, federal, and local partners. In addition, the USC regularly organizes trainings focused on BMP tracking, reporting, and verification and coordinates trainings and workshops on specific focus BMPs. Recent workshops included riparian buffers/stream restoration, wetlands, and rural roads/road ditches. The NYS Conservation District Employees Association (NYS CDEA) organizes a statewide Water Quality Symposium and Conservation Skills Workshop annually. Both events present opportunities to engage SWCDs regarding WIP implementation. During the Phase III WIP development, NYS DEC provide county-specific information to each SWCD regarding reported implementation, land use, and animal numbers and will continue to provide updated information on at least an annual basis to assist with planning and prioritization of projects within each county.

In the Wastewater Sector, NYS DEC relies mainly on regional staff within its Division of Water to communicate directly with regulated wastewater facilities. NYS DEC regularly participates in and presents at meetings held by the New York Water Environment Association (NYWEA). NYWEA has seven geographic chapters that cover New York State. Members of NYWEA include civil, design and environmental engineers; biologists, chemists, local and state government officials, treatment plant managers and operators, laboratory technicians, students, professors, lawyers, environmental scientists, equipment manufacturers and distributors. Presentations about the Phase III WIP were made at the Genesee and Central New York Chapter meetings in Spring 2019 and NYS DEC will continue to use NYWEA meetings as an avenue to relay information about implementation in the wastewater sector.

In the Developed Sector, NYS DEC works closely with regulated MS4s but has also developed assistance programs with other partners such as SWCDs through the NYS SWCC and the NYS DAM; Regional Planning Councils through the [HYPERLINK "http://www.nysarc.com/"] (NYSARC); and County Water Quality Coordinating Committees, through the Regional Planning Councils, and local stormwater coalitions. All of these groups are conduits for information and services to the regulated communities (developers, designers, and municipal officials and staff) and interested parties, as well as conduits for feedback from those groups.

Important partners in the Chemung and Susquehanna river basins, from the NYS Association of Regional Councils, include the [HYPERLINK "http://www.stcplanning.org/"], [HYPERLINK "http://www.southerntierwest.org/"], and [HYPERLINK "https://southerntier8.org/"] (formerly Southern Tier East) Regional Planning and Development Boards. NYS DEC recently awarded funding to the Southern Tier Central and Southern Tier 8 Regional Planning Boards for local

engagement assistance support of the Phase III WIP through the [HYPERLINK "https://www.dec.ny.gov/lands/53122.html"]. Local engagement assistance will include:

- Develop and implement a strategy for assisting MS4s in collecting and verifying nonpoint source best management practice (BMP) data that are currently not being accounted for (ex. Street sweeping, catch basin cleaning, retrofitting;
- Develop and implement workable strategies to fill gaps in tracking and reporting pollution reduction work (e.g. urban tree planting, nutrient management plans, stream crossings etc.) by non-regulated entities, outside of MS4 areas in developed (urban) and forestry sectors/areas; and
- Provide education and outreach to raise awareness of Phase III WIP development and local action programs available that encourage the implementation of BMPs (e.g. Tree City USA, Tree Boards, Climate Smart Communities, Chesapeake Stormwater Network).

Baseline funding through the 604(b) program includes support for regional planning boards to hold County Water Quality Coordinating Committees. County Water Quality Coordinating Committees were formed across New York to develop and implement County Water Quality Strategies to address nonpoint source pollution issues. Because local governments can address land use issues and work with individuals to improve management practices, counties, cities, and towns are able to make significant contributions to nonpoint source pollution prevention. The County Water Quality Coordinating Committees work closely with SWCDs to implement strategies that identify and set local priorities.

Two stormwater coalitions work within the watershed to assist urbanized municipalities meet MS4 requirements. The [HYPERLINK "https://www.chemungstormwaterprojects.com/"] was established in 2003 to assist municipalities in the Elmira area meet MS4 permit requirements. In 2008, the coalition was expanded to include all of the municipalities within Chemung County. The [HYPERLINK "http://www.broometiogastormwater.com/"] assists 15 municipalities in Broome and Tioga counites.

NYS DEC will also seek to engage municipal leaders, environmental justice communities, and the general public through a series of roundtables or workshops. NYS DEC will involve active not-for-profit environmental groups in WIP implementation, education and outreach, including but not limited to: Otsego County Conservation Association, Friends of the Chemung River, Otsego Land Trust, Finger Lakes Land Trust, Butternut Valley Alliance, and Trout Unlimited.

Section 4: State Pollutant Discharge Elimination System (SPDES) Permit Program Overview

New York relies on enforcement of its State Pollutant Discharge Elimination System (SPDES) permit program to eliminate pollutants from New York's waters and maintain the highest quality of water possible. High water quality is of critical importance to public health, public recreation, fish and wildlife, and industrial development in New York State. Elimination of pollutants in local waters also ensures that fewer pollutants are delivered downstream to the Chesapeake Bay.

The federal [HYPERLINK "https://www.epa.gov/laws-regulations/summary-clean-water-act"] (CWA) authorized development of a national program for implementing requirements for all discharges to surface waters of the United States. EPA authorizes New York State's SPDES program to regulate discharge activities falling under the federal program. New York's SPDES

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program extends beyond the requirements of the CWA by also regulating discharges to groundwater.

NYS DEC implements the SPDES program through the issuance of wastewater discharge permits, including both individual permits and general permits:

- An individual SPDES permit applies to a single facility, in one location, possessing unique discharge characteristics and other factors.
- A general SPDES permit applies to a class of dischargers with similar operations or pollutants. Additionally, a general permit requires that each permit issued contain similar effluent limits, operating conditions, and the same or similar monitoring.

A permit, once issued, requires the owner or operator to comply with specific conditions. For larger, more complex facilities, these requirements typically include limits on physical, chemical, or biological characteristics of the discharge. For smaller facilities, including those discharging to groundwater, the permit may simply require maintaining data and information at the facility site for review by NYS DEC staff during an inspection. In addition to the specific conditions found in the permit document itself, the SPDES permit also references “general conditions” required by the SPDES regulation [HYPERLINK "https://govt.westlaw.com/nycrr/Browse/Home/NewYork/NewYorkCodesRulesandRegulations?guid=I0b172050b5a111dda0a4e17826ebc834&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default)"] This regulation contains requirements that are applicable to all permittees, including records retention, proper operation and maintenance of a treatment plant, and requirements to report treatment plant bypasses and non-compliance events to NYS DEC.

These permits may incorporate current water quality standards, effective implementation of best management practices by permitted facilities, and timely sampling, analysis and reporting to NYS DEC on the quality of wastewater discharged under the SPDES program.

To further ensure compliance with SPDES permits NYS DEC maintains an active field presence through nine regional offices, with additional support from Central Office staff in Albany. These staff members issue permits, perform inspections, collect samples, certify facility operation staff, provide technical assistance, review discharge data, and respond to citizen complaints involving water quality.

Section 4.1: SPDES Permits in Effect

NYS DEC issues individual SPDES permits for three discharge categories:

- **Municipal:** This category includes all Publicly Owned Treatment Works (POTW, as defined by [HYPERLINK "https://www3.epa.gov/npdes/pubs/cwatxt.txt"]), owned by either a municipality or the state (does not include federally owned treatment works). A POTW is classified as either major or minor based on the facility’s design flow, population served, or potential for significant water quality impacts.
- **Industrial:** Industrial discharges are discharges resulting from industrial, manufacturing, trade or business processes. Industrial treatment facilities are classified as major, minor, or non-significant based on the characteristics of the wastewater, complexity of treatment processes, and the facility’s design flow.

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- **Private, Commercial, and Institutional (PCI):** Private, commercial and institutional-type (PCI) facilities primarily discharge domestic sewage with no addition of industrial waste. PCI discharges generally refer to wastewater generated by a single facility or building complex under single ownership and may or may not be under public ownership. Examples include restaurants, schools, apartment complexes, mobile home parks, and campgrounds. PCI facilities discharging 1,000-10,000 gallons per day of treated sanitary waste to groundwater may not require an individual SPDES permit if they qualify and obtain coverage under the PCI general permit described below.

For more information on requirements for facilities with individual SPDES permits within the Chesapeake Bay watershed, refer to [HYPERLINK \l "_Section_6:_Wastewater_1"].

The second type of SPDES permit is a general permit. General permits are issued to cover a category of dischargers involving the same or similar operations and discharging similar types of pollutants. NYS DEC has issued general permits covering the following categories of dischargers:

- **Concentrated Animal Feeding Operation (CAFO):** This general permit covers discharges that originate from feeding operations where animals are raised and kept in confined situations and that meet threshold population criteria (variable depending upon breed/age of the animal). Refer to [HYPERLINK \l "_Section_5.2:_NYS"] for more information.
- **Municipal Separate Storm Sewer System (MS4):** This general permit covers separate storm sewer systems carrying stormwater and runoff from a city, town, or village that are not part of a combined sewage system and that discharge to surface waters of the state. Refer to [HYPERLINK \l "_Section_7.4:_Municipal"] for more information.
- **Stormwater Discharges from Construction Activities (SWC):** This general permit covers stormwater discharges resulting from construction activities involving soil disturbances of one or more acres. The owner or operator must obtain coverage under the SPDES general permit prior to commencing construction activity. Refer [HYPERLINK \l "_Section_7.5:_Construction"] for more information
- **Multi-Sector General Permit (MSGP):** This general permit covers stormwater discharges associated with 31 different categories of industrial activities. Examples of such activities include concrete manufacturing, vehicle dismantling, scrap metal recycling, or any activity NYS DEC designates as requiring this type of permit.
- **Private, Commercial and Institutional (PCI):** This permit is issued for a discharge to groundwater of 1,000-10,000 gallons per day of treated sanitary waste, with no addition of industrial wastes from on-site treatment works serving PCI facilities.

Section 4.2: SPDES Program Enforcement

When NYS DEC becomes aware of violations of a SPDES permit, staff members respond by using appropriate and available tools – various informal or formal enforcement actions – to expedite a return to compliance. Typically, staff initially respond with an informal enforcement action, such as sending a warning letter, holding a compliance conference with the permittee, or issuing a Notice of Violation (NOV), to promote voluntary compliance with regulations and permit requirements.

Formal enforcement becomes necessary when a return to compliance is not achieved through informal enforcement actions or when a violation results in significant negative impact to the environment or public health. The most commonly used enforcement actions are tickets issued by an Environmental Conservation Office (ECO) and Orders on Consent. An ECO-issued ticket for a discharge violation requires payment of a penalty by the respondent. An Order on Consent is a legally binding document issued by NYS DEC and agreed to by the SPDES permit holder.

An Order on Consent commonly includes some or all of the following:

- Payable penalty;
- Suspended and/or stipulated penalties;
- Interim SPDES permit effluent limits; and/or
- Compliance schedule for corrective action.

When violations cannot be settled through an Order on Consent, NYS DEC may initiate an Administrative Hearing Process. This may result in the issuance of a Commissioner's Order to compel compliance. Also, NYS DEC staff can revoke permit coverage for the permittee based on current Significant Non-Compliance (SNC) status, past enforcement history, or the level of impact to the environment and public health caused by the violations.

An essential component of EPA's authorization of the SPDES program is the EPA/NYSDEC 1987 Enforcement Agreement. This agreement outlines the elements necessary to ensure compliance of facilities permitted under the SPDES program. These elements include:

- Monitoring permit compliance;
- Maintaining and sharing compliance information with EPA;
- Applying criteria to identify facilities in SNC;
- Identifying facilities that require enforcement action to restore compliance; and
- Ensuring timely and appropriate enforcement response to SNC violations.

The enforcement agreement also establishes procedures for EPA oversight of New York State SPDES enforcement activities with priority given to major dischargers in SNC. SNC consists of more severe violations, including:

- Discharge monitoring values exceeding an EPA-accepted threshold;
- A facility's failure to provide a specific document or report required as a condition in a legally binding Order on Consent or other enforcement action; and
- A discharge that threatens public health or the environment.

To ensure that SNC violations are addressed in a consistent manner, the agreement includes threshold criteria that, once exceeded, require formal enforcement action to return the facility to compliance. NYS DEC and EPA meet quarterly to ensure that SNC violations meeting these criteria are addressed in accordance with the enforcement agreement. At each quarterly meeting, EPA typically presents NYS DEC with a list of about 30-40 major facilities meeting the SNC criteria. The facilities on this list change from quarter to quarter as some return to compliance while others join the list. The compliance histories of SPDES permitted facilities are available to the public on EPA's [HYPERLINK "https://echo.epa.gov"] website.

Section 5: Agricultural Sector

New York supports environmental and economically sustainable agriculture. To this end, NYS DEC works with environmental and agricultural stakeholders in New York to achieve environmental compliance for all of New York's agricultural community. New York recognizes the historical, cultural, environmental and economic importance of maintaining agricultural viability in the state. On-going communication is critical to finding ways to reduce the environmental impact of farms while protecting the open space, vistas, rural economic development, food, fiber, and energy that they provide to all of us.

A coordinated effort between NYS DEC, NYS Department of Agriculture and Markets (NYS DAM), the New York State Soil and Water Conservation Committee (NYS SWCC), the Upper Susquehanna Coalition (USC), and county SWCDs actively supports increased planning for, use and performance of conservation practices with best management practice (BMP) implementation on farms through programs such as the Agricultural Environmental Management (AEM) program and the Agricultural Nonpoint Source Abatement and Control Program (AgNPS).

New York State has invested in an environmentally sound, voluntary, incentive-based program. Since 1994, about $173 million in state Environmental Protection Fund (EPF) grants have been allocated through SWCDs, cost sharing more than 7,000 conservation projects on over 4,800 farms in 55 counties. About 25% of these resources have been directed to New York's portion of the Chesapeake Bay watershed.[9] New York State contributes over $20 million annually statewide through the EPF to programs to implement BMPs on farms to protect water quality.

This coordinated effort to support environmental and economically sustainable agriculture works to document farm statistics and BMPs, develop watershed and site-specific agricultural plans, and implement and evaluate BMPs. Using tools provided by the AEM program, individual county SWCDs document and verify agricultural BMPs. The USC oversees documentation and verification of BMPs to insure accurate and consistent reporting.

Section 5.1: Current Sector Loading Baseline

According to ~~the Phase 6 Watershed Model and~~ information obtained from CAST-19~~17~~, agriculture represents nearly ~~23~~21% of the watershed land cover and delivered 45%, 27% and ~~21~~22%, respectively, of the total nitrogen, phosphorus and sediment loads from New York to the Chesapeake Bay in ~~2018~~2019. As of ~~2017~~2019, ~~663,426~~637,477 acres of crop/hay and ~~178,372~~158,224 acres of pasture were located within the watershed ([REF _Ref16687540 \h * MERGEFORMAT]).

[9] NYS Agricultural Nonpoint Source Abatement & Control Grant Program records since 1994, personal communication with Greg Albrecht, NYS Department of Agriculture and Markets and NYS Soil and Water Conservation Committee.

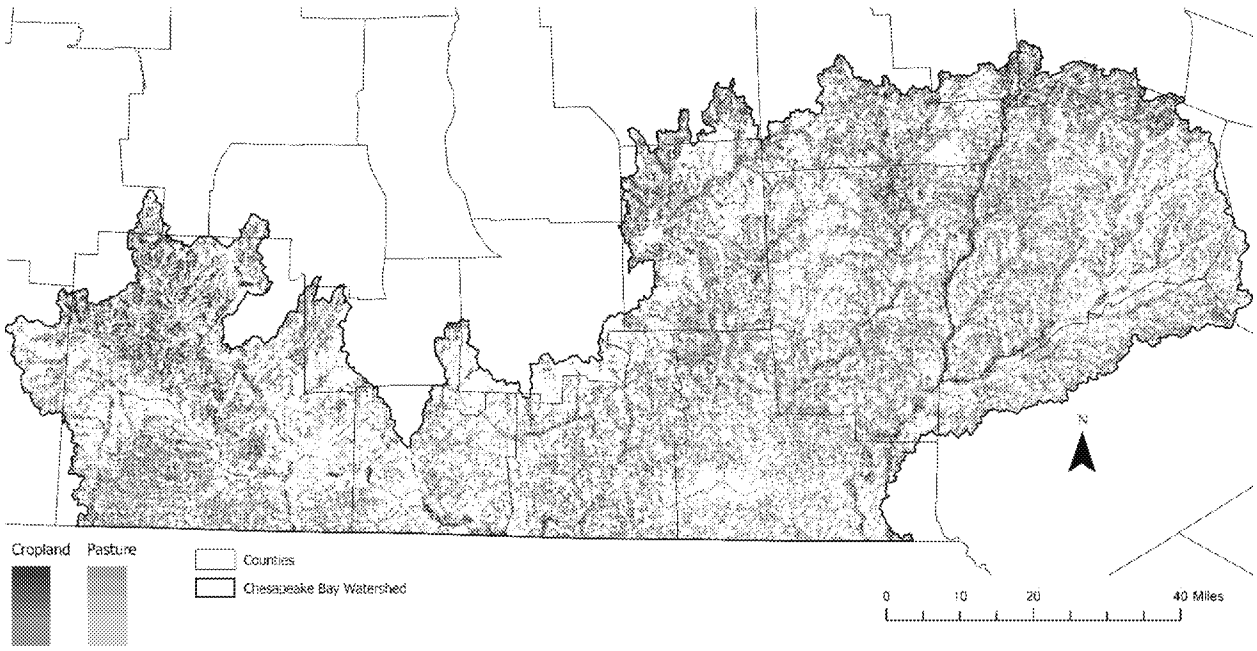

Figure [SEQ Figure * ARABIC]. Crop/Hay and Pasture in the Chesapeake Bay watershed.

There are three primary and intertwined programs in New York's Chesapeake Bay watershed that address the environmental impacts of agriculture operations: NYS DEC's Concentrated Animal Feeding Operation (CAFO) regulatory program, NYS DAM's voluntary AEM program, and the USC's team approach to implementation in its core areas of sustainable agriculture, stream restoration and wetland restoration. The careful coordination of a strong regulatory program with financial incentives and a strong local implementation team all based on sound science and applied research is the recipe for a successful agricultural water quality program. New York relied on the coordinated effort between these three programs to implement the Phase I and Phase II WIPs and will rely on them again to implement the Phase III WIP.

The success of the New York agriculture program is clearly demonstrated: New York's CAFO and AEM programs cover 95% of the dairy farms in New York's portion of the Chesapeake Bay watershed and according to modeling by the Chesapeake Bay Program, the agricultural nitrogen load delivered from New York decreased by more than 12% from ~~7,328,276~~7,169,009 pounds in 2009 to ~~6,423,998~~ 6,285,722pounds in ~~2018~~2019.

It is important to note that the New York CAFO program covers all farms with as few as 200 cows with binding permits, whereas under the EPA program, only some farms with more than 700 animals would be covered by regulatory permits. Sixty-four operations are permitted as a CAFO in New York's portion of the Chesapeake Bay watershed. New York's AEM program is currently working with 1,285 additional farms in the watershed.

Section 5.2: NYS Concentrated Animal Feeding Operation (CAFO) Permit Program

NYS DEC regulates CAFO[10] farms under a General SPDES permit. Following the first CAFO permit issuance in New York in 1999, CAFO operators were required to obtain and comply with

[10] Concentrated Animal Feeding Operation (CAFO) means an Animal Feeding Operation (AFO) that is a point source as defined pursuant to New York Environmental Conservation Law Section 17-0105(16). Two or more AFOs under

State wastewater discharge permits. Twenty years later, New York has a robust CAFO permitting program, providing coverage for over 260 medium-sized and 235 large CAFO farms statewide. [REF _Ref324334990 \h * MERGEFORMAT] below shows the cutoffs between medium and large CAFOs by the type of animal[11]. New York recognizes the need for farm-specific, technical evaluations by qualified professionals, in the form of Certified Planners and Professional Engineers, to ensure that the farm understands and implements the latest developments in land grant university guidelines, United States Department of Agriculture Natural Resource Conservation Services (USDA-NRCS) technical standards and state regulatory requirements.

Table [SEQ Table * ARABIC]. New York Medium and Large CAFO Cutoffs by Number of Animals

Animal Type	Number of Animals to be Considered a Medium CAFO	Number of Animals to be Considered a Large CAFO
Mature Dairy Cows	200-699	700
Veal Calves	300-999	1,000
Cattle	300-999	1,000
Swine (55 lbs. or more)	750-2,499	2,500
Swine (less than 55 lbs.)	3,000-9,999	10,000
Horses	150-499	500
Sheep or Lambs	3,000-9,999	10,000
Turkeys	16,500-54,999	55,000
Laying Hens or Broilers (if using liquid manure handling system)	9,000-29,999	30,000
Chickens (if using other than a liquid manure handling system)	37,500-124,999	125,000
Laying Hens (if using other than a liquid manure handling system)	25,000-81,999	82,000
Ducks (if using other than a liquid manure handling system)	10,000-29,999	30,000
Ducks (if using a liquid manure handling system)	1,500-4,999	5,000

common ownership are considered a single AFO for the purposes of determining the number of animals of an operation.

[11] Refer to New York's CAFO General Permits for more detailed definitions of medium and large CAFOs. Visit NYS DEC's CAFO Program webpage to download copies of New York's permits: [HYPERLINK "http://www.dec.ny.gov/permits/6285.html"]

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Since the start of the CAFO permitting program in 1999, New York has required New York Certified Planners to develop Comprehensive Nutrient Management Plans ([HYPERLINK "https://www.agriculture.ny.gov/SoilWater/aem/cnmp.html"]) for CAFO farms and Professional Engineers to design and certify USDA-NRCS engineering practices on farms. New York's CAFO farms must comply with stringent technical standards designed to afford superior protection of the environment. These technical standards take the form of USDA-NRCS conservation practice standards and state regulatory requirements, both of which exceed the minimum requirements set by EPA and USDA-NRCS and are tailored to be most effective for New York's conditions based on applied research from Cornell University. As such, CAFO farms must use Professional Engineers in the design and implementation of their waste management and storage structures. In addition, CAFOs must adhere to stringent setbacks for nutrient applications in farmlands adjacent to New York's waters, control erosion on crop fields, and make nutrient applications in accordance with science-based nutrient management plans. The CAFO program ensures that manure nutrients are recycled to grow crops rather than allowing those nutrients to reach the waters of New York State. It is these stringent technical standards and the CAFO program's proven rate of implementation and enforcement that protects water quality.

Section 5.2.1: Revisions to New York's CAFO Permits

NYS DEC issued an updated version of the [HYPERLINK "https://www.dec.ny.gov/docs/water_pdf/eclcafopermit(1).pdf"] in January 2017 and an updated version of the [HYPERLINK "https://www.dec.ny.gov/docs/water_pdf/cafogp019001permit.pdf"] was released in February 2019.

The updates to the permits included requiring use of the newest USDA-NRCS technical standards, enhanced practices in sensitive groundwater areas, in-person oversight of manure transfer systems, mandatory training of farm staff and further restrictions on winter/adverse weather applications of manure. More detailed information on the changes to both permits can be found in Appendix A.

Section 5.2.2: Comprehensive Nutrient Management Program

Key among the permit's requirements is the development, implementation and maintenance of a CNMP or Nutrient Management Plan (NMP), developed by an AEM Planner certified through New York's AEM Program and conforming to technical standards established by USDA-NRCS. Successfully becoming a [HYPERLINK "https://www.certifiedcropadviser.org/"] (CCA) in the Northeast Region is the first step in obtaining certification to develop CNMPs/NMPs for farm operations needing the CAFO permit in New York State.

The Certified Crop Advisor program is a certification program of the [HYPERLINK "https://www.agronomy.org/"] (ASA) and is governed by the [HYPERLINK "https://www.soils.org/certifications/uscssa"] (ARCPACS), a federation of certifying boards in agriculture, biology, earth and environmental sciences. The CCA program in New York is administered by the Northeast Regional CCA Board, which covers New York and all the New England states. Nationally, a CCA is recognized by USDA-NRCS as an individual who is qualified to service certain USDA-NRCS programs as a Technical Service Provider (TSP).

In New York, a CCA is eligible to seek further certification, as an AEM Planner, to develop CNMPs/NMPs required as a condition of the CAFO permit. Below is a list of requirements needed to become an AEM Certified Planner:

- Be a Certified Crop Advisor in good standing in the Northeast Region;
- Complete an online five-module course on the USDA-NRCS Planning Process and pass the associated exam with at least an 80% score;
- Attend a four-day CNMP Training on the development of CNMPs;
- Have three CNMPs/NMPs reviewed by a CNMP/NMP Review Team to determine if the plans appear to meet all applicable USDA-NRCS Standards and requirements of the NYS DEC CAFO General Permit, and that the planner has demonstrated full understanding of all components of the planning process. The final CNMP/NMP is reviewed in the field;
- To maintain AEM Planner Certification an individual must maintain their CCA certification by earning continuing education credits and receive acceptable reviews through the AEM Planner Quality Assurance Program. New York is one of the few states that conduct ongoing Quality Assurance/Quality Control of planners; and
- An individual completing the steps outlined above is certified by the State Conservationist of USDA-NRCS in New York in consultation with the Commissioner of the NYS DAM to develop and/or approve CNMPs/NMPs required to satisfy the conditions of the NYS DEC CAFO General Permit or for USDA-NRCS and New York State cost share programs. The State Conservationist, in consultation with the New York State Agriculture Commissioner, may revoke an individual's certification for failure to maintain their CCA certification, or for not meeting USDA-NRCS standards in developing plans.

Section 5.2.3: Technical Standards for CAFO BMPs

All CNMPs/NMPs developed in New York must be prepared in accordance with all applicable USDA-NRCS Conservation Practice technical standards. All New York USDA-NRCS technical standards meet and/or exceed the minimum national requirements as they are tailored to the stringent regulatory requirements and environmental sensitivities found in New York. The New York technical standards are reviewed and revised by a Standards Committee consisting of technical staff from USDA-NRCS, NYS DEC, NYS DAM, Cornell University and others. These revisions, under the oversight of the Standards Committee, ensure implementation of state-of-the-art BMPs on New York farms.

Section 5.2.4: CAFO Compliance

NYS DEC is the recipient of the Chesapeake Bay Regulatory Accountability Program (CBRAP) grant from EPA. This grant supports enhanced inspection requirements for both medium and large sized CAFO farms located in the Chesapeake Bay watershed. In addition, NYS DEC performs inspections of agricultural operations of any size as needed in response to citizen complaints or other observations of water quality degradation.

Overall, both medium and large CAFO farms located in the Chesapeake Bay watershed maintain a high level of permit compliance, with only a small percentage of inspections receiving an "unsatisfactory" or "marginal" inspection rating ([REF _Ref3817465 \h]).

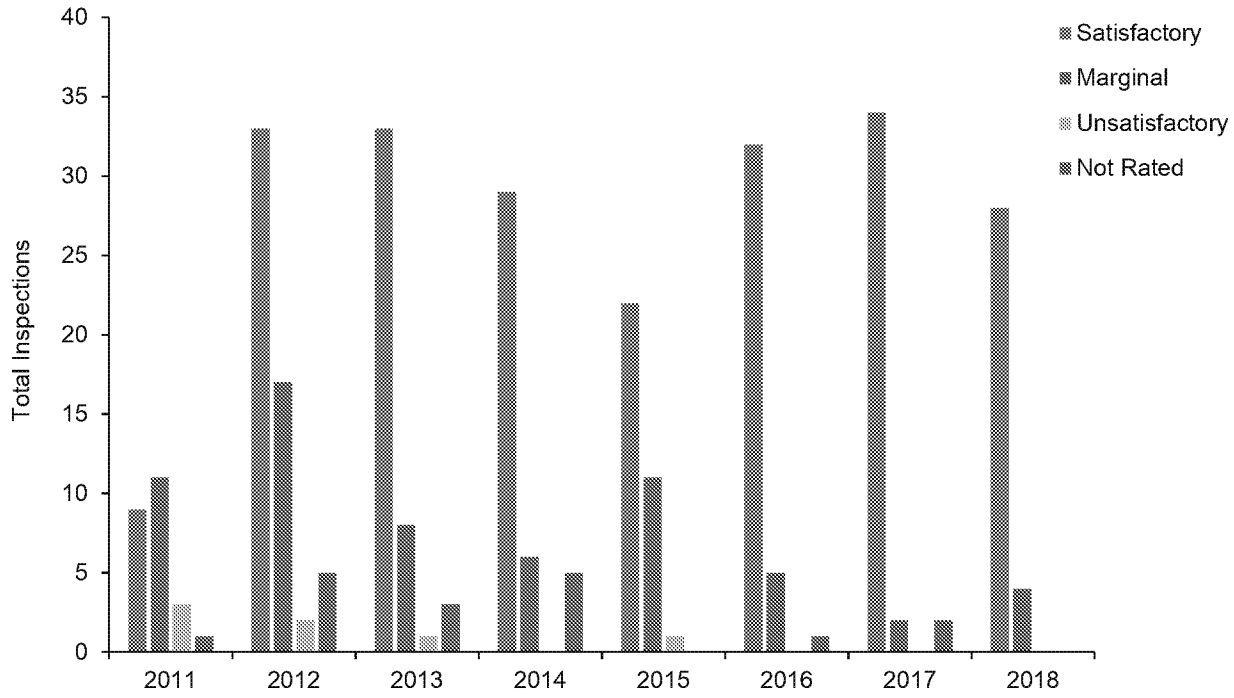

Figure [SEQ Figure * ARABIC]. CAFO inspection ratings (2011-2018).

Section 5.3. Agricultural Environmental Management (AEM) Program

The [HYPERLINK "https://www.nys-soilandwater.org/aem/nonpoint.html"] is a voluntary, incentive-based program that helps farmers operate environmentally sound and economically viable businesses. The AEM program coordinates agricultural and environmental conservation agencies and programs to provide conservation services for farmers. Most agricultural counties in New York conduct AEM programs and participation includes more than 15,000 farms statewide.

Started in 1996 and codified in New York State law in 2000, the AEM program helps farmers protect water quality and other natural resources by providing a framework to assess environmental stewardship and coordinate technical and financial assistance from federal, state and local sources to address priority water quality issues[12] on the farm. The driving principle of AEM's success is a farm-specific focus, coordinated through locally developed watershed based strategic plans and an educational component to elicit landowner confidence. Core concepts of AEM include:

- voluntary and incentive-based implementation;
- locally-led planning;
- watershed focused planning;

[12] Priority water quality issues are based on available resource assessments, including the NYS Priority Waterbodies List, the federal 303(d) list, Total Maximum Daily Loads, Source Water Assessment, NRCS Rapid Watershed Assessment, AEM Watershed Site Evaluation, locally identified water quality priorities, county-level AEM Strategic Plan, and county-level Annual Action Plan.

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- working within the resources of each farm for environmental conservation and farm viability;
- promotes teamwork among different agencies; and
- coordinates technical assistance.

Section 5.3.1: Who is involved in the AEM program

AEM is administered by the NYS Soil and Water Conservation Committee (NYS SWCC) housed at the NYS Department of Agriculture and Markets. Key partners advising the NYS SWCC that helped develop and have endorsed AEM include NYS DEC, NYS Department of Health, NYS Department of State, USDA-NRCS, Cornell University, State University of New York College of Environmental Science and Forestry, Cornell Cooperative Extension, and county SWCDs. AEM is administered and implemented at the local level through SWCDs who engage local partners including Cornell Cooperative Extension, USDA-NRCS, AEM Certified Planners, Certified Crop Advisors, USDA Technical Service Providers, and agri-businesses to work as a team to develop, implement, and evaluate conservation plans on farms. New York's SWCDs have also formed regional coalitions that include partner agencies, universities, and organizations working together on the needs of major watersheds to promote cooperation, coordination, and the sharing/pooling of resources. For example, the Upper Susquehanna Coalition (USC) covers the Chesapeake Bay Watershed portion of New York and similar coalitions are working in every other major watershed of the State.

Section 5.3.2: Why AEM was developed

AEM was created to provide a consistent approach to address stewardship and natural resource challenges of New York farms. Many federal and state programs exist to assist farmers with environmental stewardship; however, these programs lack coordination and often compete against each other. AEM is the "umbrella program" that efficiently identifies environmental concerns through a comprehensive environmental assessment and matches these identified needs with existing financial opportunities for farms. With over 30,000 farms making up New York's agricultural industry, the coordination and resource-based prioritization function of AEM is critical to targeting technical and financial assistance to the issues and farms that will yield the greatest environmental benefit. AEM also is the cornerstone of the agricultural component of New York's Nonpoint Source Water Quality Management Program[13] developed to meet requirements of the Clean Water Act, The Safe Drinking Water Act, and the Coastal Zone Management Act.

Section 5.3.3: How the AEM program works

The AEM process is driven by the AEM Strategic Plan developed at the county level with the SWCD as the lead. Together with local partners, such as local representatives of USDA-NRCS and [HYPERLINK "https://www.fsa.usda.gov/"] (USDA-FSA), Cornell Cooperative Extension, County Health and/or Planning Departments, County Farm Bureaus, environmental organizations, watershed associations, agri-business, farmers, and interested citizens, the SWCD develops a strategic plan that meets minimum criteria established by the NYS SWCC to

[13] The NYS NPS Water Quality Management Strategy was last updated by NYS DEC in 2014 and is available online at: [HYPERLINK "https://www.dec.ny.gov/docs/water_pdf/2014npsmgt.pdf"].

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guide the local AEM effort for the next five years. Key to the strategy is the targeting/prioritization of watersheds, environmental concerns/opportunities, and/or the types of BMP systems needed to address concerns/opportunities. Technical information leading to the decisions made in the strategic plans comes from a wide range of sources including federal and university studies, NYS's Priority Waterbodies List (PWL) and Source Water Assessment, prior work in the AEM Tiers to determine areas of stewardship and resource concerns in the county, and other locally funded and generated studies and assessments. From their AEM Strategic Plan, each county AEM Steering Committee develops an Annual Action Plan outlining how the Strategic Plan will be advanced in the next calendar year.

Coordination of AEM Strategic Plans and Annual Action Plans as they relate to the needs of watersheds shared by multiple counties is handled by coalitions of SWCDs. A basic tenant of AEM is that state and federal water quality priorities will be solved through local water quality priorities first. New York supports the implementation of each Annual Action Plan by providing annual, non-competitive funding through the AEM Base Program to help support SWCDs in their technical assistance activities including farm inventories, environmental assessments, conservation planning, BMP design, and BMP and/or conservation plan evaluations. More information on the AEM Base Program can be found in [HYPERLINK \l "_Section_5.8:_Agricultural"]. Implementation of planned BMPs is supported by directing the farm to the federal, state, or local program that best meets the needs of the resource concern being addressed and the practice to be implemented.

The AEM process is highly interactive and emphasizes collaboration between resource professionals and farmers throughout the process. This process increases farmer awareness of the impact of farm activities on the environment and by design it encourages farmer participation, decision making, and further adoption of best management practices, which are important overall goals. Farmers are also able to provide feedback to the AEM professionals to help hone the approaches used in conservation planning and implementation. AEM uses the USDA-NRCS Planning Process that is enhanced through a five-tiered framework:

- **Tier 1:** A resource professional collects farm contact information; inventories farm infrastructure, land use, and livestock; determines the farm's future plans; informs the farmer of their watershed(s) and watershed concerns and identifies potential environmental concerns and opportunities. Tier 1 activities are supported by technical assistance funding supplied to SWCDs through the AEM Base Program.
- **Tier 2:** A resource professional uses worksheets to conduct an environmental assessment based on watershed concerns and the potential concerns and opportunities identified in Tier 1. Tier 2 documents existing environmental stewardship provides an educational opportunity with the farmer and verifies environmental concerns or flags issues for further evaluation during the planning process. Information gathered at this stage allows for the prioritization of farms and resource concerns on the farm to receive further technical assistance and potentially financial assistance with relatively little time invested on the part of the resource professional. Tier 2 activities are supported through the AEM Base Program.
- **Tier 3:** With help from resource professionals, farms develop a conservation plan to address priority resource concerns derived from the integration of the farm's business objectives, watershed concerns (as derived through the local AEM Strategic Plan),

condition of the involved resources (water, soil, air, plants, and animals) and environmental risk. The level and extent of planning considers farm resources and is often progressive (on-going and seeking continual improvement through behavioral change). All BMP systems are planned according to USDA-NRCS Conservation Practice Standards and Cornell University Guidelines. Plan components addressing nutrient management must be completed by an AEM or USDA-NRCS Certified Planner. Conservation planning activities are supported through the AEM Base Program or competitive state and federal programs, such as AgNPS or USDA-NRCS' Environmental Quality Incentives Program (EQIP).

- **Tier 4:** Under Tier 4, farmers implement BMP systems prioritized in the Tier 3 conservation plans. All BMP systems meet USDA-NRCS Conservation Practice Standards and Cornell University Guidelines. BMP systems designated as engineering practices are designed by Professional Engineers licensed in NYS. Technical assistance for BMP design and installation oversight is supported by the AEM Base Program, or by successful application to other state funding or USDA Farm Bill Programs. Financial assistance for BMP system implementation is provided to the farmer through successful application to the appropriate program such as AgNPS or USDA Farm Bill programs. If approved for funding from a state or federal cost share program, farms must implement practices according to strict technical requirements and within the timelines set forth by contract.
- **Tier 5:** Evaluation of conservation plans and implemented BMPs to ensure effectiveness in protecting the environment, proper operation and maintenance, and needed support to the farmer to safeguard public investment is conducted under Tier 5. Conservation plans are updated according to current standards and guidelines to assure continuous improvement and address concerns resulting from expanding operations and management changes. Tier 5 activities are supported through the AEM Base Program. Through various AEM tools, evaluation can take place at the BMP, farm, watershed and/or county levels.

Section 5.3.4: Programs Associated with AEM

State and federal programs are coordinated through the AEM process to efficiently provide technical and financial assistance to priority farms and priority environmental issues.[14] Both the AEM and USDA-NRCS programs use the same technical standards as CAFOs under permit to develop plans based on the resource needs of the farm and implement the BMP systems prioritized in the plans. Conservation plans, ranging from CNMPs to prescribed grazing plans to cropland plans, all comprehensively address resource concerns on farms with systems of BMPs, as described in the [HYPERLINK "https://www.nys-soilandwater.org/aem/forms/Ag_BMP_Catalogue.pdf"]. These programs include AEM Base, AgNPS, Climate Resiliency Farming (CRF), and Conservation Reserve Enhancement Program (CREP). Additional information about these funding programs can be found in [HYPERLINK \l "_Section_5.8:_Agricultural"].

[14] Resource professionals work with farmers to prioritize projects that will improve soil and water quality and have a strong likelihood of being successfully implemented and maintained. This process also results in prioritization of farms in the watershed.

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Section 5.3.5: Incentives to Participate in the AEM Program

CAFO permitted farms in New York are required to participate in the AEM framework when developing their CNMPs/NMPs with their AEM Certified Planner. The advantages of this requirement include:

- Prioritizing CAFOs for AgNPS and USDA Farm Bill financial assistance programs;
- Identifying resource needs and opportunities beyond CAFO Permit requirements leading to advanced environmental stewardship;
- The educational component of AEM helps farmers better understand the impact their farm has on the environment; and
- Opening the door for improved teamwork between certified planners, agency resource professionals, and agri-business in developing, implementing, and evaluating conservation plans and BMPs leading to advanced environmental stewardship and continuous improvement.

Additionally, there are incentives for small, un-regulated farm participation in AEM. Incentives for AEM participation include:

- Free technical assistance to identify and address environmental risks, watershed needs, and farm goals through conservation plans;
- Technical assistance to implement conservation plans and practices that can improve farm profitability including, but not limited to: nutrient management, prescribed grazing, conservation tillage, cover crops, integrated pest management, composting, feed management, buffers, and pathogen management;
- To help maintain and improve farm natural resources for future generations;
- Eligibility for state and federal cost-share programs;
- Eligibility to participate in New York State Farmland Protection Program;
- Improved consideration when applying for competitive USDA Farm Bill cost share programs;
- The desire to be viewed and recognized as an environmental steward. NYS has a program that provides an AEM sign to farms that demonstrate and maintain high levels of environmental stewardship, as well as a Statewide and several County AEM Farmer of the Year Awards;
- Discounts for related SWCD services such as Soil Group Worksheets required for Agricultural Tax Assessments;
- The desire to be a good neighbor; and
- Eligibility for the Agricultural Water Quality Revolving Loan Fund, which provides low interest loans to farmers to implement BMPs.

Section 5.3.6: AEM training, outreach and education

Training of resource professionals is a vital component of AEM. Training is regularly provided to SWCDs and their partners at USDA-NRCS, Cornell Cooperative Extension, private AEM Certified Planners, Certified Crop Advisors, Technical Service Providers, and agri-businesses.

Training is overseen by the AEM State-wide Interagency Committee that reports to the NYS SWCC. Training is guided by a Technical Development Curriculum developed by the Conservation Partnership and endorsed by the NYS SWCC and the [HYPERLINK "https://www.nyscdea.com/"] (CDEA). The curriculum has two tracks; one for planners who generally identify environmental concerns and opportunities and work with the farmer to plan solutions, and another for technicians who generally develop detailed designs of BMPs and oversee the installation. Training on the curriculum and related topics is provided annually at three venues:

- [HYPERLINK "https://www.nyscdea.com/training-sessions/"]**:** Three days of training are held annually in March. Participants include SWCD staff, conservation partners from USDA-NRCS, Cornell Cooperative Extension, AEM Certified Planners, NYS DEC staff, some farmers, and agri-business representatives. The Water Quality Symposium annually hosts the classroom component of the AEM Planner Certification requirements. The Water Quality Symposium has occurred annually since 1979 and is supported by New York State funding and participant registrations.
- **NYS Conservation Skills Workshop:** Four and a half days of field training are held annually in October. Training at the Conservation Skills Workshop is often the field component of classroom training initiated at the Water Quality Symposium. The audience is similar to the Water Quality Symposium and averages 130 participants annually. The Conservation Skills Workshop has occurred annually since 1997 and is supported through participant registrations and contributions from CDEA, NYS SWCC, and USDA-NRCS.
- **Northeast Region Certified Crop Advisor Annual Training Session:** Three days of training are held annually in December for Certified Crop Advisors and all conservation partners. Sessions are awareness oriented related to conservation programs, regulatory issues, current events, and new technology. Offerings at the NRCCA are coordinated with the Interagency Training Committee. The audience is predominantly CCAs from the public sector (Cooperative Extension, USDA-NRCS, and SWCD) and agri-businesses and attendance averages 150 participants annually. A training component for Professional Engineers associated with AEM Certified Planners is often held in conjunction with the NRCCA or the WQS annually. The training is supported through participant registrations and has been held since 1992.

In addition to the three annual training events described above, numerous other statewide and regional sessions are offered through the AEM Interagency Training Committee as needed to support the curriculum, programs, and regulations, as well as address emerging needs, issues, and technology.

The coordinated training efforts described above are extended to the farmer through one-on-one interaction with public resources managers, AEM Certified Planners, Certified Crop Advisors, and USDA Technical Service Providers. Additional training events for farmers such as workshops, field days, tours, and demonstrations are identified in the AEM Strategic Plan and supported financially at the county and watershed level through the AEM Base Program.

Section 5.4: Upper Susquehanna Coalition (USC)

Established in 1992, the [HYPERLINK "http://www.u-s-c.org/html/index.htm"] is a network of 21 SWCDs – 17 in New York and 4 in Pennsylvania – that cover the Upper Susquehanna River Basin. The USC works under a Memorandum of Understanding based on New York and Pennsylvania state laws that allow SWCDs to enter into multi-District agreements.[15]

The mission of the USC is to protect and improve water quality and natural resources in the Upper Susquehanna River Basin with the involvement of citizens and agencies through planning and implementation of conservation projects, education and advocacy for water resources. Each of the 21-member SWCDs that make up the USC is designated as the "lead" for water quality issues in their county and each experience working with local landowners, natural resource partners, municipalities, industries and regulators on water quality issues.

The USC uses a "multiple barrier approach" for planning and implementation that addresses issues at the source, across the landscape, and in the stream corridor. At the basin-wide scale, the USC uses its success in soil and water conservation to be an active partner in the multi-state effort to restore the Chesapeake Bay and is the lead in New York for implementing New York's agricultural nonpoint source program for the Chesapeake Bay watershed.

While individual SWCDs implement best management practices across a wide variety of land uses, the roles and techniques described have led the USC to focus on three core areas: Sustainable Agriculture, Stream Corridor Rehabilitation and Wetland Restoration. Each core area has a team leader and coordinator to facilitate effective and efficient implementation within each SWCD and across the basin to meet local and regional water quality goals.

- **Environmentally and Economically Sustainable Agriculture** uses the AEM program as the basis for its planning and implementation on farms. The USC promotes prescribed grazing techniques, cow exclusion from streams and riparian buffers, nutrient management, cover crops, conservation tillage, barnyard clean water exclusion and other agricultural best management practices.
- **Stream Corridor Rehabilitation** includes natural stream design, stream rehabilitation and stabilization, floodplain enhancement, and the establishment of riparian buffers.
- **Wetland Restoration** includes a comprehensive approach for wetland restoration, construction, conservation, protection, and research. This approach serves to improve local water quality and the environment through nutrient and sediment reduction, the attenuation of floods, and increases in wildlife and habitat diversity.

Central to the success of the USC is its 'vertical and horizontal' integration. The USC represents a basin wide distribution of natural resources professionals that has established relationships and partnerships with stakeholders at every level (local, state, multi-state and federal). The result has been a productive decades-long history of strengthening and promoting environmental stewardship and protecting water quality at all scales. From 2015-2018, the USC received grants totaling close to $9.5 million from NFWF, NRCS, U.S. Forest Service, U.S. Fish and Wildlife Service, and other sources to directly support New York's WIP implementation.

[15] The 17 New York and 4 Pennsylvania Soil and Water Conservation Districts are the signatories of the Memorandum of Understanding that formed the Upper Susquehanna Coalition.

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Section 5.5: NYS Agriculture BMP Input Deck

NYS DEC and its agricultural partners are committed to implementing a consistent level of implementation achieved during the Phase II WIP period in the agricultural sector. It is believed that this level of effort is practical and reasonable considering current available funding, technical staff, time, and farm operator cooperation for implementation. An agricultural implementation scenario was built based on BMPs installed during the Phase II implementation period and applied to projected available acres and animal numbers in 2025. For this document, this scenario will be referred to as "Current Program Goal". New York's "Current Program Goal" is a realistic implementation goal considering the potential load reductions expected to occur due to the loss of farms and lack of growth in the agricultural sector (see [HYPERLINK \l "_Section_9:_Accounting"] and other factors described in [HYPERLINK \l "_Section_5.10:_Gap"]). However, if New York were to implement the Current Program Goal scenario, the agricultural sector target goals for nitrogen and phosphorus will not be achieved by 2025. New York has developed an alternative implementation scenario that will meet the agricultural sector targets for nitrogen and phosphorus by 2025. For this document, this scenario will be referred to as "2025 Program Goal". [REF _Ref3888632 \h] below compares the discrepancy in loading between the two scenarios. To achieve the 2025 Program Goal, considerable additional resources are needed as identified in [HYPERLINK \l "_Section_5.8:_Agricultural"] and [HYPERLINK \l "_Section_5.10:_Gap"].

Table [SEQ Table * ARABIC]. Implementation Program Scenarios and Reduction Targets for the Agricultural Sector

	~~2018~~ 2019 Loading	2025 Sector Target Load	Current Program Scenario	2025 Program Scenario
Nitrogen	~~6.423~~6.285	~~4.925~~ 59	~~5.945~~ 59	~~4.924~~.464 42
Phosphorus	0.167	0.151	~~0.154~~0.151	~~0.121~~0.110
Sediment	~~137.93~~150.50	~~102.58~~125.81	~~125.61~~130.67	~~122.34~~107.55106.44
Values are delivered pounds per year. All values are outputs of ~~the Phase 6 Watershed Model~~ and CAST-19.				

Because New York did not meet its 2017 interim goal for nitrogen in the agricultural sector, practices prioritized for implementation include those that have been shown to be highly cost-effective in reducing nitrogen runoff, such as riparian buffers. Many of these practices also involve source control or stream protection, which provide local benefits (such as flood protection) and tend to be fiscally sustainable. In addition, many practices reduce the impacts of climate change by reducing ammonia emissions.

The following is a description of the major agriculture BMPs, as understood and practiced in New York State. BMPs are divided into five categories: 1) BMPs for Cropland/Hay; 2) BMPs for Cropland/Hay/Pasture; 3) BMPs for Pasture; 4) Animal/Barnyard Management BMPs and 5) BMPs for All Agricultural Land. BMP e~~E~~fficiency rates are from CAST-19 ~~the latest version of~~

the [HYPERLINK "https://cast.chesapeakebay.net/"]. Efficiency rates for BMPsand may vary depending on hydrogeomorphic region. In New York, the region is either Appalachian Plateau Carbonate or Appalachian Siliciclastic (Appendix B). Definitions of BMPs are summarized from the Chesapeake Bay Program's [HYPERLINK "https://www.chesapeakebay.net/what/publications/quick_reference_guide_for_best_management_practices_bmps"].

Section 5.5.1: BMPs for Cropland/Hay

BMP: Conservation Tillage (Conservation, High Residue, Low Residue)

Conservation tillage involves planting and growing crops with minimal soil disturbance. Much of the vegetation cover or crop residue remain on the soil surface. Conservation tillage is divided into three separate BMPs, 1) Conservation tillage; 2) High residue, minimum disturbance tillage; and 3) Low residue tillage. Conservation tillage requires two components: a minimum 30% residue coverage at the time of planting and a non-inversion tillage method. High residue, minimum disturbance tillage eliminates soil disturbance by plows and maintains a minimum of 60% crop residue cover on the soil surface as measured after planting. Low residue tillage management requires 15-29% cover, strip till or no-till, and less than 40% soil disturbance.

It is recognized that although not currently found in widespread use, this practice can be successful on some farms with better-drained soils. This assumes a high level of adoption on CAFO farms because larger farms can more readily accommodate changes in management because they already have more versatile equipment and are often better positioned financially to purchase specialized equipment. CAFO farms also have a greater ability to adopt this practice because they tend to control larger acreages of the better drained valley soil, and in general they have larger acreages and field sizes which are more conducive to using custom operators. Conservation tillage is being used on some of these farms as part of a management system to control erosion, reduce runoff, and manage nitrogen to meet CAFO permit requirements.

During the Phase II WIP period, New York implemented an average of 7,558 acres of conservation tillage, 5,353 aces of high residue tillage and 1,973 acres of low residue tillage per year, which was set as the Current Program Goal. The 2025 Program Goal was based on 10% implementation on available crop acres. New York's 2025 Program Goal is to implement conservation tillage on 10,403 acres, high residue tillage on 10,911 acres, and low residue tillage on 4,059 on available cropland acres per year.

Conservation Tillage Watershed Model Credit Summary			
	Conservation Tillage	High Residue, Minimum Soil Disturbance Tillage	Low Residue Tillage
Nitrogen Efficiency (%)	10	14	5
Phosphorus Efficiency (%)	17-27	27-28	7
Sediment Efficiency (%)	41	79	18
Current Program Goal: 14,884 acres per year			

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2025 Program Goal: 25,373 acres per year

BMP: Cover Crops

The Watershed Model has a complex method for calculating nutrient reduction efficiencies for the 104 different cover crop BMPs available for credit in the model (i.e. pollution reduction achieved by the BMP). Currently, effectiveness estimates vary between species, planting dates, and seeding techniques. Cover crop BMPs are divided into three main categories: Traditional Cover Crops, Traditional Cover Crops with Fall Nutrients, and Commodity Cover Crops.

Traditional Cover Crops reduce erosion and nutrients leaching to groundwater or volatilizing by maintaining a vegetative cover on cropland and holding nutrients within the root zone. This practice involves planting and growing, but not harvesting, crops with minimal soil disturbance. The crop is seeded directly into vegetative cover or crop residue and captures nitrogen in its tissue as it grows. When the cover crop is plowed down in spring, trapped nitrogen is released and used by the following crop. Two challenges associated with this practice in New York include difficulty in establishing the crop because of early frost and difficulty in plowing under a heavy crop. Other challenges include a shorter growing season in New York and USDA-NRCS standards with required planting dates which limit the ability for farmers to receive cost sharing for cover crop implementation. CAFOs are required to plant cover crops on marginal soils and soils that have a nitrogen leaching index of 10 or above.

To receive credit for this BMP, the cover crop may not receive nutrients in the fall and may not be harvested in the spring. Traditional Cover Crops with Fall Nutrients are acres where manure is applied after the harvesting of the summer crop but before cover crops are planted. The cover crops may not be harvested in the spring.

Commodity Cover Crops differ from traditional cover crops because they may be harvested for grain, hay or silage but may not receive nutrient applications. The intent of this practice is to modify normal small grain production practices by eliminating fall and winter fertilization so that crops function similarly to cover crops by scavenging available soil nitrogen for part of their life cycle. This practice can encourage planting of more acreage of cereal grains by providing farmers with the flexibility of planting an inexpensive crop in the fall and delaying the decision to either kill or harvest the crop based on crop prices, silage needs or weather conditions.

The efficiency percent for cover crops vary depending on species, time seeded, technique used, and hydrogeomorphic region. Nitrogen, phosphorus, and sediment efficiency rates for all cover crop types can be found in Appendix C.

During the Phase II WIP period, an average of 5,443 acres of traditional cover crops, 8,530 acres of traditional cover crops with fall nutrients, and 6,010 acres of commodity cover crops were planted in the watershed per year. All cover crop acres reported were seeded during the “normal” time period and were either drilled or “other” (non-drilling methods such as broadcasting or disking). Crop species reported in New York include rye, wheat, triticale, and commodity. New York’s 2025 Program Goal is to plant 22,145 acres traditional cover crops, 22,771 acres of cover crops with fall nutrients, and 6,006 acres of commodity cover crops per year.

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Cover Crop Watershed Model Credit Summary			
	Traditional Cover Crops	Traditional Cover Crops with Fall Nutrients	Commodity Cover Crops
Nitrogen Efficiency (%)	23-41	0-7	0-10
Phosphorus Efficiency (%)	13-29	0-7	0-10
Sediment Efficiency (%)	4-15	N/A	N/A
Current Program Goal: 19,983 acres per year			
2025 Program Goal: 50,922 acres per year			

BMP: Forest Buffers and Narrow Forest Buffers

Forest Buffers are linear wooded areas, usually accompanied by shrubs and other vegetation, that are adjacent to rivers, streams, and shorelines. Forest buffers help filter nutrients, sediments and other pollutants from runoff as well as remove nutrients from groundwater. This practice has met resistance in New York by farmers because of the loss of cropland, added expense of tree planting, maintenance, and potential to shade crops. Forest buffers must meet a minimum 35-foot width requirement. For buffers less than 35-feet wide, they are credited as a narrow forest buffer. Narrow forest buffers are only credited in the model as a load source change to forest and do not receive an upland treatment efficiency credit. Both types of forest buffers may be applied to cropland and hay. As of 2018, 2,124 acres of forest buffers have been implemented. The Current Program Goal is to implement an additional 2,124 acres before 2025. New York's 2025 Program Goal is to plant and maintain approximately 4,818 cumulative acres of forested buffers on available crop/hay.

Forest Buffer Watershed Model Credit Summary			
		Forest Buffer	Narrow Forest Buffer
Efficiency Credit	Nitrogen Efficiency (%)	54	N/A
	Phosphorus Efficiency (%)	42	
	Sediment Efficiency (%)	56	
Load Source Change – Cropland or Hay to Forest	Nitrogen Runoff Coefficient Reduction (lbs./acre/yr.)	7.04-61.62	
	Phosphorus Runoff Coefficient Reduction (lbs./acre/yr.)	0.73-1.79	
	Sediment Runoff Coefficient Reduction (lbs./acre/yr.)	0.02-8.45	
Current Program Goal: 2,124 acres			

2025 Program Goal: 4,818 acres

BMP: Grass Buffers and Narrow Grass Buffers

Grass buffers are linear strips of grass or other non-woody vegetation maintained between the edge of crop or hay fields and streams or rivers that help filter nutrients and sediment and improve habitat. Like forest buffers, credit in the Watershed model is dependent on the width of the grass buffer. Grass buffers less than 35-feet in width are credited as a narrow grass buffer and do not receive an upland treatment efficiency credit. As of 2018, 776 acres of grass buffers have been implemented. The Current Program Goal is to implement an additional 766 acres before 2025. New York's 2025 Program Goal is to plant and maintain 4,656 cumulative acres of grass buffers on available crop/hay acres.

Grass Buffer Watershed Model Credit Summary			
		Grass Buffer	Narrow Grass Buffer
Efficiency Credit	Nitrogen Efficiency (%)	38	N/A
	Phosphorus Efficiency (%)	42	
	Sediment Efficiency (%)	56	
Load Source Conservation Credit – Cropland or Hay to Forest	Nitrogen Runoff Coefficient Reduction (lbs./acre/yr.)	3.65-58.23	
	Phosphorus Runoff Coefficient Reduction (lbs./acre/yr.)	0.73-1.79	
	Sediment Runoff Coefficient Reduction (lbs./acre/yr.)	0.04-8.48	
Current Program Goal: 776 acres			
2025 Program Goal: 4,656 acres			

Section 5.5.2: BMPs for Cropland/Hay/Pasture

BMP: Nutrient Management Core, Rate, Placement, and Timing N/P

Nutrient Management Plans (NMPs) optimize nutrient use to minimize nutrient loss while maintaining yield. These plans attempt to maximize use of on-farm nutrients, such as manure and cover crops, and minimize nutrient imports, such as purchased fertilizer. Comprehensive Nutrient Management Plans (CNMP) are developed by certified planners in New York. Certified planners come from both the public and private sector. To sustain nutrient reductions, technical support for plan development, continued plan implementation, and regular updates are necessary.

The Nutrient Management Plan BMP is divided into Core Nutrient Management and Supplemental Nutrient Management. Supplemental Nutrient Management is then divided further

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into rate, placement, and timing. All elements of the Core Nutrient Management must be met to receive credit for the supplemental components. The three supplemental components may be stacked together for credit. There are no sediment reductions associated with the nutrient management BMPs. Core Nutrient Management is simulated in the Watershed Model as a load source reduction BMP. Each acre of cropland is assigned an overall nutrient application goal within a county and when core nutrient management is implemented, the Watershed Model reduces the nutrient application goal. An efficiency credit is then applied if the supplemental components are also implemented. Efficiencies associated with the supplemental components vary depending on the type of cropland land use.

Approximately 151,000 acres are currently covered by core nutrient management plans, or about 22% of the available acres. New York's 2025 Program Goal for nutrient management planning core N and P will cover ~~50~~48% of all available crop/hay acres. Supplemental nutrient management plan rate, placement, and timing will cover ~~40~~38% of all available crop/hay acres.

Core Nutrient Management Plan Watershed Model Credit Summary	
	Core N and P
Nitrogen Application Goal Multiplier (Non-NM)	1.1-1.3
Nitrogen Application Goal Multiplier with Core NM	1.0
Phosphorus Application Goal Multiplier (Non-NM)	1.0-3.0
Phosphorus Application Goal Multiplier with Core NM	1.0
Current Program Goal: 151,245 acres per year	
2025 Program Goal: 334,432 acres per year	

Supplemental Nutrient Management Plan Watershed Model Credit Summary			
	Rate	Placement	Timing
Nitrogen Efficiency (%)	0-15	0-5	0-10
Phosphorus Efficiency (%)	5-10	10-20	1-20
Sediment Efficiency (%)	N/A		
Current Program Goal: 151,245 acres per year			
2025 Program Goal: 267,576 acres per year			

BMP: Manure Incorporation and Manure Injection

Longstanding guidelines and studies by Cornell University and USDA Agricultural Research Service document that incorporation or injection of manure into soil immediately after surface application prevents a significant portion of the ammonium in manure from volatilizing to ammonia and reduces surface runoff losses relative to surface application. Manure

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incorporation is defined as mixing of dry, semi-dry or liquid manure, bio-solids, or compost into the soil within a specified timeframe after application. This shall be performed in close proximity to planting to allow for effective utilization of the conserved ammonium (otherwise fall incorporation without a growing crop results in loss of conserved ammonium ultimately via leaching and/or denitrification). Immediate incorporation of manure provides a nitrogen benefit and lowers annual application rates, leading to lower phosphorus rates. Such an approach provides a nitrogen and phosphorus benefit in areas where ample crop and hay exist for manure application (e.g., areas of lower animal unit/acre densities). The proposed practice is applied on a per acre basis and can be implemented and reported for cropland on both low-till and high-till land uses that receive manure, pasture, and hay with manure.

The manure incorporation practice is separated into five BMPs in the Watershed Model. Manure incorporation can be categorized as either high disturbance or low disturbance. High disturbance incorporation provides a higher level of mixing but eliminates the benefit of conservation tillage. Low disturbance incorporation leaves greater amounts of nutrients on the soil surface but maintains the benefits of conservation tillage. Manure incorporation is also categorized based depending on timing, between early incorporation (incorporation into the soil within 24 hours of application) or late incorporation (within 1-3 days of application).

Manure injection allows for the manure to be mechanically applied to the root zone at the time of application, resulting in immediate incorporation. Manure injection provides the greatest level of nutrient reduction loss and reduces odors more effectively compared to traditional manure incorporation. This practice is also compatible with conservation tillage practices.

During the Phase II WIP period, New York did not report manure incorporation. New York's 2025 Program Goal is to apply manure incorporation to 71,570 acres or nearly 10% of the available cropland acres.

Manure Incorporation Watershed Model Credit Summary					
	Low Disturbance, Early	Low Disturbance, Late	High Disturbance, Early	High Disturbance, Late	Manure Injection
Nitrogen Efficiency (%)	8	8	8	8	12
Phosphorus Efficiency (%)	24	24	24	24	36
Sediment Efficiency (%)	N/A				
Current Program Goal: N/A					
2025 Program Goal: 71,570 acres per year					

Section 5.5.3: BMPs for Pasture

BMP: Forest Buffer and Narrow Forest Buffer with Exclusion Fencing

Like the forest buffers implemented on cropland, forest buffers can be planted on pasture. Exclusion fencing must be installed on actively pastured land to keep animals from grazing or trampling the buffer area. Watershed Model credit is dependent on the width of the buffer; full

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credit is only received for buffers greater than 35-feet in width. Narrow forest buffers with exclusion fencing must be between 10 and 35 feet in width and do not receive an upland treatment efficiency credit. New York's 2025 Program Goal is to plant and maintain 6,457 cumulative acres of forest buffers with exclusion fencing on available pasture.

Forest Buffer with Exclusion Fencing Watershed Model Credit Summary			
		Forest Buffer w/ Fencing	Narrow Forest Buffer w/ Fencing
Efficiency Credit	Nitrogen Efficiency (%)	54	N/A
	Phosphorus Efficiency (%)	42	
	Sediment Efficiency (%)	56	
Load Source Change – Pasture to Forest	Nitrogen Runoff Coefficient Reduction (lbs./acre/yr.)	10.1	
	Phosphorus Runoff Coefficient Reduction (lbs./acre/yr.)	0.73	
	Sediment Runoff Coefficient Reduction (lbs./acre/yr.)	0.01	
Current Program Goal: 3,543 acres			
2025 Program Goal: 6,457 acres			

BMP: Grass Buffer and Narrow Grass Buffer with Exclusion Fencing

Grass buffers can be planted on pastureland and require exclusion fencing. Model credit is dependent on the width of the buffer; full credit is only received for buffers greater than 35-feet in width. Narrow grass buffers with exclusion fencing must be between 10 and 35 feet in width and do not receive an upland treatment efficiency credit. The Current Program Goal is to implement an additional 1,815 acres before 2025. New York's 2025 Program Goal is to plant and maintain 6,457 cumulative acres of grass with exclusion fencing on available pasture.

Grass Buffer with Exclusion Fencing Watershed Model Credit Summary			
		Grass Buffer w/ Fencing	Narrow Grass Buffer w/ Fencing
Efficiency Credit	Nitrogen Efficiency (%)	38	N/A
	Phosphorus Efficiency (%)	42	
	Sediment Efficiency (%)	56	
Load Source Change – Pasture to Ag. Open Space	Nitrogen Runoff Coefficient Reduction (lbs./acre/yr.)	6.71	
	Phosphorus Runoff Coefficient Reduction (lbs./acre/yr.)	0.00	

	Sediment Runoff Coefficient Reduction (lbs./acre/yr.)	0.00
Current Program Goal: 1,815 acres		
2025 Program Goal: 6,457 acres		

BMP: Off-stream watering without fencing

Direct contact of pastured livestock with surface water results in manure deposition, streambank erosion, re-suspension of streambed sediments and nutrients, and aquatic habitat degradation. Stream access can also affect herd health by exposure to water borne pathogens and increased risk of hoof problems. This practice requires the use of off-stream drinking water troughs or tanks away from streams. The source of water supplied to the facilities can be from any source including pipelines, spring developments, water wells, and ponds. To be effective, this practice should also include shade away from streams for livestock. The practice should show reduced livestock manure deposition in and near streams and move heavy traffic areas surrounding water sources to more upland locations. The implementation of an off-stream watering source does not exclude animals from entering the stream, therefore it is not a preferred BMP compared to buffers with exclusion fencing.

Off-stream watering without fencing was not reported during the Phase II WIP period. New York's 2025 Program Goal is to install enough facilities to affect ~~16~~17% of pastured land, about 17,103 acres.

Off-stream Watering without Fencing Watershed Model Credit Summary	
Nitrogen Efficiency (%)	10
Phosphorus Efficiency (%)	17-27
Sediment Efficiency (%)	41
Current Program Goal: N/A	
2025 Program Goal: 17,103 acres	

BMP: Prescribed Grazing/Precision Intensive Rotational Grazing

The objective of prescribed grazing is to manage forage availability by reducing the time livestock spend grazing on a paddock. Reduced grazing time improves the uniformity of manure and urine deposition over the pasture. The cattle's urine can be taken up by grass, thus lowering ammonia emissions. Prescribed grazing also helps to prevent soil erosion, reduce surface runoff and improve forage cover, while utilizing animal manures. Livestock overgrazing and direct access to surface water are also reduced. Specific practices include exterior and interior fencing, laneway development or improvement, pasture seeding or improvement, watering systems (well, pond, spring development, pipelines, water troughs), and brush management. Prescribed grazing can be combined with other practices, such as livestock

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exclusion from streams and riparian buffers. A major barrier to overcome with this practice is that switching to prescribed grazing can be a major change in operational management.

Prescribed grazing can be applied to pastures intersected by streams or upland pastures outside of the degraded stream corridor (10-35 feet width from top of bank). The modeled benefits of prescribed grazing practices can be applied to pasture acres in association with or without alternative watering facilities. They can also be applied in conjunction with or without stream access control. Pastures under the prescribed grazing systems are defined as having a vegetative cover of 60% or greater.

During the Phase II WIP period, New York implemented 58,607 acres of prescribed grazing. New York's 2025 Program Goal is to implement prescribed grazing on ~~53~~63% of the available pasture acres, approximately 64,136 acres.

Prescribed Grazing Watershed Model Credit Summary	
Nitrogen Efficiency (%)	9-11
Phosphorus Efficiency (%)	24
Sediment Efficiency (%)	30
Current Program Goal: 58,607 acres	
2025 Program Goal: 64,136 acres	

BMP: Horse Pasture Management

Like the Prescribed Grazing BMP, Horse Pasture Management includes maintaining pasture cover and managing high traffic areas. High traffic area management is utilized to reduce the highest load contributing areas associated with pasture lands. These are often feeding areas, such as hay deposits around fence lines.

Horse Pasture Management applies to all pasture lands, as not every pasture has a stream linked to it. The off-stream watering without fencing BMP may be implemented on pastures adjacent to waterways. Where pastures are in contact with a stream, managing animal contact to the stream is critical. The dominant source of nutrient and sediment loss from pasture lands is associated with animal contact with the stream. Overstocking is also frequently the cause of many nutrient and sediment problems, when preparing horse pasture management plans they should include pasture management, heavy use area improvement, and management of stocking densities.

During the Phase II WIP Period, New York implemented 882 acres of horse pasture management. New York's 2025 Program Goal is to implement horse pasture management on 1,069 acres in the watershed.

Horse Pasture Management Watershed Model Credit Summary	
Nitrogen Efficiency (%)	N/A

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Phosphorus Efficiency (%)	20
Sediment Efficiency (%)	40
Current Program Goal: 882 acres	
2025 Program Goal: 1,069 acres	

Section 5.5.4: Animal/Barnyard Management BMPs

BMP: Animal Waste Management Systems

These important systems are designed for proper handling, storage, and utilization of wastes generated from confined animal operations. They include a means of collecting, scraping or washing wastes and contaminated runoff from confinement areas into appropriately designed waste storage structures. Waste storage structures are typically made of concrete and require continued operation and maintenance, making them a significant cost item. Scraping or flushing manure more frequently can reduce ammonia emissions from barns and animal confinement areas, as would manure transfer systems that separate feces from urine. Covered manure storage also emits less ammonia. Failure to properly collect and store generated manure may result in losses of liquid manure to surface water and nutrient leachate to groundwater. For dry manure, contact with precipitation or wet soils under stockpiles can result in nutrient leaching.

The Watershed Model credits this BMP as an application reduction applied to animal units. It reduces storage and handling loss by reducing the pool of nutrients in the manure that would be available for land application (manure recovery). The amount of manure recovery varies by animal type. In New York, waste storage systems are most commonly built for dairy, beef, or other cattle.

During the Phase II WIP period, New York implemented animal waste management systems for 89,012 animal units. Due to inaccuracies in the estimated number of animal units in the Watershed Model, the 2025 Program Goal was set to ~~100~~82% of animal units available for credit (130,867 animal units). Animal units in the model will be updated based on the 2017 U.S. Agricultural Census and New York will work with EPA to correct the animal units in the Watershed Model.

Animal Waste Management Systems Watershed Model Credit Summary					
Animal Type	Beef	Dairy	Other Cattle	Hogs for Slaughter/Breeding, Broilers, Layers, Turkeys, Pullets	Sheep, Horses, Goats
% Recoverable without Animal Waste Management System	60	75	60	90	95
% Recoverable with Animal Waste	99	95	99	99	98

Management System					
Current Program Goal: 89,012 animal units					
2025 Program Goal: 130,867 animal units					

BMP: Barnyard Runoff Control and Loafing Lot Management

Barnyard runoff control practices include diversions, rainwater gutters, and similar practices. The loafing lot management BMP, by proximity, is grouped with barnyard control practices and is defined as the stabilization of areas frequently and intensively used by people, animals, or vehicles by establishing vegetative cover, surfacing with suitable materials, and/or installing needed structures. These practices may be installed as part of a total animal waste management system or as a stand-alone practice, particularly on smaller operations.

During the Phase II WIP period, New York implemented barnyard runoff control practices and loafing lots for 115 acres. New York's 2025 Program Goal is to install these two practices to affect 35% of non-permitted feeding space (AFO farms) and on 100% of all permitted feeding space (CAFO farms) for a weighted total of approximately 253 acres.

Barnyard Runoff Control Watershed Model Credit Summary	
Nitrogen Efficiency (%)	20
Phosphorus Efficiency (%)	20
Sediment Efficiency (%)	40
Current Program Goal: 115 acres	
2025 Program Goal: 253 acres	

BMP: Dairy Precision Feeding and Forage Management

Nutrient management planning on dairy farms, with a focus on nutrient source reduction, is vital for farm economic sustainability and water quality improvement. Long-term and sustainable nutrient reduction will only occur by reducing nutrient imbalances i.e., decreasing imports and/or increasing exports. As two-thirds or more of the imported nutrients to dairy farms come in purchased feed, significant reductions in nutrient imports can be accomplished with changes in ration and crop management. Several studies have demonstrated, and it is widely accepted that precision feed management on dairy farms can reduce manure nutrient excretions, including volatilized ammonia, an important atmospheric pollutant.

Precision feeding management compliments other agricultural waste and stream corridor management practices, adding to their nutrient reduction potential. Precision feeding management is a cost-effective BMP, as it reduces the amount of feed that needs to be purchased by farmers. According to the Chesapeake Bay Program, Dairy Precision Feeding must reduce the quantity of phosphorus and nitrogen fed to livestock by formulating diets within

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110% of Nutritional Research Council recommended level to minimize the excretion of nutrients without negatively affecting milk production.

During the Phase II WIP reporting period, New York implemented an annual average of 10,370 animal units. It has been identified through the WIP planning process that this BMP is widely under reported. New York's 2025 Program Goal is to implement dairy decision feed management for 41,554 dairy animal units, about ~~70~~54% of the available animal units.

Dairy Precision Feed Management Watershed Model Credit Summary	
Nitrogen Efficiency (%)	24
Phosphorus Efficiency (%)	25
Sediment Efficiency (%)	N/A
Current Program Goal: 10,370 animal units	
2025 Program Goal: 41,554 animal units	

Section 5.5.5: BMPs for All Agricultural Land

BMP: Non-Tidal Wetland Restoration

Agricultural wetland restoration activities re-establish natural hydrologic conditions that existed prior to installing subsurface or surface drainage. Projects may restore, create, or enhance a wetland. Restored wetlands may be any wetland type including forested, scrub-shrub, or emergent marsh. Additional wetland BMPs (wetland rehabilitation, enhancement, and creation) are being reviewed by an expert panel and will be credited in the Watershed Model in the future.

Wetland restoration is credited in the Watershed Model as a load source change of the restored area from the previous land use (e.g., cropland) into wetland, which reduces the simulated load. Then there is also an efficiency applied to upland acres that further reduces pollutant loads.

To date, 1,274 acres of wetland have been restored in New York. New York's 2025 Program Goal is to create or restore a total of 6,289 acres (or 0.~~7~~8% of all available agricultural acres) of wetlands on agricultural lands.

Non-Tidal Wetland Restoration (Agriculture) Watershed Model Credit Summary		
Efficiency Credit	Nitrogen Efficiency (%)	42
	Phosphorus Efficiency (%)	40
	Sediment Efficiency (%)	31
Load Source Change – Crop/Hay, Pasture	Nitrogen Runoff Coefficient Reduction (lbs./acre/yr.)	3.39-61.62
	Phosphorus Runoff Coefficient Reduction (lbs./acre/yr.)	0.73-1.79

or Ag. Open Space to Wetland	Sediment Runoff Coefficient Reduction (lbs./acre/yr.)	0.04-8.48
Current Program Goal: 1,274 acres		
2025 Program Goal: 6,289 acres		

BMP: Land Retirement and Alternative Crops

Agricultural land retirement takes marginal and highly erosive cropland out of production by establishing permanent vegetative cover such as hay, grasses, shrubs and/or trees. Federal conservation programs incentivize land retirement, usually on marginal or highly erodible cropland. Some agricultural land is also going out of production as farms cease to operate. This BMP is broken into three categories: alternative crops; land retirement to ag. open space; and land retirement to pasture. Alternative crops accounts for crops that are planted and management as permanent, such as warm season grasses, to sequester carbon in the soil.

This BMP is especially important because agricultural land, namely cropland, is one of the highest nutrient sources in the Watershed Model and agricultural land use changes usually result in less nutrient runoff. The Watershed Model credits land retirement as a load source conversion to agricultural open space or pasture. Land retirement was identified as an under-reported BMP during the WIP planning process.

To date, New York has reported a total of 1,781 acres of land retirement. Due to the decline in agricultural operations, nearly 2% agricultural land is expected to be reportable under some form of land retirement by 2025.

Land Retirement Watershed Model Credit Summary				
		Alternative Crops	Land Retirement to Ag. Open Space	Land Retirement to Pasture
Load Source Change – Crop/Hay or Pasture to Ag. Open Space	Nitrogen Runoff Coefficient Reduction (lbs./acre/yr.)	7.04-58.23	3.65-58.23	3.65-58.23
	Phosphorus Runoff Coefficient Reduction (lbs./acre/yr.)	1.06	0.00-1.06	0.00-1.06
	Sediment Runoff Coefficient Reduction (lbs./acre/yr.)	0.36-8.44	0.00-8.44	0.00-8.44
Current Program Goal: 1,781 acres				
2025 Program Goal: 15,767 acres				

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BMP: Soil Conservation and Water Quality Plans

Farm conservation plans are a combination of agronomic, management and engineered practices that protect and improve soil productivity and water quality and prevent natural resource deterioration on a farm. Soil conservation plans are comprehensive plans that meet USDA-NRCS criteria. Soil conservation plans help control erosion by modifying operational or structural practices. Operational practices include crop rotations, tillage practices, or cover crops and may change from year to year. Structural practices are longer-term and include, but are not limited to, grass waterways in areas with concentrated flow, terraces, diversions, sediment basins and drop structures. Reduction efficiencies vary by land use.

In New York, "Conservation Plans" are completed through the AEM program on all farms participating at the Tier 3 level and as part of CNMPs. Through AEM Base Program funding, county SWCDs will work with farms in the watershed to progressively plan their farms from the Tier 3 level to Tier 4 (implementation) and Tier 5 (BMP evaluation and updates).

During the Phase II WIP period, New York implemented 301,176 acres of conservation plans. New York's 2025 Program Goal is to develop conservation plans for 443,832 acres.

Soil Conservation and Water Quality Plans Watershed Model Credit Summary			
	Ag. Open Space/Legume Hay	Pasture	All other Cropland
Nitrogen Efficiency (%)	3	5	8
Phosphorus Efficiency (%)	5	10	14
Sediment Efficiency (%)	8	15	25
Current Program Goal: 301,176 acres			
2025 Program Goal: 443,832 acres			

BMP: Tree Planting

Tree planting on agricultural land includes trees planted to stabilize highly erodible soils or identified critical resource areas. Tree planting was not reported during the Phase II implementation period. Trees planted as a riparian buffer do not qualify under this BMP. Watershed Model credit is based on a load source conversion to forest.

Tree Planting Watershed Model Credit Summary		
Load Source Change – Crop/Hay, Pasture or Ag. Open Space to Forest	Nitrogen Runoff Coefficient Reduction (lbs./acre/yr.)	3.39 – 61.62
	Phosphorus Runoff Coefficient Reduction (lbs./acre/yr.)	0.73 – 1.79

	Sediment Runoff Coefficient Reduction (lbs./acre/yr.)	0.01 – 8.45
Current Program Goal: N/A		
2025 Program Goal: 4,461 acres		

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Section 5.5.6: Agricultural BMP Scenario Summary

[REF _Ref3892660 \h] below summarizes New York's agricultural BMP scenarios, including the number of units projected to available in 2025. It is expected that the available units will be updated overtime with incorporation of new information from the ~~2017~~ U.S. Agricultural Census. ~~After the Watershed Model has been updated, New York will reassess the proposed scenarios.~~

Table [SEQ Table * ARABIC]. Agricultural BMP Scenario Summary

Load Source	Practice	BMP Type	Model Credit Duration	Available Units[16]	Current Program Goal	2025 Program Goal	Percent of Available Units
Cropland/ Hay	Conservation Tillage (all types)	Efficiency	Annual	~~298,127~~255,563 acres/year	14,884 acres/year	25,373 acres/year	10%
	Cover Crops (all types)	Efficiency	Annual	~~298,127~~255,563 acres/year	19,983 acres/year	50,922 acres/year	~~17~~20%
	Forest Buffers	Load source change with efficiency value	Cumulative	65,085 acres	2,124 acres	4,818 acres	7%
	Grass Buffers	Load source change with efficiency value	Cumulative	65,085 acres	776 acres	4,656 acres	7%

[16] Available units identified in ~~the Phase 6 Watershed Model and~~ CAST-19 with 2025 Baseline.

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Cropland/Hay/ Pasture	Nutrient Management Core N/P	Efficiency	Annual	~~688,308~~701,015 acres/year	151,245 acres/year	334,432 acres/year	~~495~~048%
	Nutrient Management Rate, Placement, Timing N/P	Efficiency	Annual	~~688,308~~701,015 acres/year	151,245 acres/year	267,576 acres/year	~~403~~938%
	Manure Incorporation/ Injection	Efficiency	Annual	~~688,308~~701,015 acres/year	N/A	71,570 acres/year	10%
Pasture	Forest Buffers with Exclusion Fencing	Load source change with efficiency value	Cumulative	32,282 acres	3,543 acres	6,457 acres	20%
	Grass Buffers with Exclusion Fencing	Load source change with efficiency value	Cumulative	32,282 acres	1,815 acres	6,457 acres	20%
	Off-stream Watering without Fencing	Efficiency	Cumulative	~~121,885~~101,512 acres	N/A	17,103 acres	~~14~~1617%
	Prescribed Grazing	Efficiency	Cumulative	~~121,885~~101,512 acres	58,607 acres	64,136 acres	~~53~~63%
	Horse Pasture Management	Efficiency	Cumulative	~~121,885~~101,512 acres	882 acres	1,069 acres	1%

Animal/ Barnyard	Animal Waste Management	Animal	Cumulative	~~130,867~~159,494 animal units	89,012 animal units	130,867 animal units	~~100~~82%
	Barnyard Runoff Control + Loafing Lot Management	Efficiency	Cumulative	~~650~~ 651 acres	115 acres	253 acres	100% CAFO 40% AFO
	Dairy Precision Feeding	Animal	Annual	~~59,363~~77,461 animal units/year	10,370 animal units/year	41,554 animal units/year	~~70~~54%
All Agricultural Land	Non-tidal Wetland Restoration	Load source change with efficiency value	Cumulative	~~909,474~~786,125 acres	1,274 acres	6,289 acres	0.~~78~~%
	Land Retirement	Load Source Change	Cumulative	~~810,743~~761,852 acres	1,781 acres	15,767 acres	2%
	Soil Conservation & Water Quality Plans	Efficiency	Cumulative	~~909,474~~786,125 acres	301,176 acres	443,832 acres	~~495~~756%
	Tree Planting	Load Source Change	Cumulative	~~909,474~~786,125 acres	N/A	4,461 acres	0.~~58~~%

Section 5.6: Local Planning Goals for the Agriculture Sector

Through a series of meetings with local partners, it was determined that local planning goals will be applied at the Chemung and Susquehanna sub-watershed scale for the agricultural sector ([REF _Ref3893005 \h]). It should be noted that there was resistance from local partners to EPA's new requirement of developing planning goals below the major basin scale. Historical local implementation in the agricultural sector in New York has been directed at the watershed scale, through the Upper Susquehanna Coalition (USC) and member SWCDs. This watershed-wide approach has resulted in consistent, coordinated and efficient implementation. Resources, including technical expertise, equipment, and funding, are shared among member soil and water conservation districts. In addition, the USC has also been able to leverage capacity funding directed to the USC by NYS DEC. Close to $10 million in grant funding has been leveraged by the USC between 2015 and 2018 and distributed watershed-wide. This funding is available to all member districts on a non-competitive basis for targeted BMPs (i.e. riparian buffers, grazing planning and associated BMPs). By forcing local planning goals to a smaller scale (e.g. county), New York's agricultural program will become less efficient and would create unnecessary competition between individual county SWCDs. This is counter-productive to the coordinated implementation approach that has proven to be successful in New York.

The two sub-watershed scale approach will have the least impact to New York's existing implementation structure, while allowing for more targeted consideration for how BMPs will be implemented in each basin. Based on long-term ambient water quality trends, the water quality between the two basins is not equivalent; water quality continues to improve in the Susquehanna basin, while trends show degrading water quality in portions of the Chemung basin. At this time, it is unclear as to why water quality is degrading and if it can be attributed to a specific sector. Tracking and reporting BMPs within this basin, along with continued ambient water quality monitoring, may help to increase understanding of this declining trend.

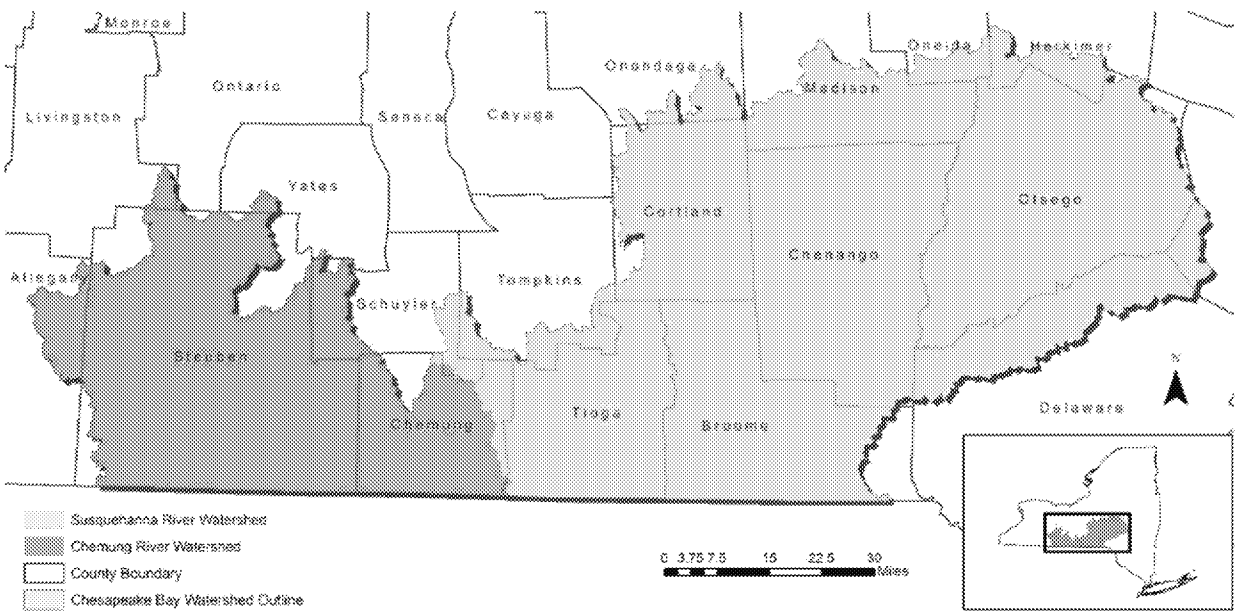

Figure [SEQ Figure * ARABIC]. Agricultural Sector Local Planning Goal Watersheds

Local planning goals were developed based on available BMP units (acres or animal units) within the Chemung and Susquehanna sub-watersheds ([REF _Ref3893067 \h]).

Table [SEQ Table * ARABIC]. Local BMP Planning Goals for Chemung and Susquehanna Sub-watersheds

Practice	Chemung Acres of Opportunity	Chemung 2025 Local Planning Goal	Susquehanna Acres of Opportunity	Susquehanna 2025 Local Planning Goal
Conservation Tillage (all types)	~~103,847~~89,021 acres/year	9,915 acres/year	~~194,280~~166,542 acres/year	18,549 acres/year
Cover Crops (all types)	~~103,847~~89,021 acres/year	17,738 acres/year	~~194,280~~166,542 acres/year	33,184 acres/year
Forest Buffers	14,684 acres	1,087 acres	50,401 acres	3,731 acres
Grass Buffers	14,684 acres	1,050 acres	50,401 acres	3,606 acres
Nutrient Management Core N/P	~~220,628~~224,701 acres/year	107,198 acres/year	~~467,680~~476,314 acres/year	227,234 acres/year
Nutrient Management Rate, Placement, Timing N/P	~~220,628~~224,701 acres/year	85,768 acres/year	~~467,680~~476,314 acres/year	181,808 acres/year
Manure Incorporation/ Injection	~~220,628~~224,701 acres/year	22,941 acres/year	~~467,680~~476,314 acres/year	48,629 acres/year
Forest Buffers with Exclusion Fencing	7,080 acres	1,416 acres	25,202 acres	5,040 acres
Grass Buffers with Exclusion Fencing	7,080 acres	1,416 acres	25,202 acres	5,040 acres
Off-stream Watering without Fencing	~~48,788~~40,633 acres	8,562 acres	~~73,097~~60,879 acres	12,269 acres
Prescribed Grazing	~~48,788~~40,633 acres	18,128 acres	~~73,097~~60,879 acres	46,008 acres
Horse Pasture Management	~~48,788~~40,633 acres	302 acres	~~73,097~~60,879 acres	767 acres
Animal Waste Management	~~59,336~~72,316 animal units	59,336 animal units	~~71,531~~87,178 animal units	71,531 animal units
Barnyard Runoff Control + Loafing Lot Management	~~243~~ 288 acres	112 acres	~~307~~ 363 acres	141 acres
Dairy Precision Feeding	~~27,734~~36,199 animal units/year	19,412 animal units/year	~~31,628~~41,282 animal units/year	22,142 animal units/year

Non-tidal Wetland Restoration	~~296,944~~256,671 1296944acres	2,053 acres	~~612,529~~529,454 acres	4,236 acres
Land Retirement	~~269,659~~256,671 acres	5,244 acres	~~541,084~~508,455 acres	10,523 acres
Soil Conservation & Water Quality Plans	~~296,944~~256,671 acres	144,912 acres	~~612,529~~529,454 acres	298,920 acres
Tree Planting	~~296,944~~256,671 acres	1,457 acres	~~612,529~~529,454 acres	3,004 acres

Section 5.7: Agriculture BMP Tracking and Reporting Protocols

The USC coordinates agriculture BMP data collection to verify information and eliminate double counting. This is done using a master list of farms that are geo-referenced to a GIS database. Each year, county SWCD staff input data of implemented BMPs into an online interface linked to the database. The database is also used for WIP planning and specific data needs. More information of tracking, reporting, and verification protocols for agricultural BMPs can be found in [HYPERLINK "https://www.dec.ny.gov/lands/33279.html"]. The USC routinely updates New York's QAPP to account for changes and additions to tracking, reporting, and verification.

Section 5.8: Agricultural Sector BMP Funding Programs

The Current Program Goal scenario described in this document reflects the practical implementation considering the type of agriculture conducted in New York, climate, social/economic, and relevant site-specific details. New York recognizes that there is a funding gap between what is currently available, and funding needed to implement the 2025 Program Goal scenario. New York cannot commit to implementing the 2025 Program Goal without additional resources outlined in this section. This section provides a summary of existing funding sources at the state, federal, and local level, as well as a summary of anticipated funding needs.

[REF _Ref3893254 \h * MERGEFORMAT] provides an estimate of the annual cost per BMP unit and cost per pound reduced of each pollutant type. Cost estimates are annualized costs and were determined using ~~the latest version of~~ [HYPERLINK "https://cast.chesapeakebay.net/"]-17. The total cost per BMP type is inclusive of operation and maintenance (O&M) costs. Cost estimates available in CAST are derived from multiple sources, including USDA NRCS – EQIP cost estimates, individual state's BMP manuals, previous implementation plans, and independent studies from farms across the watershed. New York is currently working towards developing state-specific BMP cost estimate profile that will provide a more accurate representation of implementation costs.

Table [SEQ Table * ARABIC]. Agricultural BMP Implementation and Maintenance Cost Matrix[17]

BMP	Current Program Goal	2025 Program Goal	Cost Per BMP Unit	Cost Per Pound of Nitrogen	Cost Per Pound of Phosphorus	Cost Per Pound of Sediment	O&M Cost per Year Per BMP Unit	Total Cost – Current Program Goal	Total Cost – 2025 Program Goal
Cover Crops (all types)	19,983 acres/year	50,922 acres/year	$68.70	$87.09	N/A	N/A	N/A	$1,372,832	$3,503,150
Forest Buffers	2,124 acres	4,818 acres	$124.00	$5.99	$333.16	$0.22	$0	$263,376	$597,432
Grass Buffers	776 acres	4,656 acres	$41.09	$2.48	$1,656.76	$0.07	$0	$31,886	$191,315
Nutrient Management Core N	151,245 acres/year	334,432 acres/year	$16.55	$37.11	N/A	N/A	N/A	$2,503,104	$5,534,850
Nutrient Management Core P	151,245 acres/year	334,432 acres/year	$24.84	N/A	$1,380.47	N/A	N/A	$3,756,926	$8,307,291
Nutrient Management Rate N	151,245 acres/year	267,576 acres/year	$22.36	$78.33	N/A	N/A	N/A	$3,381,838	$5,982,999
Nutrient Management Rate P	151,245 acres/year	267,576 acres/year	$22.36	N/A	$3,895.47	N/A	N/A	$3,381,838	$5,982,999
Nutrient Management Placement N	151,245 acres/year	267,576 acres/year	$17.13	$94.55	N/A	N/A	N/A	$2,590,827	$4,583,577
Nutrient Management Placement P	151,245 acres/year	267,576 acres/year	$17.13	N/A	$1,099.49	N/A	N/A	$2,590,827	$4,583,577
Nutrient Management Timing N	151,245 acres/year	267,576 acres/year	$17.13	$48.84	N/A	N/A	N/A	$2,590,827	$4,583,577
Nutrient Management Timing P	151,245 acres/year	267,576 acres/year	$17.13	N/A	$4,011.71	N/A	N/A	$2,590,827	$4,583,577

[17] Costs for conservation tillage are not estimated in CAST

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BMP	Current Program Goal	2025 Program Goal	Cost Per BMP Unit	Cost Per Pound of Nitrogen	Cost Per Pound of Phosphorus	Cost Per Pound of Sediment	O&M Cost per Year Per BMP Unit	Total Cost – Current Program Goal	Total Cost – 2025 Program Goal
Manure Incorporation /Injection	N/A	71,750 acres/year	$17.34	$30.92	$393.53	N/A	N/A	N/A	$1,244,145
Forest Buffers with Exclusion Fencing	3,543 acres	6,457 acres	$676.38	$7.85	$35.38	$0.07	$156	$2,949,122	$5,374,678
Grass Buffers with Exclusion Fencing	1,815 acres	6,457 acres	$261.44	$3.17	$13.91	$0.03	$156	$757,654	$2,695,410
Off-stream Watering without Fencing	N/A	17,103 acres	$29.53	$146.78	$2,149.88	$192.36	$0	N/A	$505,052
Prescribed Grazing	58,607 acres	64,136 acres	$13.33	$30.36	$323.49	$28.94	N/A	$781,231	$854,933
Horse Pasture Management	882 acres	1,069 acres	$20.45	N/A	$595.53	$33.30	$6.00	$23,329	$28,275
Animal Waste Management	89,012 animal units	130,867 animal units	$177.44	$35.29	$1,149.73	N/A	$50.56	$20,294,735	$29,837,676
Barnyard Runoff Control + Loafing Lot Management	115 acres	253 acres	$567.46	$2.46	$88.23	$1.23	$0	$65,258	$143,567
Dairy Precision Feeding	10,370 animal units/year	41,554 animal units/year	($9.95)	($6.51)	($211.55)	($2.47)	N/A	($103,182)	($413,462)
Non-tidal Wetland Restoration	1,274 acres	6,289 acres	$99.65-$331.66	$8.59-$37.68	$288.23-$1250.18	$0.26-$1.07	$44.65	$183,838-$479,419	$907,503-$2,366,614
Land Retirement	1,781 acres	15,767 acres	$168.87	$30	$1,000.95	$0.61	$0	$300,757	$2,662,573

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BMP	Current Program Goal	2025 Program Goal	Cost Per BMP Unit	Cost Per Pound of Nitrogen	Cost Per Pound of Phosphorus	Cost Per Pound of Sediment	O&M Cost per Year Per BMP Unit	Total Cost – Current Program Goal	Total Cost – 2025 Program Goal
Soil Conservation & Water Quality Plans	301,176 acres	443,832 acres	$1.94	$6.76	$105.11	$0.05	$0	$584,281	$861,034
Tree Planting	N/A	4,461 acres	$69.73	$12.03	$389.87	$0.31	$0	N/A	$311,066
TOTAL COST								$51,187,712	$92,210,495

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Section 5.8.1: State Funding Programs

The majority of state funding dedicated to agriculture BMP implementation is administered by the NYS DAM and NYS SWCC. State funding is awarded on a non-competitive and competitive basis. State and federal funding programs are coordinated through the AEM Program to provide technical and financial assistance to priority farms and priority environmental issues. These programs include:

- AEM Base program;
- Agricultural Nonpoint Source Abatement and Control (AgNPS) program;
- Climate Resiliency Farming (CRF) program;
- CAFO Waste Storage and Transfer Program; and
- USDA Farm Bill programs (refer to [HYPERLINK \l "_Section_5.8.2:_"]).

New York's Environmental Protection Fund (EPF) is the major source of state funding for capital projects that protect the environmental and enhance communities. Funding for the AEM Base Program, AgNPS program, and CRF program is allocated through the EPF.

AEM Base Program

The AEM Base Program is administered by the NYS SWCC and provides non-competitive technical assistance funding to SWCDs to inventory and assess farms in priority watersheds, plan and design BMPs, and evaluate effectiveness of planning and BMPs on priority farms based on County AEM Strategic Plans and Annual Action Plans.

[REF _Ref3903154 \h] details the amount of AEM Base funds earned in each Tier by SWCDs in the Chesapeake Bay watershed between 2012 and 2018. AEM Base Program funding is distributed at the county level, therefore is it not possible to track the amount of funding dedicated directly to the Chesapeake Bay watershed by counties that are only partially within the watershed boundary.

Table [SEQ Table * ARABIC]. AEM Base Program Funding in the Chesapeake Bay Watershed

AEM Base for Counties in the Chesapeake Bay watershed	Year 7 (11/12)	Year 8 (12/13)	Year 9 (13/14)	Year 10 (14/15)	Year 11 (15/16)	Year 12 (16/17)	Year 13 (17/18)
Tier 1	239	228	59	60	122	75	60
Tier 2	165	158	29	53	101	51	49
Tier 3A	91	83	56	38	28	38	20
Tier 3B	15	8	3	2	5	2	5
Tier 4	125	96	99	98	93	87	86

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Tier 5A	35	42	18	17	34	26	32
Tier 5B	100	126	78	69	48	67	83
AEM Base Funds Earned for Technical Assistance	$744K	$857K	$759K	$922K	$1.02M	$1.11M	$1.03M

[HYPERLINK "https://www.nys-soilandwater.org/aem/nonpoint.html"]

The AgNPS program is a competitive financial assistance program administered by the NYS SWCC that assists farmers in abating and preventing water pollution from agricultural activities by providing technical assistance and financial incentives. SWCDs are the only entities eligible to apply for AgNPS funding. Funding is used to plan, design, and implement priority BMP systems, including cost-share funding to farmers. Farmers are eligible to receive between 75% and 87.5% of BMP implementation costs depending on their contribution to the project.

Proposals are ranked by NYS SWCC Advisory Members including: NYS DEC, NYS DOH, NYS DOS and NYS DAM; USDA-NRCS; Cornell University; and SUNY ESF. Proposal ranking criteria includes: ranking of the farm's watershed and the pollutant(s) being addressed according to the District's AEM Strategic Plan; the level, source, and type of impairment based on the waterbody's PWL or SWA; use of priority BMPs; cost effectiveness; and the District's ability to complete the project. Bonus points are awarded to projects in TMDL watersheds, and those that include the installation of conservation buffers.

Farms included in all proposals must have a conservation plan meeting AEM criteria (waste storage BMPs must have a complete CNMP reflective of conditions post-storage). BMPs included in proposals must meet USDA-NRCS design standards. Engineering practices must be designed by a Professional Engineer, and nutrient management plans must be developed by an AEM or USDA-NRCS Certified Planner. NYS SWCC staff complete final checks on all projects.

The Request for Proposals for each Round of AgNPS is evaluated before each round and improvements are made based on past experience; as an example, Cover Crop and Mulching BMPs were expanded from a 1-year funded practice to a 3-year funded practice to provide the farmer more time to experience the BMP and associated benefits increasing chances of future adoption.

AgNPS is funded through the EPF and is in its 24th round of funding since 1994. Funding for the program has increased from $331,630 in 1994 to $16 million today statewide. Since its inception, approximately 25% of all AgNPS funding has gone to projects in the Chesapeake Bay watershed. Over $20 million dollars of state share has been directed to the Chesapeake Bay watershed since 2012 ([REF _Ref52890191 \h]). Farmers are required to provide cost share and have dedicated over $13 million to projects within the watershed since 2012. Statewide, the program is consistently oversubscribed, with only about 33% of submitted projects funded.

Table [SEQ Table * ARABIC]. AgNPS Funding in the Chesapeake Bay Watershed (2012-2018)

	Round 18 (2012)	Round 19 (2013)	Round 20 (2014)	Round 21 (2015)	Round 22 (2016)	Round 23 (2017)	Round 24 (2018)
Proposals Funded	11	16	9	11	11	18	8
Districts	7	8	8	8	6	8	8
Farms	27	65	32	33	37	23	17
BMP Systems Being Installed	49	80	42	45	44	48	29
State Share	$2.7M	$3.4M	$2.7M	$3.4M	$1.97M	$4.61M	$2.24M
Farmer Share	$1.5M	$2.1M	$1.9M	$2.3M	$1.12M	$3.41M	$991K
Total	$4.2M	$5.5M	$4.6M	$5.7M	$3.09M	$8.02M	$3.23M

[HYPERLINK "https://www.nys-soilandwater.org/aem/nonpoint.html"]

The CRF Program is a new competitive grant program administered by the NYS SWCC to reduce the impact of agriculture on climate change (mitigation) and to increase the resiliency of New York State farms in the face of a changing climate (adaptation). The CRF Program operates with three distinct tracks, in recognition of the different applications and benefits of various BMP systems for mitigation and adaptation: Manure Storage Cover and Flare Systems (Track 1), Water Management Systems (Track 2), and Soil Health Systems (Track 3). SWCDs are the only entities eligible to apply for CRF funding. Three rounds of funding have been awarded through the CRF program (2016-2018). Over the three rounds, $647,000 has been awarded for 17 projects in the Chesapeake Bay watershed.

CAFO Waste Storage and Transfer Program

The CAFO Waste Storage and Transfer Program is a new program funded through New York's Clean Water Infrastructure Act. The program was released specifically to assist CAFO farms with meeting the minimum of storage capacity of required by the CAFO permit. To be eligible for funding, farms must implement at least six months of storage capacity for all their livestock. $50 million has been dedicated to this program statewide. Two rounds of $20 million and $15 million, respectively, were released. A third round of $18 million was released in February 2019. Proposals are capped at $385,000 and can cover the costs of personnel, consulting, engineering services, other direct expenses, and implementation. Between the first two rounds, over $4.5 million was awarded to 12 projects within the Chesapeake Bay watershed.

Section 5.8.2: USDA Farm Bill Programs

Farmers who participate in the AEM program may use several federal programs funded through the USDA to develop conservation plans and receive financial assistance and other incentives

to implement BMPs. Farm Bill programs available in New York for conservation planning and implementation include:

[HYPERLINK "https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/"]

EQIP is a program administered by USDA-NRCS. EQIP assists farm, ranch, and forest production and improves and protects environmental quality and is authorized under the federal Farm Bill. This offers financial and technical assistance to help agricultural producers voluntarily implement conservation practices. To be eligible for funding for practices, farms must have a conservation plan the requirements outline in the [HYPERLINK "https://directives.sc.egov.usda.gov/viewerFS.aspx?hid=33232"]. Practices eligible for funding for EQIP include, but are not limited to, Cover Crops, Riparian Forested Buffer and Riparian Herbaceous Buffer, Grassed Waterway, Prescribed Grazing, Waste Storage Facility, Nutrient Management, and Fencing.

Conservation Reserve Program (CRP), Conservation Reserve Enhancement Program (CREP) and Farmable Wetlands Program

[HYPERLINK "http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=crp."] and [HYPERLINK "http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=cep."] are administered by the USDA-FSA, with USDA-NRCS and the SWCDs providing technical land eligibility determinations, conservation planning, and practice implementation.

CRP is a voluntary program for agricultural landowners. Through CRP, farmers can receive annual rental payments in exchange for removing farmland from production and establishing long-term vegetative cover for the goal of improving water quality, controlling soil erosion, and increasing wildlife habitat. Annual rental payments are based on the agriculture rental value of the land. Participants enroll in CRP contracts for 10 to 15 years.

CREP is an offshoot of CRP. CREP is funded in partnership between state and federal governments. In New York, CREP is funded by NYS DAM and USDA. Through the state-federal program partnership, cost-share assistance for up to 50 percent of the participant's costs in establishing approved conservation practices is available. Additional incentive payments are also available for selected practices. Incentive payments can be received at the time of contract enrollment (signing incentive payment or SIP) and after a practice is established (practice incentive payment or PIP). Practices eligible under CREP include riparian buffers, filter strips, wetland restoration, grassed waterways, establishment of permanent grasses and tree planting. In 2016, FSA received a $1 million allocation to increase the signing incentive payments for acres enrolled in CRP and planted as a riparian forest buffer. NYS DEC provided an additional $200,000 in funding as match, which is being directed to farmers in the form of an additional practice incentive payment received after riparian forest buffer establishment.

The [HYPERLINK "http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=fwp."]is a voluntary program to restore farmable wetlands and associated buffers by improving the land's hydrology and vegetation. Eligible producers in all states can enroll eligible land in the Farmable Wetlands Program through CRP. FWP is designed to prevent degradation of wetland areas, increase

sediment trapping efficiencies, improve water quality, prevent soil erosion, and provide habitat for waterfowl and other wildlife.

[HYPERLINK "http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/csp."]

CSP is a voluntary conservation program that helps producers building on existing conservation efforts. It encourages producers to undertake additional conservation activities while maintaining and managing those existing benchmark conservation activities. CSP is available on Tribal and private agricultural lands and non-industrial private forest land in all 50 States and the Caribbean and Pacific Islands Areas. The program provides equitable access to all producers, regardless of operation size, crops produced, or geographic location. CSP was changed in the 2018 Farm Bill and existing authorities were combined with EQIP. Under the new Farm Bill, Grasslands will receive some focus through the new Grassland Conservation Initiative within CSP. Soil Health will also have a focus as evidenced by the adoption of resource conserving crop rotations and higher payment rates for cover crops.

[HYPERLINK "http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/ama"]

Through the AMA program, NRCS provides financial assistance funds annually to producers in to: Construct or improve water management structures or irrigation structures; plant trees to form windbreaks or to improve water quality; and mitigate risk through production diversification or resource conservation practices including soil erosion control, integrated pest management, or the transition to organic farming. AMA is available in 16 states where participation in the Federal Crop Insurance Program is historically low, including New York. Because the funding is typically low, NRCS has focused the funding to a limited area of the state (this fiscal year funds went to our Northeast Area) allowing the area to determine the practices to offer. This year the Northeast Area offered irrigation practices in addition to high tunnels. AMA does not have the same irrigation history requirement as EQIP.

[HYPERLINK "https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/acep/"]

The Farm Bill of 2014 established ACEP and repealed the Wetland Reserve Program (WRP), Grassland Reserve Program (GRP), and Farm and Ranch Lands Protection Program (FRPP). ACEP provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits. Under the Agricultural Land Easements component, USDA-NRCS helps American Indian tribes, state and local governments, and non-governmental organizations protect working agricultural lands and limit non-agricultural uses of the land. Under the Wetlands Reserve Easements component, USDA-NRCS helps to restore, protect, and enhance enrolled wetlands.

[HYPERLINK "https://valuewetlands.tamu.edu/2015/04/10/debt-for-nature-program/"]

DFN, also known as the Debt Cancellation Conservation Contract Program, is a unique program for eligible landowners that protects important natural resources and other sensitive areas while providing a debt management tool. DFN is available to persons with Farm Service Agency (FSA) loans secured by real estate. These individuals may qualify for cancellation of a portion of their FSA indebtedness in exchange for a conservation contract with a term of 50, 30, or 10 years. The conservation contract is a voluntary legal agreement that restricts the type and

amount of development that may take place on portions of the landowner's property. Contracts may be established on marginal cropland and other environmentally sensitive lands for conservation, recreation, and wildlife purposes.

[HYPERLINK "https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/farmbill/rcpp/"]

The 2014 Farm Bill created RCPP. RCPP encourages partnerships between local, state, or private entities, and NRCS to install and maintain conservation practices in priority projects areas. In New York, conservation practices In NY conservation practices are implemented by applicants in collaboration with NRCS through the existing EQIP and ACEP NRCS programs. Funding is divided into three pools: 1) State; 2) National; and 3) Critical Conservation Areas. The Chesapeake Bay Watershed is one of eight critical conservation areas that have been identified in the program. In fiscal year 2016, the Upper Susquehanna Coalition was successfully awarded $4.1 million from RCPP to implement practices through EQIP. Farmstead and field conservation practices, such as cover crops, conservation tillage, crop nutrient management, manure storage, precision feed management, grazing, fencing livestock out of streams, streambank stabilization, riparian buffers, and barnyard runoff control are prioritized under the program. The 2018 Farm Bill has made RCPP a standalone program that will have its own direct funding. It contains improvements to make RCPP more efficient and effective and hopes to remove impediments so that NRCS and partners can better manage the program throughout the duration of the agreements.

Section 5.8.3: Other Funding Programs

Chesapeake Bay Implementation Grant (CBIG)

NYS DEC is the recipient of the Chesapeake Bay Implementation Grant from EPA. This is a non-competitive grant given to jurisdictions covered by the TMDL to support implementation programs and projects. $1.25 million is allocated to New York on an annual basis. Programs supported by the CBIG contract related to agricultural sector implementation include:

- Upper Susquehanna Coalition Capacity Contract: Funding through this single source contract with the USC supports agricultural, stream, and wetland BMP data tracking, reporting, verification, project planning and implementation, outreach and education, Chesapeake Bay Program workgroup and Goal Implementation Team participation, and progress reporting.
- USC Cover Crop Implementation Program: Funding through this single source contract with the USC supports the purchase of cover crop seeds, incentives to farmers to implement cover crops, and costs of hiring private contractors to implement cover crops on behalf of farmers.
- USC Assessment and Maintenance of Riparian Forest Buffers: Funding through this single source purchase order with the USC supported site assessments and maintenance of riparian forest buffers implemented through a variety of state and federal programs. The project term of this purchase order has expired, but NYS DEC will continue to direct funding to this work through the USC Capacity Contract.
- NYS DAM Capacity Contract: Funding for this program is transferred between NYS DEC and NYS DAM via a Memorandum of Understanding (MOU). Funding supports staff that

administer the NYS DAM Certified AEM Planning Quality Assurance Program, AgNPS grant program, and Chesapeake Bay Program workgroup and Goal Implementation Team participation.

- Riparian Buffer Protection and Restoration Competitive Grant Program: NYS DEC released the first round of competitive grant funding in 2017. $ 1 million of funding was available in the first round. Three grants awarded through this program will support local land stewardship programs to purchase land or to permanently protect and restore riparian corridors in the Chesapeake Bay watershed.

Additional sub-contracts of the CBIG grant will be considered in order to support Phase III WIP program goals.

Cornell PRO DAIRY - Dairy Acceleration Program

The [HYPERLINK "https://prodairy.cals.cornell.edu/dairy-acceleration/"] (DAP) is an initiative of Governor Cuomo in partnership with the NYS DAM and the NYS DEC designed to enhance the long-term viability of New York dairy farms while maintaining a commitment to environmentally responsible dairy farming. This program is funded through New York's EPF.

Funds may be used for preparing the farm records for business planning through benchmarking the current financial status of the dairy, the creation of strategic business plans focused on increasing the viability of the dairy, analysis of the impact of transition of the dairy, design of new or remodeled facilities, development or update of CNMPs and the design of eligible BMPs identified in the farm's CNMP, including the construction inspection and as built certification for that practice. Farms must have lactating dairy cattle and be shipping milk. Heifer boarding operations, under the large CAFO size, may apply for CNMP and design of BMP funds.

CREP State Enhancement Program

As part of the USDA-FSA Chesapeake Bay Riparian Forest Buffer Initiative of 2015, USDA-FSA's New York State office received $1 million of extra funding to increase signing incentive payments to landowners located in the Chesapeake Bay watershed that enrolled in in new riparian forest buffer CREP contracts. USDA-FSA offered additional signing incentive payments of $250-375 per acre, depending on the length of the contract. NYSDEC has allocated an additional $200,000 of CBIG funding as match that was dedicated to a new practice incentive payment. Payments were 5-15 times the soil rental rate, depending on soil type and width of the buffer to be installed. Higher payments will be made to landowners that enroll cropland acres. An amendment to the program was made in 2018, raising the payment multiplier to 20 times the soil rental rate for all acres. Despite the additional incentive funding, enrollment in CREP has remained low.

USDA FS/NRCS Joint Chiefs' Landscape Restoration Partnership

Beginning in 2014, funding was made available through the USDA-FS and USDA-NRCS [HYPERLINK "https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/newsroom/features/?cid=stelprdb1244394"] to improve the health of forests and grasslands. The USC received funding in the first year of the program to implement the *Susquehanna Watershed Riparian Buffer Enhancement Project* to provide education to promote riparian forest buffer implementation to landowners, develop and provide buffer workshops and trainings, coordinate buffer workgroups, and track implementation in the watershed. The USC's Buffer Coordinator continues to facilitate a

Riparian Forest Buffer Task Force, composed of multiple partners to address implementation obstacles.

National Fish and Wildlife Foundation (NFWF) Chesapeake Bay Stewardship Fund Grants

NFWF administers a dedicated Chesapeake Bay Stewardship fund through two grant programs. In total, $8 -$12 million in grant funding is awarded per year. Major funding is provided by the U.S. Environmental Protection Agency, Altria Group, USDA-NRCS, CSX, National Oceanic and Atmospheric Administration (NOAA), and U.S. Fish and Wildlife Service (US FWS). NFWF competitively awards funding through two programs: 1) [HYPERLINK "https://nfwf.org/chesapeake/Pages/innovative-nutrient-and-sediment-reduction-grants.aspx"]; and 2) [HYPERLINK "https://www.chesapeakebay.net/what/grants/small_watershed_grants"] (SWG) Program.

The SWG Program is divided into two smaller programs for implementation ([HYPERLINK "https://www.nfwf.org/chesapeake/Pages/small-watershed-grants.aspx"]) and planning and technical assistance ([HYPERLINK "https://www.nfwf.org/chesapeake/Pages/small-watershed-grants.aspx"]). SWG-I grants are awarded to projects within the Chesapeake Bay watershed that promote on-the-ground community-based efforts to protect and restore the diverse natural resources of the bay and its tributary rivers and streams. SWG-I projects result in improvements to local stream health and habitat, and/or the water quality of the Chesapeake Bay. SWG-I grants are between $20,000 and $200,000. SWG-PTA grants are awarded to projects that enhance local capacity to more efficiently and effectively implement future on-the-ground conservation efforts through assessment, planning and design, and other technical assistance-oriented activities. SWG-PTA projects may be funded to a maximum of $50,000 and have no matching requirements.

The INSR Program funds partnership projects that simultaneously cultivate the growth and maturation of existing regional-scale partnerships with a shared focus on water quality restoration and protection and measurably accelerate the geographic scale and/or rate of implementation for priority water quality improvement practices identified through the Chesapeake Bay TMDL and associated WIPs through enhanced collaboration, coordination, and integration of these partnerships. Applicants are encouraged to match the grant request 1:1. The USC consistently applies for and is awarded NFWF grants to supplement USC's programs.

The USC currently has two grant projects funded by NFWF:

- Sustainable Streamside Buffer Establishment in the Upper Susquehanna ($266,000, including match): Support the Upper Susquehanna Coalition Buffer Program to plant additional riparian buffer acreage and facilitate management on riparian buffer practice acres. Project will educate and manage riparian buffer stewards to evaluate and assess buffers throughout the watershed to determine plant survival and management needs and to facilitate management activities.
- Building Upon an Integrated Watershed Approach ($877,210): Integrate efforts across the watershed focusing on three key implementation focus areas, agriculture, streams, and wetlands. Project participants will work with a suite of modeling tools to identify areas for buffers, wetland restoration, and floodplain enhancement work in riparian corridors based on high-resolution land cover data.

Upper Susquehanna Coalition/USDA-NRCS Contribution Agreement

The USC and NRCS have entered a contribution agreement for $193,300.00 (75% will be from NRCS, 25% from USC), spanning the time period of 9/2018-9/2023 for work to be accomplished regarding CRP within the USC member SWCD counties. The agreement may provide funding for the development of new conservation plans for CP-22 (riparian forest buffer) and re-enrollment plans for CP-22, CP-30 and CP-21. Facilitation of implementation of these practices may also be a reimbursable expense.

Upper Susquehanna Conservation Alliance

The [HYPERLINK "https://www.fws.gov/northeast/nyfo/usca/usca.htm"] is a collaborative working organization of agencies, organizations, academic institutions, and individuals who are working to conduct green infrastructure planning, implement restoration and maintenance of high-quality waters and habitats, protect and restore species of greatest conservation need, reduce impacts of flooding, and promote sustainable working landscapes for the people of the watershed. The USCA is coordinated by the New York Field office of the US Fish and Wildlife Service (US FWS). Funding from the US FWS has been made available to members of the USCA in the past; $30,000 of funding was available in 2017.

Section 5.9: Agricultural Economic Outlook

The agricultural sector in New York is made up 35,500 farms and was valued at $5.2 billion in production in 2017[18]. The top total cash receipts for New York agriculture include dairy products and milk ($2.7 billion), apples ($343 million), corn ($256 million), cattle and calves ($333 million), and poultry and eggs ($153 million). The dairy industry in New York makes up around half of the total cash receipts for the agriculture sector, and there is a significant number of dairy farms in the Chesapeake Bay Watershed portion of New York State.

Farmer cooperation and interest in implementation is key to New York's ability to meet 2025 targets. Unfortunately, farms in New York (in particular, small dairy farms) have experienced declining net farm incomes and continue to face a challenging economic environment.

The New York agriculture industry has not been immune to the decrease in net farm income and decreased farm profitability. According to 2018 [HYPERLINK "https://www.ers.usda.gov/"] (USDA-ERS) data, New York's net farm income has decreased over the past decade, from $1.492 billion in 2008 to $1.165 billion in 2017, a total decrease of $326,776,000. There has also been a decrease in the value of agricultural production from $6.2 billion in 2014 to $5.2 billion in 2017. The decline in net farm income is a result of several different factors including a decline in commodity prices, like corn and soybeans, an overabundance of milk and decrease in milk prices, increased labor costs, and uncertainty in the foreign markets and trade relationships. According to the most recent New York State Dairy Statistics report, the price received by dairy farmers per hundred weight of milk has dropped significantly in the past four years and has often been below the cost of production ([REF _Ref3903758 \h])[19].

[18] USDA Economic Research Service and Wealth Statistics: [HYPERLINK "https://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/charts-and-maps-about-your-state/"]

[19] New York State Department of Agriculture and Markets, New York State Dairy Statistics 2017 Annual Summary can be accessed online at: [HYPERLINK "https://www.agriculture.ny.gov/DI/NYSAnnStat2017.pdf"]

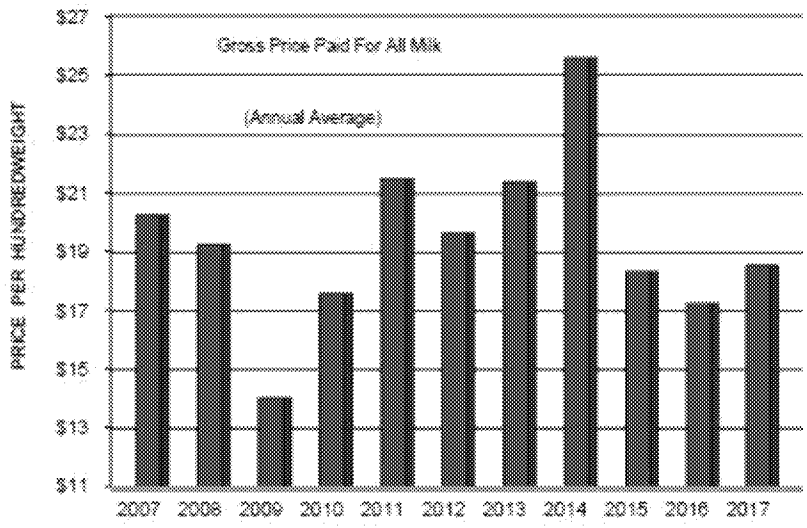

Figure [SEQ Figure * ARABIC]. Average Gross Price Paid to New York State Dairy Farmers for All Milk, 2007-2017

This will further stretch dairy farms in New York State, making substantial investments on farms unlikely and even more unlikely that dairy farms will have extra funds with which to put towards conservation practices. As economic conditions tighten, these farms may choose to exit the dairy industry and either sell the farm or convert the farm to another operation, like beef cattle, hay, or other agricultural commodities.

While low-cost BMPs can be prioritized for implementation, cost-share programs often require that a farmer pay for the conservation practice upfront and then be reimbursed by federal or state agencies. It can be extremely difficult for a farmer to get enough capital to pay for the practice out of pocket up front. In addition, very few cost-share programs cover 100% of the practice costs; farmer match ranges from 15-50% of the total cost, depending on the funding program. [REF _Ref3903779 \h] below shows the average landowner match for BMP implementation through the AgNPS funding program.

Table [SEQ Table * ARABIC]. Average Farmer Match to AgNPS BMPs

BMP	Average Landowner Match
Access Control System	$7,181.51
Alternative Water Supply	$1,425.23
Anaerobic Digestion	$190,139.15
Barnyard Runoff Management System	$6,841.60
Composting	$31,404.26
Composting System - Animal	$458.84
Conservation Tillage	$5,392.22
Constructed Wetlands	$1,014.96

Critical Area Protection	$2,583.80
Diversions	$1,739.49
Erosion Control - Structural System	$6,473.30
Feed Management System	$5,131.21
Feed Ration Evaluation and Balancing	$298.67
Fencing	$2,211.00
Fertilizer Management	$5,180.50
Filter Strips	$1,429.80
Grass Waterway	$2,367.98
Heavy Use Area Protection	$7,821.10
Livestock Heavy Use Area Runoff Management System	$19,406.22
Manure and Agricultural Waste Treatment System	$46,519.46
Manure Nutrient Analysis	$675.56
Manure Storage System	$31,951.52
Manure Transfer	$28,716.47
Milking Center Wastewater Treatment Disposal	$4,768.31
Nutrient Management	$10,208.12
Nutrient/Sediment Control System	$1,754.30
Pasture Management	$4,084.61
Pathogen Management System	$15,904.89
Permanent Vegetative Cover	$1,354.26
Prescribed Rotational Grazing System	$8,582.56
Process Wash Water Management System	$4,693.77
Riparian Buffer System	$1,757.00
Silage Leachate Control and Treatment System	$19,260.94
Soil Testing	$182.14
Stream Corridor and Shoreline Management System	$8,271.21
Stream Crossing	$2,041.25
Streambank and Shoreline Protection	$2,008.39
Waste Storage and Transfer System	$88,856.70

Given the difficult economic environment in New York's agricultural sector, additional funding and changes to existing cost-share programs is needed to reduce the financial burden of conservation practice implementation.

Section 5.10: Gap Analysis and Strategy to Fill Gaps

As discussed in [HYPERLINK \l "_Section_5.5:_NYS"], New York is facing a gap between the current agricultural program capacity and the capacity needed to attain final 2025 targets. New York proposes the following strategies to improve its agriculture program delivery including: 1) increase voluntary implementation; (2) increase local partner capacity; (3) expand BMP reporting and verification; (4) account for state-specific data in the Chesapeake Bay Watershed Model; (5) support development of innovative tools, BMPs, and research to reduce nutrients and sediment; and (6) explore new funding strategies. These strategies will require new funding sources and/or additional funding that can expand existing programs. Execution of these strategies will require collaboration among partners. Lead partners have been identified for each strategy, though partners responsible for final execution of these initiatives may vary and is dependent on available capacity.

(1) Increase Voluntary Implementation

Reduce Producer Cost Share Rates

As described in the sections above, declining net farm incomes in New York will continue to present a challenge in regard to encouraging voluntary BMP implementation. Cost share rates for state and federal programs have remained unchanged, even though cost share rates have become unaffordable for many farmers in New York. Both state and federal programs need to be reassessed in terms of reducing the required farmer cost-share. Matching multiple sources of funding should be considered to reduce the farmer cost share as much as possible. NYS DEC has begun the process with the USC to pilot a reduced cost-share program, which will pair Chesapeake Bay Implementation Grant (CBIG) funding with projects funded under the AgNPS program.

Lead Partners	NYS DEC, NYS DAM, USC
Anticipated Timeframe	Pilot program anticipated to be released in 2020-2021
Potential Funding Sources	Chesapeake Bay Implementation Grant (CBIG), Agricultural Nonpoint Source (AgNPS)

Increase Incentives for Producers

Financial incentive programs for specific BMPs have been piloted in New York and are critical to making implementation financially feasible for farmers. NYS DEC, NYS DAM, and the USC

partnered with FSA to deliver the State Practice Incentive Program for riparian forest buffers enrolled in CREP. Other Chesapeake Bay states (including Pennsylvania and Virginia) have successfully implemented BMP tax credit programs, where agricultural producers are provided a credit towards state income tax for a percentage of out-of-pocket expenses spent on installation of agricultural BMPs or purchasing of specialized equipment to reduce nutrient and sediment runoff. New York has a similar Forest Tax Law that provides tax incentives to forest landowners who implement forest management plans. New York should explore the potential for creating a similar tax credit program for agricultural BMP implementation.

Lead Partners	NYS DEC, NYS DAM, USC
Anticipated Timeframe	CREP State Incentive Program: continue funding through 2021, re-evaluate program during two-year milestones Tax Incentive Program: NYS DEC to submit legislative proposal in 2019
Potential Funding Sources	Chesapeake Bay Implementation Grant (CBIG), Environmental Protection Fund (EPF)

Expand assistance for maintenance of BMPs

Long term maintenance of BMPs was identified as a barrier to implementation by farmers during the WIP outreach meetings. Both the time and expense dedicated to maintaining BMPs, particularly riparian forest buffers, can dissuade implementation and result in BMPs being removed from the Watershed Model if they are not properly maintained. The USC's Riparian Buffer Team has begun to tackle the obstacle of maintaining riparian forest buffers by utilizing buffer stewards. The USC received a grant from the National Fish and Wildlife Foundation (NFWF) in 2018 to create the "Sustainable Streamside Buffer Establishment" program. This program supports a team of buffer stewards that educate, maintain, and assess buffers throughout the watershed to determine plant survival and management needs and to facilitate management activities on behalf of landowners. As funding through traditional grant programs does not typically cover the costs associated with maintenance, a separate maintenance support program should be established and modeled after the USC's existing buffer program.

Lead Partners	USC with support from NYS DEC
Anticipated Timeframe	Ongoing throughout WIP implementation period
Potential Funding Sources	National Fish and Wildlife Foundation (NFWF), Chesapeake Bay Implementation Grant (CBIG), Environmental Protection Fund (EPF)

(2) Increase Local Partner Capacity

Expand Technical Assistance Capacity through AEM Base Program

New York has a robust technical assistance program through AEM, with an overarching goal to increase the number of farms that participate in the program. In order to increase farm participation in the program, more funding is needed to support additional staff that will provide technical assistance and planning to farmers. AEM Base funding has remained consistent but has not increased substantially in the last seven years. Increased AEM Base funding is needed, or supplemental sources of funding need to be considered to be paired with existing state resources.

Lead Partners	SWCDs
Anticipated Timeframe	Ongoing throughout WIP implementation period
Potential Funding Sources	Chesapeake Bay Implementation Grant (CBIG), Environmental Protection Fund (EPF)

Expand engineering design support/shared services

Agricultural implementation requires planning and design that must be performed by specialized, professional staff. SWCD technicians, private planners, and engineers are needed to facilitate planning and design of projects on behalf of producers. New York supports SWCD staff trained to provide technical assistance through the AEM Base Program, though this capacity needs to be expanded (see strategy above). In addition, engineering services are required for design of structural BMPs, such as waste management structures and barnyard runoff control, and can be cost-prohibitive for small farms. While some counties have engineers on staff, often counties do not have financial capacity to fund these positions. Existing grant programs can cover a portion of planning and design for projects, through “shovel ready” projects that do not require additional planning or design receive preferred scoring. A circuit rider program for engineering services may provide a cost-effective solution to fill this need. Otsego County SWCD recently partnered with NRCS to create a shared engineer position that works across several counties to design agricultural practices and streambank restoration projects. Shared services should be explored and supported using federal or state funding.

Lead Partners	SWCDs, NRCS, NYS DEC
Anticipated Timeframe	Ongoing throughout WIP implementation period
Potential Funding Sources	Chesapeake Bay Implementation Grant (CBIG), NRCS, Local funding

Increase Capacity of Reporting/Verification Program

The USC member SWCDs are responsible for implementation, tracking, reporting, and verification of all BMPs. A significant amount of staff resources is dedicated to tracking and reporting to meet annual EPA reporting deadlines, as well as verifying practices in order to retain credit for them in the Watershed Model. By directing staff time to reporting and verification, less time is available for oversight of direct implementation. Additional funding will be required to meet EPA's reporting and verification requirements long term. In addition to staff resources, continued funding is needed to support BMP database maintenance and updates.

Lead Partners	SWCDs with coordination support from USC
Anticipated Timeframe	Ongoing throughout WIP implementation period
Potential Funding Sources	Chesapeake Bay Implementation Grant (CBIG)

(3) Enhanced BMP Reporting

Address Under-Reported BMPs

Several BMPs were identified has being widely under reported or never reported during the Phase III WIP development process. Never reported or under-reported BMPs include:

- Manure incorporation/manure injection
- Off-stream watering without fencing
- Tree planting
- Dairy precision feed management
- Land retirement/alternative crops
- Stream restoration (first reported in 2018)

The USC will work with a contractor to update the agricultural BMP database to include never reported BMPs. USC staff hold periodic trainings for member district staff responsible for data tracking and reporting. Additional trainings can be held for under-reported or never reported BMPs.

Lead Partners	SWCDs, with coordination and database support from USC
Anticipated Timeframe	Ongoing, with database updates performed on an annual basis
Potential Funding Sources	Chesapeake Bay Implementation Grant (CBIG)

Improve communication and data-sharing with Federal partners

Communication with federal partner agencies, mainly USDA-NRCS, has been inconsistent among each county SWCDs. NYS DEC does not have an overarching data sharing agreement

with USDA-NRCS for BMPs implemented through EQIP and other federal programs. This data is shared directly with EPA, but not with the USC. The USC is responsible for New York's agricultural BMP verification program. By not having access to BMP data from federal partners, BMPs in many counties cannot be verified and therefore will be removed from the model for credit. Individual SWCD may receive this data from USDA-NRCS, but this is not the case for every county. This issue is not unique to New York; other jurisdictions have similar issues with federal partner BMP data. A solution to this issue requires communication at a higher level between USDA-NRCS, EPA, and jurisdiction representatives.

Lead Partners	USDA and EPA, with support from USC and NYS DEC
Anticipated Timeframe	Ongoing throughout WIP implementation period
Potential Funding Sources	N/A – there should be no expense associated with data sharing agreement

Documentation of non-cost shared BMPs

NYS DEC, in partnership with NYS DAM and the USC, will explore ways to document BMPs implemented outside of federal or state cost share programs. New York will research mechanisms used by other jurisdictions to capture this type of BMP information. Once a mechanism has been developed, individual SWCDs will receive training on how to capture this information for reporting.

Lead Partners	NYS DEC, with support from NYS DAM, USC and SWCDs
Anticipated Timeframe	Research existing mechanisms in 2020, release mechanism and corresponding training in 2021
Potential Funding Sources	Undetermined at this time if additional funding will be needed to facilitate this type of reporting

(4) Account for state-specific data in the Chesapeake Bay Watershed Model

Accounting for Lack of Growth in the Agricultural Sector

Future forecasts of the agricultural sector in New York indicate that loading will significantly decrease due to the lack of growth and loss of farms in New York's portion of the watershed. EPA previously provided New York with a document entitled "Explanation of What's Behind New York's Draft Phase III Watershed Implementation Plan Nitrogen and Phosphorus Planning

Targets" (Appendix F pages 8 and 9), which indicated the 2025 projected decrease in total nitrogen of 0.74 million pounds and a 2025 projected decrease in total phosphorous of 0.006 million pounds. This EPA-provided analysis served as the basis for New York agreeing to the 2025 target loads at the Principal Staff Committee (PSC) meeting (July, 2018) and subsequent Phase III WIP planning activities in cooperation with stakeholders.

Lead Partners	EPA
Anticipated Timeframe	Model updates to include updated land use and agricultural data from the 2017 Agricultural Census is expected in 2021
Potential Funding Sources	N/A

Accounting for New York's Enhanced Technical Requirements

New York continues to work to implement enhanced technical requirements for agriculture. Many New York technical requirements far exceed the standards needed for the Chesapeake Bay model to truly capture New York's implementation and these technical requirements need to be accounted for in the model. Examples include:

- **Engineering Requirements:** NYS CAFOs are currently working to complete evaluations of existing manure storage and transfer systems and vegetated treatment areas by Professional Engineers.
- **Stream Setbacks:** New York's CAFO permit requires stringent setbacks for nutrient applications in farmlands adjacent to New York's waters.
- **Comprehensive Nutrient Management Plans:** The watershed model reveals that a full suite of agricultural BMPs associated with the implementation of Comprehensive Nutrient Management Plans in New York yields only a 10% nitrogen reduction. This stems from an assumption in the model that there is an excess of manure. While this may be true in other areas of the Chesapeake watershed, it is not true in New York. It may also stem from USEPA R3 overestimating the amount of purchased fertilizer in New York, which is based on county-level data. This is significant because more fertilizer (different soil types, types of agriculture) is used in northern parts of many counties that are outside of the Chesapeake Bay watershed.
- **Enhanced Nutrient Management:** The Chesapeake Bay Watershed Model assumes that all land grant universities recommend fertilizer application rates 35% above agronomic needs. This is not true in New York. In New York fertilizer application rates follow Cornell University's nutrient guidelines that are based on applied research and are actively maintained through on-going field trials with the goal of nutrient use efficiency (no

insurance factors are included in the guidelines). This holds true for all crops, including non-legume hay.

- **Agricultural Waste Management Systems:** It is not clear how the watershed model accounts for the "system-based" planning required for CNMP development in New York. For example, a waste storage system or other production area management practice, when implemented without a complementary field management practice is inappropriate and should not be credited in the model.

This level of implementation and commitment to quality best management practices needs to be captured in the model and be given adequate credit for the work being done. New York is committed to continue to work with EPA to look at the currently acceptable best management practices and definitions and to provide science-based adjustments to better reflect the New York programs.

Lead Partners	NYS DEC, in partnership with EPA and the Chesapeake Bay Program Partnership
Anticipated Timeframe	Ongoing throughout WIP implementation period
Potential Funding Sources	N/A

Accounting for New York Baseline Data in the Chesapeake Bay Watershed Model

Periodically, jurisdictions can submit state-specific data for inclusion in the baseline conditions of the Watershed Model. The following inputs and BMP information related to the agricultural sector are currently available for inclusion:

- State-specific land use data
- Land use change hotspot analysis to inform 2020-2021 forecasted land uses
- Historic land use/cover data that will be used to better forecast future land uses
- Animal populations by county
- Permitted/Non-permitted animal fractions by county
- Nutrient concentration for animals
- Manure or mass litter produced per animal
- Soil phosphorus data by county
- [HYPERLINK "http://www.aapfco.org/"] (AAPFCO) fertilizer sales
- USDA-NASS (USDA National Agricultural Statistics Service) annual poultry production data
- USDA-NASS (USDA National Agricultural Statistics Service) annual crop yield data
- USDA-NASS (USDA National Agricultural Statistics Service) 2017 Census of Agriculture

State-specific land use data: As part of the Phase III WIP planning process, it was determined that land use information is inaccurate in some portions of the watershed. In particular, pasture/hay may be overestimated in developed areas and should be re-categorized as turfgrass. New York will work with EPA to submit parcel specific information to ensure that the land use estimates in the model are as accurate as possible.

Animal populations by county: New York has identified that animal population numbers estimated in the Chesapeake Bay Watershed Model are widely inaccurate in the following counties: Broome, Cortland, Delaware, Oneida, Onondaga, Otsego, Steuben, Tioga, Tompkins, and Yates.

The discrepancy in animal numbers has resulted in some counties not being able to receive credit for certain BMPs, such as waste storage systems. After discussions with EPA, it was determined that New York will work with EPA to evaluate updated animal numbers that will be incorporated into the next model update from the 2017 US Agricultural Census. New York will review the updated numbers and will work with EPA to fix any large discrepancies.

Soil phosphorus data: Agricultural researchers have conducted extensive research on nutrient mass balances in New York.[20] Nutrient mass balances or NMBs are a measure of nutrient content and soil fertility. Soils with a high NMB contain excess nutrient content which may result in nutrient runoff and nutrient loading of waterways and inversely, a low NMB can deprive crops of necessary nutrients resulting in a lower crop yield. Research of soil samples from the New York portion of the Upper Susquehanna region found that dairy farms falling within a feasible NMB have increased 51% from 2004-2013. This is indicative of greater whole farm and feed nutrient use efficiency due to a heavier reliance on homegrown nutrients and feed in New York State. In the same study there was a notable decrease in nitrogen and phosphorous loss with a reduction of unfixed nitrogen (42%) fixed nitrogen (29%) and phosphorous (41%) either lost or added to soils in the Upper Susquehanna Watershed. It is important to note that these reductions coincide with milk production levels remaining constant. These nitrogen deficiencies are partially the result of unavoidable nitrogen losses from manure in the barn and waste storage systems – making implementation of management practices to further sequester conservable nitrogen critical. From a nutrient perspective, there are no drivers to export manure in New York because all that is produced is presently recycled in our cropping systems, though improved conservation of ammonia nitrogen could reduce reliance on purchased nitrogen fertilizer. NYS DEC is committed to working with both Cornell University and NYS DAM to provide this data to the Chesapeake Bay Program's modeling staff for incorporation into the baseline conditions of the watershed model.

Lead Partners	NYS DEC, in partnership with SUNY ESF and Cornell University
Anticipated Timeframe	2019-2021 in preparation for 2022-2023 milestones
Potential Funding Sources	Chesapeake Bay Implementation Grant (CBIG)

(5) Innovative Tools, BMPs, and Research to Reduce Nutrients and Sediment

[20] Cela*, S., Q.M. Ketterings, M., Soberon*, C. Rasmussen*, and K.J. Czymmek (2017). Upper Susquehanna watershed and New York State improvements in nitrogen and phosphorus mass balances of dairy farms. Journal of Soil and Water Conservation 27:1-11

Runoff Reduction Tool for Manure Application

For several years, the National Oceanic and Atmospheric Administration (NOAA) has been working with several states to develop and implement a manure application alert tool designed to help farmers understand when soil conditions and the weather forecast combine to make for high runoff risk for manure applications. Weather patterns shortly after manure application can have significant impact on retention or loss of nutrients, especially phosphorus. Tools that help alert farmers to marginal conditions along with using weather forecasts to help indicate when soil infiltration capacity is likely to be exceeded can help reduce runoff losses from field applications of manure. NYS DEC, NYS DAM, and Cornell University are currently working with NOAA to review, modify, and implement the tool in New York. Cornell University's [HYPERLINK "http://www.nrcc.cornell.edu/"] (NRCC) will take the lead role in hosting and managing rollout of the tool. Shifting the tool to New York will require the NRCC to build a New York-specific website patterned after a similar site developed in Wisconsin[21]. If this tool is successfully developed for New York, New York DEC will work with EPA to determine how use of this tool can be credited in the Watershed Model.

Lead Partners	NYS DEC, in partnership with Cornell University and NYS DAM
Anticipated Timeframe	Ongoing, final contract with Cornell University anticipated for 2019
Potential Funding Sources	State Funding

Nitrogen Management and On-Farm Research

Agricultural and environmental sustainability require efficient use of crop inputs, such as nitrogen and phosphorus fertilizer and manure for the highest yields, highest quality, greatest profitability, and smallest off-site environmental impact. Research shows that nitrogen losses from farm fields are primarily driven by application rates that exceed crop needs and that high yielding fields often do not require additional nitrogen inputs from manure or fertilizer. Improving how we determine crop nitrogen need while supporting high yields is key to reducing off site losses while maintaining crop productivity and optimal recycling of nutrients. Cornell University has proposed to address evolving concerns about agriculture's contribution to nitrogen enrichment of air and water by development of an on-farm partnership to improve upon recommendations for CAFO planning purposes, and potential in-season adjustments under adaptive management for corn across a wide range of conditions experienced in New York State. This would include:

- Evaluation of crop N needs/crop response for high yielding fields or areas within fields (adjustment for higher soil N contributions in high yield situations where needed).

[21] The Wisconsin Manure Management Advisory System can be found online at: [HYPERLINK "http://www.manureadvisorysystem.wi.gov/runoffrisk/index"]

- Development of improved N recommendations for corn silage and corn grain (creating a separate N equation for silage).
- Updating of the yield potential database for corn grain with yield monitor data from NY farms.
- Development of a yield potential database for corn silage with yield monitor data
- Updated Cornell N guidelines manual for field crops of New York.
- Evaluate and improve in-season adaptive management procedures for NY (i.e. in addition to taking a CSNT) in collaboration with stakeholder groups.
- Document statewide N balances and develop a method for determining field-based N balances.
- Update factsheets on N guidelines for planning and adaptive management; add new ones based on stakeholder feedback where needed.

NYS DEC will work with EPA to incorporate this research into the Watershed Model.

Lead Partners	NYS DEC, in partnership with Cornell University
Anticipated Timeframe	Ongoing throughout WIP implementation period
Potential Funding Sources	State Funding

Expand list of BMPs available for Watershed Model Credit

It is important to mention that there are often cases where non-cost shared conservation practices fail to meet EPA or NRCS standards, but the practice will have functional equivalency. New York will continue to work with other jurisdictions and EPA to account for these practices as well, with perhaps a modified efficiency. In addition, innovative BMPs (i.e. bioreactors) have not been approved for Watershed Model credit.

Lead Partners	NYS DEC, in partnership with EPA and the Chesapeake Bay Program Partnership
Anticipated Timeframe	Ongoing throughout WIP implementation period
Potential Funding Sources	N/A

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(6) Potential Funding Strategies

While TMDL watersheds are generally prioritized in existing state and federal funding programs, agricultural implementation projects located in the Chesapeake Bay watershed must compete against many other water quality needs and initiatives statewide. There are currently no funding streams dedicated directly to agricultural implementation in the Chesapeake Bay watershed.

Potential funding strategies were identified by the Environmental Finance Center at the University of Maryland in partnership with Syracuse University Environmental Finance Center and published in their report "Strategies for Financing Chesapeake Bay Restoration in New York State". Strategies identified in the report that are applicable to the agricultural sector include:

Direct a greater share of existing state water quality funds to the watershed, including dedicating a portion of the Environmental Protection Fund (EPF) to the Chesapeake Bay restoration effort and ensure the Fund's long-term stability

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. It should be noted that Chesapeake Bay is one of the few watersheds in the state that does not have a direct line item for funding in the EPF. In addition, several watershed coalitions (e.g. Lake Erie Watershed Protection Alliance, Finger Lake-Lake Ontario Watershed Protection Alliance) receive direct line items of funding in the EPF to support organizational capacity and project implementation. A similar line item should be considered to support the Upper Susquehanna Coalition and is necessary to build the necessary partner capacity for increased agricultural implementation as described above.

Secure additional funding from the AEM Base Program

While the AEM Base Program is non-competitive funding for SWCDs, the demand for AEM Base funding generally exceeds the amount of funding available and limits the capacity of individual SWCDs. This supports the argument for a state-wide increase in allocation to the program or enhanced funding for SWCDs located in the Chesapeake Bay watershed, as they are tasked with delivering enhanced levels of implementation compared to other parts of the state. Additional funds within the New York portion of the Chesapeake Bay watershed could also be used to support a regional or multi-county planner or other technical staff to help prepare projects for implementation funding.

Expand use of Clean Water State Revolving Funds to support non-traditional water quality protection efforts, including agricultural implementation

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 non-traditional 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.

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.

Leverage private sector capital to support implementation and pursue strategic public-private partnerships

Both state and federal funding present limitations to being able to support agricultural implementation. A funding strategy that may be explored is the development of private-public partnerships. 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. 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. In New York, this type of model may be applicable to 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.

Section 6: Wastewater Sector

Section 6.1: Current Sector Loading Baseline

For the purposes of this document, “wastewater” refers to wastewater discharges from municipal and industrial point sources that are controlled by individual SPDES permits. The wastewater sector includes Bay-Significant municipal and industrial wastewater treatment facilities, Bay Non-Significant municipal and industrial wastewater treatment facilities, negligible industrial wastewater discharges, and Combined Sewer Overflows (CSOs).

In New York, municipal wastewater treatment facilities are considered “Bay-Significant” if they have a design flow of 400,000 or more gallons per day. Industrial wastewater treatment facilities are considered Bay-Significant if they have a nutrient load equivalent to 3,800 total phosphorus (TP) pounds per year or 27,000 total nitrogen (TN) pounds per year. “Bay Non-Significant” wastewater treatment plants are those facilities with design flows of less than 400,000 gallons per day for municipal facilities, or lesser nutrient loads for industrial facilities.

New York’s wastewater sector was responsible for an estimated 18% of the total delivered nitrogen load and 23% of the total delivered phosphorus load in 2018.

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Section 6.2: Requirements for Wastewater Facilities

Section 6.2.1: Wastewater Discharge Monitoring

NYS DEC monitors SPDES-permitted facilities and the quality of wastewater they discharge through active and passive methods consisting of the following:

- Receiving periodic discharge monitoring reports (DMR) from permitted facilities that provide laboratory analysis of wastewater discharged by the facility
- Performing routine facility inspections
- Responding to citizen complaints of illegal or questionable activities
- Requiring certification of wastewater treatment plant operators and providing technical and regulatory assistance and training

The cornerstone of NYS DEC's surveillance program involves receiving a DMR on a recurring basis. Any SPDES-permitted facility identified as being a Bay-Significant facility is required to periodically report sample results representative of the discharge from that facility.

The DMR provides NYS DEC with sampling data that is evaluated to determine the compliance status of a permitted facility by comparing actual effluent discharge quality to the SPDES permit limits. NYS DEC enters this effluent quality data into [HYPERLINK "https://www.epa.gov/enviro/pcs-icis-overview"]. Through this system, NYS DEC staff can assess the compliance status of a facility, determine if any permit limits have been violated, or remain alert to upcoming schedule or construction completion deadlines. With this self-certification approach to reporting, falsification of any DMR data or supporting information is among the most serious of violations and could lead to significant penalties and/or criminal prosecution.

Regardless of the size and discharge capacity of the facility, all SPDES permitted facilities are required to use a laboratory that has been certified by the New York State Department of Health (NYS DOH) [HYPERLINK "https://www.wadsworth.org/regulatory/elap"] to analyze a representative sample being discharged. Generally, smaller facilities or those discharging to groundwater must maintain these data results for NYS DEC review during an inspection, while larger facilities and those discharging to surface waters must report directly to NYS DEC the results of these laboratory tests.

Using ICIS, each violation is further scrutinized by NYS DEC (and EPA) staff to determine the severity of the violation. NYS DEC is responsible for an initial response to any violation, although EPA can take action through the federal Clean Water Act and its agreement with NYS DEC. Reported discharge data for SPDES-permitted facilities is accessible to the public from the [HYPERLINK "https://echo.epa.gov/"] system.

Section 6.2.2: Municipal Wastewater Treatment Plant Operator Training

Since 1937, New York State has required certification of municipal wastewater treatment facility operators. [HYPERLINK "https://govt.westlaw.com/nycrr/Browse/Home/NewYork/NewYorkCodesRulesandRegulations?guid=I01b7fca0b5a111dda0a4e17826ebc834&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default)"] of Title 6 of *New York Codes, Rules and Regulations*

details the requirements of the Wastewater Operator Certification Program. Prior to receiving this certificate, an individual must complete NYS DEC-approved training, possess hands-on operational experience at a treatment facility, and pass a certification exam. Additionally, operators must re-certify every five years by completing NYS DEC-approved training.

Section 6.2.3: Wastewater Facility Inspections

NYS DEC is the recipient of the Chesapeake Bay Regulatory Accountability Program (CBRAP) grant from EPA. This grant supports enhanced inspection requirements for Bay-Significant and Bay Non-Significant wastewater facilities. In addition, NYS DEC performs inspections as needed in response to citizen complaints or other observations of water quality degradation. Overall, both Bay-Significant and Bay Non-Significant facilities located in the Chesapeake Bay watershed maintain a high level of permit compliance, with only a small percentage of inspections receiving an "unsatisfactory" inspection rating ([REF _Ref3966117 \h]).

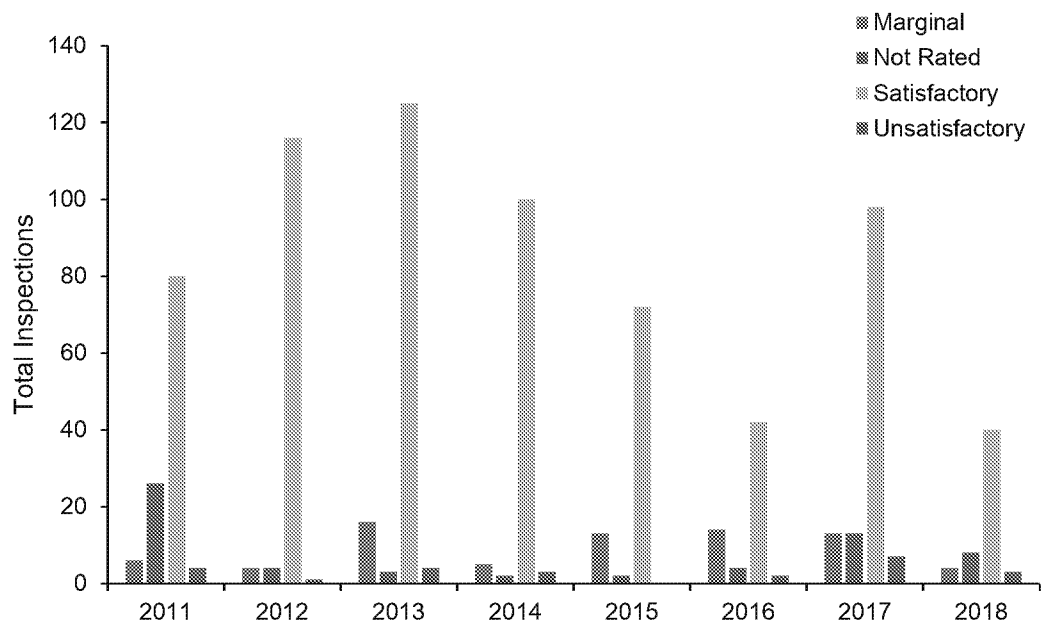

Figure [SEQ Figure * ARABIC]. Wastewater Inspection Ratings

Section 6.3: Bay-Significant Wastewater Treatment Facilities

Section 6.3.1: 2025 -Discharged Wasteload Allocations

In the Phase II WIP, individual waste load allocations (WLA) were proposed for 30 Bay-Significant wastewater treatment facilities. Individual WLAs were assigned based on existing and applicable treatment technologies at each treatment plant and the site-specific feasibility of the waste load allocation. Interim and final discharged waste load allocations were assigned to each Bay-Significant facility; interim discharged WLAs went into effect in 2017 or prior and final discharged WLAs will go into effect in 2025. The final 2025 discharged WLAs were primarily calculated based on design flow times a target concentration of 0.5 mg/L for phosphorus for most Bay-Significant facilities and design flow times a target concentration of 6-8 mg/L for nitrogen for Bay-Significant facilities that had existing nitrogen removal capabilities. As stated in

the Phase II WIP, the desire to achieve local water quality benefits drove a greater emphasis on phosphorus reductions while nitrogen reductions would be achieved by facilities that were amenable to nitrogen reduction. At facilities where the existing treatment was amenable to nitrogen reduction, a reduction in their nitrogen WLA was exchanged for an increase in their phosphorus allocation. For smaller facilities with treatment processes not amenable to nitrogen reduction, final WLAs were based on average existing loads. This approach allowed facilities to focus on either phosphorus or nitrogen reductions and reduced the need for expensive capital upgrades at every facility.

~~Final 2025 discharged WLAs assigned in the Phase II WIP were re-evaluated in the context of EPA's updated Watershed Model (Phase 6). Updated model delivery factors for each facility can be found in Appendix D. Significant changes were made to the delivery factors for each facility between the Phase 5.3.2 and Phase 6 Watershed Models. For the purpose of this document,~~ NYS DEC is proposing to retain the final 2025 discharged WLAs assigned to 30 Bay-Significant facilities in the Phase II WIP ([REF _Ref52890343 \h]). ~~and has recalculated the delivered load for each facility using the updated Phase 6 Watershed Model delivery factors~~ Final 2025 discharged WLAs will be retained from the Phase II WIP due to the fact that the final 2025 WLA has been in each permit since they were modified following the rollout of the Phase II WIP in 2013. Facilities have been planning upgrades and facility improvements based on these numbers. Changes to the 2025 WLA would result in setbacks in the planning process for facilities that have not completed upgrades and would force facilities that have upgraded in the last five years to undergo further expensive upgrades.

Monthly DMR data was analyzed to determine if an individual facility was projected to meet the 2025 WLA assigned in the Phase II WIP. For facilities that are not on track to achieve the final 2025 permit limits, consideration will be given for incorporating a compliance schedule where major capital improvements are still needed. Most facilities are already compliant, and others have projects underway such that compliance is expected in the near future.

Several final 2025 discharged WLAs were adjusted based on incorrect assumptions of technology in the Phase II WIP. In addition, a new WLA will be assigned to Kerry Bioscience – an existing industrial facility that was considered a Non-Significant facility in Phase II, but now meets the nutrient discharge threshold for Bay-Significant facilities set by EPA.

Table [SEQ Table * ARABIC]: Discharged WLA for Bay-Significant WWTPs

		Nitrogen		Phosphorus	
Facility Name	Design Flow	Interim Discharged WLA	Final 2025 Discharged WLA	Interim Discharged WLA	Final 2025 Discharged WLA
_	*MGD*	*lbs./year*	*lbs./year*	*lbs./year*	*lbs./year*
ADDISON (V)	0.42	n/a	13,000	n/a	761
ALFRED (V)	0.98	n/a	27,000	n/a	1,490
AMPHENOL CORP-AEROSPACE OPERATIONS	Monitor	134,000	90,000	n/a	761
BATH (V) WWTP	1.00	n/a	61,000	1,960	1,520
BINGHAMTON-JOHNSON CITY JOINT STP	35.00	n/a	639,261	n/a	106,543
CANISTEO (V) STP	0.70	13,000	21,000	3,180	1,920
CHEMUNG CO. SD #1 (LAKE STREET) STP	12.00	n/a	292,000	25,300	18,300
CHENANGO NORTHGATE WWTP	0.80	n/a	27,000	1,910	1,220
CHOBANI	1.15	n/a	28,000	n/a	1,750
COOPERSTOWN (V) WWTP	0.75	25,000	27,000	2,170	1,140
CORNING (C) WWTP	3.08	n/a	125,000	5,040	4,690
ELMIRA/CHEMUNG CO. SD #2	12.00	274,000	292,000	27,400	18,300

		Nitrogen		Phosphorus	
Facility Name	Design Flow	Interim Discharged WLA	Final 2025 Discharged WLA	Interim Discharged WLA	Final 2025 Discharged WLA
ENDICOTT (V)	10.00	n/a	410,000	28,600	15,200
ENDICOTT INTERCONNECT TECHNOLOGIES INC	Monitor	60,000	21,200	n/a	1,325
ERWIN (T)	1.75	27,000	34,000	n/a	4,060
GREENE (V) WWTP	0.45	n/a	19,000	1,020	761
HAMILTON (V)	0.85	n/a	32,000	1,990	1,290
HORNELL (C)	4.00	106,000	117,000	8,530	1,920
KERRY BIO-SCIENCE	Monitor	n/a	17,000	n/a	1,060
LEPRINO FOODS	Monitor	26,000	20,000	8,180	4,090
LEROY R. SUMMERSON WWTF (CORTLAND)	9.00	256,000	219,000	23,100	13,700
NORWICH	2.37	n/a	177,000	7,300	3,610
ONEONTA (C)	4.00	n/a	134,000	7,510	6,080
OWEGO #2	2.00	78,000	56,000	4,850	3,040
OWEGO (T) #1	0.85	78,000	32,000	3,600	1,290

		Nitrogen		Phosphorus	
Facility Name	Design Flow	Interim Discharged WLA	Final 2025 Discharged WLA	Interim Discharged WLA	Final 2025 Discharged WLA
OWEGO (V)	1.00	n/a	32,000	1,730	1,520
PAINTED POST (V)	0.50	13,000	14,000	953	761
RICHFIELD SPRINGS (V)	0.60	n/a	24,000	n/a	913
SHERBURNE (V) WWTP	0.43	n/a	16,000	901	761
SIDNEY (V)	1.70	n/a	41,000	n/a	2,590
UPSTATE CHEESE FARMS LLC.	Monitor	27,000	22,000	9,580	1,370
WAVERLY (V)	1.35	n/a	42,000	6,190	2,050
TOTAL			3,121,461		225,786

Section 6.3.2: 2025 Delivered Loads

When developing its August 2019 Phase III WIP wastewater scenario, NYS DEC used a conservative approach of estimating 2025 nitrogen discharges from New York wastewater facilities based upon full design flows (instead of actual flows). Most of these facilities operate well below design flow and given the current and long-trending decline in population in this part of New York, flows are likely to stay at or below current actual flows in the future. For example, a Cornell University study in 2018 forecasted a decline of 1.4 percent total population between 2020 and 2025 in New York's Southern Tier (the Upper Susquehanna River's basin)[22]. County specific data has shown population declines in every New York county within the watershed, except for Tompkins County (due to growth in the City of Ithaca, which is outside of the Chesapeake Bay watershed[23].

In this amended Phase III WIP, eEstimated 2025 delivered loads were re-calculated for each Bay-Significant facility using an average of reported monthly flows over a three-year period (July 2016- June 2019) ([REF _Ref52179040 \h][REF _Ref52179040 \h]). Delivered loads were calculated using the latest delivery factors included in the Phase 6 Watershed Model (Appendix D) and phosphorus or nitrogen concentration as described in Section 6.3.3 and Section 6.3.4. Facilities that are experiencing exceedances in flow due to Inflow and Infiltration (I&I) will be prioritized for state-funding to address aging infrastructure. Several I&I studies for Bay-Significant facilities are underway (Town of Chenango, Village of Endicott, Village of Owego) and remediation actions recommended by these studies will be prioritized for state-funding prior to 2025.

Section 6.3.3: Concentration Limits for Phosphorus

New York was close to, but did not achieve, the 2017 midpoint progress target for phosphorus in the wastewater sector. Concentration limits are being proposed ~~to close the gap~~ to further reduce phosphorus while maintaining Final 2025 WLAs. A "technology based" approach will be utilized to determine concentration limits. Municipal facilities will be assigned a concentration limit between a 0.5-1.0 mg/L based on existing technology. 2025 WLAs were calculated for the Phase II WIP based on a 0.5 mg/L concentration at design flow, although NYS DEC recognizes that many facilities operate well below design flow and would only be able to achieve a 1.0 mg/L concentration limit consistently with existing technology. Technology based concentration limits are appropriate based on [HYPERLINK "https://govt.westlaw.com/nycrr/Document/I4eda63aecd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)"]6 NYCRR section 750-2.8(a)(5), which states: "The permittee and operator shall operate the wastewater treatment facility in such a manner as to minimize the discharge of pollutants to a degree that is achievable when compared to standard practices for operation of such wastewater treatment facilities." At this time, phosphorus concentration limits are only proposed for municipal facilities; additional optimization studies are needed at the industrial facilities to determine appropriate concentration limits based on existing technology. In the

[22] [HYPERLINK "https://pad.human.cornell.edu/counties/projections.cfm"]

[23] NYS Department of Labor [HYPERLINK "https://data.ny.gov/Government-Finance/Annual-Population-Estimates-for-New-York-State-and/krt9-ym2k"].

future, concentration limits may be incorporated into permits for any new or existing facilities as deemed necessary by NYS DEC.

2025 delivered loads for phosphorus were based on future permitted total phosphorus concentration limits for 26 municipal facilities as described above. Since concentration limits are not proposed for industrial facilities at this time, 2025 delivered loads for six industrial facilities were based on concentrations achievable with current treatment technology.

Section 6.3.4: Concentration Limits for Nitrogen

Since new permitted nitrogen concentration limits for the remainder of the Bay-Significant facilities are not proposed at this time, 2025 delivered loads for nitrogen were based on total nitrogen concentration achievable with current treatment technology at all Bay-Significant facilities.~~No new permitted nitrogen concentration limits for the remainder of the Bay-Significant facilities are proposed at this time. 2025 delivered loads for nitrogen were based on total nitrogen concentration achievable with current treatment technology at all Bay-Significant facilities.~~ 13 Bay-Significant facilities have current technology to meet ammonia or total nitrogen concentration limits that are required to protect local water quality.

Section 6.3.5: Wastewater Treatment Optimization

Optimization of existing infrastructure offers a low-cost option to achieve or exceed permit limits for phosphorus and nitrogen. By adjusting internal operations and process control within the existing treatment works, there is a potential to reduce effluent nutrient loads without expensive capital upgrades. NYS DEC has made funding available to hire a contractor that will assist facilities with treatment optimization. The contractor will provide written recommendations for actions that can be taken to optimization nutrient removal. In addition, the contractor will provide training and technical assistance to WWTP operators to implement the suggested recommendations. Bay-Significant facilities will be prioritized for assistance, but the contractor can also provide assistance to Non-Significant facilities depending on need and funding available. NYS DEC expects to have a contractor in place by the end of 2020.

Table [SEQ Table * ARABIC]: 2025 Delivered Loads Bay-Significant WWTPs

Facility Name	Average Flow [24]	2025 Delivered Nitrogen Load	2025 Delivered Phosphorus Load
_	*MGD*	*lbs./year*	*lbs./year*
ADDISON (V)	0.25	4,932	~~312~~186
ALFRED (V)	0.44	6,207	~~184~~183
AMPHENOL CORP-AEROSPACE OPERATIONS	0.14	8,657	~~531~~176
BATH (V) WWTP	0.59	20,129	~~724~~362
BINGHAMTON-JOHNSON CITY JOINT STP	18.00	223,222	27,006
CANISTEO (V) STP[25]	0.32	6,396	~~810~~427
CHEMUNG CO. SD #1 (LAKE STREET) STP	8.46	84,623	~~11,719~~5,447
CHENANGO NORTHGATE WWTP	0.53	10,355	~~578~~289
CHOBANI	0.55	7,658	~~155~~310

[24] Average flow was based on 2017-2019 reporting period (July 2016-June 2019).

[25] Currently the facility does not have chemical treatment for phosphorus removal. No concentration limit is proposed for phosphorus at this time and the average from July 2016-June 2019 was used.

COOPERSTOWN (V) WWTP	0.43	12,110	~~426~~307
CORNING (C) WWTP	1.39	30,911	~~1,702~~852
ELMIRA/CHEMUNG CO. SD #2	5.79	68,010	~~8,017~~4,016
ENDICOTT (V)	10.12	284,234	~~13,692~~6,837
ENDICOTT INTERCONNECT TECHNOLOGIES INC*	0.71	11,330	~~227~~758
ERWIN (T)	0.23	630	~~1,025~~781
GREENE (V) WWTP	0.60	16,979	~~277~~154
HAMILTON (V)	2.37	60,528	~~719~~359
HORNELL (C)	1.01	19,831	1,768~~9~~
KERRY BIO-SCIENCE	0.39	12,188	~~464~~463
LEPRINO FOODS	0.27	11,103	~~870~~1,184
LEROY R. SUMMERSON WWTF (CORTLAND)	5.96	97,658	~~7,641~~3,821
NORWICH	2.08	85,097	~~2,467~~1,170
ONEONTA (C)	2.12	43,359	~~3,062~~1,529
OWEGO #2	1.20	23,047	~~1,548~~773

OWEGO (T) #1	0.47	8,356	~~607~~303
OWEGO (V)	0.61	16,223	~~789~~303
PAINTED POST (V)	0.18	2,192	~~218~~109
RICHFIELD SPRINGS (V)	0.22	1,973	30
SHERBURNE (V) WWTP	0.33	7,781	~~405~~237
SIDNEY (V)	0.64	9,433	~~746~~374
UPSTATE CHEESE FARMS LLC	0.91	16,179	~~462~~660
WAVERLY (V)	0.58	18,868	~~750~~631
TOTAL		1,230,200	~~89,931~~62,225

Section 6.3.46: Nitrogen Bubble Permit and N:P Trading

In the Phase II WIP, nitrogen allocations were aggregated under a "bubble permit". The bubble permit was phased in between 2015 and 2017 ([REF _Ref52179081 \h][REF _Ref2172458 \h]). The idea behind the bubble permit was that discharges from facilities were aggregated so that excess load from one facility could be offset by other facilities, provided those facilities achieve better than required pollutant removal during that respective month or 12-month period. Each facility received a delivered WLA, which was calculated by multiplying the discharged WLA by a delivery factor assigned to each permittee in the Watershed Model (Phase 5.3.2 model). The aggregated bubble limit was determined based the sum of the delivered loads. If the aggregate 12-month delivered load were to exceed, the individual 12-month load limit (discharged load) would be used for compliance purposes. The permittees were also allowed to exchange any discharged phosphorus load below their 12-month phosphorus load limit for an adjusted reduction to their nitrogen load. Exchanges between nitrogen and phosphorus were based on a unique N:P ratio assigned in each individual permit.

Table [SEQ Table * ARABIC]. WLA for Bay-Significant Treatment Plants under the New York Bubble Permit

Effective Year	Discharged TN (12-ML, lbs./yr.)	Delivered TN (12-ML, lbs./yr.)	Number of Facilities
2015 (Phase I Permit)	1,260,430	595,708	5
2016 (Phase II Permit)	2,308,796	976,000	24
2017 (Phase III Permit)	2,517,596	1,069,000	29

Due to the re-construction of the Binghamton-Johnson City Sewage Treatment Plant, the facility was excluded from the bubble permit.

NYS DEC is proposing to remove the nitrogen bubble permit and N:P trading from existing permits for several reasons. First, changes to the delivery factor changes due to the Watershed Model update would require the bubble to be re-calculated. This would necessitate a decrease in the individual WLAs because the nitrogen delivery factor has increased for all facilities except for one. The structure of the bubble permit will inhibit New York's ability to achieve the needed reductions; each wastewater facility will need to operate for nutrient removal to the best of their ability in order for New York to meet the overall reduction targets for the sector. Lastly, removal of the bubble will simplify tracking and reporting by both NYS DEC compliance staff and wastewater facility operators.

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Section 6.3.~~5~~7: Future Changes to Individual WLAs

It is NYS DEC's practice to implement TMDLs adaptively by making minor adjustments to the WLAs when new information becomes available or circumstances arise during the implementation of the TMDL that suggests such modifications are appropriate. NYS DEC will notify EPA and the public regarding any shifts in loading that is made to the WLAs of this TMDL. New information generated during TMDL implementation may include: monitoring data, BMP effectiveness information, and land use information. NYS DEC will not make adjustments that will result in an increase to the sum of the Delivered WLAs or the total loading delivered to Chesapeake Bay.

New or Expanded Discharges

New York does not have any reserve nitrogen or phosphorus allocations for new or expanded discharges from wastewater treatment facilities of any size. All such discharges must offset 100% of new loadings and SPDES permits will include enforceable provisions to implement offsets. Facilities may secure offsets for new or expanded loads by:

- Assimilation of existing onsite septic systems. Offsets from assimilation of existing onsite septic systems may only be secured for nitrogen, as the Watershed Model does not currently attribute any phosphorus loading to onsite systems. Septic connections receive a nitrogen credit of 0.9 lbs./yr. for every ten systems connected.
- Consolidation with other existing wastewater treatment systems for which wasteload allocations have been provided. Wasteload allocations will be re-calculated for the consolidated facilities based on the design flow, facility-specific delivery factors and treatment capability.
- Expanded facilities may improve treatment to meet load limits.
- Additional offset mechanisms may be available upon the development and approval of a future comprehensive trading program (See [HYPERLINK \l "_Section_6.10:_"] for more information).

New or expanded municipal discharges of any size will require regulation under an individual SPDES permit to implement offset provisions and allow tracking and reporting. All offsets will be based on delivered loads, rather than discharged loads, and are dependent on site-specific model delivery factors.

If any new or expanded Non-Significant facilities are permitted in the future, they will be subject to individual monitoring and reporting requirements consistent with the provisions for existing Bay-Significant facilities. Upon the request of permittees or future trading/offset partners, existing individual Non-Significant municipal facilities may be classified and tracked as Bay-Significant municipal facilities, provided that acceptable flow measurement and nutrient self-monitoring capability is demonstrated.

Re-classification or Elimination of Facilities

Non-significant facilities may be re-classified as a Bay-Significant facility at any time if the design flow threshold for municipal facilities (0.4 MGD) or nutrient loading threshold for industrial

facilities (27,000 pounds of nitrogen per year or 3,800 pounds of phosphorus per year) is exceeded. Re-classified Non-significant facilities will be subject to monitoring and reporting requirements and will receive a permit modification with wasteload allocations for both nitrogen and phosphorus. Re-classified Non-Significant wastewater loadings will no longer be reported in the aggregate Non-Significant load and will be reported as part of the Bay-Significant wastewater load as soon as the permit is modified.

For consolidating facilities in which there is no design flow increase, NYS DEC may re-assign all or a portion of the WLA from the facility that will be taken offline to the remaining facility, provided that the treatment capability of the remaining facility exceeds the treatment of the facility being taken offline. Facility-specific delivery factors will also be taken into consideration when determining re-assignment of existing load allocations.

If existing sources are eliminated through assimilation by another facility, or if CSO discharges are eliminated, their component loads will no longer be included in reported wastewater loadings.

Water Quality Trading

As described below in [HYPERLINK \l "_Section_6.5:_"], NYS DEC is willing to consider water quality trading among SPDES dischargers with a WLA as a means of providing flexibility for the implementation of this TMDL. Water quality trading is a voluntary, market-based option that regulated point sources can use to meet the water quality-based effluent limits in their SPDES permits. Trades among individual WLAs may be implemented and documented in the individual SPDES permits of those agreeing to the trade through corresponding adjustments among the SPDES permit limits by adjusting SPDES permit limits among the facilities that have agreed to trade. NYS DEC may consider the nature of the loads, e.g. bioavailable phosphorus content, when trading between sources is being considered to ensure the trade will not cause additional local water quality problems.

Consistent with the overall approach for minor adjustments above, NYS DEC will notify EPA of any proposed water quality trading 30 days prior to their implementation. Public notice would be provided through the SPDES permitting process as per [HYPERLINK "https://govt.westlaw.com/nycrr/Browse/Home/NewYork/NewYorkCodesRulesandRegulations?guid=Ifbd8d7f0b5a011dda0a4e17826ebc834&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default)"] and [HYPERLINK "https://govt.westlaw.com/nycrr/Browse/Home/NewYork/NewYorkCodesRulesandRegulations?guid=Ifc83bdf0b5a011dda0a4e17826ebc834&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default)"].

Numeric Nutrient Criteria

Adjustments to WLAs or concentration limits for phosphorus may be necessary to implement the applicable water quality standards, including the implementation of [HYPERLINK "http://www.dec.ny.gov/chemical/77704.html"]. New York, like many other states, is working with EPA to develop more specific numeric criteria that better define the levels of nutrients that result in impairment of water uses. Nutrients are currently regulated in New York State waters by a narrative water quality standard, rather than a numeric standard. A numeric standard

provides a specific numeric threshold (e.g., mercury not more than 0.0007 ug/L), and a narrative standard lays out a descriptive condition that needs to be met. The narrative standard for phosphorus and nitrogen is: "None in amounts that result in the growths of algae, weeds and slimes that will impair the waters for their best usages". NYS DEC is currently working to identify regionally specific nutrient criteria values – initially focusing on phosphorus in fresh waters – that are protective of water quality in New York State. Because wastewater loads occur continuously during the growing season and secondary treated effluent is highly bio-available, NYS DEC is aware of the impact that more strict nutrient criteria could have on regulated wastewater facilities and will develop an implementation strategy that recognizes the need to phase in new criteria over time. As these efforts move forward over the next couple years, NYS DEC will conduct public outreach to inform stakeholders and solicit their feedback

Section 6.3.~~6~~8: Binghamton-Johnson City Sewage Treatment Facility Rehabilitation

In September 2011, significant flooding associated with Tropical Storm Lee inundated the Binghamton-Johnson City Sewage Treatment Plant. At a design flow of up to 60 MGD, it is the largest wastewater treatment facility in the New York portion of the Chesapeake Bay watershed. Due to the flooding event, the facility experienced major structural damage to its biological aerated filter (BAF) treatment, causing the facility to become inoperable. Construction has been ongoing; the facility now has partial treatment capabilities but is still not performing at a comparable level to before the flooding event. NYS DEC negotiated a consent order with the City of Binghamton, Village of Johnson City, and the Joint Sewage Board with a plan to restore treatment capabilities. The Consent Order requires that construction be fully complete by January 1, 2020, and that the Plant be meeting the SPDES Permit discharge limits by April 1, 2020. Failure at the plant has prevented New York from being able to meet interim nitrogen reduction targets in the wastewater sector, though it is expected that New York will meet its wastewater sector targets when the plant is fully operational. Once the facility is fully operational, a study will be conducted to determine the extent to which phosphorus can be removed with the existing processes. Permit limits assigned in this Phase III WIP may be adjusted depending on the outcome of the study.

Section 6.4: Non-Significant Wastewater Treatment Facilities

Non-Significant wastewater treatment facilities are defined as municipal facilities with permitted flows less than 400,000 gallons per day and industrial facilities with discharges of less than 27,000 pounds of nitrogen per year or 3,800 pounds of phosphorus per year. Appendix E includes a currently list of the Non-Significant wastewater treatment facilities in New York and their associated loads. Facilities in this subcategory operate pursuant to individual SPDES permits.

Non-Significant facilities represent less than 15 and 7 percent of the total delivered load from New York for nitrogen and phosphorus, respectively. Most of these facilities are not required to monitor for nutrients and therefore at New York's request, EPA staff conducted a one-time monitoring of the largest of these dischargers. For most facilities, the discharge concentrations in this one-time monitoring effort were within the estimates used previously in EPA modeling.

An aggregate, edge-of-stream, and Chesapeake Bay delivered annual average waste load allocation of nitrogen and phosphorus are set at the New York watershed scale for Non-Significant municipal facilities. The aggregate waste load allocations are based upon the summation of individual facility loads, estimated from DMR data where available. For facilities that are not required to monitor, a modeled default load is calculated based on permitted flow and estimated total nitrogen and total phosphorus concentrations. Individual facility loads are equal to the model estimates except where, based upon the judgment of permitting staff, the existing condition is substantively different from the model representation, or monitoring indicates that a conservative estimate is warranted. Individual waste load allocations have not been assigned to any Non-Significant facility at this time, although the implementation of numeric nutrient criteria may result in future phosphorus limits. NYS DEC will continue to review of discharge monitoring reports, compliance inspections, and targeted monitoring, to ensure that the aggregate waste load allocations from Non-Significant facilities is being met. TMDL implementation will be accomplished through the verification of the aggregate loading for existing discharges at the time of permit reissuance. In the future, NYS DEC may require monitoring for Non-Significant facilities in order to better represent loads from these facilities in the Watershed Model.

Section 6.5: Combined Sewer Overflows

There are three municipalities with Combined Sewer Systems (CSO) in New York's portion of the Chesapeake Bay watershed:

- Johnson City (SPDES No. NY0023981) and Binghamton (SPDES No. NY0024406): Binghamton and Johnson City entered into a Consent Order with NYS DEC in December 1989 to address their combined sewer overflows. The Binghamton-Johnson City wastewater treatment plant system now exceeds the federal CSO policy requirements for primary treatment through the addition of capacity to treat 85% of the wet weather flow (approximately 60 MGD). The current annual wastewater flow treated is about 25 MGD. To address the remaining 15% of wet weather flows, the two communities continue to implement the CSO BMPs and make upgrades to infrastructure such as: installation of in-line screens for floatables control; installation of flap gates on combined sewer overflow structures to prevent backflow from entering the collection system; separation of sewers; and adoption of a Capacity, Management, Operations and Maintenance (CMOM) Plan.
- Elmira-Chemung County Sewer Districts: One district (SPDES No. NY0036986) has eliminated its CSOs. The second district's (SPDES No. NY0035742) Long-Term Control Plan was submitted in November 2009 and approved by DEC in April 2012, with a requirement that the district comply with requirements developed under the Chesapeake Bay TMDL. The system currently captures 88% of the estimated annual average storm events. To maximize flows to the treatment plant, the permitee has completed several repairs to the bar screens units at the treatment plant. The current Long-Term Control Plan provided a monitoring program of the CSO discharges to the Chemung River, as well as the river itself to determine if fecal coliform water quality standards were being met.

NYS DEC recommends that EPA continue to apply the default interim value for CSO waste load allocation based on its assessment of load and 85-88% reduction from the implementation of Long-Term Control Plans for estimating the potential load from these permits for inclusion in the aggregate waste load allocation of the Chesapeake Bay TMDL.

Section 6.6: Negligible Discharges

Discharges regulated by registrations under the SPDES permits for hydrostatic testing, groundwater remediation, and water treatment plants general permits are assumed to contribute negligible total nitrogen and total phosphorus loads, as are boiler blow down, water softener and filter backwash, once through cooling water, and cooling tower blow down waste streams without the addition of corrosion control inhibitors containing phosphorus.

In addition to the permit and discharge types identified above, any discharge for which the maximum expected total nitrogen and total phosphorus effluent concentrations are less than 1.3 mg/l and 0.1 mg/l, respectively, may be considered as a negligible source. The thresholds are based upon the average total nitrogen and total phosphorus concentration for New York waters based on long-term monitoring data from the Chemung and Susquehanna stations and a general assumption that discharge at or below those levels would reflect no net increase above the pollutant loads expected in the ambient background.

Section 6.7: Tracking and Reporting Wastewater Data

NYS DEC reports DMR data to EPA's Chesapeake Bay Program on an annual basis. Previously, DMR data was downloaded by NYS DEC staff from ICIS and submitted to the Chesapeake Bay Program. In 2018, a new [HYPERLINK "https://pointsource.chesapeakebay.net/"] was piloted. The pilot reporting application pulls data from ICIS and puts it into an online interface that each jurisdiction can use to correct and re-submit DMR data to meet annual progress reporting requirements. NYS DEC successfully submitted 2018 progress data for Bay-Significant and Bay Non-Significant facilities that are required to submit DMR data. For Non-Significant facilities that are not required to monitor, modeled loading estimates are still submitted to Chesapeake Bay Program staff using a spreadsheet format.

Section 6.8: Wastewater Funding and Loan Programs

This section provides a summary of existing funding sources at the state and federal level, as well as a summary of anticipated funding needs for Bay-Significant wastewater treatment facility upgrades. Anticipated upgrades to municipal facilities that will be completed prior to 2025 are summarized in [REF _Ref52890520 \h]. Upgrades may or may not be related to Chesapeake Bay permit requirements but are generally beneficial to facility operation and may improve nutrient treatment. Additional upgrades may be required at several industrial facilities to meet 2025 permit limits.

Table [SEQ Table * ARABIC]. Municipal Bay-Significant Wastewater Facility Capital Upgrades

Facility	Anticipated Upgrade	Estimated Capital Costs
BATH (V) WWTP	Complete rebuild of facility is anticipated. The Village is currently determining the type of treatment technology (MLE or MBR). Upgrade is not required to meet Chesapeake Bay 2025 permit limits.	$23.5-27.5 million

CANISTEO (V) STP	The facility will be piloting chemical addition for phosphorus removal to their exiting SBR system.	$250,000-$500,000
CHEMUNG CO. SD #1 (LAKE STREET) STP	Facility is proposed to be consolidated with Elmira/Chemung Co. Sewer District #2 to form a regional facility.	Undetermined Cost
CHENANGO NORTHGATE WWTP	Facility is currently expanding to consolidate two Non-Significant treatment facilities. The facility will convert treatment from SBR to MBR.	$25 million
ELMIRA/CHEMUNG CO. SD #2	Facility is proposed to be consolidated with Sewer District #1 to form a regional facility.	Undetermined Cost
ENDICOTT (V)	Facility has had issues with I/I and meeting phosphorus limits.	Greater than $10 million
LEROY R. SUMMERSON WWTF (CORTLAND)	Facility will need to upgrade to meet nitrogen limits.	Greater than $10 million
OWEGO (T) #1	Facility will need to upgrade to meet phosphorus limits.	Greater than $5 million
SIDNEY (V)	Facility will need to upgrade to meet phosphorus limits.	$3 million

Section 6.8.1: State Funding Sources

[HYPERLINK "https://www.efc.ny.gov/cwsrf"]**:** The CWSRF provides low-interest rate financing to municipalities to construct water quality protection projects, such as sewers and wastewater treatment facilities. A variety of publicly-owned water quality improvement projects are eligible for financing. EPA provides funding to states to capitalize the CWSRF program. New York's Environmental Facilities Corporation (EFC) uses this federal money, along with the required State match funds, to fund projects for the purpose of preserving, protecting, or improving water quality. As borrowers repay their loans, repayments of principal and interest earnings are recycled back into the CWSRF program to finance new projects and allow the funds to "revolve" over time. EFC provides both short and long-term financings, at zero or low interest to accommodate municipalities of all population sizes with varying financial needs.

[HYPERLINK "https://www.efc.ny.gov/WIIA"]**:** The Clean Water Infrastructure Act of 2017 invests $2.5 billion in clean and drinking water infrastructure projects and water quality protection across New York. It provides at least $1 billion for the New York State Water Infrastructure Improvement Act of 2017 (WIIA), which authorizes EFC to provide grants to assist

municipalities in funding water quality infrastructure. WIIA grants are available for both drinking water and sewage treatment works (clean water) projects.

[HYPERLINK "https://www.efc.ny.gov/IMG"]: The Clean Water Infrastructure Act of 2017 also included the Intermunicipal Water Infrastructure Grant Program (IMG). In 2017, $30 million was available for the IMG program, which will provide grants for water quality infrastructure projects to be undertaken by two or more cooperating municipalities. IMG funding will be awarded to projects for construction, replacement or repair of water quality infrastructure, or for compliance with environmental and public health laws. Projects may include shared water quality infrastructure or interconnection of multiple municipal water systems. IMG grants are available for both drinking water and sewage treatment works projects.

[HYPERLINK "https://www.dos.ny.gov/lg/lge/index.html"]: The Local Government Efficiency (LGE) Program is administered by the New York State Department of State (DOS) and provides state funding to local governments for the development of projects that will achieve savings and improve municipal efficiency. Funding is available for local governments considering the consolidation and sharing of management of public infrastructure including water and sewer.

[HYPERLINK "https://www.efc.ny.gov/ISC"]: The ISC Grant seeks to incentivize a multi-faceted approach to the water quality challenges caused by stormwater. Under this program, EFC provides grant dollars for the incorporation of green infrastructure practices into CWSRF-financed Combined Sewer Overflow, Sanitary System Overflow, and stormwater projects. The grant covers 50% of a municipality's construction cost up to $5 million. Successful applicants will construct projects that treat a minimum of 25% of the water quality volume from a combined, sanitary, or storm sewer system.

[HYPERLINK "http://www.nyshcr.org/Programs/NYS-CDBG/"] The NYS CDBG program is a federally funded program administered by the New York State Office of Community Renewal that provides financial assistance to eligible cities, towns, and villages with populations under 50,000 and counties with an area population under 200,000, in order to develop viable communities by providing decent, affordable housing, and suitable living environments, as well as expanding economic opportunities, principally for persons of low and moderate income. Grants are available for private water/wastewater system assistance, including construction or rehabilitation of septic systems, and installation of lateral connections to low- and moderate-income households from the public water/sewer mains. Applications for funding of lateral connections can be stand-alone projects or can be part of a larger public infrastructure project. Public infrastructure projects eligible for funding include sanitary sewage collection and treatment.

[HYPERLINK "https://www.dec.ny.gov/pubs/4774.html"]: NYS DEC administers the WQIP program, which is a competitive, reimbursement grant program that funds projects to address documented water quality impairments. Eligible projects include municipal wastewater treatment improvement projects, including improvements needed to meet TMDL requirements, upgrades needed to address CSO/SSO issues, and projects to construct municipal systems to serve multiple properties with inadequate on-site septic systems.

[HYPERLINK "https://www.efc.ny.gov/EPG"]: NYS DEC, in conjunction with EFC, offers grants to municipalities to help pay for the initial planning of eligible CWSRF or WQIP water quality projects. $3 million in funding was available through EPG in 2018. The goal of the EPG program is to advance water quality projects to construction, so successful applicants can use the engineering report funded by the grant to seek financing through other programs.

Section 6.8.2: Federal Funding Sources

[HYPERLINK "https://www.epa.gov/wifia"] The Water Infrastructure Finance and Innovation Act of 2014 (WIFIA) established the WIFIA program, a federal credit program administered by EPA for eligible water and wastewater infrastructure projects. The WIFIA program offers loans with low, fixed interest rates and flexible financial terms. The minimum project size for small communities (population of 25,000 or less) is $5 million and the minimum for large communities is $20 million.

[HYPERLINK "https://www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program/ny"]: Administered by USDA Rural Development, the purpose of this program is to support water and waste disposal systems in rural areas with populations less than 10,000 people. Long-term, low interest loans are available through the program, and grants may also be available.

[HYPERLINK "https://www.rd.usda.gov/programs-services/water-waste-disposal-predevelopment-planning-grants/ny"] Also administered by USDA Rural Development, this program assists communities with the intimal planning and development of applications for the Water & Waste Disposal Loan and Grant Program.

[HYPERLINK "https://www.eda.gov/pdf/about/Public-Works-Program-1-Pager.pdf"]: This program assists distressed communities to upgrade their physical infrastructure in order to attract new industries and expand business opportunities. Traditional public works projects, including water and sewer system improvements, are eligible under this program.

[HYPERLINK "https://nrwa.org/initiatives/revolving-loan-fund/"]: Administered by the National Rural Water Association, the Rural Water Loan Funding is a program that provides low-cost loans for short-term repair costs, small capital projects, or pre-development costs associated with larger projects to small water and wastewater utilities. Repaid funds are used to replenish the fund to make new loans.

Section 6.9: Wastewater Trading and Offset Program

NYS DEC is not considering a trading program at this time because the need for a comprehensive trading has not been demonstrated. However, concepts described in this section may be used in case-by-case offset evaluations or as the foundation for a future comprehensive trading program. Stakeholder recommendations will be considered in determining if a comprehensive trading program is needed.

The primary focus of trading program would be among traditional point sources subject to SPDES permitting requirements for the purpose of addressing short-term growth at existing facilities. All municipal facilities can be granted additional offsets if expansion involves the assimilation of other facilities or existing on-site systems, although EPA has not approved an offset mechanism for phosphorus from on-site systems because the Watershed Model does not

recognize phosphorus loads from that source sector. Nonetheless, circumstances may arise where new or expanding point sources need additional mechanisms to offset new loads. Such scenarios are intended to be evaluated case-by-case, with documentation and control requirements included in SPDES permits.

Trading would be based on individual waste load allocations for existing Bay-Significant and Non-Significant municipal and industrial wastewater facilities as identified in [HYPERLINK \l "_Section_6.3:_Bay-Significant"] and [HYPERLINK \l "_Section_6.4:_Non-Significant"]. In instances that involve loads from sources other than wastewater treatment facility discharges, offset value calculation will necessitate evaluation by the Watershed Model. The Watershed Model is the primary tool available for evaluation of watershed loading until 2025 and the means by which TMDL implementation progress will be assessed. As such, alternative mechanisms for offset calculation will only be authorized if their pollutant reduction value can by scientifically documented by NYS DEC with EPA concurrence.

Offset calculations will be described in the fact sheet associated with the draft SPDES permit that authorizes any new or increased loadings and will be publicly noticed including a comment period. The SPDES permit will also include requirements that ensure the actions by which offsets will be generated will be accomplished.

Section 6.10: Gap Analysis and Strategy to Fill Gaps

New York has set achievable sector reduction targets based on compliance with 2025 permit limits. Substantial growth is not expected in the wastewater sector before 2025, and therefore there is not expected to be a large gap between the current implementation strategy and the 2025 sector targets.

Achievement of 2025 wastewater sector targets will be based on compliance with new and existing SPDES permits. NYS DEC has developed a number of guidance documents to provide staff with a consistent plan and approach on compliance and enforcement activities for all SPDES programs. Division of Water (DOW) staff use Technical and Operational Guidance Series (TOGS) 1.4.1 - Water Integrated Compliance Strategy System (WICSS), to determine if violations have occurred at wastewater treatment facilities. This guidance establishes the criteria for identifying priority violations against the State's water resources and establishes the procedures to assure integrated compliance responses to these violations in a timely manner. Once the priority violations have been identified, DOW staff use TOGS 1.4.2 to determine the appropriate compliance response.

In 2010, DEC issued the *Division of Water Technical and Operational Guidance Series* (TOGS) *(1.4.2):* [HYPERLINK "http://www.dec.ny.gov/chemical/62557.html"]. This guidance provides for consistent statewide understanding and implementation of the SPDES compliance and enforcement program in order to protect public health and the environment. It provides DOW staff with enforcement options and operating guidelines to implement the compliance component of the program. The goal of TOGS 1.4.2 is to ensure consistent statewide understanding and implementation of the SPDES compliance and enforcement program in order to protect public health and the intended best use of the waters of the state.

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Section 7: Developed (Urban Stormwater) Sector

Section 7.1: Current Loading Baseline

Developed land uses constitute about 9% of the watershed and accounted for approximately ~~14~~15%, 12% and 17%, respectively, of the total delivered nitrogen, phosphorus and sediment loads from New York in ~~2018~~2019. While this sector focuses on urbanized areas, loading from stormwater runoff in suburban and rural areas (e.g. rural roads) are also included in this sector chapter. As of ~~2017~~2019, ~~352,032~~366,185 acres developed land was located within the watershed, including ~~133,333~~138,326 acres of impervious surface ([REF _Ref16766225 \h]) and ~~218,636~~ 226,592 acres of turfgrass ([REF _Ref16766222 \h * MERGEFORMAT]).

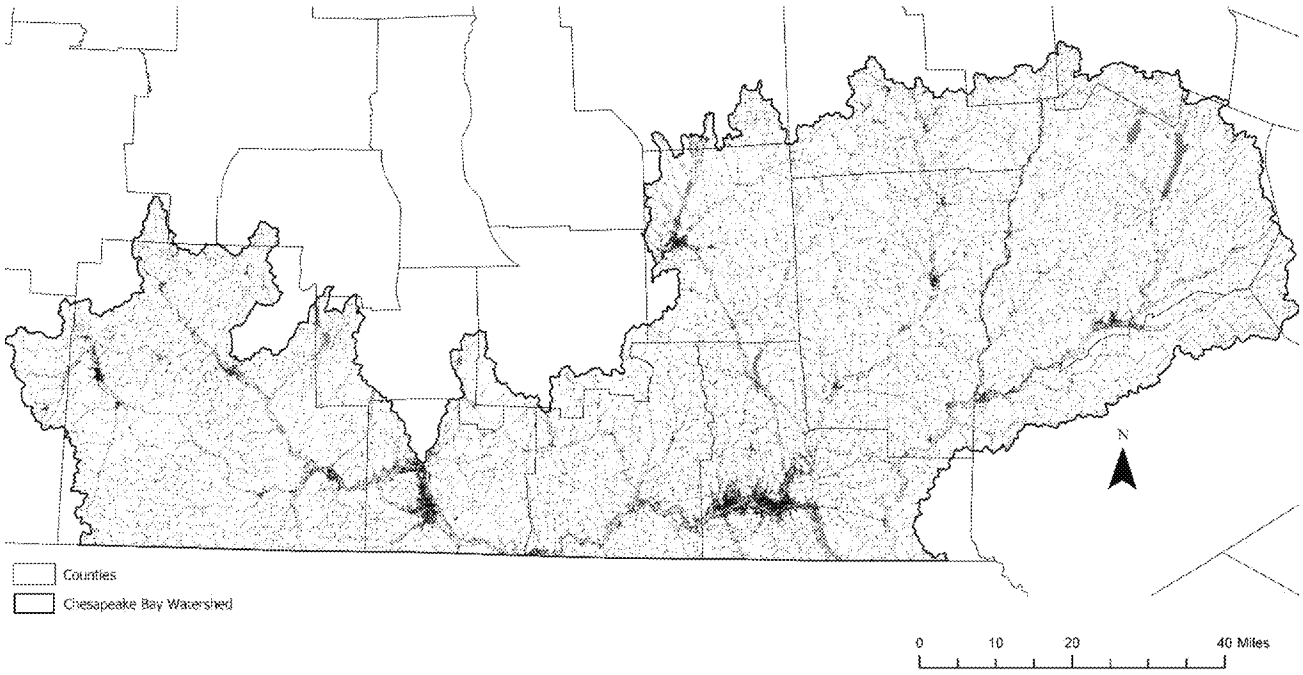

Figure [SEQ Figure * ARABIC]. Impervious surface acres in the New York portion of the Chesapeake Bay watershed

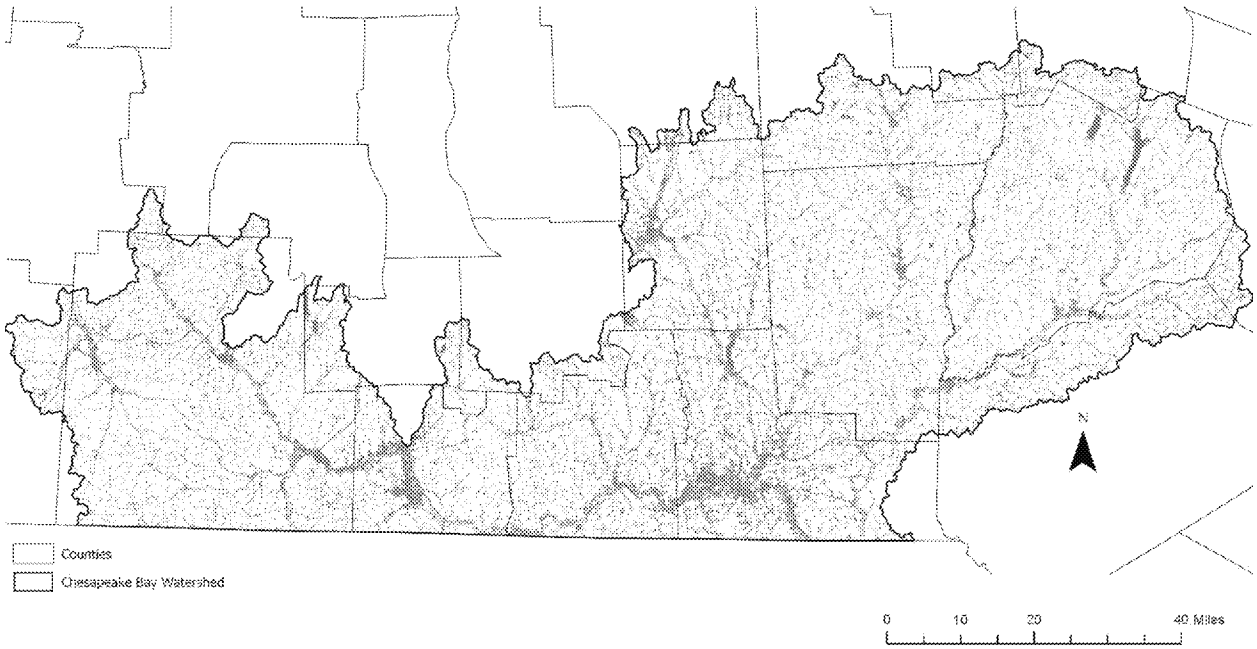

Figure [SEQ Figure * ARABIC]. Turfgrass acres in the New York portion of the Chesapeake Bay watershed

Stormwater runoff from developed areas collects and transports pollutants to surface waters. Although the amount of pollutants from a single residential, commercial, industrial or construction site may seem insignificant, the combined concentrations of contaminants threaten our lakes, rivers, wetlands and other water bodies. Pollution conveyed by stormwater degrades the quality of drinking water, damages fisheries and habitat of plants and animals that depend on clean water for survival. Pollutants carried by stormwater can also affect recreational uses of water bodies by making them unsafe for wading, swimming, boating and fishing.

Section 7.2: New York Phase II Stormwater Program

Phase I of EPA's Stormwater Law was promulgated in 1990 under the Clean Water Act[26]. The Phase II Stormwater Law expanded the Phase I program in 2000 by requiring additional operators of MS4s in urbanized areas and operators of small construction sites to implement programs and practices to control polluted stormwater runoff.

To implement the federal Phase II Stormwater Law, NYS DEC developed two SPDES general permits: and one for Municipal Separate Storm Sewer Systems (MS4) in urbanized areas and one for Stormwater Discharges from Construction Activity (Construction Stormwater). Operators of regulated MS4s and operators of construction activities must obtain permit coverage under either an individual SPDES permit or one of the general permits.

Establishment of New York's Phase II Stormwater Program included the formation of the Stormwater Implementation Team (SWIT). The team is comprised of both NYS DEC regional

[26] More information on EPA's Stormwater Program can be found online at: [HYPERLINK "https://www.epa.gov/npdes/npdes-stormwater-program"]

and Central Office staff. The SWIT collaborates in development of requirements and guidance for stormwater program implementation and coordinates training, inspection, and review activities. The structure is more collaborative than traditional top down program implementation models and has been duplicated in other programs such as the CAFO program.

In the Chesapeake Bay watershed in New York, funding through the Chesapeake Bay Regulatory and Accountability Program grant (CBRAP) has allowed NYS DEC to enhance the planned construction site inspections and the planned Stormwater Pollution Prevention Plan (SWPPP) reviews. The CBRAP grant also allows NYS DEC to plan for the compliance activities (Notices of Violation, Consent orders, follow up inspections) resulting from enhanced inspection and SWPPP review.

Section 7.3: Construction and Post Construction Practices Technical Standards

NYS DEC includes construction and post construction requirements in comprehensive technical standards that are referenced in the MS4 and Construction Stormwater Permits. NYS DEC chooses to structure the permit requirements as references because the comprehensive nature of the [HYPERLINK "https://www.dec.ny.gov/chemical/29066.html"] (Blue Book) and [HYPERLINK "https://www.dec.ny.gov/chemical/29072.html"] (Design Manual) do not lend themselves to be included directly in the permits. The Blue Book provides standards and specifications for the selection, design and implementation of erosion and sediment control practices necessary under the Construction Stormwater permit. The Design Manual provides designers with a general overview on how to size, design, select, and locate post-construction stormwater management practices at a development site to comply with State stormwater performance standards.

Section 7.4: Municipal Separate Storm Sewer Systems (MS4) General Permit

Small municipal stormwater sewer systems that are located within the boundaries of a Census Bureau defined "urbanized area" are regulated under EPA's Phase II Stormwater Rule. This requires MS4s to develop a stormwater management program that will reduce the amount of pollutants carried by stormwater during storm events to waterbodies to the "maximum extent practicable". The goal of the program is to improve water quality and recreational use of waterways.

The most recent MS4 permit ([HYPERLINK "http://www.dec.ny.gov/chemical/43150.html"]) was issued in April 2015, took effect on January 13, 2016 (revised on July 14, 2015 and November 23, 2016) and contains the bulk of EPA-recommended actions.

The 2016 MS4 permit exceeds federal minimums by requiring post-construction stormwater management practices for new construction within the municipal boundaries. Permit coverage for construction and post-construction controls extends beyond urbanized areas to municipal boundaries. MS4s must also incorporate Stormwater Pollution Prevention Plan (SWPPP) review into their local approval process.

NYS DEC's Division of Water maintains a [HYPERLINK "https://www.dec.ny.gov/chemical/8695.html" \l "mcm"] webpage that contains information and reference material to aid in the implementation of a Stormwater Management Program and

provide assistance in meeting the permit and program requirements. Guidance manuals developed for MS4s include:

- **[HYPERLINK "https://www.dec.ny.gov/chemical/9007.html"]**: NYS DEC developed a guidance manual for Implementation of Minimum Control Measures 4 (Construction Site Stormwater Control) and 5 (Post Construction Stormwater Management). The guidance manual included a sample law that requires developers to comply with the Design Manual and the Blue Book. The sample law also includes stop work order provisions for MS4s to use with non-compliant construction sites.
- [HYPERLINK "https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwipqp7w8t7gAhVyvFkKHeoWCc8QFjAAegQICRAC&url=https%3A%2F%2Fwww3.epa.gov%2Fnpdes%2Fpubs%2Fidde_manualwithappendices.pdf&usg=AOvVaw3oaKHxxMP01ypWJb8wC2fh"]: EPA developed an assistance manual for Illicit Discharge Detection and Elimination (IDDE), The assistance document includes significant technical details about outfall, sewershed, and storm sewer system mapping.
- [HYPERLINK "https://www.dec.ny.gov/docs/water_pdf/smpmaintguidance.pdf"]: This NYS DEC-developed document provides guidance on how to inspect and maintain stormwater management practices. The guidance can be used by design professionals when developing operational and maintenance documents during SWPPP development and MS4 staff that perform stormwater management practice inspections.

There are two relatively small urbanized areas (Binghamton, Elmira) covering 32 municipalities within the Chesapeake Bay watershed boundary that are regulated under the MS4 permit ([REF _Ref3991496 \h]).

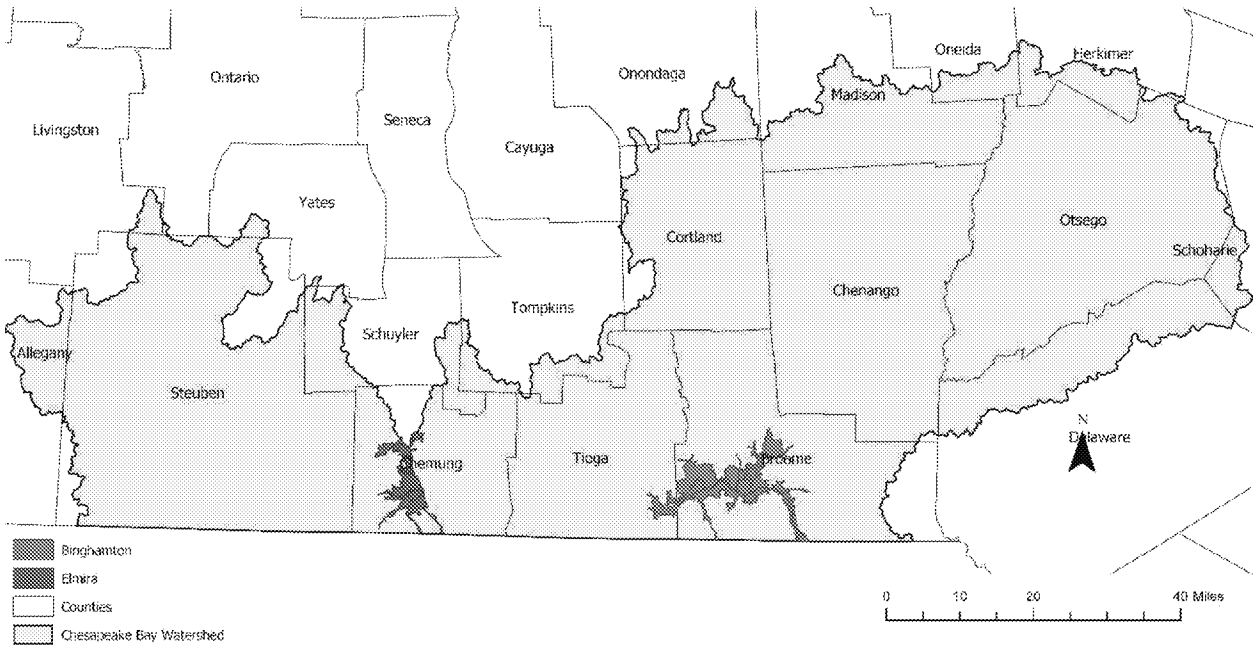

Figure [SEQ Figure * ARABIC]. Chesapeake Bay MS4 Areas in New York

Section 7.5: Construction Stormwater General Permit

According to the Watershed Model, about 0.3% of land in this part of New York is disturbed by construction activity annually. Before commencing construction activity, the owner or operator of a construction project that will involve soil disturbance of one or more acres must obtain coverage under the [HYPERLINK "https://www.dec.ny.gov/docs/water_pdf/gp015002.pdf"] (GP-0-15-002). The permit was issued in January 2015 and became effective on January 29, 2015. NYS DEC requirements for construction activities are included in this document. This requirement applies both to activities subject to the local review process of regulated MS4s areas and activities not subject to the review requirements of regulated MS4s.

NYS DEC's Division of Water maintains a [HYPERLINK "http://www.dec.ny.gov/chemical/8694.html"] webpage that contains sources of technical information needed to comply with the requirements of the Construction Permit and references that are useful for the design of stormwater management practices.

Section 7.5.1: Stormwater Pollution Prevention Plan (SWPPP)

Under NYS DEC's Construction Stormwater permit, each authorized construction project is required to prepare a SWPPP as a condition of authorization, prior to submitting a notice of intent. The Construction Stormwater permit includes requirements for SWPPPs as follows:

- Throughout New York State (not just in regulated MS4 areas), construction sites must comply with the Blue Book during construction or show the erosion and sediment control practices to be equivalent to Blue Book practices.
- Throughout New York State (not just in regulated MS4 areas), post construction stormwater management practices must be designed in accordance with Design Manual or the practices must be shown to be equivalent to practices from the Design Manual.
- All post construction practices must be designed by a "qualified professional" (almost exclusively Professional Engineers). That qualified professional must sign the NOI certifying the project meets all permit requirements, making the engineer liable for projects not designed in conformance with the Manual.

If the project is outside of a regulated MS4 area, and the project complies with the New York's Technical Standards (the Design Manual and the Blue Book), the project is authorized five business days after NYS DEC receives a complete an electronic version of the Construction General Permit Notice of Intent (eNOI). The authorization period is ten business days if the paper NOI is used. If the project is outside of a regulated MS4 area, and the project does not comply with New York's Technical Standards, the project is authorized 60 business days (approximately 84 calendar days) after NYS DEC receives a complete NOI. The longer review period gives NYS DEC more time to perform a detailed review of the SWPPP. In addition, NYS DEC may suspend the review period to ask for more information. The longer review period and uncertainty of final acceptance of the project by NYS DEC combined with the comprehensive nature of the Design Manual strongly influences projects to comply with all the requirements of the Design Manual.

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Section 7.5.2: Sizing Criteria and Review of Notices of Intent

All projects authorized under the construction general permit must submit a complete NOI providing the basic design information for post construction practices including: Land use before and after construction, total site acreage, acreage to be disturbed, existing and future impervious area, percentage of each Hydrologic Soil Group (HSG) at the site, practices to be employed during construction, post construction practices to be employed, required sizing and design sizing. The design information provides for an abridged review of the SWPPP. Every NOI is reviewed by NYS DEC staff. To be complete, all NOIs must demonstrate compliance with required sizing criteria.

Development projects must capture and retain on-site, the 90th percentile storm (as determined by simple method calculation) or manage the 95th percentile storm on site (as determined by continuous simulation). Redevelopment projects are allowed a menu of sizing alternatives as set forth in Chapter 9 of the Design Manual.

Section 7.5.3: Training and Inspection Requirements

Under the Construction Stormwater permit, certain contractors (Trained Contractor) and certain Qualified Inspectors are required to complete four hours of Department-endorsed training in the principles and practices of Erosion and Sediment Control (E&SC) every three years. To satisfy this training requirement, NYS DEC has partnered with County SWCDs to deliver a [HYPERLINK "https://www.dec.ny.gov/chemical/8699.html"]. In addition, NYS DEC accepts the NYS Builders Association online version of the NYS DEC-endorsed 4-hour E&SC course and 1-day “CPESC Exam Review Course” for those taking the CPESC exam as options to meet the 4-hour endorsed training requirement.

Prior to the commencement of construction, an owner or operator shall have each contractor and sub-contractor, that has been identified as being responsible for implementation of the SWPPP, identify at least one employee from their company as a Trained Contractor that has received E&SC training. The Trained Contractor must be on-site on a daily basis when soil disturbance activities are being performed and will be responsible for implementation of the practices included in the SWPPP.

An owner or operator of a regulated construction project, with some exceptions, shall have a Qualified Inspector conduct specific site inspections. Certain Qualified Inspectors who work on these sites (i.e. individuals working under direct supervision of, and at the same company as, a licensed Professional Engineer or Registered Landscape Architect of New York State) are required to complete E&SC training under the General Permit.

Section 7.6: NYS Developed BMP Input Deck

New York has developed an attainable implementation scenario that will meet the developed sector targets for nitrogen and phosphorus by 2025. For this document, this scenario will be referred to as “2025 Program Goal”. [REF _Ref52890643 \h] below compares 2018 progress (current loading) and the 2025 sector target goal. It is expected that the majority of runoff reduction, stormwater treatment BMPs, and Erosion and Sediment Control for Construction Sites will be implemented to meet requirements of both the Construction Stormwater and MS4 General Permits. Urban forestry and urban nutrient management will be targeted for

implementation on municipally or state-owned land, with some implementation on privately-owned land. SWCDs already work with municipal governments to correct erosion and sediment control issues from dirt and gravel roads and NYS DEC will continue to fund projects these projects.

Table [SEQ Table * ARABIC]. Implementation Program Scenario and Reduction Target for the Developed Sector

	~~2018~~ 2019 Loading	2025 Sector Target Load	2025 Program Goal
Nitrogen	2.~~00~~09	~~1.39~~1.52	~~1.39~~1.52
Phosphorus	~~0.072~~0.075	0.052	~~0.048~~0.052
Sediment	~~110.43~~117.78	74.48	~~67.94~~74.48

[HYPERLINK \l "_Section_7.9:_Developed"] details the amount resources and programs currently available to finance New York's selected developed BMPs.

The following is a description of the major developed sector BMPs, as understood and practiced in New York State. BMPs are divided into several different categories: 1) Runoff Reduction BMPs; 2) Stormwater Treatment BMPs; 3) Urban Forestry BMPs; 4) Urban Nutrient Management; and 5) Erosion and Sediment Control. Efficiency rates are from CAST-19. ~~the latest version of the~~ [HYPERLINK "https://cast.chesapeakebay.net/"]. Definitions of BMPs are summarized from the Chesapeake Bay Program's [HYPERLINK "https://www.chesapeakebay.net/what/publications/quick_reference_guide_for_best_management_practices_bmps"] and [HYPERLINK "https://cast.chesapeakebay.net/Home/SourceData"].

Section 7.6.1: Runoff Reduction BMPs

Runoff reduction is achieved by installing practices that reduce the volume of water that runs off newly developed sites. In New York State, new development sites must capture and retain on-site, the 90th percentile storm (as determined by simple method calculation) or manage the 95th percentile storm on site (as determined by continuous simulation) using post-construction BMPs. [REF _Ref52890666 \h] below is a crosswalk between the runoff reduction BMPs identified in New York's Stormwater Design Manual and the runoff reduction practices that are available for credit in the Watershed Model. Currently, runoff reduction BMPs in New York are individually reported from each construction site using the Construction Stormwater permit notice of intent (NOI).

Table [SEQ Table * ARABIC]. Stormwater Runoff Reduction BMP Crosswalk

NYS Stormwater Design Manual BMP	Watershed Model BMP
Vegetated Open Swale	Vegetated open Channel
Tree planting / Tree Box	Urban Tree Planting
Rain Garden	Bioretention/Raingarden
Green Roof	Bioretention/Raingarden

Stormwater Planter	Bioretention/Raingarden
Rain tank/Cistern	Bioretention/Raingarden
Porous Pavement	Permeable Pavement
Sheetflow to riparian buffers or filter strips	Filter Strips
Infiltration Trench	Infiltration Practices
Infiltration Basin	Infiltration Practices
Dry Well	Infiltration Practices

BMP: Bioretention/Raingardens

The Bioretention/Raingardens Watershed Model BMP encompasses a number of different practices including biofiltration, bioretention, and raingardens. These practices are engineered spaces that are filled with topsoil, mulch, or vegetation and are designed to temporarily pond water and filter it through the bed components. Biological processing of nutrients also occurs within the soil matrix and around the root zones of the plants. Watershed model credit varies depending on the type of underlying soils and the presence of an underdrain. Cisterns, rain barrels, disconnection of rooftop runoff, green roofs are also credited under this BMP in the Watershed Model. New York's 2025 Program Goal is to treat 53,132 acres of developed land using bioretention/raingardens.

Bioretention/Raingarden Watershed Model Credit Summary			
	A/B soils, no underdrain	A/B soils, underdrain	C/D soils, no underdrain
Nitrogen Efficiency (%)	80	70	25
Phosphorus Efficiency (%)	85	75	45
Sediment Efficiency (%)	90	80	55
2025 Program Goal: 53,132 acres treated			

BMP: Infiltration Practices

Infiltration practices are created by forming a depression basin where sediment is trapped and where water infiltrates into the underlying soil. No underdrains are associated with infiltration practices because these systems provide complete infiltration. Design specifications require infiltration basins and trenches to be built in A or B soil types. Watershed Model credit varies depending on the presence of sand and vegetation. New York's 2025 Program Goal is to treat 53,132 acres using infiltration practices.

Infiltration Practices Watershed Model Credit Summary		
	Infiltration practices with Sand and Vegetation, A/B soils, no underdrain	Infiltration practices without Sand and Vegetation, A/B soils, no underdrain
Nitrogen Efficiency (%)	85	80
Phosphorus Efficiency (%)	85	85

Sediment Efficiency (%)	95	95
2025 Program Goal: 53,132 acres treated		

BMP: Permeable Pavement

Permeable pavement or pavers reduce stormwater runoff by infiltrating water through open voids in the pavement surface into underlying soils. Watershed model credit varies depending on the type of underlying soils and the presence of an underdrain. There are six different combinations of underlying soils and underdrain available for credit in the Watershed Model. New York's 2025 Program Goal is to install enough permeable pavement to treat 1,771 acres.

Permeable Pavement Watershed Model Credit Summary						
	Permeable Pavement w/ Sand, Veg. - A/B soils, no underdrain	Permeable Pavement w/ Sand, Veg. - A/B soils, underdrain	Permeable Pavement w/ Sand, Veg. - C/D soils, underdrain	Permeable Pavement w/o Sand, Veg. - A/B soils, no underdrain	Permeable Pavement w/o Sand, Veg. - A/B soils, underdrain	Permeable Pavement w/o Sand, Veg. - C/D soils, underdrain
Nitrogen Efficiency (%)	80	50	20	75	45	10
Phosphorus Efficiency (%)	80	50	20	80	50	20
Sediment Efficiency (%)	85	70	55	85	70	55
2025 Program Goal: 1,771 acres treated						

BMP: Filter Strips

Urban filter strips are stable areas with vegetated cover on flat or gently sloping land. Runoff entering the filter strip must be in the form of sheet-flow and must enter at a non-erosive rate for the site-specific soil conditions. A 0.4 design ratio of filter strip length to impervious flow length is recommended for stormwater treatment urban filter strips for the purposed of runoff reduction. New York's 2025 Program Goal is to implement filter strips to treat 3,542 acres.

Filter Strip Watershed Model Credit Summary	
	0.4 design ratio of filter strip length to impervious flow length
Nitrogen Efficiency (%)	20
Phosphorus Efficiency (%)	54
Sediment Efficiency (%)	56
2025 Program Goal: 3,542 acres treated	

BMP: Vegetated Open Channels

Vegetated open channels convey stormwater runoff and provide treatment as the water is conveyed. Vegetated open channels be used instead of underground storm sewers or concrete lined open channels. These practices can be installed either with or without an underdrain. Model credit varies depending on the underlying soil type. New York's 2025 Program Goal is to install vegetated open channels to treat 3,582 acres of developed land.

Vegetated Open Channels Watershed Model Credit Summary		
	A/B soils, no underdrain	C/D soils, no underdrain
Nitrogen Efficiency (%)	45	10
Phosphorus Efficiency (%)	45	10
Sediment Efficiency (%)	70	50
2025 Program Goal: 3,542 acres treated		

Section 7.6.2: Stormwater Treatment BMPs

Stormwater treatment practices filter post-development runoff to remove pollutants. Stormwater treatment practices are not as effective at reducing the volume of runoff compared to runoff reduction practices, and therefore have lower efficiency rates. [REF _Ref52890809 \h][REF _Ref52890666 \h] below is a crosswalk between the runoff reduction BMPs identified in New York's Stormwater Design Manual and the runoff reduction practices that are available for credit in the Watershed Model.

Table [SEQ Table * ARABIC]. Stormwater Treatment BMP Crosswalk

NYS Stormwater Design Manual BMP	Watershed Model BMP
Surface Sand Filter	Filtering Practices
Underground Sand Filter	Filtering Practices
Perimeter Sand Filter	Filtering Practices
Organic Filter	Filtering Practices
Dry Swale	Filtering Practices
Micropool Extended Detention Pond	Wet Ponds & Wetlands
Wet Pond	Wet Ponds & Wetlands
Wet Extended Detention Pond	Wet Ponds & Wetlands
Multiple Pond System	Wet Ponds & Wetlands
Pocket Pond	Wet Ponds & Wetlands
Shallow Wetland	Wet Ponds & Wetlands
Extended Detention Wetland	Wet Ponds & Wetlands
Pond/ Wetland System	Wet Ponds & Wetlands
Pocket Wetland	Wet Ponds & Wetlands

BMP: Filtering Practices

Filtering practices capture and temporarily store runoff. Runoff passes through a sand or other organic media filter bed. These systems require annual inspection and maintenance to receive

pollutant reduction credit. New York's 2025 Program Goal is to treat 17,710 acres with filtering practices.

Filtering Practices Watershed Model Credit Summary	
Nitrogen Efficiency (%)	40
Phosphorus Efficiency (%)	60
Sediment Efficiency (%)	80
2025 Program Goal: 17,710 acres treated	

BMP: Wet Ponds and Wetlands

Wet ponds and wetlands installed on developed sites hold stormwater runoff and release it slowly to an open water system at a controlled rate. A permanent pool of water is maintained in these systems, which allows for settling of sediment particles and attached nutrients. New York's 2025 Program Goal is to treat 17,710 acres with wet ponds or wetlands.

Wet Ponds and Wetlands Watershed Model Credit Summary	
Nitrogen Efficiency (%)	20
Phosphorus Efficiency (%)	45
Sediment Efficiency (%)	60
2025 Program Goal: 17,710 acres treated	

Section 7.6.3: Urban Forestry BMPs

Several urban forestry BMPs are available for credit in the watershed model, including urban forest buffers, urban tree planting, and urban forest planting. NYS DEC has an active [HYPERLINK "https://www.dec.ny.gov/lands/4957.html"] that supports and assists communities in comprehensive planning, management, and education to create healthy urban and community forests to enhance the quality of life for urban residents.

BMP: Urban Forest Buffers

Forest buffers are linear wooded areas that help filter nutrients, sediments and other pollutants from runoff as well as remove nutrients from groundwater. Forest buffers must be a minimum of 35 feet minimum in width to received credit in the model. Forest buffers that are less than 35-feet wide are credited under the urban tree planting BMP. Urban forest buffers are credited as both a load source change and received upland efficiency credit. To date, New York has planted 1,061 acres of urban forest buffers. New York's 2025 Program Goal is to plant a cumulative total of 3,132 acres of urban forest buffer.

Urban Forest Buffers Watershed Model Credit Summary

Efficiency Credit	Nitrogen Efficiency (%)	25
	Phosphorus Efficiency (%)	50
	Sediment Efficiency (%)	50
Load Source Change – Turf Grass to Forest	Nitrogen Runoff Coefficient Reduction (lbs./acre/yr.)	9.51
	Phosphorus Runoff Coefficient Reduction (lbs./acre/yr.)	0.78
	Sediment Runoff Coefficient Reduction (lbs./acre/yr.)	0.31-0.40
2025 Program Goal: 3,132 acres		

BMP: Urban Tree Planting

Urban tree plantings result in an increase in tree canopy over and is commonly referred to as urban tree canopy expansion. Watershed model credit is dependent on the number of trees planted, which is converted to acres. 144 square feet per tree is credited, which is approximately 300 trees planted per acre. Urban tree planting converts either turfgrass or impervious surface load sources to turfgrass/impervious surface with tree canopy, which has a lower loading rate. Trees do not have to be planted in a contiguous area to be credited under this BMP. Larger plantings that establish forest-like conditions with an understory are credited under the Urban Forest Planting BMP. New York anticipates that the majority of tree planting will qualify under the Urban Tree Planting BMP. Urban tree plantings do not receive an upland efficiency credit. New York's 2025 Program Goal is to plant an equivalent of 1,857 acres of trees in developed areas.

Urban Tree Planting Watershed Model Credit Summary		
Load Source Change – Impervious or Turfgrass to Tree Canopy	Nitrogen Runoff Coefficient Reduction (lbs./acre/yr.)	2.66
	Phosphorus Runoff Coefficient Reduction (lbs./acre/yr.)	0.21
	Sediment Runoff Coefficient Reduction (lbs./acre/yr.)	0.3-0.37
2025 Program Goal: 1,857 acres		

Section 7.6.4: Urban Nutrient Management

BMP: Urban Nutrient Management Plans

Urban nutrient management plans are a written, site-specific plan that addresses how nitrogen and phosphorus are to be managed on turf grass for the protection of water quality and avoiding unnecessary nutrient applications. This annual practice can be applied to lawns that complete ten core urban nutrient management practices:

1. Consult with the local extension service, master gardener or certified applicator to get technical assistance to develop an effective urban nutrient management plan for the property
2. Maintain a dense cover of grass or conservation landscaping to reduce runoff, prevent erosion, and retain nutrients.
3. Choose not to fertilize, or adopt a reduce rate/monitor approach or small fertilizer dose approach (e.g. applying less than one pound of nitrogen per 1,000 square feet per each individual application)
4. Keep clippings and mulched leaves on the lawn and keep them out of streets and storm drains.
5. Do not apply fertilizers before spring green up or after the grass becomes dormant.
6. Maximize use of slow-release nitrogen fertilizer.
7. Set mower height at three inches or taller.
8. Do not apply fertilizer within 15 to 20 feet of any water feature and manage this zone as a grass, meadow, or forest buffer.
9. Immediately sweep off any fertilizer that lands on a paved surface.
10. Use other practices to increase the porosity and infiltration capability of your lawn to treat stormwater.

Credit for urban nutrient management is based on if the lawn is located in a high risk or low risk area. High risk areas were determined using the following criteria:

- High Use Parcels (athletic fields, golf courses)
- Parcels adjacent to a Stream, River, or Waterbody
- Parcels located on steep soils
- Parcels located on soils with a water table depth less than three feet and/or frequently flooded
- Parcels with exposed soils
- Newly established turfgrass (less than three years old)
- Phosphorus-saturated soils determined by a soil phosphorus test
- Over-irrigated lawns
- Soils that are sandy, shallow, compacted or have low water holding capacity
- Parcels on karst terrain

New York's 2025 Program Goal is to implement urban nutrient management plans for 18,573 acres per year.

Urban Nutrient Management Watershed Model Credit Summary

	Urban Nutrient Management Plan, High Risk Lawn	Urban Nutrient Management Plan, default for unknown risk type	Urban Nutrient Management Plan, Low Risk Lawn
Nitrogen Efficiency (%)	20	9	6
Phosphorus Efficiency (%)	10	4.5	3
Sediment Efficiency (%)	N/A		
2025 Program Goal: 18,573 acres			

BMP: NYS Nutrient Runoff Law

Legislation was signed into New York law on July 15, 2010, to limit the use of fertilizer containing phosphorus on lawns and non-agricultural turf. [HYPERLINK "https://www.nysenate.gov/legislation/laws/ENV/A17T21"] prohibits the application of phosphorus fertilizer on lawn or non-agricultural turf, except when: (1) a soil test demonstrates that additional phosphorus is needed for lawn or non-agricultural turf growth, or (2) new lawn or non-agricultural turf is being established.

ECL § 17-2103 requires retail stores to comply with the requirements of [HYPERLINK "https://www.nysenate.gov/legislation/laws/AGM"] related to the display of phosphorus fertilizer and the posting of educational signs. AML § 146-g was amended to require retail stores that sell or offer to sell to consumers specialty fertilizer, in which the available phosphate content is greater than 0.67 percent, to display such fertilizer separately from non-phosphorus specialty fertilizer.

This law also prohibits the application of all fertilizer on lawn or non-agricultural turf: between December first and April first; on impervious surfaces; and within twenty feet of surface water except where there is a continuous vegetative buffer of at least ten feet from the water body, and except that, where a spreader guard, deflector shield or drop spreader is used, the application would be prohibited within three feet of a New York surface water. ECL §17-2103 allows local governments to adopt more stringent standards for non-agricultural fertilizer applications after demonstrating that such action is necessary to address local water quality conditions.

Section § 71-1945 of the ECL was added to provide for the enforcement of law. Any New York owner, owner's agent, or occupant of a household who violates the law would receive a written warning and educational materials for a first violation, be liable for a civil penalty not to exceed $100 for a second violation and be liable for a civil penalty not to exceed $250 for third and subsequent violations. Any other person who violates this law would be liable for a civil penalty not to exceed $500 for a first violation, and not to exceed $1,000 for each subsequent violation.

States with phosphorus-free fertilizer laws historically received “state-wide” phosphorus credit. In the Phase 6 Watershed Model, phosphorus application rates are now adjusted to reflect non-agricultural fertilizer sales data.

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Section 7.6.5: Erosion and Sediment Control

BMP: Erosion and Sediment Control for Construction Sites

Three levels of erosion and sediment control for construction sites are available for credit in the model. Level 1 is for practices implemented before 2000 to meet historic performance standards. Level 2 includes a greater sediment treatment capacity (typically 3,600 cubic feet/acre), surface outlets, more rapid vegetative cover for temporary and permanent stabilization, and improved design specifications for individual practices to enhance sediment trapping or removal and conform to the standard requirements in EPA's 2012 Construction General Permit. Level 3 captures the expanded use of passive chemical treatment within Level 2 ESC practices, including the use of polyacrylamide (PAM) and other flocculants. New York expects to only report Level 2 Erosion and Sediment Control, as this level of control is currently required by New York's Construction Stormwater permit and required on 100% of the construction acres.

BMP: Erosion and Sediment Control for Dirt and Gravel Roads

Dirt and gravel roads, along with roadside ditches, have been identified as areas with high erosion potential. Currently, the Watershed Model only gives credit for practices that control erosion and sedimentation from dirt and gravel road surfaces and does not credit any BMPs implemented to control erosion of roadside ditches.

Erosion and sediment control practices available for credit in the Watershed Model reduce the amount of sediment runoff through the use of driving surface aggregates (DSA), such as durable and erosion resistant road surface and raising road elevation to restore natural drainage patterns. Drainage can also be improved with the use of outlets. Model credit is dependent on the combination of practices installed and is calculated as a load reduction BMP for sediment only. New York has not historically reported this BMP.

Stabilizing road ditches and banks is a local priority, not only to minimize stream pollution, but also to improve highway safety and reduce ditch maintenance. Changes in how water flows along and across roads can reduce erosion and flooding problems. Several roadway practices are beneficial, including hydro-seeding, grade breaks (check dams), under-drains, French mattresses (allowing water under the road through course stone), crown reshaping, profile and cross slope modification, high-water bypass techniques and the use of different surface aggregates. In-stream design structures, such as cross vanes, also protect bridges and culverts. Wetlands and other buffers also can be specifically designed and constructed or restored to capture road ditch runoff to reduce energy, capture sediments and provide opportunity to denitrify atmospheric and automobile exhaust sources of nitrogen. Incorporating these concepts into planning, implementation and training efforts is essential.

The Chesapeake Bay Program Scientific and Technical Advisory Committee held a workshop in October 2014 to discussed impacts from roadside ditches. A STAC Workshop report, [HYPERLINK "http://www.chesapeake.org/pubs/349_Boomer2016.pdf"], was produced that recommends specific types of BMPs that can be installed in roadside ditches for the purpose of erosion and sediment control. A [HYPERLINK "http://chesapeakestormwater.net/wp-content/uploads/dlm_uploads/2017/06/WORK-GROUP-DRAFT-of-RDM-MEMO.pdf"] was also

written and submitted to the urban stormwater and agricultural workgroups. Both the STAC report and memo are under review by both workgroups.

Recently, NYS DEC has started to collaborate with NYS SWCC, NYS DAM, SWCDs, and Cornell Local Roads Program to develop a state-wide Rural Roads Program, modeled after the Rural Roads Active Management Program developed by Champlain Watershed Improvement Coalition of New York for the municipalities located in the Lake Champlain watershed. If roadside ditch BMPs are approved by the Bay Program partnership for inclusion in the Watershed Model, NYS DEC will evaluate the overlap with the developing state-wide program.

Section 7.6.6: Developed BMP Scenario Summary

Table 22 summarizes New York's Phase III WIP developed BMP scenario. The best management practices listed are those proposed to meet the 2025 developed sector target under the 2025 Program Goal Scenario.

Table [SEQ Table * ARABIC]. Developed Sector BMP Scenario Summary

BMP Type	Practice	BMP Type	Model Credit Duration	Available Acres[27]	2025 Program Goal	Percent of Available Acres
Stormwater Runoff Reduction	Bioretention/ Raingardens	Efficiency	Cumulative	~~352,080~~370,707 acres	53,132 acres treated	~~15~~14%
	Infiltration Practices	Efficiency	Cumulative	~~352,080~~ 370,707acres	53,132 acres treated	~~15~~14%
	Permeable Pavement	Efficiency	Cumulative	~~185,735~~140,457 acres	1,771 acres treated	~~0.5~~1%
	Urban Filter Strips	Efficiency	Cumulative	~~352,080~~ 370,707acres	3,542 acres treated	~~5~~1%

[27] Available acres identified in CAST-19.~~the Phase 6 Watershed Model.~~

	Vegetated Open Channels	Efficiency	Cumulative	~~352,080~~370,707 acres	3,542 acres treated	1%
Stormwater Treatment	Filtering Practices	Efficiency	Cumulative	~~352,080~~370,707 acres	17,710 acres treated	5%
	Wet Ponds and Wetlands	Efficiency	Cumulative	~~352,080~~370,707 acres	17,710 acres treated	5%
Urban Nutrient Management	Urban Nutrient Management Plans	Efficiency	Annual	~~185,735~~230,250 acres	18,573 acres	~~108~~%
Urban Forestry	Forest Buffers	Load source change with efficiency value	Cumulative	31,323 acres	3,132 acres	10%
	Tree Planting - Canopy	Load Source Change	Cumulative	~~352,080~~370,707 acres	1,857 acres	1%

Section 7.7: Local Planning Goals for the Developed Sector

For the developed sector, the county level was chosen as the geographic scale to apply local planning goals. A percent reduction of total existing loads will be tracked as the measurable outcome ([REF _Ref4760215 \h]).

The total reduction for nitrogen, phosphorus, and sediment was calculated from the difference between 2018 progress and 2025 Program Goal. Reductions were assigned to each county based on the available acres for each BMP type. Overall, percent reductions were kept consistent among counties but may be adjusted in the future through the two-year milestone process.

Table [SEQ Table * ARABIC]. Local Planning Goals for the Developed Sector

County	Nitrogen Reduction (total lbs.)	Percent Nitrogen Reduction	Phosphorus Reduction (total lbs.)	Percent Phosphorus Reduction	Sediment Reduction (total lbs.)	Percent Sediment Reduction
Allegany	4,304	28%	222	32%	634,524	35%
Broome	147,584	31%	5,582	34%	10,916,903	38%
Chemung	45,676	35%	1,916	39%	1,677,440	43%
Chenango	67,452	28%	2,520	31%	3,534,393	35%
Cortland	55,829	29%	1,901	32%	3,298,071	35%
Delaware	23,576	29%	1,160	32%	2,815,535	35%
Herkimer	2,877	28%	263	31%	256,364	34%
Livingston	431	28%	22	32%	73,930	35%
Madison	20,012	28%	743	31%	1,319,352	36%
Oneida	2,473	28%	129	31%	248,127	35%
Onondaga	7,310	28%	178	31%	194,348	35%
Ontario	56	29%	2	32%	6,555	35%
Otsego	46,444	28%	2,108	31%	4,118,343	35%

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Schoharie	2,145	29%	92	32%	208,773	35%
Schuyler	4,771	28%	170	32%	199,155	35%
Steuben	77,544	29%	4,299	32%	7,314,260	35%
Tioga	72,705	29%	2,333	32%	2,794,345	35%
Tompkins	5,964	29%	180	32%	251,654	36%
Yates	227	28%	17	31%	11,710	36%

Section 7.8: Developed BMP Tracking and Reporting Protocols

In New York, NYS DEC is responsible for collecting and reporting stormwater BMP data to the Chesapeake Bay Program. Currently, NYS DEC's Construction Stormwater general permit is the only source of erosion and sediment control data that is reported for Watershed Model credit. NYS DEC plans to expand collection of stormwater BMP data to include information on post-construction BMPs and "good housekeeping" BMPs implemented by MS4 and non-MS4 urban communities. More information of tracking, reporting, and verification protocols for developed BMPs can be found in [HYPERLINK "https://www.dec.ny.gov/lands/33279.html"]

Previously, EPA contracted with Tetra Tech to develop a stormwater practice reporting tool that converted construction stormwater BMP data into a format that could be reported to the Chesapeake Bay Program. NYS DEC had a database that tracked BMP information that was submitted on Construction Stormwater NOI forms. This BMP database is no longer supported by NYS DEC, and therefore the stormwater practice reporting tool developed by Tetra Tech is no longer functioning. NYS DEC has been able to submit progress data by manually pulling data and formatting it for submission to the National Environmental Information Exchange Network (NEIEN) node. EPA has provided additional funding to NYS DEC to build a fully supported database for developed BMPs that will export data in the NEIEN XML format. It is expected that the database will be completed for the 2020 progress reporting deadline.

Section 7.9: Developed Sector BMP Funding Programs

[REF _Ref4066764 \h] below provides an estimate of the annual cost per BMP unit and cost per pound reduced of each pollutant type. Cost estimates are annualized costs and were determined using the latest version of [HYPERLINK "https://cast.chesapeakebay.net/"].

Table [SEQ Table * ARABIC]. Developed BMP Implementation and Maintenance Cost Matrix

BMP	2025 Program Goal	Cost Per BMP Unit	Cost Per Pound of Nitrogen	Cost Per Pound of Phosphorus	Cost Per Pound of Sediment	O&M Cost Per Year Per BMP Unit	Total Cost – 2025 Program Goal
Bioretention/ Raingardens	53,132 acres treated	$1,127.56	$736.40	$8,838.83	$2.38	$195	$70,270,258
Infiltration Practices	53,132 acres treated	$1,163.69	$237.49	$4,807.73	$1.42	$312	$78,406,361
Permeable Pavement	1,771 acres treated	$14,214.02	$23,206.22	$250,525.03	$29.98	$3,610	$31,566,399
Urban Filter Strips	3,542 acres treated	$4,481.08	$3,657.97	$29,272.29	$9.28	$673	$18,255,751
Vegetated Open Channels	3,542 acres treated	$871.29	$316.12	$1,380.47	$1.44	$324	$4,233,717
Filtering Practices	17,710 acres treated	$2,474.51	$1,010.06	$6,829.96	$3.59	$891	$59,603,182
Wet Ponds and Wetlands	17,710 acres treated	$351.71	$287.11	$2,757.02	$0.68	$67	$7,415,354
Urban Nutrient Management Plans	18,573 acres	$0.00	$0.00	$0.00	$0.00	N/A	$0

Forest Buffers	3,132 acres	$120.78	$20.64	$324.66	$0.17	N/A	$378,283
Tree Planting	1,857 acres	$65.49	$96.00	$1,688.59	$0.25	N/A	$121,615
TOTAL							$270,250,860

The following funding programs are available to finance the BMPs needed to meet the 2025 Program Goal.

[HYPERLINK "https://www.efc.ny.gov/ISC"]: The ISC Grant seeks to incentivize a multi-faceted approach to the water quality challenges caused by stormwater. Under this program, EFC provides grant dollars for the incorporation of green infrastructure practices into CWSRF-financed CSO / SSO / stormwater projects. The grant covers 50% of a municipality's construction cost up to $5 million. Successful applicants will construct projects that treat a minimum of 25% of the water quality volume from a combined, sanitary, or storm sewer system.

[HYPERLINK "https://www.efc.ny.gov/GIGP"]: GIGP supports projects across New York State that utilize unique stormwater infrastructure design and create cutting-edge green technologies. GIGP-funded projects range from rain gardens to stream "daylighting" projects. GIGP provides funding for transformative projects that: utilize green infrastructure components to protect and improve water quality; spur innovation in the field of green infrastructure for stormwater; build capacity to construct and maintain green infrastructure; and provide multiple benefits in the communities where they are built.

[HYPERLINK "https://www.dec.ny.gov/public/31226.html"]: NYS DEC's Office of Environmental Justice offers Community Impact Grants to provide community-based organizations with funding for projects that address various environmental and public health concerns. The program has a particular focus on low-income and minority communities that have historically been burdened by environmental problems. More than $5 million in 145 grants to organizations statewide that have made exceptional improvements in the communities they serve. Projects that have been funded include: research, community gardens, tree plantings, education and curriculum development, urban farming training, habitat restoration, water quality monitoring, air quality monitoring and more.

[HYPERLINK "https://www.dec.ny.gov/animals/77710.html"]: Since 2007, NYS DEC's Trees for Tribs Program has been working to reforest New York's tributaries, or small creeks and streams, which flow into and feed larger rivers and lakes. The goal of the program is to riparian buffers in order to prevent erosion, increase flood water retention, improve wildlife and stream habitat, as well as protect water quality. Trees for Tribs has engaged more than 8,751 volunteers in planting more than 101,416 trees and shrubs at 614 sites across New York State. Grants of up to $100,000 are available through this program with no match requirement.

[HYPERLINK "https://www.dec.ny.gov/lands/5285.html"]: NYS DEC's Division of Lands and Forests offers grants that provide support and assistance to communities in comprehensive planning, management, and education to create healthy urban and community forests. Eligible projects
Include tree inventories and management plans; tree planting, maintenance and education programming. Funds are made available from the New York State Environmental Protection Fund. Grants of up to $75,000 are available per community.

[HYPERLINK "https://www.dos.ny.gov/opd/grantOpportunities/epf_lwrpGrants.html"] NYS DOS provides matching grants on a competitive basis to eligible villages, towns, cities, and counties located along New York's coasts or designated inland waterways for planning, design, and construction projects to revitalize communities and waterfronts. Green infrastructure and stormwater retrofit projects are eligible under this grant opportunity.

[HYPERLINK "https://www.dec.ny.gov/pubs/4774.html"]: NYS DEC administers the WQIP program, a competitive, reimbursement grant program that funds projects to address documented water quality impairments. Non-agricultural non-point source grants are provided through the program, including funding for green infrastructure, road ditch stabilization, and riparian buffers.

[HYPERLINK "https://www.dec.ny.gov/lands/53122.html"]: The Federal Clean Water Act provides for funding to states for regional water quality management planning projects. EPA awards 604(b) grants to states, which in turn award funding to regional planning and interstate organizations. Support for stormwater programs is typically an eligible project type in the 604(b) program. Through the 604(b)-funding program, NYS DEC supports regional planning councils around the state, including Southern Tier West, Central, and East.

[HYPERLINK "https://www.nfwf.org/fivestar/Pages/home.aspx"]: The National Fish and Wildlife Foundation (NFWF) offers grant funding for projects that address water quality issues in priority watersheds, such as erosion due to unstable streambanks, pollution from stormwater runoff, and degraded shorelines caused by development. Ecological improvements may include one or more of the following: wetland, riparian, forest, and coastal habitat restoration; wildlife conservation, community tree canopy enhancement, water quality monitoring, and green infrastructure best management practices for managing run-off. Awards range from $20,000 to $50,000.

[HYPERLINK "https://www.dec.ny.gov/energy/109181.html"]: The Climate Smart Communities (CSC) grant program provides funding for municipalities to perform inventories, assessments, and planning projects that advance their ability to address climate change at the local level and become certified Climate Smart Communities. Eligible adaptation projects that benefit water quality include: increasing or preserving natural resilience, such as construction of living shorelines and other nature-based landscape features to decrease vulnerability to the effects of climate change and to improve or facilitate conservation, management, and/or restoration of natural floodplain areas and/or wetland systems and extreme-heat preparation, including, but not limited to, establishment of cooling centers, construction of permanent shade structures, and implementation of other cooling features or programs (such as establishing urban tree canopy).

Section 7.10: Gap Analysis and Strategy to Fill Gaps

New York believes the developed sector reduction targets are achievable, since they are largely based on compliance with the existing statewide Construction Stormwater and MS4 general permits and increased reporting of both regulatorily-required and voluntary implementation. Enhanced oversight and inspections for both permits are supported by the Chesapeake Bay Regulatory and Accountability Program (CBRAP). Substantial growth is not expected in the developed sector before 2025, and therefore there is not expected to be a large gap between the current implementation strategy and the 2025 sector targets. New York proposes the following strategies to improve its developed sector program delivery including: (1) increase voluntary implementation; (2) increase local government capacity; (3) expand BMP reporting and verification; (4) account for state-specific data in the Chesapeake Bay Watershed Model; (5) explore potential permit program modifications; and (6) explore new funding strategies. These strategies will require new funding sources and/or additional funding that can expand existing programs. Execution of these strategies will require collaboration among partners. Lead

partners have been identified for each strategy, though partners responsible for final execution of these initiatives may vary and is dependent on available capacity.

(1) Increase voluntary implementation

Reduction targets are expected to be achieved through a combination of regulatorily-required implementation and voluntary implementation. Voluntary implementation may occur on both public and privately-owned land. Cost effective practices will be prioritized for voluntary implementation on public and private land, including urban tree planting, urban riparian buffers, and urban nutrient management plans.

Direct greater proportion of existing urban forestry grant funding to Chesapeake Bay watershed

NYS DEC currently has existing urban forestry and riparian buffer grant programs administered by the Division of Lands and Forests. While municipalities, land trusts, and private landowners are eligible to receive funding under these grants, there is an opportunity to direct more funding through these programs directly to the Chesapeake Bay watershed. There also may be an opportunity to direct additional federal funding through these programs.

Lead Partners	NYS DEC
Anticipated Timeframe	Ongoing throughout WIP implementation period
Potential Funding Sources	Urban Forestry Program, Trees for Tribs, Chesapeake Bay Implementation Grant (CBIG)

Create Urban Nutrient Management Program

New York does not currently have a comprehensive urban nutrient management program. While New York has passed legislation to limit the use of fertilizer containing phosphorus on lawns and non-agricultural turf, additional steps can be taken to encourage better management of turfgrass, both on private and public properties. Other jurisdictions, including Maryland and Virginia, have advanced urban nutrient management programs that can be used as a framework. New York can also focus on urban nutrient management on state-owned lands; New York State owns and operates approximately 19,556 acres of turfgrass in the watershed. Colleges, universities, golf courses, and large public parks can also be targeted for urban nutrient management.

Lead Partners	NYS DEC
Anticipated Timeframe	Ongoing throughout WIP implementation period

Potential Funding Sources	Chesapeake Bay Implementation Grant (CBIG), Environmental Protection Fund (EPF)

Education/Outreach for private landowners

New York has existing education and outreach programs targeted for private landowners, though there is not an overarching program related to Chesapeake Bay restoration efforts. Examples of existing programs include NYS DEC's "Buffer in a Bag" program and Trees for Tribs. Both of these programs can be utilized to meet implementation goals and the benefit to the Chesapeake Bay watershed can be highlighted. Local partners can also be leveraged to incorporate Chesapeake Bay restoration highlights in their existing educational/outreach programs.

Lead Partners	NYS DEC, Friends groups, Stormwater Coalitions, SWCDs, Not-for-profit organizations
Anticipated Timeframe	Ongoing throughout WIP implementation period
Potential Funding Sources	Chesapeake Bay Implementation Grant (CBIG), Environmental Protection Fund (EPF)

Create new grant or rebate programs for private landowners, schools, and non-for-profit organizations

Other jurisdictions have established grant or rebate programs to encourage installation of practices by homeowners, schools, and not-for-profits to benefit water quality. For example, Washington D.C.'s Department of Environment and Energy administers a series of "RiverSmart" programs, including RiverSmart Homes, RiverSmart Schools, RiverSmart Rooftops, RiverSmart Rebates, and RiverSmart Rewards. Practices that are incentivized through these programs include green roofs, rain barrels, tree planting, replacement of impervious surfaces, bioretention and other green infrastructure practices. The majority of grant funding available in New York is only available to municipalities and SWCDs. Similar programs should be explored to expand voluntary implementation.

Lead Partners	NYS DEC
Anticipated Timeframe	Ongoing throughout WIP implementation period
Potential Funding Sources	Chesapeake Bay Implementation Grant (CBIG), Environmental Protection Fund (EPF)

(2) Increase Local Government Capacity

The majority of the communities within the New York portion of the Chesapeake Bay watershed are small and have limited local government capacity to undertake water quality restoration activities. To address this issue, shared technical expertise and services is critical to achieving enhanced voluntary implementation in the developed sector. This model has been implemented successfully in New York's agricultural sector through the Upper Susquehanna Coalition, and a similar structure should be replicated in the developed sector. The shared services structure for the developed sector may include:

Circuit-Rider Planning Program Network

The Local Government Advisory Committee (LGAC) to the Chesapeake Bay Executive Council produced a report of recommendations for advancement of WIP implementation, "[HYPERLINK "https://www.chesapeakebay.net/channel_files/19528/2018_local_government_forum_report_final.pdf"]". In the report, the establishment of a network of circuit-rider planners was recommended to increase capacity of local governments, especially small governments that do not have funding for positions related to water quality issues. In New York, Otsego County has established a circuit rider planner program housed at the Otsego County Conservation Association. Funding to support the position is split between the county government and Association. Regional Planning and Development Boards may be in a position to provide overarching consistency and support for a circuit rider network. The key to developing this type of network is to creatively pair funding between multiple sources.

Lead Partners	Local Governments, with support from non-profit organizations, regional planning and development boards, and NYSDEC
Anticipated Timeframe	Workshop to discuss development of circuit rider network proposed for 2020
Potential Funding Sources	Local government contribution, non-for-profit contribution, Chesapeake Bay Implementation Grant (CBIG), Clean Water Act 604(b)

Technical Assistance Collaborative/Repository

It was also recommended in LGAC's report that jurisdictions consider creating a technical assistance collaborative or repository of information about technical assistance services currently being offered within the watershed. This repository could be accessed by local governments to secure specific services for their communities, including planning, engineering, financing, grant writing and reporting, legal aid, and project management. Circuit rider planners could also responsible for connecting appropriate technical service providers or specialists, and engaging them on behalf of, or in cooperation with, local governments. Regional planning boards can also assist with making sure the collaborative remains up to date with relevant technical assistance providers and the services they offer.

Lead Partners	Local Governments, with support from non-profit organizations, regional planning and development boards, and NYSDEC
Anticipated Timeframe	Workshop to discuss development of technical assistance collaborative proposed for 2020
Potential Funding Sources	Chesapeake Bay Implementation Grant (CBIG), Clean Water Act 604(b)

(3) Expand BMP reporting and verification

Due to lack of staff capacity, NYS DEC has not tracked and reported developed BMP data beyond what is collected from the Construction Stormwater permit notices of intent submitted to the Department. In particular, urban forestry BMPs are not currently tracked and reported, despite having a robust urban forestry program.

NYS DEC recently released a Request for Applicants (RFA) for the Clean Water Act, Section 604(b) Water Quality Management Planning Program, which provides funding for programs that will implement regional comprehensive water quality management planning activities as described in Section 604(b) of the federal Clean Water Act. Regional Planning Boards are the eligible entities in New York for this funding. Funding is available specifically to assist NYS DEC with Phase III WIP Local Engagement Assistance, including developing and implementing a strategy for assisting in collecting and verifying nonpoint source best management practice (BMP) data that are currently not being accounted for (e.g. street sweeping, catch basin cleaning, retrofitting).

NYS DEC would also like to partner with the local stormwater coalitions (Broome-Tioga and Chemung County Stormwater Coalitions) to collect and verify stormwater BMPs in both MS4-regulated areas and non-MS4 areas. Stormwater Coalition staff have a greater level of technical expertise regarding stormwater BMP performance and would be able to properly verify BMPs for continued Watershed Model credit.

Lead Partners	NYS DEC, Regional Planning and Development Boards, Stormwater Coalitions
Anticipated Timeframe	Development of tracking protocol (2019-2020), pilot data collection (2020)
Potential Funding Sources	Chesapeake Bay Implementation Grant (CBIG), Clean Water Act 604(b)

(4) Account for state-specific data in the Chesapeake Bay Watershed Model

Convert Model Credit for Stormwater Reduction/Stormwater Treatment BMPs

NYS DEC will transition reporting of existing individual stormwater BMPs to the Stormwater Performance Standard-runoff reduction or stormwater treating 1.0 inch of runoff, as runoff reduction and stormwater treatment BMPs receive more Watershed Model credit that individual BMPs. The credit is based on volume of runoff treated, area treated, and percent imperviousness. Runoff reduction BMPs reduce the volume of runoff and pollutant concentration, while stormwater treatment BMPs reduce only the pollutant concentration. NYS DEC will re-submit existing BMP practices as part of the 2019 Progress Run and will continue to track data needed to continue reporting Stormwater Reduction and Stormwater Treatment.

Lead Partners	NYS DEC
Anticipated Timeframe	2019 Progress Run, deadline of December 2019
Potential Funding Sources	N/A

Account for New York's Enhanced Permit Requirements

New York continues to work to implement enhanced technical requirements for both the Construction Stormwater and MS4 general permits. Many New York requirements far exceed the standards of the Watershed Model and need to be accounted for. NYS DEC will work with the EPA's Chesapeake Bay Program to help ensure the comprehensive nature of the New York MS4 and Construction Stormwater programs are adequately reflected in the Watershed Model.

Lead Partners	NYS DEC, in partnership with EPA and the Chesapeake Bay Program Partnership
Anticipated Timeframe	Ongoing throughout WIP implementation period
Potential Funding Sources	N/A

Accounting for New York Baseline Conditions in the Chesapeake Bay Watershed Model

Periodically, jurisdictions can submit state-specific data for inclusion in the baseline conditions of the Watershed Model. The following inputs and BMP information related to the developed sector are currently available for inclusion:

- State-specific land use data
- Zoning
- MS4 area boundaries
- Land use change hotspot analysis to inform 2020-2021 forecasted land uses
- Historic land use/cover data that will be used to better forecast future land uses

NYS DEC is committed to working with the Chesapeake Bay Program's modeling staff for incorporation into the baseline conditions of the watershed model. In addition, NYS DEC will

provide analysis of phosphorus-free fertilizer sales data to the Chesapeake Bay Program in order to maintain model credit for New York's Nutrient Runoff Law.

Lead Partners	NYS DEC, in partnership with SUNY ESF
Anticipated Timeframe	2019-2021 in preparation for 2022-2023 milestones
Potential Funding Sources	Chesapeake Bay Implementation Grant (CBIG)

Expand list of BMPs available for credit

New York will benefit from the comprehensive inclusion of road ditch BMPs available for credit in the Watershed Model. New York has a large network of rural roads, making roadside ditches an important pathway and innovative opportunity to abate stormwater runoff for both quality and quantity issues. Many of the SWCDs in New York are already actively managing rural roads and road ditch networks in conjunction with their local municipalities. Cornell Local Roads Program can also enhance and expand technical assistance through their training program. Capacity to support this type of work needs to be expanded so that all SWCDs have the ability to assist local municipalities with proper road and road ditch maintenance. NYS DEC will continue to work with the Chesapeake Bay Program to help ensure the Watershed model reflects the nutrient and sediment reduction associated with potential improvement of maintenance practices and design of road side ditches.

Lead Partners	NYS DEC, in partnership with EPA and the Chesapeake Bay Program Partnership
Anticipated Timeframe	Ongoing throughout WIP implementation period
Potential Funding Sources	N/A

(5) Permit Program Modifications

The following permit program modifications may be considered in the future in order to further reduce loading from regulated areas:

- Evaluate potential MS4 Enhancements

- Address all municipal road ditch systems and appropriate hydrologic, sediment, and nutrient control practices (not just for erosion control during construction/maintenance but long-term use of ditches as bio-retention structures for nutrient reduction
- Consider application of Enhanced Phosphorus Design Guidance
- Consider excluding stream setback area from Construction Stormwater General Permit coverage

(6) Explore New Funding Strategies

Funding strategies identified in [HYPERLINK \l "_Section_5.10:_Gap"] in the Agricultural Sector could also serve to fill gaps in the developed sector, including:

- Direct a greater share of existing state water quality funds to the watershed, including dedicating a portion of the Environmental Protection Fund (EPF) to the Chesapeake Bay restoration effort and ensure the Fund's long-term stability;
- Expand use of Clean Water State Revolving Funds to support non-traditional water quality protection efforts, including stormwater implementation;
- Further incentivize voluntary conservation practices on unregulated developed lands; and
- Leverage private sector capital to support implementation and pursue strategic public-private partnerships.

Additional funding strategies identified by the Environmental Finance Center at the University of Maryland in partnership with Syracuse University Environmental Finance Center and published in their report "Strategies for Financing Chesapeake Bay Restoration in New York State" that were focused on the developed sector include:

Secure additional funding for the WQIP Program

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. While funding awarded through this program has steadily risen over the past few years, 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.

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. Several potential opportunities include the Climate Smart Communities grant, NYS Open Space Acquisition Program, and Community Development Block Grant Program.

Investigate the potential for stormwater-based water quality trading

Water quality trading 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, water quality trading 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.

Section 8: Remaining Source Categories

Section 8.1: Natural Sector

Load sources in the natural sector include forests, open space, shorelines, stream beds and banks, and wetlands. A limited number of BMPs are available for Watershed Model credit to reduce loads from these sources. Much of the load from the natural sector is considered "uncontrollable". Nutrient and sediment loads from the land (e.g. agricultural and developed sectors) are modified as they move through the "natural" system by the processes of denitrification, bank erosion, floodplain deposition, and reservoir deposition ([REF _Ref16766298 \h * MERGEFORMAT]). Changes on the landscape will influence natural sector loads. For example, impervious surfaces result in streambank erosion and a reduction in impervious surfaces will also have a corresponding reduction in streambank erosion.

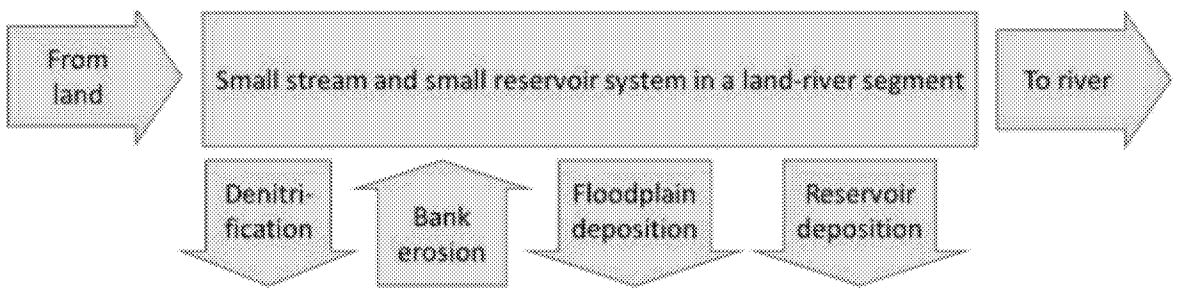

Figure [SEQ Figure * ARABIC]. Natural Sector Processes from Phase 6 Model Documentation

New York has assigned modest load reduction targets to the natural sector that will be accomplished through streambank restoration (urban and non-urban), wetland rehabilitation, and implementation of forest harvesting BMPs. [REF _Ref4666273 \h] below compares 2018 progress (current loading) and the 2025 sector target goal. These reductions will be achieved through a combination of implementation of streambank restoration projects and reductions gained in the natural sector resulting from implementation in the agricultural and developed sectors. Absent of any implementation of natural sector BMPs, if New York implements the "Current Program Goal" scenario in the agriculture and developed sectors, 150,228 pounds of nitrogen (5% reduction) and 39,795 pounds of phosphorus (21% reduction) will be achieved in the natural sector. The remainder of the reductions are expected to be achieved through streambank restoration. Additional implementation of wetland rehabilitation and forest harvesting BMPs will reduce in reductions that will exceed the targets assigned to the natural sector and will be used to offset gaps in other sectors.

Table [SEQ Table * ARABIC]. Implementation Scenario and Reduction Target for the Natural Sector

	2018 Loading2019 Loading	2025 Sector Target	2025 Program Scenario
Nitrogen	3.093.11	2.93	2.852.93
Phosphorus	0.2440.244	0.221	0.2130.221
Sediment	407.40413.96	322.49	337.01322.49

Section 8.1.1: Streambank Restoration

Flooding, streambank erosion, gravel deposition, and nutrient loading are common problems in New York's portion of the Chesapeake Bay watershed. Streambank restoration is classified in the Watershed Model as either urban or non-urban. A collection of site-specific engineering techniques is used to stabilize an eroding streambank and channel, restore the natural hydrology and landscape of a stream, and helps improve habitat and water quality conditions in degraded streams. This BMP includes any natural channel design, legacy sediment removal, and regenerative stream channel projects. Reaches restored must be at least 100-feet in length to receive model credit and bank armoring/rip-rap projects are not eligible.

Model credit is dependent on protocols used to define the pollutant load reductions from restoration practices:

- Protocol 1. Credit for prevented sediment during storm flow
- Protocol 2. Credit for in-stream nitrogen processing during base flow
- Protocol 3. Credit for reconnection to the floodplain
- Default for existing or non-conforming projects

More information on the stream protocols can be found in the [HYPERLINK "http://chesapeakestormwater.net/wp-content/uploads/dlm_uploads/2013/10/stream-restoration-short-version.pdf"].

During the Phase II WIP period, NYS reported 23,540 feet of non-urban stream restoration. The 2025 Program Goal is to restore 169,000 linear feet of streambank.

Urban and Non-Urban Stream Restoration Watershed Model Credit Summary				
	Protocol 1: Prevented Sediment	Protocol 2: In-stream nitrogen processing	Protocol 3: Floodplain reconnection	Default
Nitrogen Reduction (lbs./linear ft./yr.)	Site-specific			0.075
Phosphorus Reduction (lbs./linear ft./yr.)	Site-specific			0.068
Sediment Reduction (lbs./linear ft./yr.)	N/A			248

2025 Program Goal: 169,000 linear feet

The Upper Susquehanna Coalition's (USC) Stream Team serves as the technical lead in New York's portion of the watershed on stream corridor management. The USC Stream Team has developed a core group of individuals throughout the membership that enable the USC to provide technical expertise and training to all USC member districts. The USC Stream Team's holistic approach to stream corridor management combines natural stream design techniques, stream rehabilitation and stabilization, floodplain enhancement and re-planting of riparian buffers. The USC Steam Team's guiding principles are:

- Stream issues will be approached on systemic manner considering whole watershed condition and impact
- When possible, stream issues will be monitored to determine rate and status of observed or perceived impairments
- Stream issues will be approached with a restoration objective as opposed to a stabilization approach where possible
- Restoration includes consideration of geomorphic, hydrologic, habitat, water quality, riparian, social, and economic values
- Stream issues will be approached in a pragmatic manner with the realization that funding, materials, and other resources are limited
- The education of landowners, municipal officials, maintenance personnel, land use planners, etc. is of primary importance in order to effect cultural change in how we manage our streams and watersheds
- Creative, cost effective approaches to stream restoration is encouraged in management, regulation and actual in channel work
- Information learned in our region regarding stream restoration (what works and what doesn't work) will be shared and networked
- Local empowerment through education, training, actual experience, etc. is a primary objective (use of local designers, contractors, and material suppliers)
- Further research of regional stream system elements is needed to better understand the complexity of our local streams

Section 8.1.2: Wetland Rehabilitation

Wetland rehabilitation is a new BMP available for Watershed Model credit. This BMP is similar to the Wetland Creation and Wetland Restoration BMPs available to credit in the agricultural sector and is defined as rehabilitation of wetlands by manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a degraded wetland.

New York has chosen to not set a specific BMP goal for wetland rehabilitation in the natural sector, as these projects are implemented infrequently on a small number of acres in the watershed. However, wetland rehabilitation provides multiple co-benefits (Refer Section 10 of

this document for discussion of co-benefits) and will play an important role in mitigating the impacts of climate change.

New York has several programs dedicated to the enhancement and rehabilitation of wetlands. The Upper Susquehanna Coalition has an active [HYPERLINK "http://www.u-s-c.org/html/wetlandprogram.htm" \h] with specialized technical staff that specialize in wetland site identification, evaluation, delineation, survey, design, and monitoring, and construction. The USC Wetland Team has constructed or restored over 700 acres of wetland since its inception in 2002. The USC Wetland Team has worked in partnership with NYS DEC to restore wetlands on state land, with USDA-NRCS on various federal programs, and with local land trusts to restore wetlands on permanently protected lands.

Section 8.1.3: Forest Harvesting

The New York Chesapeake Bay Watershed is about 75% forested. At least 1% is harvested annually and about 50% of the harvested acres have forest harvest water and soil resource protection BMPs installed as part of the harvesting activity.

NYS DEC's Division of Lands and Forests has developed a [HYPERLINK "http://www.dec.ny.gov/lands/5240.html" \h] for loggers, foresters, and landowners that harvest timber. It presents suggestions, guidelines, and technical references on a variety of timber harvesting practices, including skid trails, haul roads, and landings. The guide is to be used as a menu of options to protect soil, water, and timber resources from loss or degradation.

Such BMPs are installed due in part to recommendations of a forest management plan (through the NYS DEC Forest Stewardship Program or others) or are required per Section 480a of the Real Property Tax Law on Certified tracts or required in Sales Agreements for timber harvests on DEC managed Multiple Use, Reforestation, and Unique Areas collectively known as State Forests. The installation of forestry BMPs are identified as a means to reduce the emission of nutrient and sediment that might otherwise be introduced into waters within the watershed during timber harvesting activities.

Combined management plan acreage, Forest Tax Law tract acreage and actual State Forest timber sale acreage are used to generate an estimate of the number of acres on which timber was harvested pursuant to a management plan or statutory requirement that resulted in the installation of forestry BMPs. NYS DEC Division of Lands and Forests maintains an internal database of acres of state forest and management strategy being implemented. Of the 262,157 acres of state forest in the watershed, 202,746 acres are managed for timber and sales harvest. Strong anecdotal evidence supports that BMPs are being implemented on at least as many acres as timber harvests taking place outside of state land or private land under a forest stewardship program. For example, the number of loggers participating in the New York Logger Training [HYPERLINK "http://www.newyorkloggertraining.org/certification"] Program has risen dramatically in the region over the past several years, and this has likely increased awareness and implementation of BMPs. The NYLT offers certifications, workshops, and online courses on best management practices and wildlife habitat considerations for logging. Trained Logger Certification was required effective August 2010 to operate on a DEC timber sale on State Forests, directly increasing the number of trained loggers throughout the watershed area. Furthermore, some municipalities in the watershed require the use of forest harvest BMPs on all harvested acres.

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The amount of New York's forest harvesting BMP implementation may be underestimated in the CAST model. New York plans to evaluate the USFS BMP monitoring methodology used by other jurisdictions to capture unaccounted for data and evaluate how New York may develop a more formalized monitoring protocol to include a mechanism to track and locate timber harvesting operations in the watershed and provide monitoring staff.

Section 8.2: Septic Systems

It is estimated in the Chesapeake Bay Watershed Model that about half of the residential population in New York's portion of the Chesapeake Bay watershed, or about 300,000 people, are served by about 120,000 septic systems or on-site wastewater treatment systems (OWTS).

Because studies show that most of the nitrogen from OWTS is removed by natural processes in soil, the Bay Watershed Model attributes only about 0.09 pounds of nitrogen per year to streams for each system.

Residential on-site wastewater treatment systems are regulated by the New York State Department of Health (NYS DOH) or are delegated to county health departments. New residential systems less than 1,000 gallons per day are required to achieve specific design criteria in NYS DOH regulations ([HYPERLINK "https://www.health.ny.gov/regulations/nycrr/title_10/part_75/appendix_75-a.htm" \h]).

Larger on-site wastewater treatment systems, including private, commercial, and institutional systems, are regulated by NYS DEC. NYS DEC requires all subsurface discharges greater than 1,000 gallons per day to obtain SPDES permits and to adhere with New York State groundwater water quality standards. For sanitary subsurface systems greater than 30,000 gallons per day, compliance with groundwater effluent standards for nitrate is required. Construction standards for these systems are found in NYS DEC's *Design Standards for Intermediate-Sized Wastewater Treatment Systems*[28]. These design standards were last revised in 2014. In addition, NYS DEC has identified sub-standard OWTS as a significant contributor to pollutants in urban stormwater runoff. MS4s are required to implement a process to identify and eliminate such illicit connections. This requirement is expected to reduce the number of sub-standard systems in urban areas.

While New York State does not routinely inspect residential OWTS, several watershed-based programs have been developed. In some areas, such as Lamoka – Waneta Lakes[29] and Otsego Lake, local inspection and enforcement programs exist. As a means to protect water resources in a cost-effective manner, municipal management of OWTS is encouraged. NYS DEC encourages municipalities to conduct OWTS inspections and to develop OWTS management strategies.

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[28] The New York State Design Standards for Intermediate Sized Wastewater Treatment Systems can be found online at: [HYPERLINK "https://www.dec.ny.gov/docs/water_pdf/2014designstd.pdf" \h]

[29] More information on the Lamoka-Waneta Lakes Wastewater Treatment Inspection Program can be found online at: [HYPERLINK "https://www.schuylercounty.us/367/Lamoka-Waneta-Inspections"].

The New York Onsite Wastewater Treatment Training Network (OTN)[30] is a largely volunteer industry group that provides professional trainings on soil analysis, inspection, and installation of onsite septic systems.

New York's Clean Water Infrastructure Act of 2017 established the State Septic System Replacement Fund. The purpose of this fund is to replace existing cesspools and septic systems that are having significant and quantifiable environmental and/or public health impacts to groundwater used for drinking water, or a threatened or impaired waterbody. The State Septic System Replacement Fund is administered by the New York Environmental Facilities Corporation (EFC) and is authorized to reimburse property owners for up to 50% of the eligible costs incurred for eligible septic system projects, up to $10,000. The Fund is being targeted to priority geographic areas within participating counties that contain groundwater supplies and surface water drinking water supplies and other threatened or impaired surface waters where septic systems and cesspools are known or suspected to be adversely impacting the waterbody. [REF _Ref4760267 \h] is a list of counties in New York's portion of the Chesapeake Bay watershed and associated waterbodies that are participating in the program currently.

Table [SEQ Table * ARABIC]. Counties Participating in State Septic System Replacement Program

County	Waterbodies
Broome	Park Creek and tributaries, Whitney Point Lake/Reservoir, Fly Pond, Deer and Sky Lakes
Chenango	Chenango and Guilford Lakes
Otsego	Goodyear Lake
Steuben	Almond, Keuka and Waneta Lakes, Mill and Smith Ponds

Financing is also available from the Clean Water State Revolving Fund for projects to construct municipally owned decentralized wastewater treatment systems. The fund provides low-interest funding for new projects or upgrades to address inadequate or failing systems, or to help establish sewer districts and alternative centralized treatment systems, where appropriate. However, properly functioning onsite systems typically provide effective wastewater treatment at a lower cost than centralized treatment plants, particularly in non-urban areas.

Because OWTSs make up a minor fraction of the total nitrogen load and because de-nitrifying systems are expensive (about $10,000/system), NYS DEC does not consider it practical to expect major nitrogen reductions from OWTS. Although there could be isolated instances where additional nitrogen removal systems may be needed to meet local groundwater quality

[30] More information on the New York Onsite Wastewater Treatment Training Network can be found online at: [HYPERLINK "http://www.otnny.org/" \h]

standards, ([HYPERLINK "https://govt.westlaw.com/nycrr/Browse/Home/NewYork/NewYorkCodesRulesandRegulations?guid=I070d30d0b5a111dda0a4e17826ebc834&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default)" \h]) de-nitrifying systems are not included in this plan.

Section 8.3: Federal Facilities

New York's portion of the Chesapeake Bay watershed includes 13 facilities run by federal agencies. The facilities and the agencies running them are shown in [REF _Ref323290007 \h * MERGEFORMAT] below.

Table [SEQ Table * ARABIC]: Federal Agency Facilities in the Upper Susquehanna Watershed

Facility Name	Federal Agency
Binghamton Armory	Army National Guard
Hornell Armory	Army National Guard
Horseheads Armory	Army National Guard
Windsor Training Site	Army National Guard
Whitney Point Lake	Army Corps of Engineers
Almond Lake	Army Corps of Engineers
East Sidney Lake	Army Corps of Engineers
U.S. Reservation	Army Corps of Engineers
Big Flats Plant Material Center	Department of Agriculture
Woodlawn National Cemetery	Department of Veterans Affairs
Fed Building & CTHSE-Binghamton	General Services Administration
Bath National Cemetery	Department of Veterans Affairs
VA Medical Center	Department of Veterans Affairs

NYS DEC works with federal agency partners that have facilities in the Upper Susquehanna watershed to account for best management practices on federal lands. Once accounted for, NYS DEC expects to include those BMPs in future milestones and Watershed Model progress runs.

In 2015, New York opted to use the default method to set nitrogen, phosphorus, and sediment pollutant reduction targets for federal facilities in New York's portion of the Chesapeake Bay watershed. The default method is described in the document *Protocol for Setting Targets, Planning BMPs and Reporting Progress for Federal Facilities and Lands* dated June 11, 2015.

Section 9: Accounting for Growth

In December 2017, the Chesapeake Bay Partnership approved the use of 2025 projected conditions to account for growth. It was also decided that the forecasted conditions will be updated every two years. Jurisdictions were required to offset any increases in nutrient and

sediment loads resulting from growth as part of the Phase III WIP. As part of the two-year milestone process, jurisdictions will have the opportunity to factor in updated growth projections. New York ran the proposed Phase III WIP input decks for each sector on the current 2025 projection available in CAST.

New York is projecting negative growth within the agriculture sector. Animal numbers and production acres will be updated using the U.S. 2017 Agricultural Census data, and it is expected that both animal numbers and production acres will decline compared to current estimates in the Watershed Model. Projecting to 2025, the decline in the agricultural sector is expected to continue. For the developed sector, NYS DEC estimates a small amount of nutrient and sediment loads will be gained due growth. These amounts are considered negligible and will be offset with improved BMP reporting. In the wastewater sector, wastewater facility flows are not expected to increase due to a declining population across the watershed. Any future growth may be offset with facility optimization or remediation of excessive flows due to Inflow and Infiltration (I&I).

Based on information provided to the NYS DEC by EPA's Chesapeake Bay Program Office in December 2017, 2025 projected growth in loading was estimated to be negative 740,000 pounds of nitrogen and negative 6,000 pounds of phosphorus (Appendix F pages 8 and 9). This EPA-provided analysis served as the basis for New York agreeing to the 2025 target loads at the Principal Staff Committee Meeting (July 2018) and subsequent Phase III WIP planning activities in cooperation with stakeholders.

Section 10: Addressing Climate Change

Section 10.1: Partnership Decisions Regarding Climate Change

The Chesapeake Bay Program Partnership relayed preliminary modeling results of climate change in 2025 in the form of nutrient load projections as part of the Midpoint Assessment completed in July 2018. [REF _Ref3789698 \h] shows the additional loading attributed to climate change based on preliminary model results. New York is committed to adopting the new numeric climate change loads starting with the 2022-2023 milestones.

Table [SEQ Table * ARABIC]. Preliminary Climate Change Model Results

	Increased load attributed to Climate Change
Nitrogen	0.400 (3.5%)
Phosphorus	0.014 (2.4%)

The Partnership also committed to the following strategy to address climate change between now and 2025:

- Understand the Science: By refining the climate modeling and assessment framework, continue to sharpen the understanding of the science, the impacts of climate change, and any research gaps and needs.

- Develop an estimate of pollutant load changes (nitrogen, phosphorus, and sediment) due to 2025 climate change conditions.
- Develop a better understanding of BMP responses, including new, enhanced, and climate resilient BMPs.
- In March 2021, the CBP partnership will consider results of updated methods, techniques, and studies, and refine estimated loads due to climate change for each jurisdiction.
- The PSC agreed that in September 2021, jurisdictions will account for additional nutrient and sediment pollutant loads due to 2025 climate change conditions in a Phase III WIP addendum and/or two-year milestones beginning in 2022.

Jurisdictions are required to include a narrative strategy that describes programmatic commitments to address the impacts of climate change as part of the Phase III WIP. In developing the narrative strategy, the following Chesapeake Bay Program Partnership approved Guiding Principles were considered:

- Capitalize on Co-Benefits – Maximize BMP selection to increase climate or coastal resiliency, soil health, flood attenuation, habitat restoration, carbon sequestration, or socio-economic and quality of life benefits.
- Account for and integrate planning and consideration of existing stressors – Consider existing stressors such as future increase in the amount of paved or impervious area, future population growth, and land-use change in establishing reduction targets or selection/prioritizing BMPs.
- Align with existing climate resiliency plans and strategies where feasible– Align with implementation of existing greenhouse gas reduction strategies; coastal/climate adaptation strategies; hazard mitigation plans; floodplain management programs; DoD Installation Natural Resource Management Plans (INRMPs); fisheries/habitat restoration programs, etc.
- Manage for risk and plan for uncertainty – Employ iterative risk management and develop robust and flexible implementation plans to achieve and maintain the established water quality standards in changing, often difficult-to-predict conditions.
- Engage Federal and Local Agencies and Leaders – Work cooperatively with agencies, elected officials, and staff at the local level to provide the best available data on local impacts from climate change and facilitate the modification of existing WIPs to account for these impacts.

Section 10.2: Current Action Plans, Programs and Regulations

New York has many action plans and programs in place to prepare for and respond to climate change risks across multiple sectors. Regulations and funding criteria have also been modified at the state-level to incorporate climate change considerations. The following action plans and regulations have been developed and are being implemented to address climate change in New York:

Community Risk and Resiliency Act (CRRA)

On September 22, 2014, Governor Andrew Cuomo signed bill A06558/S06617-B, the Community Risk and Resiliency Act (CRRA). The purpose of the bill is to ensure that certain state monies, facility-siting regulations, and permits include consideration of the effects of climate risk and extreme-weather events. The bill included five major provisions:

1. Official Sea-Level Rise Projections: CRRA adds a new section to Environmental Conservation Law (ECL) that requires NYS DEC to adopt science-based sea-level rise projections into regulation. NYS DEC [HYPERLINK "https://www.dec.ny.gov/press/109195.html"] into regulation in February 2017. These projections will guide future planning efforts and must be considered by applicants for certain permit and funding programs, but they will not have any impact on federal flood insurance rates or independently create any new design standards or permit requirements.
2. Consideration of Sea-Level Rise, Storm Surge and Flooding in Facility Siting, Permitting and Funding.
3. Smart Growth Public Infrastructure Policy Act Criteria: CRRA amends ECL Article 6 (Smart Growth Public Infrastructure Policy Act) to add mitigation of risk due to sea-level rise, storm surge, and flooding to the list of smart-growth criteria.
4. Model Local Laws Concerning Climate Risk: CRRA requires NYS DOS, in cooperation with NYS DEC, to develop model local laws that include consideration of future risk due to sea-level rise, storm surge, and/or flooding. These model local laws must be based on available data predicting the likelihood of extreme-weather events, including hazard-risk analysis.
5. Guidance on Natural Resiliency Measures: CRRA requires NYS DEC, in consultation with NYS DOS, to develop guidance on the use of natural resources and natural processes to enhance resiliency.

To meet its obligation to develop guidance for the implementation of CRRA, NYS DEC has proposed a new document, the State Flood Risk Management Guidance (SFRMG). The SFRMG is intended to inform state agencies as they develop program-specific guidance to require that applicants demonstrate consideration of sea-level rise, storm surge, and flooding, as permitted by program-authorizing statutes and operating regulations. The SFRMG incorporates possible future conditions, including the greater risks of coastal flooding presented by sea-level rise and enhanced storm surge, and of inland flooding expected to result from increasingly frequent extreme-precipitation events.

NYS DEC is also proposing new Guidance for Smart Growth Public Infrastructure Assessment. This new document is intended to guide state agencies as they assess mitigation of sea-level rise, storm surge and flooding in design of public-infrastructure projects, as required by CRRA. NYS DEC released both the draft State Flood Risk Management Guidance and Guidance for Smart Growth Public Infrastructure Assessment for public review in June 2018 and is currently reviewing public comments while preparing final versions of these two documents. Agency work groups are also drafting guidance on the use of natural resiliency measures, and model local laws to enhance resiliency. Drafts of these documents will be made available for public review as they are prepared by NYS DEC and other involved state agencies.

Climate Action Plan Interim Report

NYS Executive Order 24 was signed into effect in August 2009 to set a NYS goal of reducing greenhouse gas (GHG) emissions 80 percent below 1990 levels by 2050 (or 80 by 50) and establish the Climate Action Council to determine how to meet the goal. The resulting [HYPERLINK "https://www.dec.ny.gov/energy/80930.html"] identifies challenges and assesses how all economic sectors can reduce GHG emissions and adapt to climate change in a coordinated fashion. The Plan also identifies the extent to which such actions support New York's goals for a clean energy economy. The Agriculture, Forestry, and Waste Management Mitigation subgroup (AFW) points to several strategies for renewable energy production, adaptation, and greenhouse gas mitigation while striving to conserve other natural resources. Agricultural practices included in the AFW portion of the Plan include significant implementation of on-farm anaerobic digesters, perennial biomass production, on-farm energy audits, manure nutrient treatment and recycling, etc. ([REF _Ref16683625 \h]).

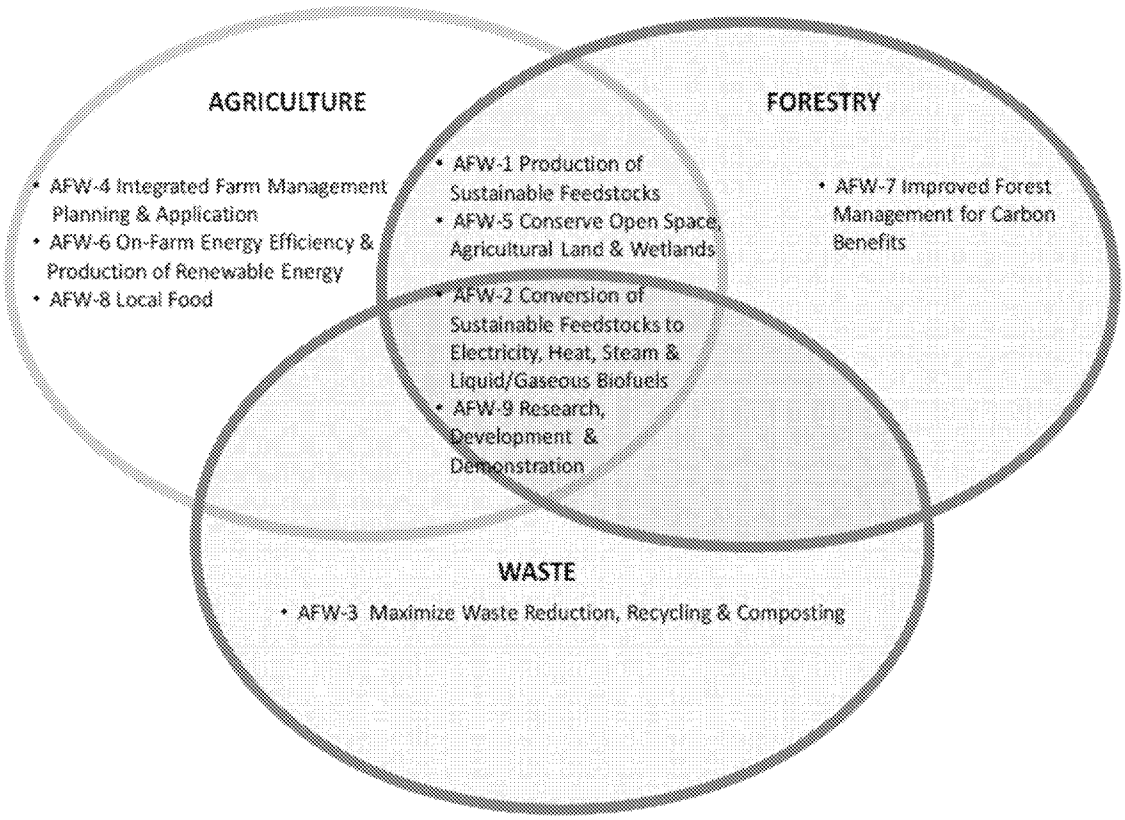

Figure [SEQ Figure * ARABIC]. Agricultural, Forestry and Waste Policy Options

ClimAID: the Integrated Assessment for Effective Climate Change Adaptation Strategies in New York State

[HYPERLINK "https://www.nyserda.ny.gov/About/Publications/Research%20and%20Development%20Technical%20Reports/Environmental%20Research%20and%20Development%20Technical%20Reports/Response%20to%20Climate%20Change%20in%20New%20York"] was undertaken to provide decision-makers with cutting-edge information on the state's vulnerability to climate change and to facilitate the development of adaptation strategies informed by both local experience and scientific knowledge.

This state-level assessment of climate change impacts is specifically geared to assist in the development of adaptation strategies. It acknowledges the need to plan for and adapt to climate change impacts in a range of sectors: Water Resources, Coastal Zones, Ecosystems, Agriculture, Energy, Transportation, Telecommunications, and Public Health.

This report is authored by a team of university and research scientists who are specialists in climate change science, impacts, and adaptation. To ensure that the information provided would be relevant to decisions made by public and private sector practitioners, stakeholders from state and local agencies, non-profit organizations, and the business community participated in the process as well.

This document provides a general synthesis of highlights from a larger technical report that includes much more detail, case studies, and references. The larger report provides useful information to decision-makers, such as state officials, city planners, water and energy managers, farmers, business owners, and others as they begin responding to climate change in New York State.

Regional Greenhouse Gas Initiative (RGGI)

New York and eight other Northeastern and Middle Atlantic states participate in the [HYPERLINK "https://www.dec.ny.gov/energy/rggi.html"] RGGI is the first mandatory market-based emissions trading program in the U.S. to reduce carbon dioxide (CO_2) emissions, and the first anywhere to use the cap-and-invest model for reducing pollution. RGGI states invest most of the proceeds from the quarterly CO_2 emission allowance auctions in consumer benefit programs with emphasis on end-use energy efficiency, renewable energy deployment and greenhouse gas abatement technology development. Since 2005, the RGGI states collectively have seen a decrease in CO_2 emissions from RGGI-affected power plants of more than 45%, while providing cleaner air, better health, and economic growth.

Climate Smart Communities

Members of the Climate Smart Communities program are a network of New York communities engaged in reducing greenhouse gas emissions and improving climate resilience. The program provides guidance to local governments on best practices for mitigating and adapting to climate change. Communities can act in two main ways to minimize the risks of climate change and reduce its long-term costs:

1. Reducing GHG Emissions: Starting now to reduce GHG emissions and create permanent carbon sinks that remove GHG emissions from the atmosphere - these actions will help stabilize atmospheric levels of carbon dioxide at manageable levels and avoid severe climatic changes.
2. Adapting to a Changing Climate: Altering the built and natural environment in anticipation of predicted climatic changes, or in response to actual changes, will alleviate the risks associated with unavoidable changes in climate.

The Climate Smart Communities program is jointly sponsored by the following six New York State agencies: NYS DEC; NYSERDA; Department of Public Service (DPS); NYS DOS; NYS DOT; and NYS DOH.

Benefits to becoming a climate smart community include leadership recognition, free technical assistance, and access to grants. Registered communities have made a commitment to act by

passing the CSC pledge. Pledge elements do not have to be completed in order to pass the CSC pledge and the CSC pledge is not required to obtain funding through the Climate Smart Communities (CSC) Program. Pledge elements are listed below:

[HYPERLINK "https://www.dec.ny.gov/energy/53013.html"] - Model resolution municipal governments can use to adopt the Climate Smart Community Pledge.

[HYPERLINK "https://www.dec.ny.gov/energy/93943.html"] - Guidance for local governments interested in joining the Climate Smart Communities program.

[HYPERLINK "https://www.dec.ny.gov/energy/67101.html"] - Information on creating a local climate action plan.

[HYPERLINK "https://www.dec.ny.gov/energy/57170.html"] - Available tools and assistance for conducting a greenhouse gas inventory.

[HYPERLINK "https://www.dec.ny.gov/energy/64089.html"] - Energy efficiency and conservation in buildings and in local services, such as water treatment and street lighting

[HYPERLINK "https://www.dec.ny.gov/energy/56925.html"] - Reducing vehicle miles traveled by municipal governments and employee commuters; making local government fleets more efficient

[HYPERLINK "https://www.dec.ny.gov/energy/56918.html"] - Green purchasing and other policies that save energy and reduce greenhouse gases from government and the community.

[HYPERLINK "https://www.dec.ny.gov/energy/91964.html"] - Information on the availability and implementation of renewable energy use for New York's Climate Smart Communities.

[HYPERLINK "https://www.dec.ny.gov/energy/57186.html"] - Information on reducing solid waste for Climate Smart Communities.

[HYPERLINK "https://www.dec.ny.gov/energy/82168.html"] - Increasing local resilience to climate impacts and preparing for changing climate hazards.

Certified communities are the foremost leaders in the state; they have gone beyond the CSC pledge by completing and documenting a suite of actions that mitigate and adapt to climate change at the local level. Actions related to water quality include watershed assessment, restoration of floodplains and riparian buffers, and conservation of natural habitats. Communities in the watershed participating in the CSC program include the City of Binghamton and Village of Whitney Point (Broome County), the Town of Big Flats and Village of Van Etten (Chemung County), the City of Cortland and Town of Preble (Cortland County), Madison County (certified), the Town of Eaton, Town of Hamilton, Village of Hamilton (Madison County), Town of Fabius (Onondaga County), the City of Oneonta, Town of Hartwick, Town of Otsego, Town of Richfield and Village of Cooperstown (Otsego County), the Town of Campbell and Village of Bath (Steuben County) and Tompkins County (certified).

Cleaner Greener Southern Tier Plan

A coalition representing eight New York counties[31] received a grant in 2012 to create the [HYPERLINK "http://tompkinscountyny.gov/files2/planning/Sustainability/FINAL%20CGST%20Regional%20Sustainability%20Plan%205-22-13.pdf"] – a comprehensive smart growth plan for regional sustainability. Even though the Plan's primary goal is to reduce greenhouse gas emissions in the Southern Tier region, implementation of the plan will have water quality, floodplain, agriculture, and land conservation benefits. Goals of the plan include:

- Preserve and enhance existing floodplains, wetlands, and stream buffers to support regional ecosystem resiliency and function and reduce flooding. Includes plans, policies, education, and investment to preserve and restore critical lands (Goal 12)
- Efficiently manage and upgrade existing water, sewer, and other utility infrastructure to support compact development and reduce energy use. Includes plant and distribution system upgrades focused on supporting existing development areas rather than continued expansion of service areas. (Goal 13)
- Improve and protect water quality and quantity. Includes water source protection (wells, lakes, rivers, and aquifers), contamination protection (retention of 'first inch' of runoff, industrial and commercial pollution prevention), and green streets/green infrastructure strategies to clean stormwater and recharge aquifers (Goal 14)
- Promote best management of fields, forests, and farmland to keep working lands in agricultural production, protect natural resources, and increase carbon sequestration. Includes planning, education, financial, and management support for farming and forestry and other resource-based businesses (Goal 17)
- Preserve and connect natural resources, open spaces and access to waterways, to protect regional environment, ecology, habitat and scenic areas, and support outdoor recreation. Includes trails, parks, and open space planning, resource conservation, green infrastructure planning, and lake and river access. Also includes education along with access to build public awareness and support (Goal 18)

NYS Climate Resilient Farming Program

The [HYPERLINK "https://www.nys-soilandwater.org/programs/crf.html"], under the New York State Soil & Water Conservation Committee, the goal of the CRF program is to reduce the impact of agriculture on climate change (mitigation) and to increase the resiliency of New York State farms in the face of a changing climate (adaptation). SWCDs use the Agricultural Environmental Management (AEM) Framework to plan and assess their environmental risks. Historically, farmers working through the AEM framework have only been able to receive funding through the Agricultural Non-Point Source program, for water quality concerns. Climate Resilient Farming fills those gaps by allowing farmers to proactively address risks due to the changing climate while also mitigating their greenhouse gas emissions.

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[31] Members of the coalition are: Tompkins County (project lead), the Southern Tier East Regional Planning & Development Board and the Southern Tier Central Regional Planning & Development Board. The coalition represents Steuben, Schuyler, Chemung, Tompkins, Tioga, Broome, Chenango, and Delaware counties.

While New York State is projected to increase precipitation overall, it is expected to come in short, extreme precipitation events in between mild droughts. This represents a major risk to farms, particularly those in low-lying or flood prone areas. Localized downpours and cloud bursts can cause substantial damage to farms. This program capitalizes on the opportunities to mitigate agriculture's greenhouse gas emissions while strengthening the resiliency of New York State's farms.

Cornell Climate Smart Farming Program

The [HYPERLINK "http://climatesmartfarming.org/"] is a voluntary initiative that offers a suite of online tools for farmers in New York to increase farm resiliency to extreme weather and climate variability, increase agricultural productivity and farming incomes sustainably, and reduce greenhouse gas emissions from agricultural production by adopting best management practices. The program was created in 2017 and offered through Cornell University Institute for Climate Smart Solutions. CSF tools include: U.S drought monitor, NOAA Seasonal outlook-temperature, NOAA Seasonal outlook- precipitation, Adapt-N Nitrogen Management tool, Cover crop tool for vegetable growers, USDA Plant Hardiness Map, COMET-Farm greenhouse gas accounting tool, Winter cover crop planting scheduler, and Growing degree day calculator.

Resilient NY Flood Mitigation Studies

As part of Governor Cuomo's Resilient NY program, $3 million of state funding has been dedicated for state-of-the-art studies to reduce flooding and ice jams and improve ecology on 48 priority flood-prone streams throughout New York State. The studies will employ advanced modeling techniques and field assessments to identify priority projects and actions to reduce community flood and ice jam risks, while improving habitat. NYS DEC and Office of General Services (OGS) will implement the studies in high-priority watersheds. Watersheds were selected based on several factors, such as frequency and severity of flooding and ice jams, extent of previous flood damage, and susceptibility to future flooding and ice jam formations. The Resilient NY flood studies will identify the causes of flooding within each watershed and develop, evaluate, and recommend effective and ecologically sustainable flood and ice-jam hazard mitigation projects. Proposed flood mitigation projects will be identified and evaluated using hydrologic and hydraulic modeling to quantitatively determine flood mitigation recommendations that will result in the greatest flood reductions benefits. In addition, the flood mitigation studies will incorporate the latest climate change forecasts and assess ice jam hazards where jams have been identified as a threat to public health and safety. Watersheds within the Chesapeake Bay watershed selected for these studies include: Butternut Creek, Cherry Valley Creek, Otego Creek (Otsego County) and Rock Creek in Tioga County.

Section 10.3: BMP Evaluation and Co-Benefits

NYS DEC commits to prioritizing implementation of climate-resilient BMPs. Leveraging on existing plans and studies, BMPs with multiple co-benefits such as flood protection/control will be prioritized. BMP co-benefits related to climate resiliency are described in more detail in Section 10 of this document. Any information developed by the Chesapeake Bay Program Partnership regarding BMP efficiency and/or vulnerability will be incorporated into New York's implementation process. NYS DEC will encourage the following Climate Resiliency Guiding Principles will be considered when selecting BMPs for implementation at the local level:

- Reduce vulnerability - Use “Climate-Smart” principles to site and design BMP’s to reduce future impact of sea level rise, coastal storms, increased temperature, and extreme events on BMP performance over time. Vulnerability should be evaluated based on the factor of risk (i.e. consequence x probability) in combination with determined levels of risk tolerance, over the intended design-life of the proposed practice.
- Build in flexibility and adaptability - Allow for adjustments in BMP implementation in order to consider a wider range of potential uncertainties and a richer set of response options (load allocations, BMP selections, BMP redesign).
- These principles are reinforced by New York’s action plans, regulations, and funding program considerations.

Section 11: Chesapeake Bay Watershed Agreement and BMP Co-Benefits

In addition to the TMDL, New York and the other jurisdictions signed the [HYPERLINK "https://www.chesapeakebay.net/what/what_guides_us/watershed_agreement"] in 2014. The Chesapeake Bay Watershed Agreement established ten goals for sustainable fisheries, vital habitats, improved water quality (of which the implementation of the TMDL is one component), toxic contamination, healthy watersheds, stewardship (including diversity, local leadership and citizen stewardship), land conservation, public access, environmental literacy and climate resiliency. There are 31 management strategies and associated workplans with identified action items and indicators for these goals.

There are multiple benefits that can be achieved from the coordination of the TMDL and the Chesapeake Bay Watershed Agreement, including; (1) improving communications and messaging about what the Chesapeake Bay Program is about, (2) showcasing the progress made to date and (3) the combining of available resources to more effectively restore and protect the Chesapeake Bay, as well as protect and improve the environment in New York. As a result of this, New York has incorporated Watershed Agreement goals and outcomes in this Phase III WIP based on BMPs that achieve goals of both the TMDL and Watershed Agreement.

Brook Trout

Brook Trout are a valuable species to the Chesapeake Bay watershed, providing social, economic, and ecological benefits to residents. Brook Trout is designated as the state fish in New York. Brook trout require cool, clean water and it is very easy for human activity to eliminate this condition. Activities such as clearing forests for farming, housing, or commercial purposes can convert cool, fast-flowing gravelly streams into still, warm, silty waterways incapable of supporting brook trout. The presence of brook trout is, and has been for many years, used as a measure of water and habitat quality by NYS DEC when making decisions regarding permitted land or water use.

The Chesapeake Bay Watershed Agreement Goal for Brook Trout is to restore and sustain naturally reproducing brook trout populations in Chesapeake Bay headwater streams, with an eight percent increase in occupied habitat by 2025.

BMPs selected by New York to meet water quality targets for the Chesapeake Bay TMDL also enhance brook trout habitat as well. These BMPs include:

- Agricultural Forest Buffers

- Streamside Forest Buffers (Urban)
- Stream Restoration (Agricultural and Urban)
- Stream Access Control with Fencing
- Land conservation
- Wetland Restoration

Below is a map of HUC 12 watersheds in the New York portion of the Chesapeake Bay watershed with the percent Brook Trout habitat and watershed without Brook Trout ([REF _Ref16766328 \h * MERGEFORMAT]).

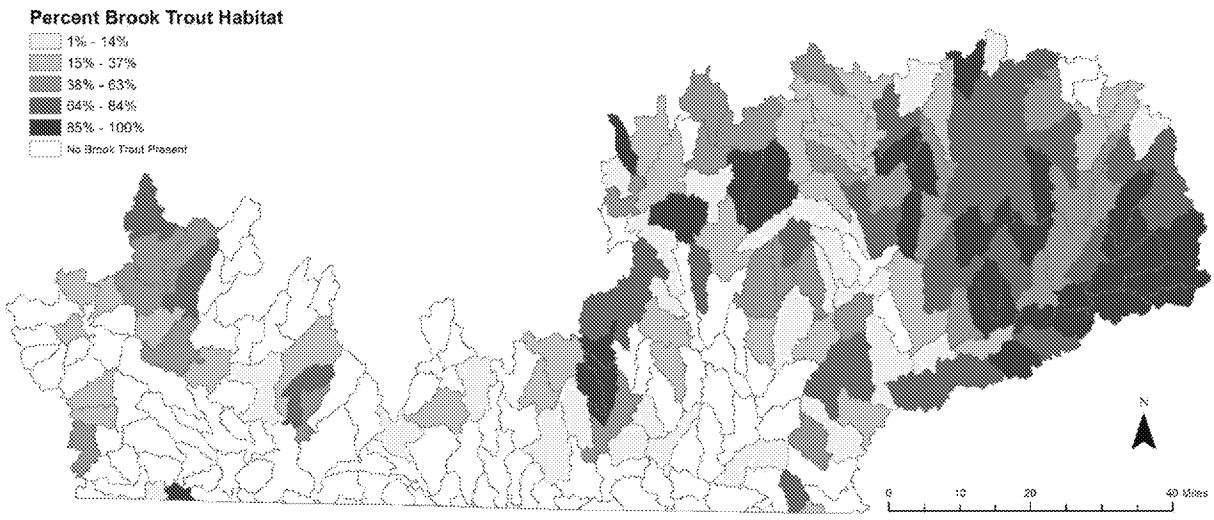

Figure [SEQ Figure * ARABIC]. Percent Brook Trout Habitat in HUC 12 watersheds

SWCDs and other organizations in New York utilize the [HYPERLINK "https://northatlanticlcc.org/products/north-atlantic-aquatic-connectivity-collaborative"] framework to assess culverts and road stream crossings for aquatic barriers. Removal of aquatic barriers identified through NAACC assessments will improve brook trout passage and connectivity. NYS DEC continues to support the use of the NAACC framework and has historically provided funding to partners to conduct these assessments. Additional funding is needed to support additional assessments and implementation of culvert/road crossing replacement projects.

Climate Resiliency

As discussed in detail in [HYPERLINK \l "_Section_9:_Addressing"] of this document, climate change factors such as increased temperature, increased heavy precipitation events, and stronger storms will alter the Chesapeake Bay watershed and New York's environment. The overall Watershed Agreement Goal is to increase the resiliency of the Chesapeake Bay watershed, including its living resources, habitats, public infrastructure, and communities, to withstand adverse impacts from changing environmental and climate conditions. Adaptation to these impacts will require proper siting, design, and implementation of BMPs that will reduce vulnerability to future impacts.

In addition to water quality benefits, the following BMPs have been identified to increase resilience to climate change:

Climate Adaptation:

- Urban Forest Buffers
- Forest Conservation
- Urban Stream Restoration

Energy Efficiency:

- Urban Forest Buffers
- Urban Tree Planting
- Forest Conservation

Flood Risk Mitigation:

- Bioretention, Raingarden, Bioswales
- Wetlands Restoration
- Agricultural Forest Buffer
- Urban Stream Restoration
- Forest Conservation
- Urban Forest Buffers

Forest Buffers

A healthy forest buffer improves stream health and water quality by slowing runoff, filtering pollution, preventing soil erosion, contributing essential nutrients to the food chain through leaf litter, providing woody debris for in-stream habitat, and shading the stream to keep waters cool. Forest buffers also provide critical habitat for birds, mammals and other terrestrial species. Buffers also absorb and slow flood waters, which protects property and human safety. Riparian forest buffers are a cost-effective water quality practice and are one of the most effective BMPs to reduce nutrient and sediment pollution. NYSDEC widely promotes riparian forest buffers due to multiple co-benefits. NYS DEC developed a [HYPERLINK "https://www.dec.ny.gov/docs/water_pdf/bufferfunding.pdf"] available in New York to assist partners with implementation of riparian buffers.

The Chesapeake Bay Watershed Agreement goal for forest buffers is to continually increase the capacity of forest buffers to provide water quality and habitat benefits throughout the watershed and restore 900 miles per year of riparian forest buffer and conserve existing buffers until at least 70 percent of riparian areas throughout the watershed are forested. BMPs selected by New York in the Phase III WIP that will advance progress towards meeting the Chesapeake Bay Watershed Agreement goal include:

- Agricultural Forest Buffers (including narrow forest buffers)
- Streamside Forest Buffers (including narrow urban buffers)
- Forest Harvesting Practices

- Land Conservation

Challenges to implementing forest buffers include a lack of coordinated, consistent, dependable funding programs. In addition, funding programs generally do not focus on monitoring and maintenance of forest buffers, which places the burden on the landowner and jeopardizes the success of buffers that are planted. Flexible programs with increased maintenance and incentive funding are needed to meet forest buffer goals.

Stream Health

The Chesapeake Bay Watershed Agreement has a goal to continually improve stream health and function throughout the watershed. Improve health and function of ten percent of stream miles above the 2008 baseline for the Chesapeake Bay watershed. Stream health can be improved by utilizing in-stream BMPs which stabilize banks, improve water quality through reduced sediment loading, improve riparian and upland habitat, increase biodiversity, and restore aesthetic value. Current stream restoration techniques highlight the importance of reconnecting a stream to its floodplain. BMPs that improve stream health, as well as water quality, include:

- Stream Restoration (Agricultural and Urban)
- Forest Buffer (Agricultural and Urban).
- Alternative Watering Systems
- Forest Harvesting Practices
- Forest Conservation

Tree Canopy

Increased tree canopy provides a variety of environmental benefits, including improvements to air quality, water quality and habitat. The Watershed Agreement goal is to expand urban tree canopy by 2,400 acres by 2025. The practices listed below support expansion of tree canopy in both agricultural and urban settings:

- Agricultural Forest Buffer (including narrow buffers)
- Urban Forest Buffer
- Forest Conservation
- Urban Tree Planting

Tree canopy and planting goals can be incorporated into local planning, ordinances, and stormwater management permits compliance.

Wetlands

Wetland restoration, creation, and rehabilitation BMPs receive a high amount of nutrient and sediment reduction credit in the Watershed Model. In addition, wetlands slow runoff and provide wildlife habitat. The Watershed Agreement Goal is to create or reestablish 85,000 acres of tidal and non-tidal wetlands and enhance the function of an additional 150,000 acres of degraded wetlands by 2025. These activities may occur in any land use (including urban) but primarily occur in agricultural or natural landscapes. BMPs with wetland-related benefits include:

- Wetland Restoration
- Wet ponds/Wetlands (Urban)
- Urban Forest Buffers
- Urban Stream Restoration

Section 12: Other Key Program Areas

Section 12.1: Alternative Land Use Scenarios

Through CAST, jurisdictions have several alternative future land use scenarios in which to use for projecting 2025 growth conditions, such as forest conservation, growth management, and agricultural conservation. At this time, NYS DEC is not proposing to implement any alternative land use scenarios. A future land use scenario that may be considered is a forest conservation scenario. Approximately 350,000 acres of land are under state protection through NYS DEC Lands and Easements, New York State Parks, and New York Heritage Areas. At least an additional 30,000 acres are protected by land trusts, local municipalities and federal entities. Several specific programs contribute to forest land preservation efforts in the watershed. New York's [HYPERLINK "https://www.dec.ny.gov/lands/98720.html" \h] identifies and targets high-priority open space lands, including forests, for acquisition and preservation using State Environmental Protection Funds. Conservation easements are annually being placed on these high value forest lands to permanently preserve them for forest use. Forest land easements are held by a public entity, such as the State, or by one of many not-for-profit land trusts, Finger Lakes Land Trust, Otsego Land Trust, The Nature Conservancy and other regional land conservancies.

Section 12.2: Floodplain Management

Floodplains play an important hydraulic function in river systems. Undisturbed floodplains dissipate flood water energy and allow flood waters to infiltrate native soils. These functions reduce erosion potential and facilitate natural processes to attenuate nutrients. In addition, disturbance of structures and fill materials during a flood lead to deposition of large quantities of sediment and other debris that contribute to violations of the state narrative water quality standard for deposition. Further, such sediments will carry nutrients and other contaminates that have the reasonable potential to cause or contribute to violations of water quality standards. Improved local government administration of its floodplain development regulations will reduce nutrient and sediment transported downstream during flood events. This will be accomplished by enhancing the current FEMA/State program, whereby NYS DEC conducts Community Assessment Visits and Community Technical Assistance Contacts, works with municipalities to take corrective actions and reports resulting findings to FEMA.

Although not directly regulated, under the CBRAP grant, NYS DEC will augment its work, under contract with FEMA, to audit and assist local government administration of floodplain development regulations enacted for participation in the National Flood Insurance Program. NYS DEC will also assist municipalities with implementation of flood damage reduction programs that exceed federal standards and protect floodplain functions.

A focus will be on restoration of the hydraulic function of floodplains, especially regarding smaller headwater streams that have often been isolated due to historic human alterations of stream beds and banks in an effort to limit bank flooding and resulting field scour or other perceived and/or real damages, and to retain the function of undeveloped floodplains.

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In addition to DEC's programs, many local organizations are actively engaged in efforts to reduce the Southern Tier's vulnerability to flooding. These programs include an emphasis on protection of natural and beneficial floodplain functions, such as preservation and re-establishment of wetlands and vegetated riparian buffers.

Section 12.3: Planned SPDES Program Improvement

The current data management infrastructure used by NYS DEC staff hinders the SPDES program in many ways, requiring duplication of data entry and making common access to data cumbersome. In 2009, NYS DEC assessed the existing data management systems and business processes used to support the SPDES program. The objective of the assessment was to develop a plan for future information management investments that will streamline the SPDES data management process, meet the future business needs of the program, and complement the ongoing use of EPA's national system.

During this assessment DEC first developed a comprehensive outline of the SPDES program business workflow and the limitations in the existing information management system. Given consideration next were alternative actions that could be undertaken to streamline the data management process and effectively respond to future business needs. Over the last few years NYS DEC has been working on developing interim data systems to address the issues identified in the 2009 assessment. In 2018, Governor Cuomo announced an Information Technology Water Quality Initiative and allocated resources for the modernization and integration of several Division of Water data systems. NYS DEC is using the 2009 assessment as a foundation and guiding document, as well as, evaluating new business processes to develop a modernized data management system for the SPDES program. The project is in the initial stages and is expected to take 3-4 years to complete.

Section 13: Partnership Decisions related to the Conowingo Dam

The Susquehanna Basin drains from New York through Pennsylvania to a series of hydroelectric dams located in Maryland (Safe Harbor, Holtwood, and Conowingo Dams). Behind the Conowingo Dam is the Conowingo Reservoir, which had the capacity to trap nutrients and sediment. It was assumed in the 2010 TMDL that the Conowingo Reservoir would retain its ability to trap nutrients and sediment until at least 2025. Studies conducted by USGS now indicate that the Conowingo Dam is now in a state of "dynamic equilibrium" and no longer trapping nutrients and sediment.

To address the loss of trapping capacity of the dam, the Chesapeake Bay Partnership made the decision to develop a separate and collaborative implementation plan that will provide details on actions to address additional loading. A target of six million pounds of nitrogen and 260,000 phosphorus was assigned to the separate Conowingo implementation plan (Conowingo WIP). All jurisdictions agreed to collaborate to develop and carry out the Conowingo WIP. The Conowingo WIP will be developed concurrently with the seven jurisdiction's WIPs, with assistance from a third-party contractor. It is expected that the final Conowingo WIP will be finalized in November 2019 and a financing strategy for implementation of the WIP will be finalized by May 2020.

Appendices

Appendix A: Revisions to CAFO ECL and CWA General Permits

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Appendix B: Hydrogeomorphic Regions in New York

Appendix C: Cover Crop Watershed Model Efficiencies

Appendix D: Delivery Factors for Bay-Significant Wastewater Treatment Facilities

Appendix E: Delivered and Discharged Load from Non-Significant Wastewater Treatment Facilities

Appendix F: Explanation of New York's Draft Phase III WIP Planning Targets

Appendix G: Nutrient Exchange

Appendix H: New York is meeting its nitrogen targets for the Chesapeake Bay TMDL: Technical summary (submitted to EPA Sept. 14, 2020)

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