New York State Department of Environmental Conservation

Final Phase II
Watershed Implementation Plan

for

New York Susquehanna and Chemung River Basins

and

Chesapeake Bay Total Maximum Daily Load

January 7, 2013

ANDREW M. CUOMO
GOVERNOR

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COMMISSIONER

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK 12233-1010

JAN – 7 2013

Mr. Jeffery Corbin
Senior Advisor to EPA Administrator Jackson
for Chesapeake Bay and Anacostia River
410 Severn Avenue
Annapolis City Marina
Annapolis, MD 21403

Dear Mr. Corbin:

Enclosed please find New York's *final* Phase II Watershed Implementation Plan (Phase II WIP), including the narrative and "input deck" with respect to the Total Maximum Daily Load (TMDL) program to reduce phosphorus, nitrogen and sediment pollution entering Chesapeake Bay. New York is pleased to have completed this milestone as part of our mutual efforts to improve the water quality, habitat and flood resiliency of the Bay and its watershed.

In July of this year, the New York State Department of Environmental Conservation (DEC) submitted a *draft* Phase II WIP to the U.S. Environmental Protection Agency (EPA). At that time, DEC circulated those draft documents widely among the affected stakeholder communities throughout New York's Susquehanna and Chemung River Basins. The recent stakeholder consultations were part of an ongoing collaborative dialogue that has involved regular community meetings, deliberations and problem-solving. Previously, DEC had submitted to EPA a two-year milestone program detailing the more immediate actions New York State will undertake to make incremental progress toward reducing pollutant loadings within the Chesapeake Bay watershed. The final Phase II WIP submitted today is similar to the draft document previously submitted, with the exception of a small adjustment downward of approximately 11,000 pounds of phosphorus per year in the Phase II WIP target load.

DEC submits the Phase II WIP on the condition that any "backstop" limitations previously applicable to any "Bay significant" New York waste water treatment plants, and described in the documents associated with the December 2010 Chesapeake Bay TMDL, will be removed in favor of an "enhanced oversight" categorization for these facilities. Our understanding is that such a categorization would remove the potential for any independent EPA effort to modify the Clean Water Act permits (known as State Pollutant Discharge Elimination System or SPDES permits in New York) to increase treatment requirements beyond what is reflected in the final Phase II WIP.

DEC acknowledges that, collectively, we must achieve compliance with water quality standards associated with nitrogen, phosphorus and sediment loadings into Chesapeake Bay under the Clean Water Act. In that regard, New York is committed to doing its fair share to achieve water quality standard compliance. DEC looks forward to working with EPA and the United States Department of Agriculture to assure the fullest possible level of federal assistance to New York so as to off-set the significant costs of these programs to New York's hard-pressed farmers and municipalities.

EPA has stated its intention to review and update its December 2010 TMDL for Chesapeake Bay in 2017. DEC recognizes, under the Clean Water Act framework, that the modeling, monitoring and assessments associated with the 2017 TMDL update may result in the need for the Chesapeake Bay jurisdictions to undertake further efforts to assure water quality standard compliance. In the alternative, the 2017 TMDL review may result in a finding that somewhat less stringent pollutant target loads than those identified to date would result in the achievement of water quality standards.

In the event New York's final Phase II WIP program is not sufficiently effective in achieving the target loads, or that the 2017 TMDL revision results in equitable increases in the stringency of target loadings or allocations to achieve water quality standard compliance, New York would seek to explore the following (non-exclusive) options for the most cost-effective program to achieve additional required pollution reductions:

(i) heightened federal air emission controls or efficiency standards on automobiles, boilers and the like to reduce overall emission and subsequent deposition of oxides of nitrogen;

(ii) a TMDL modeling assessment of the impacts of market-driven conversions of coal-fired electric power plants or industrial boilers to lower NOx-producing natural gas fuels;

(iii) heightened phosphorus and/or nitrogen treatment systems or methods on the Bay-significant industrial or municipal waste water treatment plants;

(iv) innovative or heightened management practices on the landscape to reduce levels of targeted pollutants from farm, forestry, or mining activity;

(v) programs to reduce pollutant loadings from residential septic systems;

(vi) road-side ditch or highway maintenance practices designed to reduce erosion and infiltrate storm waters along rural roadways;

(vii) increased implementation of storm water management practices, including green infrastructure, within urbanized areas in a manner that is consistent with the Municipal Separate Storm Sewer System General Permit and underlying technical criteria;

(viii) a TMDL model assessment to assure that the model fully accounts for the benefits of air emission limitations and farm management practices undertaken by New York;

(ix) heightened implementation of DEC's General Permits for Construction Activity and Multi-Sector Industrial Activity;

(x) if authorized, implementation of engineering, buffer and regulatory protocols concerning high volume hydraulic fracturing for natural gas;

(xi) bio-harvesting practices within Chesapeake Bay;

(xii) potential modification by Maryland of the stringency of certain water quality standards, in particular, the dissolved oxygen criteria in two deep-channel segments (not mid-level or surface areas) of the 92 water segments within Chesapeake Bay;

(xiii) full implementation of New York's stream and wetland protection statutes, along with expansion of the wetland construction/restoration programs led by the Upper Susquehanna Coalition;

(xiv) a full TMDL model accounting for the implementation of New York's recently adopted low phosphorus lawn fertilizer and low phosphorus dishwashing machine detergent statute;

(xv) continued stream restoration, re-vegetation and stabilization projects to improve flood resiliency and reduce stream bed/bank erosion under the "NY Works" program and the Natural Resources Conservation Service "Emergency Watershed Protection" program; and

(xvi) heightened flood plain management mapping, code enforcement and training in conjunction with municipal governments and the Federal Emergency Management Agency's national flood insurance program.

DEC understands that the measures identified in the Phase II WIP must be tracked and maintained over the long-term, and that adequate levels of federal financial support will be necessary to implement and maintain these measures. Without adequate and consistent levels of federal funds over the next several years, New York will not be able to meet these TMDL commitments.

Sincerely,

Joseph J. Martens

c: Judith Enck

New York State Department of Environmental Conservation

Division of Water

Final Phase II Watershed Implementation Plan for New York Susquehanna and Chemung River Basins and Chesapeake Bay Total Maximum Daily Load

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Prepared by: New York State Department of Environmental Conservation

In collaboration with: New York State Department of Agriculture & Markets
Upper Susquehanna Coalition

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Section 1:Introduction

1.1: New York and the Chesapeake Bay

New York's portion of the Chesapeake Bay watershed is made up of the Susquehanna River watershed and the Chemung River watershed. Together these two watersheds form the northern headwaters of the Chesapeake Bay and cover much of New York's Southern Tier. 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. New York's portion of the Bay watershed covers 6,250 square miles and about 640,000 people.

1.2: A Plan to Improve Water Quality

All six states (and the District of Columbia) in the Chesapeake Bay watershed, including New York, are developing and implementing Watershed Implementation Plans (WIP) that describe how each state will meet nutrient and sediment loads outlined in the Chesapeake Bay Total Maximum Daily Load (TMDL) developed by the U.S. Environmental Protection Agency (EPA). This document is New York's Phase II Watershed Implementation Plan.

New York expended considerable effort to determine the best balance of load reductions among the agriculture, wastewater and stormwater sectors. New York will seek appropriate reductions in agricultural loads because these loads represent the greatest proportion of the total controllable load from New York. With funding likely available for implementation of agricultural practices and the documented cost effectiveness of such practices when compared to reductions in wastewater loads or stormwater loads, agricultural reductions are generally more cost effective than either wastewater or stormwater reductions. New York's wastewater reductions will be implemented through robust legal requirements (numeric effluent limits), these reductions are necessary to meet numeric nutrient criteria, and to effect equitability with other states that are requiring wastewater reductions. New York is not seeking further reductions in stormwater load through retrofit requirements because these reductions are by far the most cost intensive and are a very small proportion of the total New York load.

1.3: Chesapeake Bay Total Maximum Daily Load

EPA has projected 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 and clarity.

EPA divided the total amount of these pollutants among the major river basins, or jurisdictions, in the Bay watershed. After on-going discussions, EPA has provided a reasonable set of target load reductions for New York. New York has one set of allocations at the major river basin/jurisdiction scale because all pollutant loads from New York are conveyed to Chesapeake Bay by the Susquehanna River. In New York, the Susquehanna River basin is described as two separate watersheds: the Susquehanna River watershed and the Chemung River watershed.

The following source sector chapters (Agriculture, Wastewater, Urban Runoff, and Other Remaining Sources) represent New York's Phase II Watershed Implementation Plan associated with the Chesapeake Bay Total Maximum Daily Load. The source sector chapters show how the nutrient and sediment allocations for New York will be achieved and maintained. They may be modified based upon:

- Federal implementation 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 Susquehanna and Chemung watersheds.
- Trading as defined in Section 4.
- Other unforeseen events and/or outcomes of advances in scientific understanding and technology.

Section 2: Interim and Target Loads

EPA's objective is for watershed jurisdictions to implement the actions necessary to achieve the nutrient and sediment allocations by 2025 and to have controls in place by 2017 that will achieve 60% of the necessary reductions from 2009 loads. *Table 1: New York Nutrient & Sediment Reduction Schedule* depicts this reduction schedule as it applies to New York.

Table 1: New York Nutrient & Sediment Reduction Schedule

	Nitrogen	Phosphorus	Sediment
2009	10.72	0.96	332
2017 60% goal	9.86	0.79	307-324
2025 TMDL Phase II allocation goal	9.282	0.672	293-322
Values are million pounds per year. All 2009 values are delivered load and an output of EPA Chesapeake Bay Watershed Model Version 5.3.2.			

Table 2: 2009 Nutrient & Sediment Contributions from Major Source Categories shows the description of the loads delivered to Chesapeake Bay from New York from major source categories based on EPA Chesapeake Bay Watershed Model Version 5.3.2. When comparing categories, it is important to note the 2009 wastewater load is based on the actual quantity discharged from wastewater treatment plants in 2009, a relatively dry year, whereas the remaining non-point source loads are based on an average hydrologic year.

Table 2: 2009 Nutrient & Sediment Contributions from Major Source Categories

	Nitrogen	Phosphorus	Sediment
Agriculture	4,536,179 (42%)	526,822 (55%)	132,413,421 (40%)
Urban Runoff	1,241,289 (12%)	122,385 (13%)	99,826,877 (30%)
Point Source (wastewater)	1,493,503 (14%)	189,651 (20%)	2,619,906 (1%)
Septic	317,635 (3%)	0 (0%)	0 (0%)
Forest	3,130,805 (29%)	117,128 (12%)	96,975,728 (29%)
New York Totals	10,719,411	955,986	331,835,932
Values are pounds per year. In parentheses is the percent of the total. Because both are largely uncontrollable load, the Forest category includes 85,698 pounds per year of nitrogen and 7,294 pounds per year of phosphorus attributed to Non-			

tidal Water Deposition. All 2009 values are delivered load outputs of the EPA Chesapeake Bay Watershed Model Version 5.3.2 and units are pounds per year.

Based on several factors, including pollutant magnitude, technical feasibility, implementation capacity and nutrient and sediment control benefits, New York divided its total nutrient loads among the major source categories in the following manner.[1]

2.1: Sub-allocation to the Major Source Categories in New York

Agriculture

Within the framework of New York's Agriculture Environmental Management program (NY Ag & Mkts Law §11A-150, *et seq.* enacted into law in 2002, http://www.nys-soilandwater.org/aem/index.html), the management practices and associated implementation levels are the recommendation of the collaborative effort of the Upper Susquehanna Coalition (Soil and Water Conservation Districts), the NYS Department of Agriculture and Markets, the NYS Department of Environmental Conservation, the USDA Natural Resources Conservation Service, and Cornell University.

Wastewater

The waste load allocation for significant wastewater treatment plants will be implemented in stages.

The proposed interim waste load allocations would be implemented through 2017 and would start with immediate incorporation of the phosphorus limits upon EPA approval of the WLA as meeting the intent of the adopted TMDL and permit revision. See *Section 4: Wastewater* for specific implementation criteria.

For nitrogen, implementation dates will be staged, beginning in:

- 2015 for plants of 9 MGD or higher capacity
- 2016 for plants from 0.5 to 4 MGD
- 2017 for the smallest plants

DEC is proposing 2025 waste load allocations that are primarily based on design flow times a target concentration of 0.5 mg/l for phosphorus, although for some industrial dischargers, the interim and final WLA is based on a comparable percent reduction required from municipal dischargers. For nitrogen, the 2025 waste load allocations are primarily based on design flow times a target concentration that averages out to be 8.7 mg/l. All final waste load allocations are to become effective in 2025. Certain facilities are already compliant and others have projects underway such that compliance is expected in the near future.

[1] New York does not describe the same for sediment as the sediment allocation is a modeled outcome of the nutrient controls.

Urban Runoff

The type of management practice and associated implementation levels are an outcome of the New York stormwater regulatory program (construction stormwater and municipal separate storm sewer system permits.) It also incorporates the New York fertilizer law enacted in 2010.

Forest

Forest harvest management practices are included on lands where the DEC Division of Lands and Forests is involved in timber harvest management.

Septic Systems

No new septic system controls are proposed. Connections to municipal sewers or other remedies of areas of inadequate systems may occur based on local water resource or public health concerns.

Table 3: Major Source Category Nutrient Targets shows the breakdown of the nutrient load targets among the various source sectors based on the modeled result of aforementioned controls.

Table 3: Major Source Category Nutrient Targets[2]

	Nitrogen Delivered			Phosphorus Delivered		
	2009	**2017**	**2025**	**2009**	**2017**	**2025**
Agriculture	4.54	3.79	3.04	0.53	0.45	0.36
Urban Runoff	1.24	1.14	1.14	0.12	0.10	0.10
Point Sources (wastewater)	1.49	1.66	1.61	0.19	0.12	0.09
Septic	0.32	0.32	0.32	0.00	0.00	0.00
Forest[3]	3.13	3.16	3.16	0.12	0.12	0.12
Watershed Model Total	10.72	10.07	9.28	0.96	0.78	0.67
2017 60% target		9.86			0.79	
2025 target			9.28			0.67
Modeled Difference		(0.21)	(0.00)		0.01	(0.00)

[2] All target values are subject to verification in future model runs. All values are million pounds per year. All values are delivered load and an output of USEPA Chesapeake Bay Watershed Model Version 5.3.2.

[3] Because both are largely uncontrollable load, the Forest values include New York non-tidal water deposition.

2.2: Federal Funding

New York expects EPA's funding criteria to be commensurate with the level of burden to remove a "delivered" pound of nutrients. This is significant to New York because of its distance from the Bay and the resulting appearance of funding being less cost-effective in New York. New York's ability to achieve deliverables set in this WIP is contingent upon continued receipt of targeted federal funding.

Section 3: Agriculture

New York State supports environmental and economically sustainable agriculture." To this end, DEC has been working with both environmental and farming stakeholders in New York State for over a decade to achieve environmental compliance for all New York's agricultural community. New York recognizes the historic, cultural, environmental and economic importance of maintaining agricultural viability in the Upper Susquehanna region. 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 carefully coordinated effort between DEC, the NYS Department of Agriculture and Markets, the NYS Soil and Water Conservation Committee, and the Upper Susquehanna Coalition 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). NYS contributes over $10 million annually statewide through the Environmental Protection Fund (EPF) to these programs to implement best management practices on farms to protect water quality.

This coordinated effort to support environmental and economically sustainable agriculture works to document farm statistics and best management practices, develop watershed and site specific agricultural plans, and implement and evaluate those practices. New York farmers are active stewards and more than 12,000 farms statewide of all types and sizes are involved in AEM, a program that responds to environmental needs with cost effective improvements that benefit farms and communities. Using tools provided by the AEM program, the status of agricultural best management practices are accurately documented by the Upper Susquehanna Coalition and reported to the EPA Chesapeake Bay Program.

New York State has invested in an environmentally sound, voluntary, incentive-based program that works. Since 1994, about $110 million in State Environmental Protection Fund grants have been allocated through Soil and Water Conservation Districts, cost sharing more than 5,000 conservation projects on over 2,000 farms in 50 counties. Approximately 25% of these resources have been directed to New York's portion of the Chesapeake Bay watershed.[4]

3.1: Current Loading Baseline and Capacity of New York's Agriculture Program

Agriculture represents nearly 25% of the watershed land use and, in a 2009 Chesapeake Bay Model run, delivered approximately 42%, 55% and 40%, respectively, of the total nitrogen, phosphorus and sediment loads from New York.

[4] 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.

There are two primary and intertwined programs in New York that address agriculture: the Concentrated Animal Feeding Operation (CAFO) regulatory program and the Agricultural Environmental Management (AEM) Program. 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.

The success of the New York agriculture program is clear. New York's CAFO and AEM programs cover 95% of the dairies in the New York portion of the Chesapeake Bay watershed. According to modeling by EPA Region 3, comparing 2002 to 2009, the agricultural nitrogen load delivered from New York decreased by more than 27% from 5,917,424 pounds in 2002, to 4,293,439 pounds in 2009.

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-three CAFOs are permitted in New York's portion of the Chesapeake Bay watershed. New York's AEM program is currently working with 2,285 additional farms in the watershed.

3.2: Agricultural Environmental Management Program

The New York State Agricultural Environmental Management (AEM) Program[5] supports farmers in their efforts to protect water quality and conserve natural resources, while enhancing farm viability. Started as an initiative in 1996 and codified in New York State law in 2000, New York's AEM Program helps farmers protect water quality by providing a framework to assess environmental stewardship and coordinate technical and financial assistance from the Federal, State, and local levels to address priority water quality issues[6] 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, incentive based
- Locally-led
- Watershed focus
- Works within the resources of each farm
- Promotes teamwork
- Coordinates assistance

[5] www.nys-soilandwater.org.

[6] 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.

Why AEM was Developed

AEM was created to provide a consistent format to address environmental challenges facing NY agriculture in a manner that enhances long-term economic viability. Many Federal and State programs exist to assist the farmer 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 State's diverse agricultural industry, the coordination and screening 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 Strategy[7] developed to meet requirements of the Clean Water Act, The Safe Drinking Water Act, and the Coastal Zone Management Act.

Who is Involved in the AEM Program

AEM is administered by the NYS Soil & Water Conservation Committee (SWCC) housed at the NYS Department of Agriculture and Markets. Key partners advising the SWCC that helped develop and have endorsed AEM include the NYS Departments of Environmental Conservation, Health, and State; the USDA – Natural Resources Conservation Service; Cornell University, State University of New York College of Environmental Science and Forestry; Cornell Cooperative Extension, and New York State's County Soil and Water Conservation Districts. AEM is administered and implemented at the local level through County Soil and Water Conservation Districts who engage local partners such as Cooperative Extension, 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 Conservation Districts have also formed coalitions of Districts that include partner agencies, universities, and organizations working together on the needs of our major watersheds to promote cooperation, coordination, and the sharing/pooling of resources in advancing AEM. Such coalitions include the Upper Susquehanna Coalition, the Finger Lakes-Lake Ontario Watershed Protection Alliance, Mohawk River Coalition, and others throughout the State.

How the AEM Program Works

The AEM process at the County level begins with the Conservation District forming an AEM Steering Committee made up of local resource professionals[8] and stakeholders. These committees often include local representatives of USDA NRCS and Farm Service Agency (FSA), Cornell Cooperative

[7] The NYS NPS Water Quality Management Strategy was last updated by DEC in 2000. It had four priority issues with agriculture as one of them and it was to be addressed through AEM.

[8] The term "resource professional" refers to a person who is qualified – based on the general expertise of their employer, or on their job description – to provide conservation assistance to farmers. In New York's public sector, resource professionals are typically employed by federal agencies (e.g. USDA), state agencies (e.g. NYSDEC or NYSDAM), local Soil and Water Conservation Districts, or Cornell Cooperative Extension. Private sector resource professionals in New York may include AEM Certified Planners and Professional Engineers.

Extension, County Health and/or Planning Departments, Farm Bureau, environmental organizations, watershed associations, agri-business, farmers, and interested citizens. The committee is tasked with developing an AEM Strategic Plan meeting minimum criteria developed by the State Soil & Water Conservation Committee to guide the local AEM effort for the upcoming five years. Key to the strategy is the targeting/prioritization of watersheds, environmental concerns/opportunities, and 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, the State's Priority Waterbodies List (PWL) and Source Water Assessment, and numerous locally funded and generated studies and assessments. From their AEM Strategic Plan each County AEM Steering Committee develops an Annual Action Plan (AAP) outlining what will be done in the coming calendar year to advance their Strategic Plan. Coordination of AEM Strategic plans and AAPs as they relate to addressing the needs of watersheds shared by multiple counties are addressed through the previously mentioned coalitions of Conservation Districts. As an example, the Upper Susquehanna Coalition coordinates the activities for the Susquehanna River watershed not only in New York, but also in three counties in Pennsylvania. A basic tenant of AEM is that State and Federal water quality priorities will be solved through addressing local water quality priorities. New York supports the implementation of each Annual Action Plan by providing up to $75,000 in technical assistance funding to Conservation Districts supporting identified activities including farm inventories, environmental assessments, conservation planning, best management practice design, and BMP and/or conservation plan evaluations. Associated activities such as related educational programs, outreach activities, and data management can also be funded, but emphasis is placed on identifying priority concerns and providing technical assistance to address concerns and work toward continuous environmental improvement. Implementation of planned BMPs is supported by directing the farm to the appropriate Federal, State, or local program that best meets the needs of the resource concern being addressed and the practice to be implemented.

AEM's on-farm framework is designed to be highly interactive and utilizes resource professionals and peers working with the farmer throughout the process. This framework and associated process increases farmer awareness of the impact farm activities have on the environment and by design; it encourages farmer participation and seeks behavioral change, which are important overall goals. AEM utilizes the 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 Conservation Districts through the AEM Base Program which is supported by an annual allocation from New York State's Environmental Protection Fund (EPF) (www.nys-soilandwater.org/aem/techtools.html).

- **Tier 2** – A resource professional utilizes pertinent worksheets to conduct an on farm 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 (www.nys-soilandwater.org/aem/techtools.html).

- **Tier 3** – Priority farms develop a conservation plan with assistance from a team of resource professionals addressing 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 BMPs must be planned according to NRCS Conservation Practice Standards and Cornell University Guidelines. Plan components addressing nutrient management must be completed by an AEM or NRCS Certified Planner. Conservation planning activities are supported through the AEM Base Program or competitive State and Federal programs such as NYS Agricultural Nonpoint Source Abatement and Control Program (ANSACP) or USDA's Environmental Quality Incentives Program (EQIP).

- **Tier 4** – Implementation of priority BMPs in priority conservation plans. All BMPs must meet NRCS Conservation Practice Standards and Cornell University Guidelines. BMPs designated as engineering must be 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 NYS ANSACP or USDA Farm Bill Programs. Financial assistance for BMP implementation (generally cost sharing) is provided to the farmer through successful application to the appropriate program such as ANSACP or USDA Farm Bill programs. If approved for funding within 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** – Conduct evaluations 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. Conservation plan updates according to current standards and guidelines 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.

Initiation of the AEM process serves as recognition by the farmer of their potential environmental impact.

Programs Associated with AEM

State and Federal programs are coordinated through AEM to work together to efficiently provide technical and financial assistance to priority farms and priority environmental issues.[9] Both the AEM and EQIP programs require adherence to the same technical standards as CAFOs under permit. NRCS requires producers to have a current CNMP to be eligible for EQIP funds to install livestock waste practices. Only practices required in the CNMP are eligible for EQIP funding. New York State and NRCS also provide funding for the development of CNMPs for producers who do not have them. These programs include:

- **AEM Base Program** – www.nys-soilandwater.org/aem/basefunding.html noncompetitive technical assistance funding to Conservation Districts to inventory and assess farms in priority watersheds then plan, design BMPS, and evaluate effectiveness of planning and BMPs on priority farms based on County AEM Strategic Plans and Annual Action Plans.

- **Agricultural Nonpoint Source Abatement and Control Program (ANSACP)** – www.nys-soilandwater.org/aem/nonpoint.html Competitive financial assistance program available to Conservation Districts that provides funding to plan, design, and implement priority BMPs, as well as cost-share funding to farmers to implement BMPs.

- **USDA Farm Bill Programs** – AEM is an "umbrella program" providing the framework and tools for farmers to assess their environmental risks and opportunities, learn about the impacts of their actions on water quality and other natural resources, and prepare them to participate in programs to address priority concerns and opportunities. AEM participating farmers may use several programs to develop conservation plans and receive cost-sharing and other incentives to implement BMPs through USDA and the current Farm Bill. A description of Farm Bill programs available to support New York's farms is in *Section 3.6: NYS and Federal Agriculture Program Implementation and Targeting*, under the header *USDA Farm Bill Programs*.

Incentives to Participate in the AEM Program

CAFOs (large and medium) are required to participate in AEM. Additionally, there are several incentives for small 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

[9] 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.

  - Prescribed grazing
  - Conservation tillage including no-till
  - Cover crops
  - Integrated Pest Management
  - Composting
  - Feed ration evaluation and balancing
  - Buffers
  - Pathogen management

- To help maintain and improve farm natural resources for future generations
- Improved consideration when applying for competitive Farm Bill cost share programs
- Eligibility for the NYS ANSACP cost-share program
- Eligibility to participate in NYS Farmland Protection Program
- 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
- Eligibility for the Agricultural Water Quality Revolving Loan Fund - provides low interest loans to farmers to implement BMPs

AEM Tools

To improve the effectiveness of the AEM framework and related conservation programs in addressing priority farms, environmental and pollutant concerns, several tools have been developed by the AEM Partnership. AEM tools include:

- **AEM Tier 1 Worksheet:** The Tier 1 worksheet is filled out by the farmer and provides an inventory of current activities, future plans, and potential environmental concerns.
- **AEM Tier 2 Assessment Worksheets**
  - **Core Worksheets** – 12 worksheets generally applicable to all farms

- **Commodity Specific Worksheets** (to be considered in addition to appropriate core worksheets)
  - Dairy, Livestock, & Field Crops – 8 worksheets
  - Equine – 4 worksheets
  - Vegetables & Fruit – 2 worksheets
  - Vineyards – 8 worksheets
  - Greenhouses – 3 worksheets

- **Manure Storage Screening Tool** – determines whether or not manure storage is needed in order to apply according to NRCS NY 590, and clarifies for the farmer all the requirements needed to properly operate and maintain a manure storage structure including appropriate application according to an NMP. Steps taken to satisfy the Manure Storage Screening Tool can then be applied to the development of a CNMP.

- **AEM Tool for the Evaluation of Manure Storage Structures** – a tool to guide the evaluation of existing manure storages to meet applicable NRCS Standards including proper operation and maintenance. This evaluation must be completed by a Professional Engineer.

- **AEM Tool for the Evaluation of Vegetated Treatment Areas** – a tool to guide the evaluation of existing filter and treatment areas to meet NRCS Standard 635 including proper operation and maintenance. The evaluation must be completed by a Professional Engineer.

- **AEM Report Card** – A self-evaluation tool for Conservation Districts and partners to evaluate their overall AEM effort from Strategic and Annual Action Plan development, through outreach, educational programming, communication, technical assistance, coordination and use of associated programs, and roles of partners, to on-farm evaluation of plans and implemented BMPs.

AEM Training, Outreach, and Education

Training of resource professionals from the public and private sectors is a vital component of AEM. Training is regularly provided to Soil and Water Conservation Districts and their partners at 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 SWCC. Training is guided by a Technical Development Curriculum developed by the Conservation Partnership and endorsed by the SWCC and the NYS Conservation Districts Employee's Association (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:

- **NYS Water Quality Symposium (WQS)** – 3 days of concurrent training held annually in March. Over 300 participants attend including Conservation District staffs and conservation partners from NRCS, Cooperative Extension, AEM Certified Planners, DEC staff, some farmers and agri-business representatives. The WQS annually hosts the classroom component of the AEM Planner Certification requirements. The WQS has occurred annually since 1979 and is funded through State Funds and participant registrations.

- **NYS Conservation Skills Workshop (CSW)** – 4.5 days of concurrent field training in support of the curriculum is held annually in October. Training at the CSW is often the field component of classroom training initiated at the WQS. The audience is similar to the WQS and averages 130 participants annually. The CSW has occurred annually since 1997 and is supported through participant registrations and contributions from CDEA, SWCC, and NRCS.

- **Northeast Region Certified Crop Advisor Annual Training Session (NRCCA)** – 3 days of concurrent training is 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, NRCS, and SWCD) and agri-businesses averaging around 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. Examples of training opportunities held during 2010 available to the conservation partnership, CCAs, TSPs, and agribusiness included:

- AEM: Overview of Procedures and Tools for Inventory and Assessment – 2 sessions held
- AEM: Overview of Procedures and Tools for Conservation Planning – 3 sessions held
- AEM Communications Training Phase 1, 2, and 3
- Cropland Conservation Planning Field Session – 2 sessions held
- Farmstead Resource Concern Identification – 2 sessions held
- Nutrient Management and Groundwater
- Cover Crops Field Day
- Soil Health Training Course
- Conservation Planning on Pasture – 2 sessions held

- Cornell Cropware Nutrient Management Planning and RUSLE2 Training
- NRCS Phase 3 Conservation Planning Training – 5 day session

The coordinated training efforts described above are extended to the farmer through one-on-one interaction with public resources managers, AEM Certified Planners,[10] Certified Crop Advisors,[11] 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.

3.3: NYS Concentrated Animal Feeding Operation Program

Following the first Concentrated Animal Feeding Operation (CAFO)[12] general permit issuance in New York in 1999, CAFO operators were required to obtain and comply with state wastewater discharge permits. Thirteen years later, New York has one of the most robust CAFO permitting programs in the nation, providing coverage for 150 large- and over 450 medium-sized CAFO farms (*Table 4* below shows the cutoffs between medium and large CAFOs by the type of animal). New York's CAFO program is clear, actively implemented and enforced by DEC, of state-wide applicability, practical and scientifically supported. 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 Resources Conservation Services (NRCS) technical standards and State regulatory requirements.

Since the start of the CAFO permitting program in 1999, New York has required New York Certified Planners to develop Comprehensive Nutrient Management Plans (CNMP) for CAFO farms and Professional Engineers to design and certify NRCS engineering practices on farms. This type of science-based, risk reduction approach to CAFO regulation should be considered the national standard;

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[10] New York's requirements to become an AEM Certified Planner are outlined below under the heading, *Requirements to Become an AEM Certified Planner*.

[11] The Certified Crop Advisor program is one of the certification programs of the American Society of Agronomy and is governed by 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 of the New England states. Nationally, a CCA is recognized by the USDA – Natural Resources Conservation Service (NRCS) as an individual who is qualified to service certain NRCS programs as a Technical Service Provider. In New York, a CCA is eligible to seek further certification, as an AEM Planner, to develop CNMPs required as a condition of the CAFO permit.

More about the requirements to become a Certified Crop Advisor is in the *Certified Crop Advisor Requirements* section below.

[12] 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) and is a CAFO. Two or more AFOs under common ownership are considered to be a single AFO for the purposes of determining the number of animals of an operation.

anything less is inconsistent with the Clean Water Act's "best technology" requirements. The historical lack of a consistent program nationally and between Chesapeake Bay watershed states, that provide objective, consistent regulatory requirements on par with the New York program, has placed New York's CAFOs, along with CAFOs of other States that have sought to be good environmental stewards, at a competitive disadvantage. Nonetheless, the New York CAFO program has persisted in its efforts to afford superior protection of the environment through continued education, enforcement and applied research efforts. These efforts are supported by New York's regulated farms as documented by a very high rate of compliance.

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 NRCS conservation practice standards and state regulatory requirements, both of which exceed the minimum requirements set by EPA and NRCS and are tailored to be most effective for New York's conditions based on applied research from Cornell University – New York's land grant university. As such, CAFO farms must use professional engineers in the design and implementation of their waste management and storage structures, must adhere to stringent setbacks for nutrient applications in farmlands adjacent to New York's waters, must control erosion on crop fields and must make nutrient applications in accordance with science-based nutrient management plans. The CAFO program ensures that manure nutrients from medium and large livestock farms 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.

Table 4: 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	25,000-81,999	82,000

a liquid manure handling system)		
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
Note: Refer to New York's CAFO General Permits for more detailed definitions of medium and large CAFOs. Visit DEC's CAFO Program webpage (http://www.dec.ny.gov/permits/6285.html) to download copies of New York's permits.		

Revisions to New York's CAFO Program

DEC is currently updating its Clean Water Act SPDES CAFO General Permit (GP-04-02) and expects to release a draft permit for public comment in March 2013.

Comprehensive Nutrient Management Program

Key among the permit's requirements is the development, implementation and maintenance of a Comprehensive Nutrient Management Plan (CNMP), developed by an AEM Planner certified through New York's Agricultural Environmental Management (AEM) Program and conforming to the technical standards established by the USDA Natural Resources Conservation Service (NRCS). Successfully becoming a Certified Crop Advisor (CCA) in the Northeast Region is the first step in obtaining certification to develop CNMPs for farm operations needing the CAFO permit in New York State.

The Certified Crop Advisor program is one of the certification programs of the American Society of Agronomy (ASA) and is also governed by 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 of the New England states. Nationally, a Certified Crop Advisor is recognized by the Natural Resources Conservation Service as an individual who is qualified to service certain 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 required as a condition of the CAFO permit.

Technical Standards for CAFO Best Management Practices

All CNMPs developed in New York must be prepared in accordance with "NRCS Conservation Practice Standard No. 312" and all applicable technical standards where invoked by NY312 (NY590, NY748, etc.). All New York 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 NRCS, DEC, the New York State Department of Agriculture and Markets, Cornell University and others. These revisions, under the oversight of the Standards Committee, ensure implementation of state-of-the-art best management practices on New York farms.

Certified Crop Advisor Requirements

- Pass two comprehensive exams (state/regional and international) that measure competency in four areas: soil and water conservation; nutrient management; integrated pest management; and crop production. Each exam may be attempted up to 3 times.

- Subject credentials including: experience, education, and references, to a peer review by the CCA Board. Minimum education and experience requirements include: appropriate BS degree with 2 years crop consulting experience; appropriate AAS degree with 3 years experience; or 4 full years of appropriate crop consulting experience. A reference must be provided by a client and employer outlining the candidate's crop consulting experience.

- Sign and adhere to a Code of Ethics. A CCA pledges to work only in areas in which they are competent and give the highest quality advice. They are ethically bound to make recommendations that are in the best interest of the client and the public. An individual gaining CCA status must then earn 40 Continuing Education Units (CEUs) in a 2-year cycle to maintain their certification. A minimum of 5 CEUs must be earned in each of the previously mentioned competency areas, and the Northeast Regional CCA Board must sanction at least 10 of the CEUs.

Requirements to Become an AEM Certified Planner

- Be a Certified Crop Advisor in good standing in the Northeast Region.

- Complete an online 5-module course on the NRCS Planning Process and pass the associated exam with at least an 80% score (www.nedc.nrcs.usda.gov/catalog/consplan.html).

- Attend a 4-day CNMP Training on the development of CNMPs.

- Have 3 CNMPs reviewed by a CNMP Review Team to determine if the plans appear to meet NRCS Standard New York-312 Waste Management System and requirements of the DEC CAFO General Permit, and that the planner has demonstrated full understanding of all components of the planning process. The final CNMP is reviewed in the field.

- To maintain AEM Planner Certification an individual must maintain their CCA certification by earning CEUs and receive acceptable reviews through the AEM Planner Quality Assurance Program (New York is one of the few states that conduct such ongoing Quality Assurance/Quality Control).

- An individual completing the steps outlined above is certified by the State Conservationist of the USDA-NRCS in New York in consultation with the Commissioner of the New York State Department of Agriculture and Markets to develop and/or approve CNMPs required to satisfy the conditions of the 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 NRCS standards in developing plans.

CAFO Program Highlights

- Since 1999, New York State has exceeded the federal minimum CAFO requirements by permitting over 450 medium-sized CAFO farms
- New York requires erosion control to "Tolerable Soil Loss" on all CAFO crop land, a technical requirement of NRCS NY590 for nutrient management
- No direct discharge of process water is permitted, except during extreme precipitation events
- In 2009, New York State once again exceeded the federal CAFO requirements through the issuance of the State Environmental Conservation Law (ECL) permit for CAFO-sized farms
- The CAFO program provides permit coverage to CAFOs, whether or not there is a discharge to surface waters
- 65 permits, >45% of the total dairy animal numbers in Susquehanna basin
- The federal CAFO program would require permits for only a small number of the New York permitted CAFOs
- High level of regulatory oversight
- CAFO permitted farms in NYS are required to utilize the AEM framework and tools when developing their Comprehensive Nutrient Management Plan with their AEM Certified Planner. The advantages of this requirement include:
    - Prioritizing CAFOs for ANSACP and 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
    - 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

3.4: Upper Susquehanna Coalition

Established in 1992, the Upper Susquehanna Coalition (USC) is a network of 19 Soil and Water Conservation Districts – 16 in New York and 3 in Pennsylvania – that cover the Upper Susquehanna River Basin – the northern headwaters of the Chesapeake Bay. The USC works under a Memorandum

of Understanding based on New York and Pennsylvania state laws that allow Soil and Water Conservation Districts to enter into multi-District agreements.[13]

The mission of the Upper Susquehanna Coalition 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 19 Soil and Water Conservation Districts (SWCD) that make up the USC is designated as the "lead" for water quality issues in their county and each has over 60 years of 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 developing the agricultural nonpoint source implementation portion of New York's Tributary Strategy and this Phase II Watershed Implementation Plan.

While individual Soil and Water Conservation Districts 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.

- **Sustainable Agriculture** uses the New York State Agricultural Environmental Management 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

[13] The 16 New York and 3 Pennsylvania Soil and Water Conservation Districts are the signatories of the Memorandum of Understanding that formed the Upper Susquehanna Coalition.

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.

Upper Susquehanna Coalition highlights:

- Interstate coalition of 19 Soil and Water Conservation Districts (16 New York, 3 Pennsylvania) in the Upper Susquehanna region (north of Towanda, PA)
- Implements county-level AEM strategies (95% of dairy farms participating)
- USC and NRCS implementation totals 2005-2009
    - 1,621 acres of wetland restoration
    - 377 acres of wetlands created
    - 17,278 acres of prescribed grazing
    - 164 miles of stream fencing
    - 63,078 acres of Comprehensive Nutrient Management Plans
    - Precision Feed Management work is resulting in an initial in farm mass nutrient balance reduction of ~65% of Nitrogen and Phosphorus with a long term reduction of ~25%
    - Receives New York State Chesapeake Bay Implementation Grant from the EPA Chesapeake Bay Program
    - Work plan includes in-field documentation of agriculture management practices and annual reporting to the EPA Chesapeake Bay Program
    - Institutes additional conservation efforts by integrating its model wetland program (Bay Program Wetland Champion role) and burgeoning stream restoration program into routine discourse with agricultural and other large landowners

The Upper Susquehanna Coalition currently has funding from outside organizations for projects that will have water quality benefits to the Susquehanna and Chemung river basins:

- **National Fish & Wildlife Foundation** – An enhanced nutrient management approach in New York. The USC received $200,000 to reduce nutrients on 20 dairy farms through precision feed benchmarking and nitrogen testing.
- **National Fish & Wildlife Foundation** – Integrating nutrient reduction tools and programs in New York. The USC received $700,000 to integrate nutrient reduction programs to perform benchmark analysis, adaptive nitrogen tests, measure mass balance impact, and hold farm demonstrations to promote nutrient reduction strategies.

- **National Fish & Wildlife Foundation** – The USC received $150,000 to support a berm removal program.
- **NY Cover Crop CIG** – The USC received $74,936 to develop a cover crop program in New York's portion of the Chesapeake Bay watershed.
- **USC Wetland Endowment** – The USC received $60,000 for wetland restoration.
- **Chesapeake Bay Implementation Grant** – The USC will receive $500,000 per year from 2012-2014.
- **NRCS Emergency Watershed Protection Program**
- **FEMA and NYS funding** – Streambank restoration.

3.5: Science Based Approach

Agronomy – Nutrient Balances

New York CAFOs in the Susquehanna Basin **do not have excess manure**.

- 1.5 million tons manure generated
- Over 72,000 acres covered by Comprehensive Nutrient Management Plans that meet the enhanced nitrogen field management practices of the New York State technical standard
- Only about 50,000 acres needed for compliant land application of manure
- New York exceeds the federal minimum manure application standards with more comprehensive nitrogen accounting in the New York State technical standard
- Up to 65% of nitrogen losses through ammonia volatilization eliminated through management practice implementation of immediate manure incorporation

Nutrient Balances in NYS

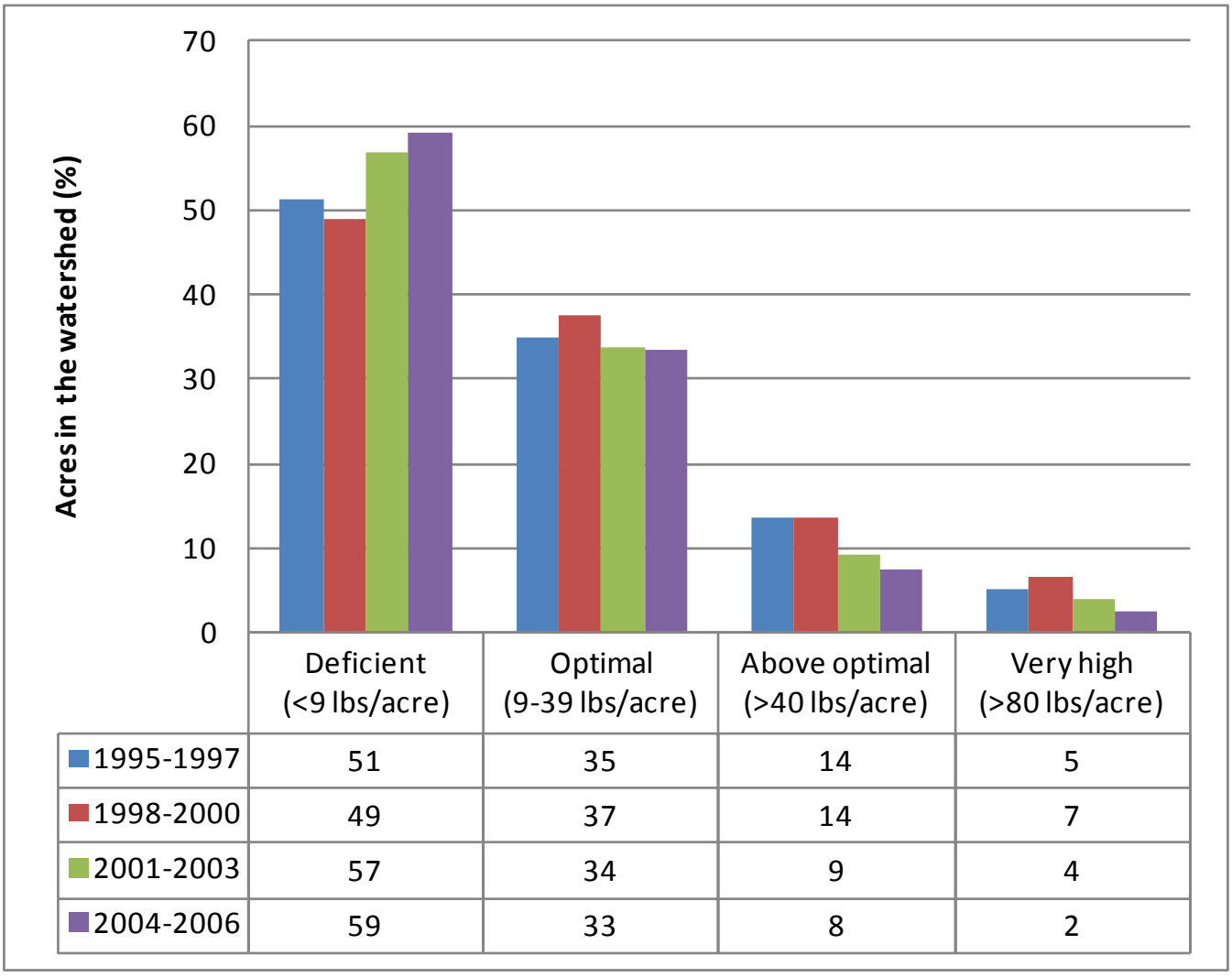
Cornell University agricultural researchers have conducted nutrient mass balance evaluations.[14] This research identified that the agricultural lands in the Upper Susquehanna region of New York are in gross balance for phosphorus inputs and cropping systems. This is largely attributed to source reduction efforts including better feed rationing for phosphorus. Cornell research has also demonstrated a negative balance for nitrogen, with a 53% decrease in agricultural nitrogen from 1987 to 2007 for New York. 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

[14] Swink, n.; Q.M. Ketterings; L.E. Chase; K.J. Czymmek; M.E. Van Amburgh (2010.) Nitrogen Balances for New York State: Implications for manure and fertilizer management. Journal of Soil and Water Conservation (in press).

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.

The percentage of soil samples from the New York portion of the Upper Susquehanna region testing *Optimal*, *Above Optimal*, or *Very High* for phosphorus decreased from 54% to 43% from 1995-97 to 2004-06.[15] As of 2006, the overall phosphorus balance in New York (expressed as *manure phosphorus plus fertilizer phosphorus minus crop removal equals balance*) is 1.5 lbs/acre; however, the balance is lower for the Upper Susquehanna region. Figure 1 reflects lower phosphorus levels in manure due to a reduction in phosphorus content of dairy rations and a reduction in the amount of fertilizer phosphorus applied to the Upper Susquehanna region land base. Source reduction results in fewer nutrients potentially prone to loss.

Figure 1: Percent of Soil Samples Testing Deficient, Optimal, Above Optimal, and Very High for Phosphorus[16]



	Deficient (<9 lbs/acre)	Optimal (9-39 lbs/acre)	Above optimal (>40 lbs/acre)	Very high (>80 lbs/acre)
1995-1997	51	35	14	5
1998-2000	49	37	14	7
2001-2003	57	34	9	4
2004-2006	59	33	8	2

[15] Soil samples were analyzed at the Cornell Nutrient Analysis Lab.

[16] Soil test P based on samples analyzed by the Cornell Nutrient Analysis Laboratory between 1995 and 2006.

Based on Ag census data, average animal density (expressed in 1,000 pounds of live animal weight per cropland acre) in the Upper Susquehanna watershed has decreased from 0.53 AU/acre in 1987 to 0.43 AU/acre in 2007 (Table 5).

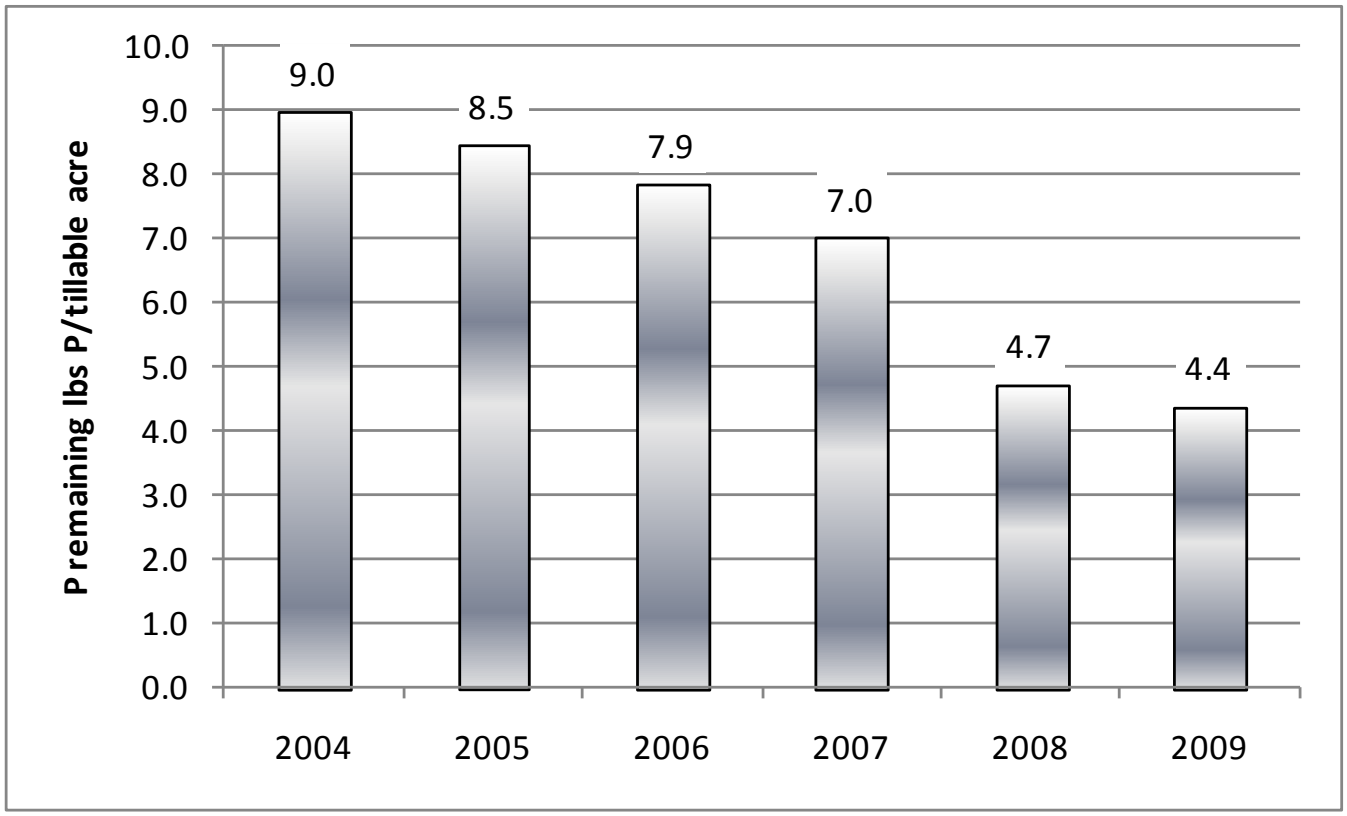
Table 5: Change in Animal Density over Time for New York Upper Susquehanna Watershed

	Total Animal Units[17]	**Total Harvested Cropland**	**Animal Density**
Year	**AU**	**Acres**	**AU/acre**
1987	328,364	619,877	0.53
1992	292,985	547,086	0.54
1997	270,019	574,840	0.47
2002	255,479	585,121	0.44
2007	232,290	534,973	0.43

In 2007, 52 Upper Susquehanna watershed dairy and beef farms participated in a whole farm nitrogen, phosphorus, and potassium balance assessment. For these farms, the average animal density was 0.57 AU/acre; higher than the watershed average in 2007. These case study farms still had 2.7 acres per mature cow or equivalent available for manure application. Fifty percent of these farms had a phosphorus balance of 7 lbs P/acre or less. These data indicate low density farming is the norm across the Upper Susquehanna watershed and the trends over time show the drastic improvements farmers have made (Figure 2).

[17] 1,000 pound animal weight = 1 animal unit (AU).

Figure 2: Impact of Farm Management Changes on Phosphorus Balances of New York Upper Susquehanna Watershed Farms (2004-2009)



Census data show New York does not have significant numbers of poultry or swine; types of production systems where the animals are fed 100% concentrates, all feed may be imported, and a local land base may not be part of the operation.

Fertilizer nitrogen use in the Upper Susquehanna watershed was reduced by about 50% from 1987-1992 and remained stable from 1992-2007. Between reductions in cattle numbers and diet changes, manure nitrogen dropped from about 52 million pounds per year to about 32 million pounds per year from 1987-2007 (Figure 3). Given current fertilizer usage, manure quantity, and nitrogen composition, *even if* manure could be stored and spring-incorporated on corn land (providing maximum nitrogen use efficiency for manure), the total amount of nitrogen in fertilizer and manure is insufficient to compensate for crop nitrogen removal (Table 6).

Figure 3: Gross nitrogen balances for the NY Upper Susquehanna Watershed[18]

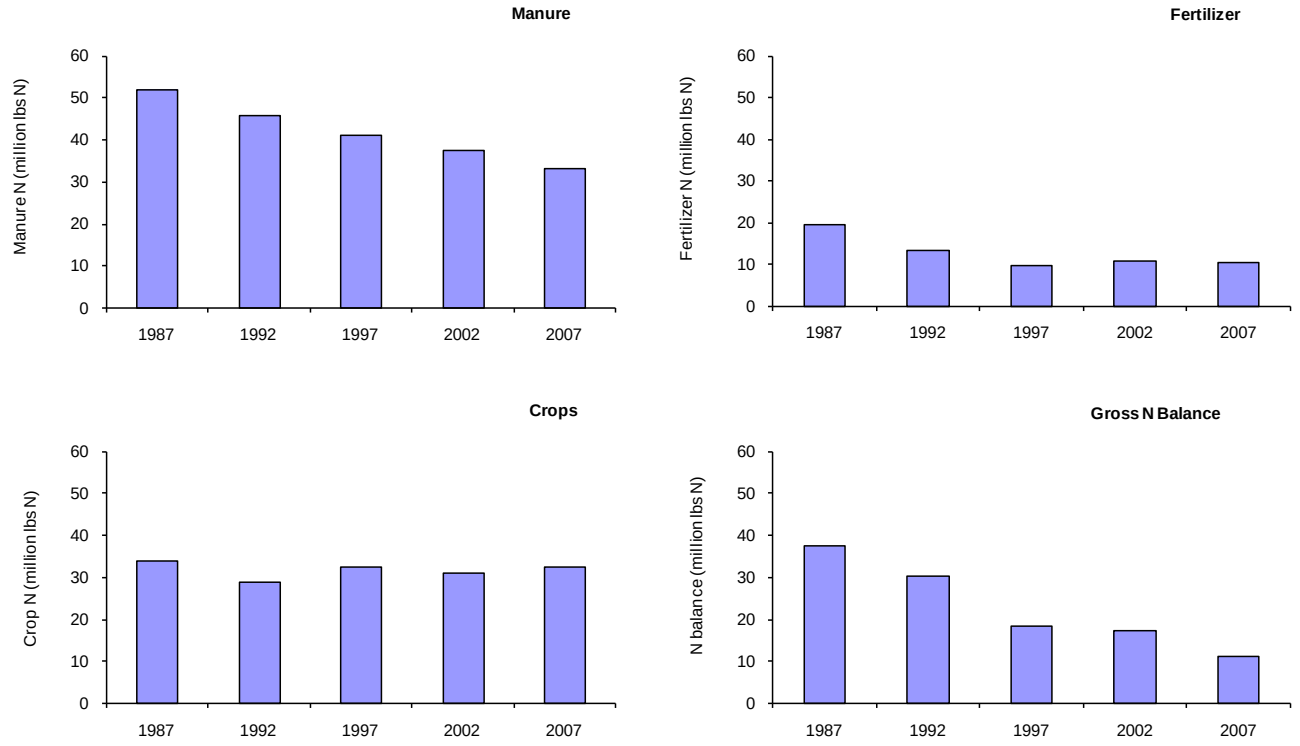


Table 6: Cropland Nitrogen (net) Balances for NYS

2007	N in manure	N in fertilizer	N in crops*	N balance	
	(tons)	(tons)	(tons)	(tons)	(lb/ac)
Gross N balance	115,081	69,237	113,973	+70,344	+55
Spring incorporated manure (60% efficiency of manure N; 75% of fertilizer)	45,898	51,928	113,973	-16,147	-13
No incorporation of manure (25% efficiency of manure N; 75% of fertilizer)	19,124	51,928	113,973	-42,921	-34

Limited hot spots, easily rectified

[18] These balances represent manure N plus fertilizer N (total N) minus N in crop removal for agricultural land in the watershed.

Frugal farm management along with the robust outreach, extension and applied research efforts of New York's Cornell University have already established a neutral (if not negative) state of nitrogen and phosphorus in the New York land area of the Chesapeake Bay watershed and, as such, our agronomic focus is improved capture and distribution within the watershed.

With low animal density across the watershed, there are very few farms that must export manure to meet Land Grant University nutrient management standards. New York State regulations have required a comprehensive nutrient management plan (CNMP) be prepared by a third party certified planner for medium CAFOs (200 milking cows or 300 heifers) and large CAFOs (700 milking cows or 1000 heifers) starting in 1999. All manure and nutrients must be accounted for in conformance with Cornell Guidelines through a field specific nutrient management plan. Permit compliance requires that all fields be balanced for N, a P index assessment is done for every field on the farm, and P index guidance is followed. This guidance includes discontinuing application of manure (and P fertilizer) for fields that have a high P index (hot spots). While a low stocking density estimate does not preclude misallocation of manure on a field basis, any remaining nutrient allocation issues (hot spots) can be handled within the current land base of most operations through development and implementation of a sound nutrient management plan.

Cornell University guidelines for field crop management

It is also important to understand that the Land Grant guidelines are not the same in every state, in part because there are several ways to develop fertility guidelines. Cornell Guidelines are based on the sufficiency approach to fertilization which means fertilizer guidelines are reduced to a small starter when soil test levels reach the agronomic critical value, and no further addition is recommended when a soil test is classified as very high. For nitrogen, soil N supply is taken into account, leading to soil-type specific conservative guidelines as well. These methods have been somewhat controversial, deemed by some to be the most economical way to fertilize, by others as a good way to get poor yields, but the guidance is based on in-field trials on many soil types. It is important to also understand:

- Cornell uses a different soil test than the other Chesapeake Bay states. The Mehlich-3 test extracts 3x to 30x more P as the Cornell Morgan, depending on soil type (especially Al levels).
- Cornell soil test P interpretation scales are different than the other Chesapeake Bay states. What we consider "high" is classified as optimal in some of the Bay states.
- Cornell recommends less. When our soil test is classified as high ("optimum") in NY, the recommendation is reduced to a small starter (10-20 lbs P_2O_5/acre). Examples from other states show recommended rates that equate to estimated crop removal when soil test P is classified as optimum.

A comparison of Land Grant University guidelines for corn for New York and the New England states was published in Ketterings et al. (2005) (Table 7).

Table 7: Critical soil test level comparisons for Northeastern states that use the Morgan or Modified Morgan extraction method[19]

State	Method	Critical soil test level	P_2O_5 recommendation at critical level	Soil test P where no additional fertilizer is recommended
		ppm	lbs/acre	ppm
New York	Morgan	4.5	20	20
Massachusetts	Morgan	7	85	21
Rhode Island	Morgan	7	85	21
Vermont	Modified Morgan†	4	20-25	20
Maine	Modified Morgan	5	100	20
Connecticut	Modified Morgan	7	60	14

† Ammonium acetate extraction (McIntosh, 1969).

Interpretations for the Mid Atlantic states show differences among states as well. These states almost all use Mehlich-3 with ICP detection of P in solution (Table 4).

The states represented in Table 7 have a similar agronomic soil test (Morgan or Modified Morgan) so that we can compare state guidance to each other. Table 1 in that paper (Table 7 above) shows classifications (critical soil test P levels) and what we recommend at the critical soil test P level. It is obvious from this table that New York and Vermont recommend a small starter P application (20 lbs/acre for NY, up to 25 lbs/acre for VT depending on their soil test Al levels) while all other states have recommendations that are considerably higher (crop removal or even higher as the average crop removal for NY is 4.3 lbs P_2O_5 per ton of corn silage (at 35% DM) which would result in a crop removal estimate of 86 lbs P_2O_5 for a 20 ton crop).

Table 8: Current soil test P critical levels used to guide P fertilization of corn based on Mehlich-3[20]

Current critical level		
State	P	Maximum soil test P level for which broadcast P is recommended‡

[19] The comparison assumes a 25 ton/acre (at 35% DM) corn silage yield. In the ranges for Vermont guidelines, the low number represents fields with a reactive Al level of 10-50 ppm Al and the high values correspond with an Al level of 100-200 ppm (Adapted from Ketterings et al., 2005).

[20] The number of experimental sites testing below the critical level and the number of sites with yield increases below the critical level. Source: Adapted from Heckman et al. (2006).

Current critical level		
State	P	Maximum soil test P level for which broadcast P is recommended‡
	ppm	
PA	30	50
NJ	36	69
DE	NA	50
NH	30	50
MD	50	100

‡ A starter fertilizer containing some P may be applied at higher than these soil test P levels.

Table 8 demonstrates a range in interpretations with critical soil test levels ranging from 30 ppm in Pennsylvania to 50 ppm in Maryland. Given completely different soil chemistries being used by the Mid-Atlantic states (Mehlich-3) and most of the Northeastern states (Morgan or Modified Morgan), it is difficult to compare their critical values. As mentioned, Mehlich-3 extracts anywhere from 3 to 30 times more P as the Morgan test depending mostly on Al levels in the soil (Ketterings et al., 2002; Soil Science). The table in the Heckman et al. (2006) paper does not include the actual recommendations for P for corn at the critical value for each of the Mid Atlantic states but if you search for agronomy guides for the different states you will find that for Pennsylvania (as an example), with soil test levels between 30 and 50 ppm Mehlich-3 (classified as optimal in P in PA), the state recommends 50 lbs P_2O_5 for corn grain and 110 lbs/acre for corn silage (compared to 10-20 lbs P_2O_5 in NY for soils classified as optimal/high in P). Virginia recommends 40-100 lbs P_2O_5 depending on productivity level when their soil test is classified as optimal/high in P (again compared to 10-20 lbs P_2O_5 in NY). In Delaware, a soil is considered high in P when the Mehlich-3 test is 150 ppm or higher and the regulations there state that P loadings for soils high in P cannot exceed three times crop removal:

"A significant requirement of this law is that no more than a three-year crop removal rate of P can be applied to soils that are considered "high" in P, with "high" currently defined as soil test P concentrations above 150 mg P/kg (Mehlich 3 extractant). This requirement assumes that reliable information exists on the amount of nutrient that is removed by commonly grown crops in Delaware." From: http://www.iuss.org/19th%20WCSS/symposium/pdf/1095.pdf.

These examples clearly illustrate the two drastically different approaches being used among land grant university recommendation systems for soils in the optimal/high soil test range: (1) small starter

recommended (NY and VT) and (2) P applications equating estimated crop removal or a multiple thereof (PA, VI, DE, New England states).

Cornell nitrogen guidelines take into account soil N supply and are therefore considered to be conservative as well (http://nmsp.cals.cornell.edu/publications/extension/Ndoc2003.pdf or http://nmsp.cals.cornell.edu/publications/factsheets/factsheet21.pdf and http://nmsp.cals.cornell.edu/publications/factsheets/factsheet35.pdf).

Additional P references:

- Swink, S.N, Q.M. Ketterings, L.E. Chase, K.J. Czymmek, and M. van Amburgh (2011). Nitrogen balances for New York State: Implications for manure and fertilizer management. Journal of Soil and Water Conservation (in press).
- Ketterings, Q.M., K.J. Czymmek, and S.N. Swink (2011). Evaluation methods for a combined research and extension program used to address starter phosphorus fertilizer use for corn in New York. Canadian Journal of Soil Science (in press).
- Swink, S.N., Q.M. Ketterings, L.E. Chase, and K.J. Czymmek, and J.C. Mekken (2009). Past and future phosphorus balances for agricultural cropland in New York State. Journal of Soil and Water Conservation 64(2):120-133.
- Ketterings, Q.M., J. Kahabka, and W.S. Reid (2005). Trends in phosphorus fertility of New York agricultural land. Journal of Soil and Water Conservation 59: 10-20.
- Ketterings, Q.M., S.N. Swink, G. Godwin, K.J. Czymmek, and G.L. Albrecht (2005). Maize silage yield and quality response to starter phosphorus fertilizer in high phosphorus soils in New York. Journal of Food, Agriculture and Environment 3: 360-365.
- Ketterings, Q.M., K.J. Czymmek, and S.N. Swink (2011). Evaluation methods for a combined research and extension program used to address starter phosphorus fertilizer use for corn in New York. Canadian Journal of Soil Science (in press).

Farm-Scale Nutrient Management Case Study in the New York State Chesapeake Bay Watershed

Agriculture in the NYS portion of the Chesapeake Bay Watershed is comprised primarily of integrated livestock and forage crop farms (mostly dairies) with low livestock density (0.43 animal units per acre), low to optimum soil test phosphorus levels, low nitrogen and phosphorus balances (i.e., manure + fertilizer nutrient – nutrient removal by crops), low nutrient risk index ratings, and modest annual additions of nitrogen and phosphorus for crop production via fertilizer and manure. These relatively balanced conditions are due to a variety of factors including:

- economics,
- low livestock densities associated with forage-dependent dairy farming,

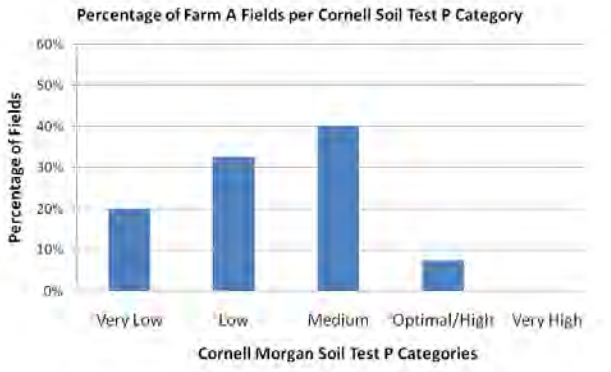
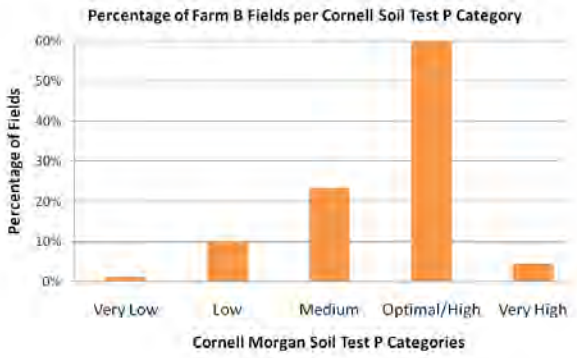
- a long standing recognition by Cornell Nutrient Guidelines of nitrogen supplied by soil, tilled sods, and manure,
- the efficient and conservative Sufficiency Method to crop nutrient recommendations employed by Cornell Nutrient Guidelines (not crop removal or insurance-factored),
- the Nitrate Leaching Index and Phosphorus Runoff Index restrict/prohibit manure and fertilizer applications to high risk fields (and every field within a Comprehensive Nutrient Management Plan is assessed with these indices),
- locally-led, risk-prioritized voluntary conservation through Agricultural Environmental Management (AEM),
- a progressive farmer response to relatively thoughtful environmental regulation, and
- a strong local extension presence from Cornell Cooperative Extension, Soil and Water Conservation Districts, NRCS, private-sector conservation planners, and other conservation partners.

The balanced nitrogen and phosphorus status of farms in this portion of the Bay Watershed has been well documented at the county scale[21] [22] and similar results are the norm when analyzed at the individual farm scale (http://nmsp.cals.cornell.edu/projects/massbalance.html). To further demonstrate this, actual nutrient management plans taken from Comprehensive Nutrient Management Plans (CNMP) for two dairy farms typical of AFO and CAFO farms in this area of NYS have been summarized below.

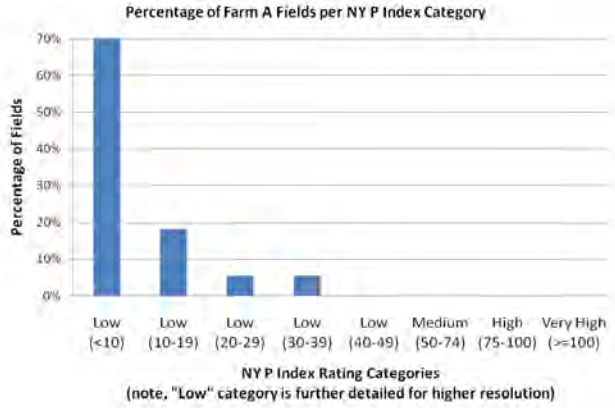
The case studies are based on nutrient management plans developed according to Cornell Nutrient Guidelines using Cornell Cropware, a USDA-NRCS Common Computing Environment (CCE) certified software tool for NRCS Nutrient Management Standard (590) planning in NYS (http://nmsp.cals.cornell.edu/software/cropware.html). The nutrient balances in the plans represent nutrients allocated minus nutrient recommended by the Cornell Guidelines. These recommendations represent the additional nutrients needed to realize a crop yield response after nutrients from soil, past manure applications, tilled sods, etc. have been credited. This is an important distinction with nutrient management plans in NYS, as many other Bay states calculate nutrient balances as nutrients allocated minus crop nutrient removal, thereby downplaying many nutrient credits already in the field and available to the crop. Therefore, without sacrificing yield, Cornell Guidelines often result in nutrient recommendations that are much lower than systems based on a crop nutrient removal approach (and thereby offer improved nutrient use efficiency). More information and thorough documentation of Cornell Nutrient Guidelines and associated tools are available from the Cornell University Nutrient Management Spear Program website (http://nmsp.cals.cornell.edu).

[21] Swink, S.N, Q.M. Ketterings, L.E. Chase, K.J. Czymmek, and M. van Amburgh (2011). Nitrogen balances for New York State: Implications for manure and fertilizer management. Journal of Soil and Water Conservation (in press).

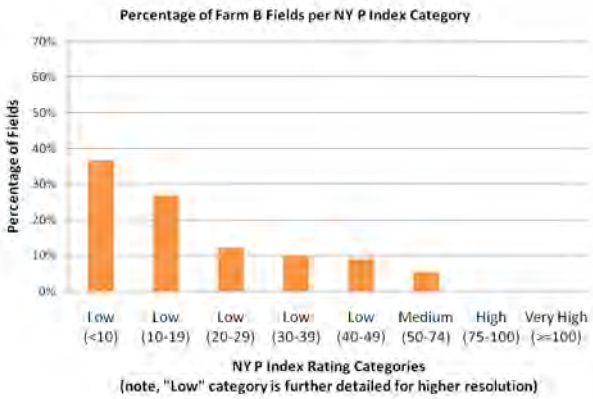
[22] Swink, S.N., Q.M. Ketterings, L.E. Chase, and K.J. Czymmek, and J.C. Mekken* (2009). Past and future phosphorus balances for agricultural cropland in New York State. Journal of Soil and Water Conservation 64(2):120-133.

Farm A	**Farm B**
Overview • 90 cow dairy farm plus replacements (not CAFO; voluntary CNMP). • ~525 acres: 375 hay acres and 150 corn silage acres. • 55 fields; 9.5 acre average field size. • Soils of glacial till, glacial outwash, and alluvial fan origins (range of drainages). • Stocking density = 0.4 animal units/acre.	**Overview** • 360 cow dairy farm plus replacements (CAFO permitted). • ~935 acres: 510 acres hay and 425 acres corn (mix of grain and silage). • 90 fields; 10.3 acre average field size. • Soils of glacial till, glacial outwash, and alluvial fan origins (range of drainages). • Stocking density = 0.7 animal units/acre.
• 100% of fields with Optimal soil test P or deficit and 0% Very High. Cornell Guidelines recommend a small amount of starter P_2O_5 fertilizer at Optimal/High soil test P levels and, as with other Bay states, no P_2O_5 at Very High. However, most other Bay states would still recommend P_2O_5 to crop removal levels at Optimal/High soil test P levels. 	• 96% of fields with Optimal soil test P or deficit and 4% Very High. As a note, a field with a large P_2O_5 balance in a given year, but a low soil test P level and moderate P Index risk is an reasonable scenario to safely build soil test P to the Optimal level. 

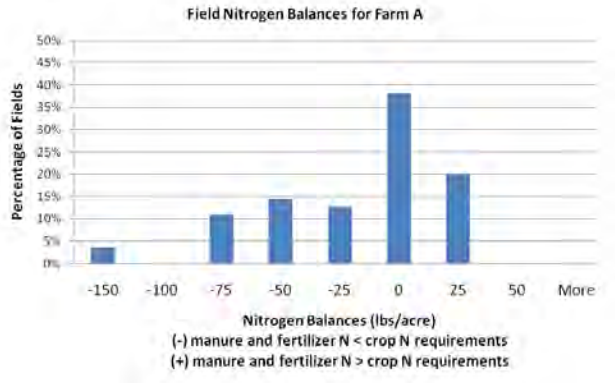
- 100% of fields in low P Index Risk Category.



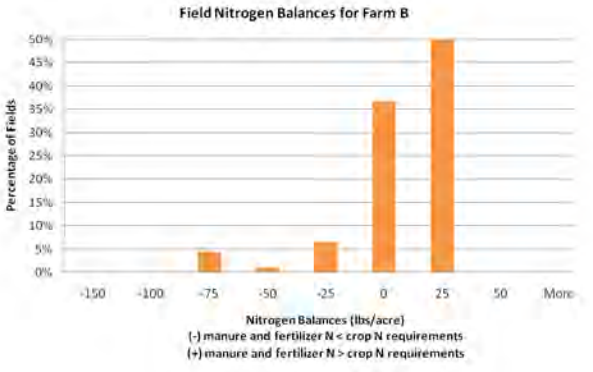
- 94% of fields in low P Index Risk Category and 6% medium. The medium fields provide a signal to the planner and farmer to shift P management before soils are overloaded.



- 42% of fields have less manure and fertilizer N allocated than needed to meet crop N requirements while the remainder of fields are in balance (i.e., balance = manure and fertilizer nutrients allocated – nutrient recommendation).



- 12% of fields have less manure and fertilizer N allocated than needed to meet crop N requirements while the remainder of fields are in balance (i.e., balance = manure and fertilizer nutrients allocated – nutrient recommendation).



Actual Nutrient Plans versus Cornell Guidelines versus Crop Removal for Farm A (averages weighted by field acreage)	**Actual Nutrient Plans versus Cornell Guidelines versus Crop Removal for Farm B (averages weighted by field acreage)**
• Bottom line: manure and fertilizer N plans are often at or below the conservative Cornell Guidelines, with both less than crop removal values. P_2O_5 is moderated for all fields by the P Index.	• Bottom line: manure and fertilizer N plans are often at or below the conservative Cornell Guidelines, with both less than crop removal values. P_2O_5 is moderated for all fields by the P Index.
• Hay field weighted averages: o Plan manure & fertilizer N: 26 lbs/acre o Cornell Guidelines N: 55 lbs N/acre o Crop Removal N: 65 lbs N/acre o Plan manure & fertilizer P_2O_5:22 lbs/acre o Cornell Guidelines P_2O_5: 35 lbs/acre o Crop Removal P_2O_5: 28 lbs/acre	• Hay field weighted averages: o Plan manure & fertilizer N: 15 lbs/acre o Cornell Guidelines N: 32 lbs N/acre o Crop Removal N: 65 lbs N/acre o Plan manure & fertilizer P_2O_5:22 lbs/acre o Cornell Guidelines P_2O_5: 19 lbs/acre o Crop Removal P_2O_5: 28 lbs/acre
• Corn field weighted averages: o Plan manure & fertilizer N: 66 lbs/acre o Cornell Guidelines N: 64 lbs N/acre o Crop Removal N: 162 lbs N/acre o Plan manure & fertilizer P_2O_5:72 lbs/acre o Cornell Guidelines P_2O_5: 43 lbs/acre o Crop Removal P_2O_5: 94 lbs/acre	• Corn field weighted averages: o Plan manure & fertilizer N: 99 lbs/acre o Cornell Guidelines N: 96 lbs N/acre o Crop Removal N: 162 lbs N/acre o Plan manure & fertilizer P_2O_5:66 lbs/acre o Cornell Guidelines P_2O_5: 24 lbs/acre o Crop Removal P_2O_5: 94 lbs/acre

While these studies solely present conditions for the New York portion of the Bay watershed, it is extremely challenging to chart similar, low risk nutrient conditions in areas where livestock farms lack an adequate local crop production land base to support efficient manure nutrient recycling. The integrated dairy and crop farms found in New York, coupled with the long legacy of Cornell soil testing, Cornell Nutrient Guidelines, and nutrient risk indices position agriculture in the New York portion of the Bay watershed to address any existing nutrient hotspots (fields) and continue its performance in delivering clean water to the Bay.

See attached tables for actual nutrient plan, nutrient balance, and risk assessment data from the Comprehensive Nutrient Management Plans for Farm A and Farm B.

Table 9: Farm A Nutrient Management Plan Data

Field ID	Acres	Crop	Residual Sod N	Gross N Req.	Residual Manure N	Total Nutrients Required (lb/a)			Nutrients From Applied Manure (lb/a)			Nutrients From Fertilizer (lb/a)			Nutrient Balance (lb/a)			PI (DP/PP)	LI
						N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O		
1	4.7	GRT9	0	75	21	54	35	85	0	0	0	0	0	0	-54	-35	-85	4 / 4	5
2	3.1	GRT19	0	75	0	75	40	0	0	0	0	0	0	0	-75	-40	0	3 / 2	5
3	7.3	GRT9	0	75	0	75	40	118	0	0	0	0	0	0	-75	-40	-118	2 / 3	13
4	5.6	COS2	18	110	29	81	20	20	0	0	0	30	15	15	-51	-5	-5	12 / 12	8
5	2.8	COS2	0	134	29	105	20	0	0	0	0	30	15	15	-75	-5	15	20 / 20	8
6	7.5	COS1	138	30	0	30	50	80	0	0	0	29	29	29	-2	-22	-52	6 / 6	8
7	4.7	GRE1	8	50	21	29	15	20	0	0	0	19	19	19	-10	4	-1	3 / 3	5
8	6.1	COS3	8	75	0	75	35	20	59	99	146	30	15	15	15	79	141	7 / 20	5
9	8.3	GRT10	0	75	0	75	20	68	42	71	104	0	0	0	-33	51	36	5 / 13	5
10	3.5	GRE1	8	50	16	34	15	20	0	0	0	19	19	19	-15	4	-1	7 / 2	5
11	4.9	COS7	0	85	29	56	35	20	42	71	104	75	29	29	19	-7	9	10 / 10	5
12	7	GRE1	8	50	0	50	5	20	17	28	42	19	19	19	-31	14	-1	1 / 5	5
13	5.1	GRT19	0	75	0	75	40	0	42	71	104	0	0	0	-33	31	104	32 / 4	5
14	4.5	GRT8	0	75	0	75	20	0	0	0	0	0	0	0	-75	-20	0	5 / 2	5
15	6.7	AGT5	0	0	0	0	35	37	0	0	0	0	0	0	0	-35	-37	4 / 1	5
16	9.6	GRT19	0	75	16	59	25	0	0	0	0	0	0	0	-59	-25	0	4 / 1	5
17	12.2	GRT19	0	75	16	59	10	0	0	0	0	0	0	0	-59	-10	0	10 / 10	5
18	26.1	COS1	83	30	0	30	20	25	0	0	0	30	15	15	0	-5	-10	12 / 12	5

Field ID	Acres	Crop	Residual Sod N	Gross N Req.	Residual Manure N	Total Nutrients Required (lb/a)			Nutrients From Applied Manure (lb/a)			Nutrients From Fertilizer (lb/a)			Nutrient Balance (lb/a)			PI (DP/PP)	LI
						N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O		
19	3.2	PIT19	0	150	0	150	15	20	0	0	0	0	0	0	-150	-15	-20	1 / 1	5
20	10	AGT4	0	0	0	0	50	145	0	0	0	0	0	120	0	-50	-25	1 / 1	5
21	12	COS2	18	70	0	70	55	75	42	71	104	30	15	15	2	31	44	32 / 28	5
22	8	CGT2	0	0	0	0	35	60	0	0	0	0	0	0	0	-35	-60	1 / 1	5
23	10	CGE1	8	0	0	0	55	20	0	0	0	0	40	40	0	-15	20	4 / 3	5
24	12	GRT5	0	75	16	59	45	52	33	48	219	0	0	0	-27	3	167	9 / 11	5
25	29.9	CGT2	0	0	0	0	45	52	0	0	0	0	0	0	0	-45	-52	1 / 1	5
26	9	CGT2	0	0	16	0	15	20	0	0	0	0	0	0	0	-15	-20	3 / 2	5
27	11	GRT15	0	75	21	54	40	57	33	48	219	0	0	0	-54	-40	-57	1 / 1	5
28	6.3	GRT14	0	75	0	75	25	30	33	48	219	0	0	0	-42	23	189	11 / 4	5
29	26.2	PIT19	0	150	0	150	45	20	0	0	0	0	0	0	-150	-45	-20	1 / 1	5
30	16.6	GRT2	0	75	21	54	40	13	0	0	0	69	0	0	15	-40	-13	1 / 1	5
31	13.4	COS3	0	100	29	71	55	70	0	0	0	75	29	29	3	-27	-42	1 / 2	5
32	8	COS3	0	100	0	100	60	65	85	142	209	29	29	29	13	110	172	27 / 31	5
33	6	COS2	0	85	37	47	45	20	0	0	0	29	29	29	-19	-17	9	7 / 7	5
34	6.3	GRT3	0	75	21	54	35	0	0	0	0	0	0	0	-54	-35	0	4 / 4	5
35	9.8	COS2	0	85	0	85	50	45	59	99	146	30	15	15	5	64	116	6 / 23	5
36	3.7	COS2	0	85	0	85	60	25	59	99	146	30	15	15	5	54	136	6 / 18	5
37	9.8	GRT2	0	75	21	54	35	0	0	0	0	69	0	0	15	-35	0	4 / 4	5

Field ID	Acres	Crop	Residual Sod N	Gross N Req.	Residual Manure N	Total Nutrients Required (lb/a)			Nutrients From Applied Manure (lb/a)			Nutrients From Fertilizer (lb/a)			Nutrient Balance (lb/a)			PI (DP/PP)	LI
						N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O		
38	6.6	GRT12	0	75	19	56	40	0	0	0	0	0	0	0	-56	-40	0	2 / 1	5
39	7.6	GRT12	0	75	21	54	45	41	42	71	104	0	0	0	-12	26	64	13 / 7	5
40	19.3	GRT9	0	75	0	75	30	8	33	48	219	69	0	0	-6	-30	-8	5 / 5	5
41	8.4	GRT9	0	75	0	75	30	0	33	48	219	69	0	0	-6	-30	0	5 / 5	5
42	6.4	COS1	83	30	0	30	60	80	0	0	0	29	29	29	-2	-32	-52	2 / 1	5
43	6.1	COS1	83	30	0	30	60	80	0	0	0	29	29	29	-2	-32	-52	4 / 4	9
44	7.1	CGT2	13	0	0	0	45	20	42	71	104	0	0	0	0	-45	-20	1 / 1	5
45	7.1	GRT7	0	75	0	75	35	41	0	0	0	0	0	0	-75	-35	-41	1 / 1	5
46	11.3	GRT19	0	75	0	75	35	68	42	71	104	0	0	0	-33	36	36	14 / 2	5
47	18.5	GRT19	0	75	0	75	45	30	42	71	104	0	0	0	-33	26	75	4 / 2	5
48	20.1	GRT2	0	75	0	75	40	63	0	0	0	69	0	0	-6	-40	-63	1 / 1	5
49	14.6	COS2	0	100	0	100	45	20	85	142	209	30	15	15	15	112	204	27 / 9	5
50	6.1	COS1	83	30	0	30	45	60	0	0	0	29	29	29	-2	-17	-32	5 / 1	5
51	9	COS2	0	100	0	100	35	25	85	142	209	30	15	15	15	122	199	28 / 17	5
52	10	CGE1	0	0	0	0	35	20	0	0	0	0	40	40	0	5	20	3 / 2	5
53	10	GRT2	0	75	0	75	30	19	0	0	0	0	0	0	-75	-30	-19	1 / 1	5
54	5	CGT3	0	0	0	0	30	32	0	0	0	0	0	0	0	-30	-32	1 / 2	5
55	6.1	GRT10	0	75	16	59	10	19	0	0	0	0	0	0	-59	-10	-19	1 / 3	5

Table 10: Farm B Nutrient Management Plan Data

Field ID	Acres	Crop	Residual Sod N	Gross N Req.	Residual Manure N	Total Nutrients Required (lb/a)			Nutrients From Applied Manure (lb/a)			Nutrients From Fertilizer (lb/a)			Nutrient Balance (lb/a)			PI (DP/PP)	LI
						N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O		
1	10.8	COS5	0	133	13	120	40	25	32	48	117	99	11	0	11	18	92	11 / 6	13
2	4.5	GRT19	0	75	16	59	0	0	0	0	0	0	0	0	-59	0	0	24 / 2	4
3	4	COS3	0	133	0	133	50	20	119	95	233	30	11	0	16	56	213	5 / 5	12
4	3.1	ALE1	0	0	0	0	10	20	0	0	0	10	20	20	10	10	0	37 / 21	4
5	4.8	ALE1	0	0	0	0	65	20	0	0	0	10	60	20	10	-5	0	10 / 6	4
6	8.4	COG4	0	134	0	134	20	35	44	67	163	86	30	16	-4	76	144	17 / 15	7
7	24.8	GRT3	0	75	8	67	0	0	44	67	163	0	0	0	-23	67	163	21 / 9	5
8	24.6	COS6	0	139	22	118	20	0	32	48	117	76	11	0	-10	38	117	42 / 42	8
9	19.6	COS5	0	133	22	111	30	20	72	107	296	30	11	0	-9	88	276	22 / 14	13
10	15.7	ALT2	0	0	20	0	10	0	20	48	117	0	0	0	20	38	117	31 / 31	13
11	21.6	COS5	0	133	8	125	30	0	64	95	233	76	11	0	15	76	233	16 / 5	13
12	4.9	ALT2	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	9 / 5	5
13	5.5	AGT2	0	40	15	25	10	0	35	48	252	0	0	0	10	38	252	15 / 10	5
14	10.8	COG3	10	91	7	84	20	20	0	0	0	76	11	0	-8	-10	-20	4 / 2	5
15	9.4	AGT3	0	40	11	29	10	59	44	67	163	0	0	0	15	57	104	18 / 10	5
16	9.3	AGT1	0	0	6	0	10	0	19	29	70	0	0	0	19	19	70	13 / 7	5
17	9.3	COG3	15	84	2	82	10	0	0	0	0	76	11	0	-6	1	0	8 / 4	5
18	9.1	COS1	110	30	12	18	10	0	0	0	0	30	11	0	12	1	0	9 / 3	5
19	9	ALE1	0	0	12	0	40	20	0	0	0	10	40	20	10	0	0	7 / 4	5
20	6.6	GRT19	0	75	0	75	25	79	89	133	327	0	0	0	14	108	247	11 / 7	5
21	9.8	COG2	18	74	0	74	55	80	64	95	233	30	11	0	19	51	153	35 / 24	5
22	15.3	COS3	10	91	18	72	10	65	53	79	226	30	11	0	11	79	161	24 / 14	5
23	6.9	COG5	0	143	0	143	10	0	0	0	0	145	11	0	2	1	0	48 / 48	8
24	5.9	COG4	0	139	18	122	10	0	0	0	0	122	11	0	0	1	0	13 / 17	8
25	7.1	AGT3	0	40	15	25	10	0	44	67	163	0	0	0	19	57	163	18 / 24	8
26	7.4	ALE1	0	0	13	0	40	20	0	0	0	10	40	20	10	0	0	7 / 9	8
27	7.8	COS1	110	30	15	15	20	0	0	0	0	30	11	0	15	-10	0	11 / 13	8

Field ID	Acres	Crop	Residual Sod N	Gross N Req.	Residual Manure N	Total Nutrients Required (lb/a)			Nutrients From Applied Manure (lb/a)			Nutrients From Fertilizer (lb/a)			Nutrient Balance (lb/a)			PI (DP/PP)	LI
						N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O		
28	8.9	COG2	24	105	20	85	20	0	32	48	117	53	11	0	0	38	117	42 / 42	8
29	5.6	AGT1	0	40	12	28	10	0	32	48	117	0	0	0	4	38	117	29 / 29	8
30	5.7	COS3	10	94	21	73	20	0	37	53	196	30	11	0	-7	43	196	46 / 42	5
31	3	COS5	0	126	19	107	20	0	32	48	117	76	11	0	1	38	117	37 / 41	8
32	2.2	ALE1	0	0	3	0	20	20	0	0	0	10	20	20	10	0	0	28 / 28	12
33	20.8	GRT19	0	75	0	75	40	0	0	0	0	0	0	0	-75	-40	0	3 / 3	5
34	21.5	GRT19	0	75	0	75	40	24	0	0	0	0	0	0	-75	-40	-24	2 / 1	5
35	13.4	GRT5	0	75	0	75	40	24	0	0	0	0	0	0	-75	-40	-24	2 / 1	5
36	8.1	COS1	138	30	2	28	10	20	0	0	0	30	11	0	2	1	-20	33 / 33	8
37	8	ALE1	0	0	51	0	20	20	0	0	0	10	20	20	10	0	0	33 / 29	8
38	10.3	AGT2	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	45 / 45	8
39	16.1	COS5	0	101	21	81	10	20	35	48	252	30	11	0	-16	49	232	65 / 65	5
40	10.3	AGT2	0	0	10	0	10	0	19	29	70	0	0	0	19	19	70	20 / 5	5
41	11.4	COG5	0	101	14	87	25	45	64	95	233	30	11	0	6	81	188	48 / 13	5
42	11.4	ALT2	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	8 / 5	8
43	8.6	COS5	0	101	13	88	20	0	64	95	233	30	11	0	5	86	233	52 / 11	5
44	3.7	AGT1	0	40	7	33	10	0	32	48	117	0	0	0	-1	38	117	15 / 9	5
45	1.4	COG4	0	92	3	88	45	0	0	0	0	100	35	23	12	-11	23	7 / 2	5
46	11.1	ALT2	0	0	12	0	30	0	0	0	0	0	0	0	0	-30	0	2 / 1	8
47	19.9	COG5	0	139	14	125	40	0	89	133	327	53	11	0	17	104	327	39 / 39	8
48	14.9	GRT2	0	75	6	69	0	0	44	67	163	0	0	0	-24	67	163	40 / 10	5
49	7	GRT8	0	75	0	75	35	2	0	0	0	0	0	0	-75	-35	-2	3 / 1	5
50	8.9	AGT1	0	40	19	21	40	0	32	48	117	0	0	0	11	8	117	15 / 15	5
51	7.5	AGT2	0	40	3	37	0	25	2	2	13	0	0	0	-35	2	-12	15 / 10	8
52	7.8	GRT1	0	75	1	74	0	15	0	0	0	69	0	0	-5	0	-15	11 / 7	8
53	11.1	COS3	10	189	29	160	10	0	49	72	243	99	11	0	-11	72	243	25 / 14	8
54	6.2	COS5	0	203	23	180	0	0	58	84	306	122	11	0	0	94	306	31 / 19	8
55	7.5	AGT2	0	40	11	29	0	6	35	48	252	0	0	0	6	48	246	18 / 12	8

Field ID	Acres	Crop	Residual Sod N	Gross N Req.	Residual Manure N	Total Nutrients Required (lb/a)			Nutrients From Applied Manure (lb/a)			Nutrients From Fertilizer (lb/a)			Nutrient Balance (lb/a)			PI (DP/PP)	LI
						N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O		
56	7.2	COS4	0	203	51	152	20	60	76	108	432	76	11	0	0	98	372	24 / 16	8
57	9.4	ALT3	0	0	31	0	0	0	0	0	0	0	0	0	0	0	0	9 / 6	8
58	9.6	AGT2	0	40	18	22	10	0	32	48	117	0	0	0	10	38	117	13 / 9	8
59	9.6	COG3	10	189	12	177	25	20	89	133	327	99	11	0	11	119	307	27 / 18	8
60	13	COG3	10	156	12	144	20	20	71	103	352	76	11	0	2	93	332	52 / 5	5
61	13.2	COS3	10	119	7	113	40	45	32	48	117	76	11	0	-5	18	72	11 / 11	13
62	13.6	COS2	24	101	6	94	20	30	32	48	117	76	11	0	13	38	87	13 / 7	13
63	7.9	COS1	110	30	10	20	30	30	0	0	0	30	11	0	10	-20	-30	3 / 2	13
64	9.7	AGT1	0	0	34	0	10	0	0	0	0	0	0	0	0	-10	0	9 / 8	8
65	3.4	COS5	0	126	11	115	20	0	0	0	0	112	7	0	-3	-13	0	24 / 24	8
66	11.8	AGT2	0	40	16	24	20	0	0	0	0	0	0	0	-24	-20	0	9 / 5	5
67	3.9	COG3	10	82	0	82	20	0	0	0	0	76	11	0	-6	-10	0	8 / 5	4
68	8.8	AGT2	0	40	19	21	10	62	32	48	117	0	0	0	10	38	55	12 / 9	13
69	8.3	COS1	110	30	18	12	20	0	0	0	0	30	11	0	18	-10	0	5 / 4	13
70	23	PLT14	0	40	7	33	0	20	0	0	0	0	0	0	-33	0	-20	14 / 14	4
71	12.4	PLT14	0	40	9	31	10	20	0	0	0	0	0	0	-31	-10	-20	10 / 10	4
72	53	PLT14	0	40	3	37	45	20	0	0	0	0	0	0	-37	-45	-20	1 / 1	4
73	9.3	COS2	24	99	9	90	25	20	44	67	163	30	11	0	-15	52	143	51 / 51	13
74	6	COS2	24	86	2	84	20	35	32	48	117	30	11	0	-22	38	82	5 / 10	8
75	10.3	ALT2	0	0	7	0	10	0	0	0	0	0	0	0	0	-10	0	5 / 2	13
76	14.5	AGT2	0	40	11	29	10	120	32	48	117	0	0	0	3	38	-3	12 / 8	13
77	6.1	COS4	0	107	45	62	0	0	0	0	0	76	11	0	14	11	0	73 / 73	5
78	8.7	AGT1	0	40	12	28	0	0	0	0	0	0	0	0	-28	0	0	41 / 41	5
79	6	COS1	110	30	20	10	50	25	0	0	0	30	11	0	20	-40	-25	4 / 3	5
80	12.7	COS3	10	113	28	84	20	20	19	29	70	76	11	0	11	19	50	4 / 7	8
81	14	COS5	0	96	17	80	25	20	0	0	0	76	11	0	-4	-15	-20	11 / 11	5
82	11.7	AGT2	0	40	27	13	20	0	32	48	117	0	0	0	19	28	117	11 / 7	8
83	5.8	COS3	10	119	19	101	30	55	32	48	117	76	11	0	7	28	62	11 / 15	13

Field ID	Acres	Crop	Residual Sod N	Gross N Req.	Residual Manure N	Total Nutrients Required (lb/a)			Nutrients From Applied Manure (lb/a)			Nutrients From Fertilizer (lb/a)			Nutrient Balance (lb/a)			PI (DP/PP)	LI
						N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O		
84	13.3	ALE1	0	0	15	0	40	20	0	0	0	10	40	20	10	0	0	2 / 4	8
85	4.5	COG5	0	133	0	133	55	45	64	95	233	76	11	0	7	51	188	35 / 40	13
86	12	AGT2	0	40	7	33	15	117	0	0	0	0	0	0	-33	-15	-117	3 / 2	8
87	7.3	GRT2	0	75	3	72	0	0	0	0	0	69	0	0	-3	0	0	10 / 2	5
88	8	AGT2	0	40	16	24	10	28	0	0	0	0	0	0	-24	-10	-28	7 / 5	13
89	4.8	COS2	24	70	0	70	30	25	0	0	0	76	11	0	6	-20	-25	7 / 1	5
90	9.9	COS1	83	30	0	30	30	25	0	0	0	30	11	0	0	-20	-25	1 / 4	12

3.6: NYS and Federal Agriculture Program Implementation and Targeting

The proposed management practice implementation levels in this Phase II WIP reflect practical implementation considering the type of agriculture conducted in New York, climate, social/economic and relevant site specific details, and an estimate of state and federal funding realistically expected to be available through 2025. Funding comes from State sources, a large part of which is awarded in contracts[23] on a competitive basis (includes special request for funding received by Upper Susquehanna Coalition), and through various USDA – NRCS programs (includes the Chesapeake Bay Watershed Initiative in the Farm Bill).

State and Federal programs are coordinated through the Agricultural Environmental Management Program to work together to efficiently provide technical and financial assistance to priority farms and priority environmental issues. These programs include:

New York State AEM Base Program

The AEM Base Program (www.nys-soilandwater.org/aem/basefunding.html) is noncompetitive technical assistance funding to New York's Soil and Water Conservation Districts to inventory and assess farms in priority watersheds then plan and design best management practices (BMP), and evaluate effectiveness of planning and BMPs on priority farms based on County AEM Strategic Plans and Annual Action Plans. This program provides the financial resources to prepare and prioritize farms for participation in various State and USDA Farm Bill programs that provide financial assistance to implement BMPs; then supports the farmer as they manage, operate and maintain their plan and the associated BMPs.

- AEM Base also supports outreach, educational, and data management activities needed to assure successful planning, BMP implementation, maintenance, and continuous improvement.
- AEM Base provides a financial incentive to Conservation Districts to put an AEM Certified Planner on staff. Districts with an AEM Certified Planner may earn up to $75,000 in technical assistance funding while Districts without a Certified Planner may only earn $40,000. The 18 Conservation Districts with land in the NY portion of the Chesapeake Bay Watershed employ 10 AEM Certified Planners with another 6 planners working toward their certification. The 18 Districts are currently eligible for $965,000 in AEM Base technical assistance funds.
- NYS Soil and Water Conservation Committee (SWCC) staff members perform a quantitative review of AEM Base deliverables such as assessments, conservation plans, BMP designs, and evaluations. These reviews advance quality, adherence to policies and participation requirements on an annual basis.
- AEM Base requires Conservation Districts to complete an AEM Self-Evaluation Report Card to assess impacts and progress toward watershed goals.

[23] State staff reviews projects before costs are fully reimbursed.

- AEM Base Program accomplishments in the Susquehanna Watershed in the 5 years since program inception (2005) include:
    - 1,214 on-farm Tier 1 Inventories.
    - 863 on-farm Tier 2 Assessments.
    - 552 on-farm Tier 3 Conservation Plans.
    - 244 farms implementing BMPs with SWCD technical assistance (this does not include implementation completed through ANSACP or implementation completed solely through NRCS).
    - 345 on-farm Tier 5 conservation plans and/or BMP evaluation.
- The AEM Base Program is in its sixth consecutive year of operation; funding availability to Districts with land in the Susquehanna Watershed has grown from $380,000 in 2005 to the $965,000 today. The AEM Base Program is funded entirely by the NYS Environmental Protection Fund.

Targeting within New York's AEM Program

AEM was created to provide a coordinating framework to target the limited technical and financial resources available from all levels of government toward the watersheds, issues, pollutants, farms, practices, and BMPs that are of the greatest concern and where the most significant water quality benefits will occur. To accomplish this task, County Soil and Water Conservation Districts are required to form a county level AEM Steering Committee to develop a Strategic Plan identifying priority water bodies/watersheds, associated water quality impairments, pollutants of concern from agricultural sources, BMPs to address the identified pollutants, and potential sources of technical and financial assistance. Coordination on the strategic plans between Counties is accomplished through the existing major watershed coalitions of Conservation Districts established throughout the State (the Upper Susquehanna Coalition is an example). Resources utilized to create AEM Strategic Plans included the State's Priority Waterbodies List (PWL) and Source Water Assessment (SWA), Federal designations such as 303 d watersheds and TMDLs, and locally generated studies and information. Once completed the County AEM Strategic Plan prioritizes all waterbodies/watersheds within the County identifying the impairment associated with agriculture, the priority agriculturally generated pollutants, and the appropriate BMPs generally needed to address the priority pollutants. AEM Base funds are then used to systematically inventory and assess (AEM Tiers 1 & 2) willing farms in order of priority waterbodies/watersheds.

On the farm resource professionals working with farmers utilize the AEM *Tier 1 Questionnaire*, the *Watershed Site Evaluation Worksheet*, and appropriate *Tier 2 Assessment Worksheets* to gather information on the farm's position on the landscape (topography, proximity to waterbodies, soil types, etc.), potential pollution sources, and management practices to determine the lack or presence of an environmental concern, or the need to collect additional information to be analyzed. Armed with this

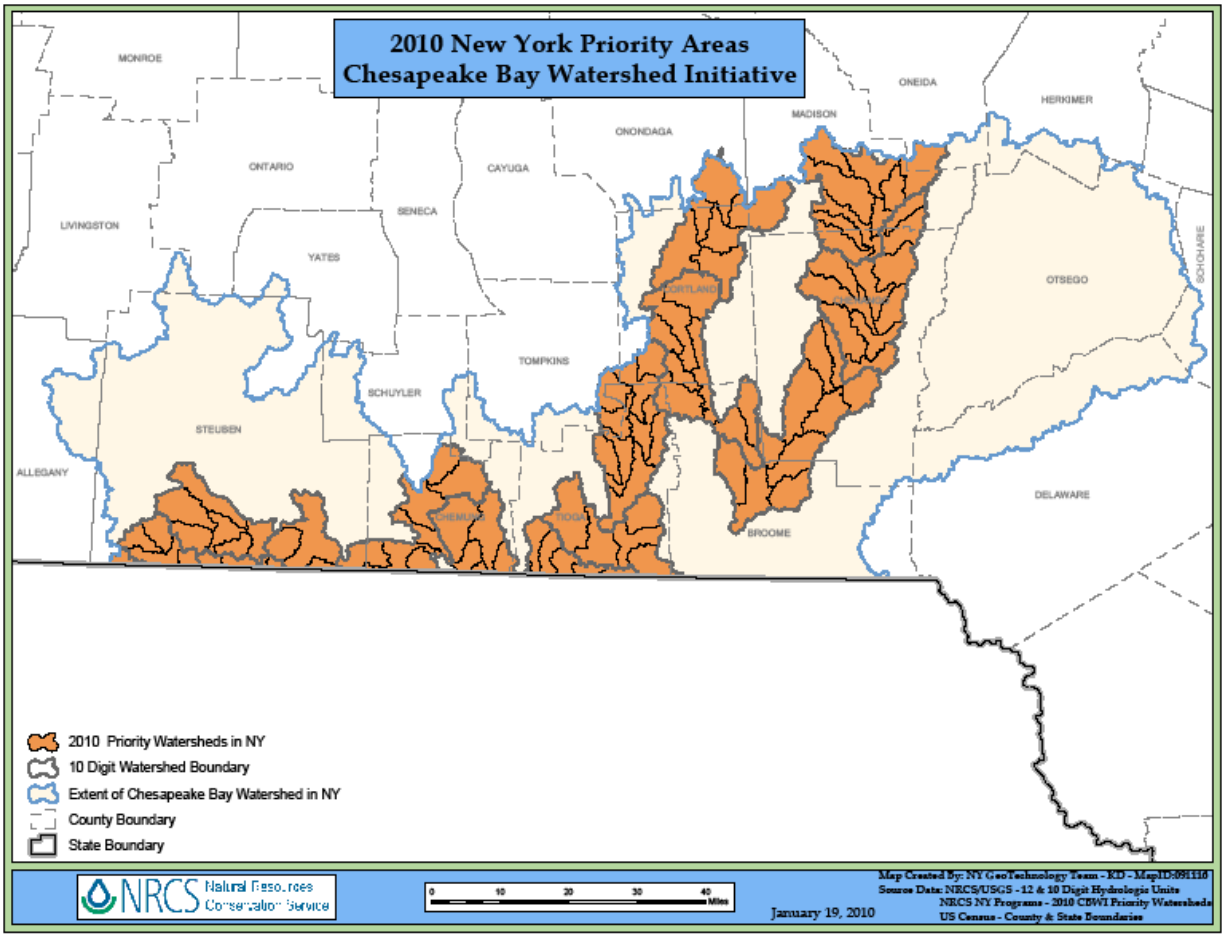
information, decisions can be made by the Conservation District where to rank farms for further technical and financial assistance.

The Agricultural Nonpoint Source Abatement and Control Program (ANSACP) targets projects based on priority farms, pollutants and watersheds. ANSACP proposals must be cost effective with farm commitment to complete and maintain the project. ANSACP projects receive bonus points when in a Federal TMDL designated watershed and if the proposal includes conservation buffers as part of the proposed BMP system.

Applicants to the EQIP and Chesapeake Bay Watershed Initiative (CBWI) programs who want to address livestock waste or grazing issues have completed the appropriate AEM Tier II worksheets at the time of application. The results of those worksheets will be used to prioritize and rank applications to direct funding to those that will address the most serious environmental risks, and make the greatest contribution to reduce delivery of nutrients and sediments to Chesapeake Bay. CBWI funds will be targeted to priority areas that have the highest potential for delivery of N, P, and sediment to the Bay. EQIP funds will be utilized in the remainder of the watershed also to address delivery of N, P, and sediment to the Bay.

USDA-NRCS targets funds available through the Chesapeake Bay Watershed Initiative to specific priority watersheds in the Upper Susquehanna region of New York (Figure 4).

Figure 4: 2010 NRCS New York Priority Areas



New York State Agricultural Nonpoint Source Abatement and Control Program

The Agricultural Nonpoint Source Abatement and Control Program (ANSACP) (www.nys-soilandwater.org/aem/nonpoint.html) is a competitive financial assistance program available to Conservation Districts that provides funding to plan, design, and implement priority BMPs, as well as cost-share funding to farmers to implement BMPs. 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 SWCC Advisory Members including: NYS Departments of Environmental Conservation, Health, State, and Agriculture & Markets; 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 NRCS design standards. Engineering practices must be designed by a Professional Engineer, and nutrient management plans must be developed by an AEM or NRCS Certified Planner.

- SWCC staff complete final checks on all projects. All engineering practices must be approved by a Professional Engineer. Conservation practices must be approved by an appropriate Certified Planner, TSP, or individual with appropriate NRCS Job Approval Authority.

- The Request for Proposals for each Round of ANSACP 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.

- ANSACP is funded through the New York State Environmental Protection Fund and is in its 17th round of funding since 1994. Funding for the program has increased from $331,630 in 1994 to $12,068,124 today statewide. Since its inception 25% of all ANSACP funding has gone to projects in the Susquehanna River Watershed totaling over $26.7M. The program is consistently oversubscribed with only approximately 33% of submitted projects funded statewide.

USDA Farm Bill Programs

New York's Agricultural Environmental Management (AEM) program is an "umbrella program" providing the framework and tools for farmers to assess their environmental risks and opportunities, learn about the impacts of their actions on water quality and other natural resources, and prepare them to participate in programs to address priority concerns and opportunities. AEM participating farmers may utilize several programs to develop conservation plans and receive cost-sharing and other incentives to implement best management practices through the U.S. Department of Agriculture (USDA) and the current Farm Bill. Farm Bill programs available in New York for conservation planning and implementation include:

- **Environmental Quality Incentives Program (EQIP)** – Includes special funds for the Chesapeake Bay Watershed. AEM Tier 2 Assessment Worksheets are used to help rank EQIP applications.

- **Conservation Reserve Program (CRP)**[24] – CRP is a voluntary program for agricultural landowners. Through CRP, farmers can receive annual rental payments and cost-share assistance to establish long-term, resource conserving covers on eligible farmland. Acreage enrolled in the CRP is planted to resource-conserving vegetative covers, making the program a major contributor to increased wildlife populations in many parts of the country. By reducing water runoff and sedimentation, CRP protects groundwater and helps improve

[24] Details about the Conservation Reserve Program can be found on the USDA FSA website at: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=crp.

the condition of lakes, rivers, ponds, and streams. The Commodity Credit Corporation makes annual rental payments based on the agriculture rental value of the land, and provides cost-share assistance for up to 50 percent of the participant's costs in establishing approved conservation practices. Participants enroll in CRP contracts for 10 to 15 years. Together, the CRP and CREP (see next bullet) programs have enrolled 19,332 acres through 2,186 contracts in New York's portion of the watershed. The CRP and CREP programs provide technical and financial assistance to eligible farmers and ranchers and helps farmers and ranchers comply with Federal, State, and Tribal environmental laws and encourages environmental enhancement. CRP and CREP are administered by the USDA Farm Service Agency, with NRCS and the Soil and Water Conservation Districts providing technical land eligibility determinations, conservation planning, and practice implementation.

- **Farmable Wetlands Program (FWP)**[25] – FWP is a voluntary program to restore up to one million acres of 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 the Conservation Reserve Program. Producers plant long-term, resource-conserving covers to improve the quality of water, control soil erosion and enhance wildlife habitat on land enrolled in CRP. In return, FSA provides participants with rental payments and cost-share assistance. Contract duration is between 10 and 15 years. 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. Of note in the FWP is a new allowable conservation practice: CP39 – Farmable Wetlands Constructed Wetland. These are wetlands that are located and designed to intercept and treat agricultural drainage water. Land eligible to be enrolled in CP39 is land that receives flow from a row crop agriculture drainage system designed to provide nitrogen removal and other wetland functions.

- **Conservation Reserve Enhancement Program (CREP)**[26] – CREP is a voluntary land retirement program that helps agricultural producers protect environmentally sensitive land, decrease erosion, restore wildlife habitat, and safeguard ground and surface water. CREP is an offshoot of the Conservation Reserve Program. Like CRP, CREP is administered by USDA's Farm Service Agency (FSA). By combining CRP resources with state, tribal, and private programs, CREP provides farmers and ranchers with a sound financial package for conserving and enhancing the natural resources of farms. CREP addresses high-priority conservation issues of both local and national significance, such as impacts to water supplies, loss of critical habitat for threatened and endangered wildlife species, soil erosion,

[25] Details about the Farmable Wetlands Program are on the USDA-Farm Service Agency website at: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=fwp.

[26] Details about the Conservation Reserve Enhancement Program can be found on the USDA-Farm Service Agency website at: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=cep.

and reduced habitat for fish populations such as salmon. CREP is a community-based, results-oriented effort centered on local participation and leadership. The USDA Farm Service Agency (FSA) has recently expanded CREP eligibility in New York to include all sub-watersheds of the Susquehanna River.

- **Conservation Stewardship Program (CSP)** – CSP is a voluntary conservation program that encourages producers to address resource concerns in a comprehensive manner by undertaking additional conservation activities; and improving, maintaining, and managing existing 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.[27]

- **Agricultural Management Assistance Program (AMA) –** AMA provides financial and technical assistance to agricultural producers to voluntarily address issues such as water management, water quality, and erosion control by incorporating conservation into their farming operations.

  Producers may construct or improve water management structures or irrigation structures; plant trees for windbreaks or to improve water quality; and mitigate risk through production diversification or resource conservation practices, including soil erosion control, integrated pest management, or transition to organic farming.

  AMA is available in 16 states where participation in the Federal Crop Insurance Program is historically low: Connecticut, Delaware, Hawaii, Maine, Maryland, Massachusetts, Nevada, New Hampshire, New Jersey, **New York**, Pennsylvania, Rhode Island, Utah, Vermont, West Virginia, and Wyoming.[28]

- **Wetland Reserve Program (WRP)** – WRP is a voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. The USDA Natural Resources Conservation Service (NRCS) provides technical and financial support to help landowners with their wetland restoration efforts. The NRCS goal is to achieve the greatest wetland functions and values, along with optimum wildlife habitat, on every acre enrolled in the program. This program offers landowners an opportunity to establish long-term conservation and wildlife practices and protection.[29]

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[27] Details about the Conservation Stewardship Program are on the USDA NRCS website at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/csp.

[28] Details about the Agricultural Management Assistance program are on the USDA NRCS website at http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/ama.

[29] Details about the Wetlands Reserve Program are on the USDA NRCS website at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/wetlands.

- **Debt for Nature Program (DFN) –** 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.

- **Grassland Reserve Program (GRP)[30] –** GRP is a voluntary program assisting landowners and operators in protecting grazing uses and related conservation values by restoring and conserving grassland resources. The Grassland Reserve Program in New York emphasizes preservation and restoration of native grasslands; supporting grazing operations; protecting grasslands from threats of conversion; maintaining and improving plant and animal biodiversity.

- **Farm and Ranch Lands Protection Program (FRPP)[31]** – FRPP is a voluntary program of the Natural Resources Conservation Service to protect working agricultural lands by limiting non-agricultural uses. NRCS works with approved state, local and non-profit entities who arrange for the purchase of development rights through conservation easements on private lands. The entity holds and manages these conservation easements in perpetuity.

Current Agriculture Program Implementation

The following table is from the New York WIP II Input Deck submitted to EPA. The best management practices listed are those being proposed for the agriculture sector as part of the New York Watershed Implementation Plan.

[30] Details about the Grassland Reserve Program are on the USDA NRCS website at: http://www.ny.nrcs.usda.gov/programs/grp/index.html.

[31] Details about the Farm and Ranch Lands Protection Program are on the USDA NRCS website at: http://www.ny.nrcs.usda.gov/programs/frpp/index.html.

Table 11: New York WIP II Input Deck

Practice	Available Units FROM MODEL	BMPs Previously Installed FROM MODEL	Scenario 12 Implementation Levels	Total Set Up Cost (minus BMPs already installed)	Total Yearly Maintenance Cost	BMP Units to be Installed	Set Up Cost per unit BMP	Total Set Up Costs through 2024	Total Maintenance Cost through 2024
Enhanced Nutrient Management (On Cropland/Hay/Alfalfa)	511,090 ac	26,341 ac/yr	228,957 ac/yr	$22/ac	$8/ac	228,957	$22	$5,037,054	$12,821,592
Nutrient Management (On All Agland)	691,290 ac	104,967 ac/yr	36,056 ac/yr	$18/ac	$0/ac	36,056	$18	$649,008	0
Decision Agriculture (On Cropland/Hay/Alfalfa)	511,090 ac	0 ac/yr	74,255 ac/yr	$12/ac	$0/ac	74,255	$12	$891,060	0
Conservation Plans (On all Agland)	799,468 ac	82,099 ac/yr	431,960 ac/yr	$5/ac	$0/ac	431,960	$5	$2,159,800	$0
Cover Crops (all types) (On Cropland)	156,510 ac/yr	1,597 ac/yr	31,357 ac (row corn)	$54/ac	$0	31,357	$54	$1,693,278	$0
Conservation-Tillage (On Cropland)	137,479 ac/yr	9596 ac	47,884 ac/yr	$25/ac	$0/ac	47,884	$25	$1,197,100	$0
Continuous No-Till (On Low-till with manure)	47,884 ac/yr	669 ac	2,831 ac/yr	$50/ac	$0/ac	2,831	$50	$141,550	$0
Dairy Manure/Poultry Litter Injection (On Cropland)	797,970 ac	0 ac	149,554 ac	$25/ac	$0/ac	149,554	$25	$3,738,850	$0
Tree Planting (On all Agland and Pasture Corridor)	810,587 ac	1,785 ac	1,923 ac	$615/ac	$2.21/ac	1,923	$615	$84,870	$305
Forest Buffers (On all Agland and Pasture Corridor)	797,970 ac	4,042 ac	10,222 ac	$700/ac	$5/ac	10,222	$700	$4,326,000	$357,770
Grass Buffers (On all Agland and Pasture Corridor)	703,910 ac	13,194 ac	38,630 ac	$300/ac	$15/ac	38,630	$300	$7,630,800	$4,056,150
Stream Access Control with Fencing (Now Grass Buffers) (DRP)	12,617 ac	7,805 ac	12,051 ac	$22,950/mi ($500)	$158/mi ($25)	0	$500	$0	$0
Non Urban Stream Restoration (On Agland/Forest/ Pasture Corridor)	1,207,140 ft	0 ft	338,000 ft	$100/ft	$5/ft	338,000	$100	$33,800,000	$11,830,000
Land Retirement (On all Agland and Pasture Corridor)	703,910 ac	7,608 ac	14,481 ac	$0	$0	14,481	$0	$0	$0
Prescribed Grazing/Precision Intensive Rotational Grazing (Pasture)	180,203 ac	35,213 ac	152,221 ac	$350/ac - $500/ac	$10/ac	152,221	$425	$49,728,400	$10,655,470
Horse Pasture Management (Pasture)	180,203 ac	47 ac	2,057ac	$150/ac	$6/ac	2,057	$150	$301,500	$86,394

Off-Stream Watering w/out Fencing (Pasture)	180,203 ac	885 ac	8,571 ac	25/ac	$5.20/ac	8,571	$25	$192,150	$311,984
Animal Waste Management - Large	100% A.U.	43% afo/cafo	100% cafo	$400,000/system	$10,000/system	20	$400,000	$4,000,000	$1,400,000
Animal Waste Management - Medium/Small	35% A.U.		35% afo	$200,000/system	$5,000/system	150	$200,000	$20,000,010	$5,250,000
BarnYard Runoff Control Systems/Loafing Lot Management	1,000 dairy farms	16% afo/cafo	78% afo/cafo	$140,000/system	$2,000/system	230	$140,000	$27,048,000	$3,220,000
Precision Feeding Dairy	1,000 dairy farms	3% dairy AMUs	50% dairy AMUs	$6,000/farm	$1,000/farm	125	$6,000	$750,000	$875,000
Mortality Composters	1,000 dairy farms	1% A.U. mortality	80% A.U. mortality	$9,200/farm	$200/farm	125	$9,200	$1,138,500	$325,000
Wetland Restoration (On all Agland)	797,970 ac	6,363 ac	13,792 ac	$4,317/ac	25/ac	13,792	$4,317	$32,070,993	$2,413,600
							Sub Total	**$164,507,930**	**$51,189,665**
							Total		**$215,697,595**
							Grand Total		**$250,182,188**

Estimated Available Funding for NYS Agricultural BMPs Through 2025

The following is a linear estimate of funding available in New York for agricultural best management practice implementation and maintenance through 2025. These estimates are a linear extrapolation that assumes that current funding levels are maintained through 2025.

Table 12: Estimated Available Funding for NYS Agricultural BMP Implementation and Maintenance

Funding Source	Funding Amount
Farm Bill funding through NRCS-NY EQIP	Funding: $87,159,600 Technical support (10 FTEs): $13,950,000
NYS Environmental Protection Fund & County contributions	ANPSCAP: $55,800,000 AEM Base (30 FTEs): $28,039,500
Chesapeake Bay Program Implementation Agreement	USC funding: $7,440,000
Upper Susquehanna Coalition	USC special grants: $11,160,000
Farmer contributions (cost share)	12% for capital investments: $20,460,000 O&M: $43,245,000
Total available funding	**$267,254,100**[32] [33]

These funds are expected to be available to implement the suite of management practices proposed in this Phase II WIP.

Two-Year Milestones Narrative Description

Table 13: Two-Year Funding Levels for NYS Agricultural Programs (2012-2013)

Source	Amount
AgNPS Abatement and Control Program	$9,857,200
Ecosystem Based Management Grant	$35,000
NFWF Watershed, Stream and Grazing Pilot	$30,000
NFWF Enhanced Nutrient Management Approach	$133,350
NFWF Integrating Nutrient Reduction Tools and Programs in NY	$462,000

[32] The estimated funding levels do not account for funding increases due to inflation of costs.

[33] Wetlands also use separate funds from WRP funds, USC funds, USFWS Partners for Wildlife funds, EPA Wetland Development Funds and NFWF Wetland funds.

Army Corps of Engineers Precision Feed and Forage Management Program	$65,600
Chesapeake Bay Implementation Grant Funding	$1,000,000
Grazing Lands Conservation Initiative	$226,040
NRCS Contribution Agreement – Grazing Support	$12,000
NY CIG Project	$75,000
USDA NRCS Farm Bill Programs	$5,622,000
USDA FSA Farm Bill	Pending
Total	**$17,595,390**

The USC has completed a 2-year implementation plan and has projected implementation with consistent levels of funding through 2025. Funds are usually obtained from competitive grant programs at both the state and federal levels as well as through the private sector. Since 1994, the New York State SWCC Agricultural Nonpoint Source Abatement and Control Grant Program, has allocated cost-share funds from the New York State Environmental Protection Fund to support farmers' efforts to protect water quality and natural resources that are in the public's interest. The USC has also obtained special grants obtained through RFPs, such as the Special Environmental Protection Funds, EPA Targeted Watershed Initiative, and the Chesapeake Bay Program Small and Targeted Watershed Grants. Total funding from all sources described below is estimated to be over $17,595,390 for the next two years. This total does not include matching funds or farmer contributions. It only includes cost share funds to assist farmers in paying for BMPs. Furthermore, this total does not include FSA CRP/CREP, Cornell Cooperative Extension, or special individual Soil and Water Conservation District's funds because they were not available at the time this document was written. However, the funding described below has provided almost all of the agricultural BMP implementation in this watershed (Table 13).

Pending NYS Agricultural Nonpoint Source Abatement and Control Program (ANSACP) Projects ($9,857,200)

As described above, this program is a competitive financial assistance program available to Conservation Districts that provides funding to plan, design, and implement priority BMPs, as well as cost-share funding to farmers to implement BMPs. Farmers are eligible to receive between 75 and 87.5% of BMP implementation costs depending on their contribution to the project. There are 40 ANSACP contracts in New York's Susquehanna River watershed that are scheduled to be completed in the next two years representing a farmer and NYS commitment of $9,857,197 toward the projects. These projects will result in the following BMPs being installed:

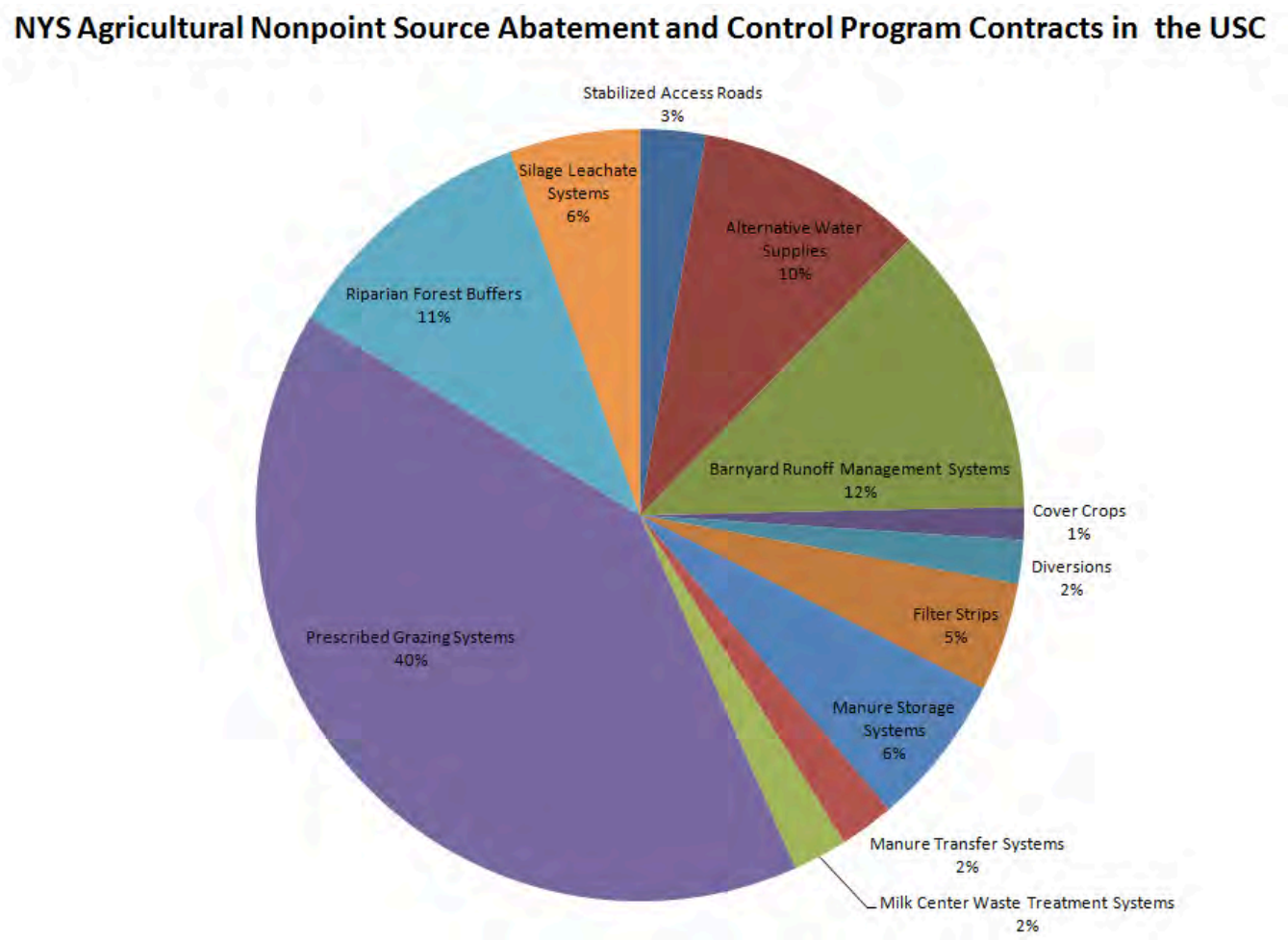
Table 14: Best Management Practices Installed under the ANSACP

Best Management Practice	Number of Farms Installing the Best Management Practice

Stabilized Access Roads	6
Alternative Water Supplies	21
Barnyard Runoff Management Systems	27
Cover Crops	3 (600 acres)
Diversions	4
Filter Strips	10 (14 acres)
Manure Storage Systems	14
Manure Transfer Systems	5
Milk Center Waste Treatment Systems	5
Prescribed Grazing Systems	88
Riparian Forest Buffers	24
Silage Leachate Systems	12

The following chart (Figure 5) is for all projects that are under contract to be started within the next two years.

Figure 5: NYS Agricultural Nonpoint Source Abatement & Control Program Contracts in the USC[34]



Ecosystem Based Management ($35,000) & National Fish and Wildlife Foundation Stream, Grazing, Wetlands Project ($30,000)

These grants combine "buffer related" projects into an umbrella approach called the Grass-Based Initiative. New York combines all buffer types, cow exclusion practices and prescribed grazing to address both agricultural sustainability and community needs in relation to stream bank erosion, habitat improvement and flooding. Furthermore, it will complement the USC Wetland Program adding further value to both programs.

The Ecosystem Based Management grant has $35,000 remaining and the NFWF Stream, Grazing and Wetlands Project grant has $30,000 remaining.

An Enhanced Nutrient Management Approach in NY Grant ($133,350)

2010 National Fish and Wildlife Foundation Small Watershed Grants are using Precision Feed Management benchmark analysis to determine specific nutrient problems. It also includes specialized

[34] ANSACP funding percentages by practice. Percentages are based on a total of $9,857,200 of funding for the 2009-2011 period.

nitrogen testing and modeling with Illinois Soil Nitrogen Test (ISNT), Corn Stalk Nitrate (CSNT), and Adapt-N management tool.

Integrating Nutrient and Sediment Reduction Tools and Programs in NY Grant ($462,000)

This 2011 National Fish and Wildlife Foundation Innovative Nutrient and Sediment Reduction grant is integrating nutrient reduction programs to perform precision feed management benchmark analysis, adaptive nitrogen tests, measuring mass balance impact, and farm demonstrations to promote nutrient reduction strategies.

Army Corps of Engineers Water Resource Development Act/Water Evaluation and Planning System (WRDA/WEAP) Precision Feed and Forage Management Program ($65,600)

This funding, for Delaware County, is using Precision Feed Management benchmark analysis to determine specific excess nutrient sources in feed and develop feed management plans to make dietary changes affecting 1,708 animal units on 3 farms in the watershed.

Chesapeake Bay Implementation Grant Funding ($1,000,000)

CBIG funds are being used for data collection to feed the model. The funding is $500,000 per year which equates to $1,000,000 total for the 2 year milestone period.

The Grazing Lands Conservation Initiative (GLCI) ($226,040)

GLCI was founded to provide high quality technical assistance on privately owned grazing lands on a voluntary basis and to increase the awareness of the importance of grazing land resources.

The program in New York has a coordinator, Karen Hoffman, and supports staff for basin wide technical assistance which includes developing grazing plans, farm visits, and educational events.

Upper Susquehanna Coalition/NRCS Contribution Agreement ($12,000)

The NRCS and the USC have a mutual interest to accomplish the goals and objectives of the Chesapeake Bay Watershed Initiative (CBWI) Programs in New York by assuring that participants are implementing projects that include, but are not limited to, livestock waste projects, prescribed grazing systems, related riparian buffers, access control projects, nutrient management, and other high quality BMPs. USC personnel are assisting the NRCS by providing such services as planning, design of eligible practices, oversight of installation of eligible practices, and post construction throughout the Upper Susquehanna River Watershed. $54,730 was under contract through 2011.

There is $12,000 remaining in the USC/NRCS agreement.

USDA/NY NRCS Conservation Innovation Grant – Developing a Cover Crop Program in the Chesapeake Bay Watershed in NYS ($75,000)

To begin stimulating cover crop implementation on corn silage acres in New York, the Upper Susquehanna Coalition is piloting a Cover Crop Initiative through an interactive outreach approach sponsored by a Conservation Innovation Grant from the New York Natural Resources Conservation Service. This project is partnering with Cornell University to compare end of season nitrate capture and N release in spring and summer as impacted by cover crop species, biomass, timing and method of cover termination, and to test various tools for N management in cover-crop based corn systems.

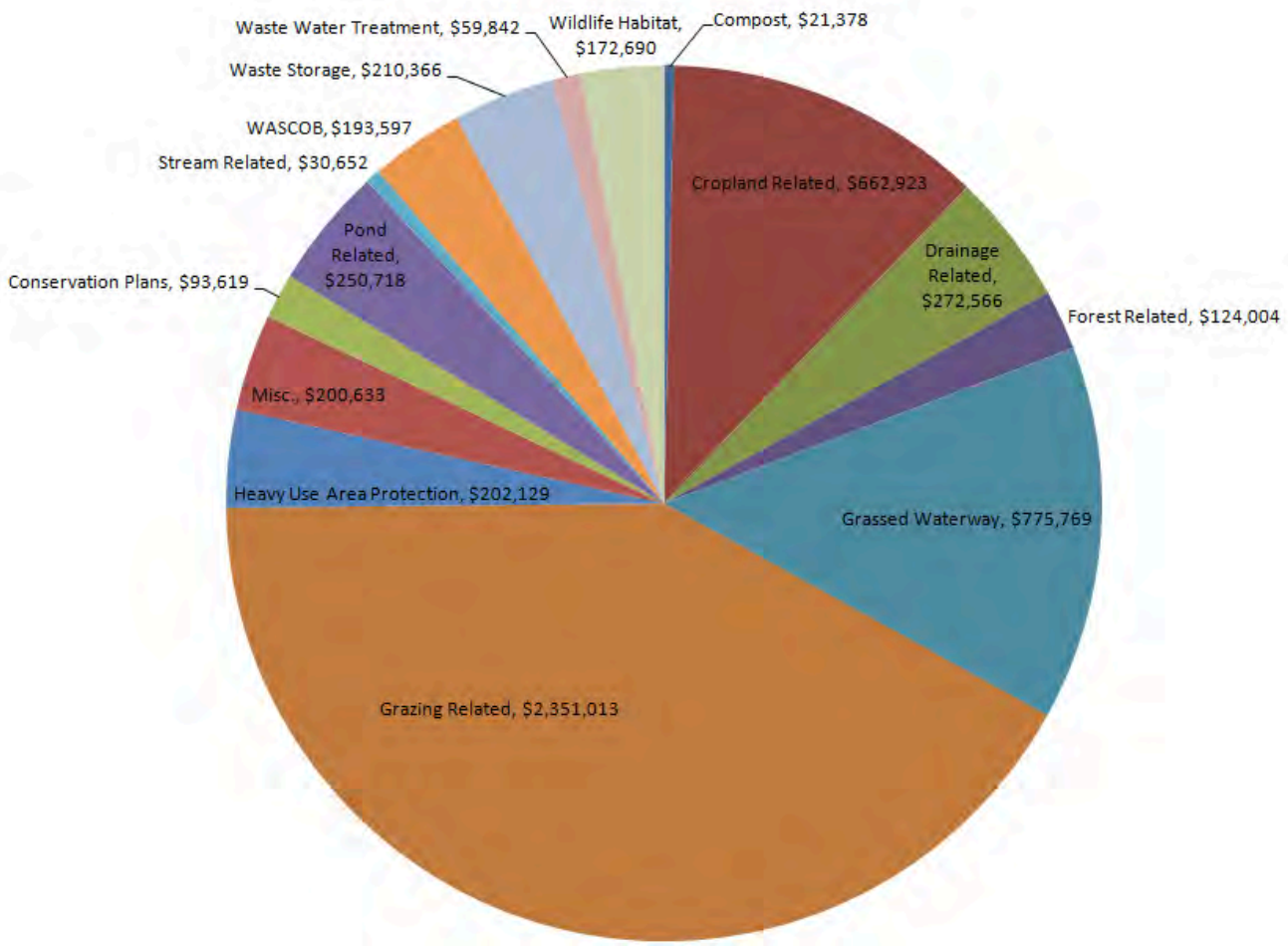
Outreach will include field day demonstrations and an annual workshop in November to highlight benefits and share ideas on how producers in our region are overcoming the challenges of cover crop implementation on their farms

USDA/NRCS Farm Bill Programs ($5,622,000)

In the Chesapeake Bay watershed in New York, NRCS staff works closely with Upper Susquehanna Coalition staff to plan and implement projects through various Farm Bill programs which include EQIP, WRP, AMA and others. This funding is separate from the contribution agreement with the Upper Susquehanna Coalition mentioned above as this includes implementation money and includes practices that may be completed by NRCS staff. However, individual districts within the USC often have their own contribution agreements to assist the NRCS in getting this work done. For example, Delaware County Cooperative Extension has a contribution agreement for $46,200 to develop 18 feed management plans in the designated priority areas of the Chesapeake Bay Watershed Initiative and conduct several outreach meetings to inform producers about the benefits of feed management. The contribution agreement funding that NRCS has with individual entities is not included in the total because it was not readily available at the time this document was published.

The chart below (Figure 6) includes all NRCS planned (but not applied) practices for 2009-2011. Also included are CSP enhancements which are loosely tied to NRCS practice standards but which are only applicable to the CSP program. This data represents all known planned practices regardless of funding. These should be considered representative for future years.

Figure 6: NRCS known planned practices by category 2009-2011[35]



USDA Farm Service Agency Conservation Programs

Two-year NY CRP, FWP, and CREP contract funding levels were not available in time to be included with this document. However, this program has successfully worked with thousands of farmers in New York over the last decade and has spent several hundred thousand dollars a year to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filter-strips, or riparian buffers and will continue to do so over the next 2 years and beyond.

3.7: NYS Agriculture Best Management Practices

This section was developed and written by the Upper Susquehanna Coalition (USC) in coordination with the NYS Department of Agriculture and Markets and offers suggestions for agricultural and wetland Best Management Practice implementation to reduce nutrient and sediment loads in New York's portion of the Chesapeake Bay watershed.

[35] Total NRCS Farm Bill funding is planned for $5,622,000 for 2009-2011.

Nutrient Reduction for Agriculture

The USC developed levels of management practice implementation based on USC meetings with knowledgeable agricultural experts and farmers that are believed to be practical and reasonable considering available funding, technical staff, time, and farm operator cooperation for implementation. These practices include those that have been shown to be highly cost-effective in reducing nutrient runoff, such as comprehensive nutrient management plans, so they are clear choices to achieve significant nutrient reduction. Many of these practices also involve source control or stream protection, so they have local benefits and tend to be fiscally sustainable. In addition, many practices reduce the impacts of atmospheric nitrogen deposition by reducing ammonia emissions and/or providing nitrogen retention. Agricultural practices can also be very cost-effective because some involve operational changes without major capital commitments. The following is a description of the major Watershed Implementation Plan Agriculture BMPs, as understood and practiced in New York State. The efficiency rates are based on the Chesapeake Bay Program "Non-Point Source Best Management Practices and Efficiencies currently used in Scenario Builder" document dated October 27, 2011.

BMP: Conservation Tillage

Conservation tillage involves planting and growing crops with minimal soil disturbance. Conservation tillage requires two components, (a) a minimum 30% residue coverage at the time of planting and (b) a non-inversion tillage method. No-till farming is a form of conservation tillage where the crop is seeded directly into vegetative cover or crop residue. Minimum tillage farming involves some disturbance of the soil, but uses tillage equipment and leaves much of the vegetation cover or crop residue on the surface.

New York's climate offers many challenges to successful conservation tillage implementation. These barriers are often greater for our smaller farms. A primary barrier is soil suitability. Upland Channery soils are not conducive to the no-till planting method. Other upland soils present challenges as they are often clay loams with poor drainage. Soils will also remain wetter later into the spring, especially in years where snow melt is delayed. Combined with slower spring warm up in New York, conservation cover slows soil warming and delays planting dates. A second challenge for New York is that ensuring adequate cover requires either plant residue or vegetation. This would necessitate a change in cropping for most smaller farms as they would be required to either convert from silage to grain corn or would need to apply a cover crop (vegetation). However, grain corn or cover crops are often not feasible due to the slower spring warm up and shorter growing season in New York. Later harvests of grain corn on uplands soils means harvesting off wetter soils and thus creating a tremendous potential for rutting, compaction and erosion. Additionally, conservation tillage itself and the cover requirements are also not feasible due to the additional management complications that they create for the smaller farms and on upland soils. The additional equipment or equipment conversions necessary are cost prohibitive, especially in a region where nearly a quarter of its inhabitants live below the poverty line. Finally, there are pest management issues that accompany conservation tillage acreages such as grey leaf spotting, mycotoxins, and western cut worm. All of these concerns are

serious barriers to conservation tillage implementation. Research and incentives will be necessary to stimulate wide-spread adoption of this practice, especially on smaller farms.

The opportunities for success on the proposed acreage for conservation tillage are based on several factors. We recognize that although not currently found in widespread use, this practice can be successful on some of our farms and on our 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 because they 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. Given these factors, we are reasonably assured of the estimated application of this practice, and yet reluctant to assert that the level can be increased to any significant degree.

Conservation Tillage does not have an efficiency value in the Chesapeake Bay watershed model but is credited as a land use change on row cropland that is conventionally tilled and has manure applied to it. New York's goal is to implement conservation tillage on 47,884 acres of available cropland per year.

BMP: Continuous No-Till

The same factors limiting conservation tillage will limit continuous no-till – late spring warm up, wetter soils and capital expenditures for equipment. The adoption of continuous no-till is also not broadly feasible for New York agriculture, which is predominantly dairy farms with a cropping system and rotation of corn/soybean and alfalfa/grass that is used to supply forages for feed. Some tillage is necessary to return to hay from a row crop. Tillage is also needed to control weed population and pest build-up. It is, however, reasonable to expect that through education and outreach, and by expanding on current practices, some of our better drained soils that will warm and dry more quickly and are more suitable for harvest later in the season could be utilized for continuous no-till. We estimate that 1000 acres of cropland could be reasonably converted to continuous no-till.

A system to support farmers who implement these practices is necessary to buffer the economic risks they take in the early years of implementation. Demonstration sites would augment outreach and education efforts to encourage implementation. Equipment cost-share or rental options, yield/performance insurance or guarantees, and incentive payments would stimulate long term use and adoption.

Continuous No-Till is given credit with an efficiency of 15% nitrogen, 40% phosphorus, and 70% TSS. It can only be applied to conservation tillage acres that receive manure. New York's goal is to implement continuous no-till on 2,831 acres of cropland per year.

BMP: Cereal and Commodity Cover Crops

Cereal 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, cereal 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 include difficulty in establishing the crop because of early frost and difficulty in plowing under a heavy crop. Crops capable of nutrient removal include rye, wheat, barley, and to a much lesser extent, oats.

The Bay Watershed Model has a complex method for calculating nutrient reduction efficiencies for cereal cover crops. The research-based estimates of cover crop efficiencies will be adjusted in 2012 to provide more realistic estimates of efficiencies for widespread adoption of this practice. Currently, effectiveness estimates vary between species, planting dates, and seeding techniques. To be eligible for level 1 reduction credit, referred to as early planting, the cover crop must be planted earlier than 14 days prior to the long-term published average date of the first killing frost in the fall. To be eligible for level 2 reduction credit, called standard planting, the cover crop must be planted 14 days prior to the average frost date up to the published long-term average date of the first killing frost in the fall. The Bay Watershed Model has no reduction efficiency for legume cover crops such as clover and vetch that fix their own nitrogen from the atmosphere.

Where total nitrogen is concerned, baseline efficiencies were developed for a particular cereal cover crop and then effectiveness estimates were assigned. The baseline calculation for drilled rye uses the baseline and multiples it by the subsurface flow proportion for the location and 0.75 to account for operational effectiveness. For the remaining rye calculations (other and aerial) and the drilled wheat and drilled barley calculations, the drilled rye baseline is multiplied against the individual species/corresponding seeding coefficient, and also multiplied by the subsurface flow proportion for the location and the scale coefficient. For each aerial or other wheat and barley calculation the base value is multiplied against the individual species/corresponding seeding coefficient, the seeding coefficient for the baseline species (drilled rye), the subsurface flow proportion for the location and also the scaling coefficient.

The total phosphorous (TP) and total suspended sediment (TSS) reductions associated with cover crops are associated with surface flow and are recommended as a 15% and 20% reduction for TP and TSS, respectively for planting cereal cover crops on conventional tillage within 13 days after the first frost. See Table 10 for a summary of all Cereal Cover Crop Total Efficiency Reductions.

Commodity cover crops differ from cereal cover crops because they may be harvested for grain, hay or silage and they may receive nutrient applications, but only after March 1 of the spring following their establishment. 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 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.

Because fertilizer may be applied in the spring, the reduction efficiencies are reduced from cereal cover crop efficiencies. The same planting date criteria apply as specified under cereal cover crops. Refer to table 17 for reduction efficiencies.

There is estimated to be approximately 70,000 corn silage acres or about 45% of the total row crop acreage. This is important because corn silage is the land use that has the most likelihood of successful cover crop implementation in New York. We are anticipating the implementation of 34,000 acres of cereal and commodity cover crops, which will be on approximately 15,000 of the total of CAFO corn silage acres (approximately 50% of CAFO corn silage acres). We anticipate another 5,000 CAFO acres of small grains to be planted in cover crops. Of the remaining row crop acres, approximately 14,000 AFO corn silage acres (35% of AFO corn silage acres) will be cover cropped by 2025. The 34,000 acres is approximately 22% of the total available row crop acreage and almost half of the potential cover crop acreage available.

CAFOs are most likely to be the first farms to implement cover crops because CAFOs are required to plant them on marginal soils and soils that have an N leaching index of 10 or above. The remaining acreage will not be easily accomplished because of the types of crops that are grown, a shorter growing season in New York, and the NRCS standards that have required planting dates which limit the ability for farmers to receive cost sharing for cover crop implementation.

Cover crops can only be applied to row crop acres with and without manure application under conventional tillage management. They can only be applied to conservation tillage acres when they receive manure application. An efficiency is applied to these acres. With the proper incentive, New York's goal is to implement cover crops on 31,357 acres of cropland. See Table 15 and Table 16 below for cover crop efficiencies.

Table 15: Total Nitrogen (TOTN), Phosphorus (TOTP), and Suspended Solids (TSED) efficiencies for various cereal cover crops on various land uses for three constituents of concern

Cover Crop BMP	Land use Type	TOTN Efficiency	TOTP Efficiency	TSED Efficiency
Early Drilled Rye	High-Till	34%	15%	20%
Early Drilled Rye	Low-Till	34%	0%	0%
Early Other Wheat	High-Till	20%	15%	20%
Early Other Wheat	Low-Till	20%	0%	0%

Standard Other Wheat	High-Till	18%	7%	10%
Standard Other Wheat	Low-Till	18%	0%	0%

Table 16: Total Nitrogen (TOTN), Phosphorus (TOTP), and Suspended Solids (TSED) efficiencies for *commodity* cover crops on various land uses for three constituents of concern

Cover Crop BMP	Land use Type	TOTN Efficiency	TOTP Efficiency	TSED Efficiency
Early Other Wheat	High- Till	8%	0%	0%
Early Other Wheat	Low-Till	11%	0%	0%
Standard Other Wheat	High-Till	6%	0%	0%
Standard Other Wheat	Low-Till	9%	0%	0%

BMP: Conservation Plans – Field and Pasture Erosion Control Practices

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. In New York, "Conservation Plans" are completed through the Agricultural Environmental Management (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 to the Tier 3 level, and beyond to Tier 4 implementation and Tier 5 plan and BMP evaluation and updates. Given projected AEM base funding levels for planning, the many associated incentives and the requirement for Tier 3 planning in order for farms to be eligible for State grant funding for BMP implementation, **New York's goal of developing conservation plans for 431,960 acres per year is realistic and attainable.**

Conservation Plans can be applied to all Ag land uses and this specific BMP is given a reduction efficiency. Reduction efficiencies vary by land use and constituent of concern. Conservation plans addressing high till acreage receives a reduction of 8%, 15% and 25% for TN, TP, and TSS respectfully. Low-till and hay acreage efficiencies are 3%, 5%, and 8%. Pasture acreage has a 5%, 10%, and 14% reduction for TN, TP, and TSS.

BMP: Comprehensive Nutrient Management Plans

Comprehensive Nutrient Management Plans (CNMPs) 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 BMPs are developed by certified planners in New York. Certified planners come from both the public and private sector. In order to sustain nutrient reductions, technical support for plan development, continued plan implementation and regular updates are necessary.

The estimate for New York is that comprehensive nutrient management planning could cover 100% of all CAFO cropland under the Enhanced Nutrient Management definition. Component practices in CNMPs that receive additional reduction credits are listed separately in the following descriptions of individual practices.

BMP: Enhanced Nutrient Management (Yield Reserve)

Based on the following definition of the Enhanced Nutrient Management (ENM) practice by EPA, ENM is the reduction in nitrogen applied to cropland beyond the nutrient management (NY NRCS 590 standard) recommendation. The reduction percentage is currently defined at 15%. Based on research, the nutrient management rates of N application are set approximately 35% higher than what a crop needs to ensure nitrogen availability under optimal growing conditions. In a yield reserve program, the farmer would reduce the N application rate by 15%. Because farmers would be accepting some risk in yield loss, an incentive or crop insurance is used. We are assuming that NY has a greater land base to implement NRCS Conservation Practice 590 compliant nutrient management compared to other states in the basin and that existing CAFO regulations in the USC portion of the basin in NY are sufficient to meet the federal standard. Therefore it is assumed that everyone following Cornell recommendations will be employing ENM.

In the Chesapeake Bay Watershed Model, ENM is only applied to conventionally tilled row crops with and without manure, hay with nutrients, low-till with manure, and alfalfa. It is credited first as a land use change to the equivalent land use under nutrient management. **The reduction efficiencies for Enhanced Nutrient Management are 7% for TN applied after a land use change. Both TP and TSS estimates are not applied.**

New York estimates that Enhanced Nutrient Management can be applied to 100% of both crop and hay land for CAFO acres and about 10% for AFO acres. This equates to 228,957 acres per year.

BMP: Decision Agriculture

This practice is not currently clearly defined for New York. However, this BMP will generally cover adaptive management practices like the Corn Stalk Nitrate Test (CSNT), Illinois Soil Nitrogen Test

(ISNT), Adapt-N online tool, Mass Nutrient Balances, and other management tools that improve nutrient use efficiency. Like the Enhanced Nutrient Management BMP, Decision Agriculture only applies to row crops with and without manure, hay with nutrients, low-till with manure, and alfalfa**. It is first credited as a land use change to the equivalent land use under nutrient management and then an efficiency of 4% TN is applied after the land use change. No efficiency is applied for either TP or TSS.**

New York estimates that some form of Decision Ag can be applied to 15% of cropland, hayland and alfalfa. This equates to approximately 74,255 acres per year.

BMP: Buffers (Agriculture)

Besides nutrient reduction value, buffers contribute to habitat improvement. Buffer designs based upon "variable source area" hydrology, which incorporate an analysis of field slopes, drainage patterns and concentrated points of entry at the streambank, are priority projects because they maximize water quality benefits. The SWCC Agricultural Non-point Source Abatement and Control Grants Program scoring system gives added priority to buffers.

- **Agricultural Riparian 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 meets some resistance by farmers because of the loss of cropland, added expense of tree planting, maintenance and potential to shade crops. A graded approach that transitions from trees at the water's edge to shrubs near the crops provides maximum benefits while reducing farmer concerns of shading. The CBP recommends a buffer width for riparian forest buffers (agriculture) of 100 feet, yet a 35 feet minimum (NRCS criteria) width is required to obtain reduction in the Bay Watershed Model. **This practice may be applied to cropland, hayland, pastureland, and the degraded riparian pasture area. The model converts the land use to unfertilized hay and then applies an efficiency to the upland landuse.** For New York, this practice reduces nitrogen by 54%, phosphorus by 42% and sediment by 56%. **New York's goal is to install approximately 10,222 acres of forested buffers, mostly along streams running through pastureland.**

- **Agricultural Riparian Grass Buffers** are linear strips of grass or other non-woody vegetation maintained between the edge of fields and streams or rivers that help filter nutrients and sediment and improve habitat. Credit is given for riparian grass buffers in the model when the recommended buffer width is the same as riparian forests buffers (35ft minimum). This practice is similar to stream protection in pastures (see below). This practice has tremendous potential and would be more widely used if it were eligible for CREP funding on more than just cropland and if the grass grown on the buffer could be cut and utilized. A "natural regeneration" buffer that could ultimately revert to forest also has tremendous potential. This practice may be applied to cropland, hayland, pastureland, and the degraded riparian pasture area. The model gives credit for riparian grass buffers by converting agricultural land to unfertilized hay, then applying an efficiency to the upland pasture acres. This practice is slightly

less efficient for nitrogen reduction in the Bay Watershed Model than forested buffers, (38%). Phosphorus and sediment reductions are the same in grass buffers as they are for forest buffers. **New York's goal is to install 38,630 acres of grass buffers, mostly along streams running through pastureland, after forest buffers are applied.**

BMP: Land Retirement

Agricultural land retirement takes marginal and highly erosive cropland out of production by establishing permanent vegetative cover such as shrubs, grasses and trees. Land retired and planted to trees is reported under the "Tree Planting" BMP. Wetland construction could also be considered a form of land retirement. USDA NRCS Programs such as CRP, CREP and WHIP provide incentives for retirement. Some agricultural land is also going out of production as farms cease to operate. All retired land will be documented. This is especially important because agricultural land, namely cropland, is one of the highest nutrient sources in the Bay Watershed Model and agricultural land use changes usually result in less nutrient runoff. **This practice may be applied to cropland, hayland with nutrient application, pastureland, and the degraded riparian pasture area.**

Total retirement of agricultural lands is estimated to be nearly 2% of the total available acreage, or 14,481 total acres. Reduction credit is given as a land use change in the model to hay not receiving nutrients or pasture, depending on the practice.

BMP: Tree Planting

The Tree Planting BMP, or forestation (converting agricultural land to forest), includes tree planting on agricultural lands, except those used to establish riparian forest buffers, which is a separate practice. The tree planting practice targets highly erodible lands and critical resource areas. The Chesapeake Bay Watershed Model treats tree planting as a land use conversion from row crop, pasture or hayland, to forest. The tree planting **practice may be sparingly used considering that the New York portion of the Bay watershed is about 70% forested.**

New York's goal is to convert 1,923 agricultural acres (or 0.2%) to forest with the help of active tree planting. However it is likely that through natural succession on voluntarily abandoned agricultural lands this number will be significantly higher.

In addition, programs exist at the federal, state, and local levels to support tree planting and reforestation in the region. The NRCS provides cost share assistance though its CRP and WHIP programs. DEC encourages planting of trees and shrubs by providing nursery service to supply low cost, quality stock that is readily available to the public. The nursery program has been an integral part of forest stewardship on public and private lands since its inception in 1902. Also, every Soil and Water Conservation District has a seedling program for conservation cover and reforestation to private landowners.

BMP: Non-Urban Stream Restoration

A collection of site specific engineering techniques are used to stabilize an eroding streambank and channel. These are areas not associated with animal entry. **This practice may be applied to forest, cropland, hayland, pastureland, nurseries, and the degraded riparian pasture area.**

The total implementation level is estimated to be about 338,000 total feet. Reduction credit is given as a load reduction in the model per foot. Credit is given as 0.02 Lbs N/ foot, 0.003 lbs P/foot, and 2 lbs TSS/foot.

Best Management Practices that Specifically Treat Pasture

It is anticipated that education and outreach through the AEM program combined with cost-share and incentive payment programs such as CRP, CREP, EQIP, Grazing Lands Conservation Initiative, and state funding, will result in a very high level of BMP implementation to treat pasture and degraded riparian pasture acres. In addition, the USC has an entire agricultural program and Grazing Initiative that promotes cow exclusion from streams and riparian buffers. It includes an Agricultural Team with a team leader, coordinator, and two full-time grazing specialists in addition to the technical staff most counties in the watershed already have dedicated to grazing. Furthermore, the USC has secured additional funding, outside of traditional federal and state sources. This funding includes National Fish and Wildlife grants that combine "buffer related" projects under an umbrella approach we call the Grass-Based Initiative. The USC initiative combines all buffer types, cow exclusion practices, and prescribed grazing to address both agricultural sustainability and community needs in relation to stream bank erosion, habitat improvement and flooding. Further assurance of a high level of implementation will be the potential regulatory or enforcement action that could result from a lack of stream protection with fencing as DEC implements its in-stream water quality standards.

BMP: Stream Access Control with 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 also affects herd health by exposure to water borne pathogens and risk of hoof problems. Stream access control with fencing involves excluding a strip of land with fencing along the stream corridor to provide protection from livestock. The fenced areas may be planted with trees or grass, or left to natural plant succession, and can be of various widths. To provide the modeled benefits of a functional riparian buffer, the width must be a minimum of 35 feet from top-of-bank to fence line (see forest and grass buffers above). However, the stream access control with fencing BMP is applied specifically to the degraded riparian pasture area when the buffer zone is between 10 and 35 feet between top of stream bank and fence line. The implementation of stream fencing provides stream access control for livestock but does not necessarily exclude animals from entering the stream if incorporating limited and stabilized in-stream crossing or watering facilities. By reducing constant stress on streambanks from hooves, cattle exclusion is also a very important practice for stabilizing stream banks. **The Bay Watershed Model only credits this BMP as a land use change from degraded riparian pasture to hay without nutrients. Unlike the riparian forest and grass buffers, there is no upland efficiency benefit applied.**

The NYS WIP II identifies stream protection BMPs separately for model purposes but it should be noted that New York will exclude nearly 100% of degraded riparian pasture acres by 2025.

> **Alternative Watering Facility** – This practice requires the use of alternative 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. To be successful, the practice should show reduced livestock manure deposition in and near streams and move heavy traffic areas surrounding water sources to more upland locations. **This practice can be applied only to pastureland with or without nutrient management plans. The Bay Watershed Model reduction efficiencies (applied to pastureland acres) are 5%, 8%, and 10% for nitrogen, phosphorus and sediment, respectively.**

New York's goal is to install enough facilities to affect 90% of pastured land (about 162,000 acres) however, this practice can only be applied to approximately 8,570 acres in the model because of the way it stacks available acres from previously applied BMPs.

BMP: Prescribed Grazing/Precision Intensive Rotational Grazing

The *Prescribed Grazing* system objective is to manage forage availability by reducing the time livestock spend grazing on a paddock. Reducing 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. 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 brings added benefits because some of the grazing practices are associated with other practices, such as livestock exclusion from streams and riparian buffers. A major barrier to overcome with this practice is that switching to grazing can be a major change in operational management.

Grazing support was first initiated in New York through the Grazing Lands Conservation Initiative (GLCI), established in 1991 to provide voluntary high quality technical assistance and awareness of the importance of grazing land resources on private grazing lands. GLCI is a coalition of individuals and organizations functioning at the local, state, regional and national levels. It includes livestock producer organizations, scientific and professional grazing resource organizations, conservation and environmental groups, and state and federal natural resource and agricultural agencies. USDA NRCS administers the program. In 1995, the "Graze NY" program was developed with the assistance of Congressmen James Walsh, Sherwood Boehlert and Maurice Hinchey. Eleven counties in New York were given the opportunity to provide technical assistance to interested livestock producers. These counties focused their efforts on informing producers about the benefits associated with prescribed grazing. Information was delivered to interested producers through pasture training workshops, informational farm tours, on-site farm visits and personal contacts with interested producers. Unfortunately this program offended in 2010. Another leader in this initiative was the Finger Lakes Resource Conservation & Development Council that supported work through several grants that covered the entire New York portion of the Bay watershed.

Additional grazing initiatives in New York are currently being supported through the SWCC Agricultural Non-point Source Abatement and Control Grants Program, NYS Ecosystem Based Management, and

the National Fish and Wildlife Foundation. Sixteen counties in the New York portion of the Bay watershed participate in one or more grazing initiatives.

The USC actively supports all such programs through its Grazing Initiative, described above, by tracking progress, providing additional staff support and securing additional funding to maximize implementation efforts. Because of its multiple potential benefits, cost-effectiveness and sustainability, Prescribed Grazing and supporting practices are an important practice supported and promoted throughout the watershed.

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. The Bay Watershed Model gives the same efficiencies for both Prescribed Grazing and the Precision Intensive Rotational Grazing BMP. In an effort to simplify tracking, reporting, and verifying the NY USC Ag Committee decided to report this BMP as Prescribed Grazing. The modeled effects are an applied efficiency at 11%, 24% and 30% reductions for N, P, and sediment, respectively.**

New York's goal, with the right incentives, is to implement prescribed grazing on 90% of the available pasture acres (approximately 152,221 acres).

BMP: Horse Pasture Management

Like the Prescribed Grazing BMP, Horse Pasture Management[36] includes maintaining a 60% pasture cover with managed species (desirable inherent) and managing high traffic areas. Maintaining a 60% cover improves the pasture so erosion and nutrient loss is minimized. High traffic areas are concentration areas within the pasture where the grass is sparse or nonexistent. 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. These areas are treated as sacrifice areas.

Horse pasture management excludes offstream watering with and without fencing. Instead these stream protection BMPs are credited as separate practices (See above for details). Horse Pasture Management applies to all pasture lands, as not every pasture has a stream linked to it. The offstream watering BMPs 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.

[36] The definition of Horse Pasture Management is pending EPA Chesapeake Bay Program approval.

The horse pasture management practice may be an increasingly important practice as a number of smaller horse farms have begun to appear in the basin. According to the Bay Model, the proposed efficiencies for nitrogen, phosphorus and sediment are N/A%, 20% and 40%, respectively. However, currently the Horse Pasture Management practice falls under the umbrella of the prescribed grazing BMP and provides the same efficiencies.

New York's goal is to implement horse pasture management on 2,057 acres in the watershed.

BMP: Animal Waste Management Systems

These important practices 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. Controlling runoff from roofs, feedlots and "loafing" areas are an integral part of these systems (See, *BMP: Barnyard Runoff Control Practices and Loafing Lots*, below). 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 Bay 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. The reduction efficiencies for animal waste systems for livestock are 75%, 75%, and N/A for nitrogen, phosphorus, and sediment, respectively.

When all CNMPs are fully implemented, an estimated 100% of CAFO cropland acres and 45% of AFO cropland acres for a weighted average total of approximately 59% of the animal units will have at least one component of a complete system and will be implemented almost exclusively on dairy operations.

BMP: Barnyard Runoff Control Practices and Loafing Lots

These practices may be installed as part of a total animal waste management system or as a stand-alone practice, particularly on smaller operations. Barnyard runoff control practices include diversions, rainwater gutters, and similar practices. The rotational loafing lot practice, by proximity, is grouped with barnyard control practices and are 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. **Reduction efficiencies for barnyard runoff control and rotational loafing lot practices are 20%, 20%, and 40% for nitrogen, phosphorus and sediment, respectively.**

New York's goal is to install these two practices to affect 35% of all AFOs and 100% of all CAFOs for a weighted total of approximately 78% of AFO/CAFO acres.

BMP: Wetland Restoration (Agriculture)

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.

Preliminary results of work by Binghamton University researchers and others show that wetlands capturing high nutrient runoff from barnyards reduce nitrogen concentrations by at least 50%. Restored wetlands also provide high quality wildlife habitat. However, in the Bay Watershed Model, wetland restoration receives reduction efficiencies equivalent to reverting the area back to upland forest.

The USC has an active wetland program that is described in more detail in the *Wetland Restoration and Streambank Rehabilitation* section of this Watershed Implementation Plan. A total of 6,363 wetland acres have been restored since 1990, most on agricultural lands.

New York's goal is to create or restore a total of 13,792 acres (or 1.7% of all available acres) of wetlands on agricultural lands, including projects funded under USDA Natural Resources Conservation Service's Wetlands Reserve Program.

BMP: Manure Incorporation (Interim)

Longstanding guidelines and recent studies by Cornell University and USDA-ARS document that incorporation of manure immediately after surface application conserves a significant portion of ammonium in manure from volatilization as ammonia and reduces surface runoff losses relative to surface application. The proposed practice of manure incorporation would include immediate incorporation of surface applied manure into the soil with any non-injection incorporation method (see Liquid Manure Injection Interim BMP for injection methods) within the limits set by the NRCS 590 standard (i.e., nutrient and erosion goals met) and the conservation tillage standards set by NRCS and further defined in the Chesapeake Bay Program BMP Assessment Report (http://archive.chesapeakebay.net/pubs/BMP_ASSESSMENT_REPORT.pdf). This shall be performed in close proximity to planting to allow for effective utilization of the conserved ammonium (e.g., 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 hayland 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 lo-till and hi-till land uses that receive manure, pasture and hay with manure. The Manure Incorporation practice will be used as a transition pathway to manure injection practices over time.

New York's goal is to apply the manure incorporation practice to 149,554 acres or nearly 19% of the available acres.

The current placeholder effectiveness value for this practice has been proposed at 15% TN, 0%TP and 0% TSS, utilizing a conservative estimate in combined nutrient and sediment loss reductions by current university and USDA-ARS research as a reference.

BMP: Precision Feed Management on Dairy Farms

Nutrient management planning on dairy farms, with a focus on nutrient source reduction, is vital for farm economic sustainability and water quality improvement. Previous studies at Cornell University have reported that 60 to 80% of nitrogen and phosphorus imported onto dairy farms remains after accounting for all nutrients that leave. 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 can reduce manure nutrient excretions, including volatilized ammonia, an important atmospheric pollutant.

New York State has a track record of implementing Precision Feed Management (PFM)[37] [38] [39] on dairy farms in the Delaware River Basin since 2000 and the Susquehanna River Basin since 2005. In 2005 the Upper Susquehanna Coalition, Cornell University and Cornell Cooperative Extension began a collaborative effort through an NRCS Conservation Innovation Grant program project to define, streamline, pilot and quantify PFM in the Upper Susquehanna basin to prepare to develop basin wide implementation. The achievements of this project included the following:

- Development of a common definition of Precision Feed Management in New York State
- Development of a farm level PFM implementation process and software tools to aid in the quantification and documentation of PFM impact
- Provide educational outreach on PFM to farm and feed industry communities
- Provide input to New York NRCS for the development and implementation of the NY 592 feed management standard
- Develop professional capacity to implement PFM on farms in the Upper Susquehanna watershed
- Quantify the environmental and economic impact of PFM on farms

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[37] Cerosaletti, P.E., D.G. Fox, and L.E. Chase. 2004. Phosphorus reduction through precision feeding of dairy cattle. J. Dairy Sci. 87:2314-2323

[38] Ghebremichael, L.T., P.E. Cerosaletti, T.L. Veith, C.A. Rotz, J.M.Hamlett, W.J. Gburek. 2007. Economic and Phosphorus-Related Effects of Precision Feeding and Forage Management at a Farm Scale. J. Dairy Sci. 90:3700-3715.

[39] Cerosaletti, P.E., 2008. Phosphorus reduction through precision feeding implementation project phase I; Final technical report. Available at: http://cornellpfm.org/technicalReports.htm. Accessed November 9, 2010.

The New York Precision Feed Management Definition and Process

In New York, **Precision Feed Management** means providing adequate, but not excess, nutrients to the animal to maintain or improve environmental and economic sustainability through the integration of feed and crop management.

PFM is a continuous improvement process voluntarily adopted and directed by the farm management with goals of optimized nutrient efficiency, homegrown feed utilization and milk income overfeed costs. New York has developed a process to facilitate the implementation of PFM on farms. This process includes:

- Assessment of feed management at the farm level using key indicators or benchmarks. These indicators are:
- Neutral Detergent Fiber intake as a percentage of body weight
- Forage as a percentage of diet
- Home grown feeds as a percentage of diet
- Ration P as a percentage of requirement
- Diet crude protein under a recommended percentage
- Milk Urea Nitrogen (MUN) concentration within a recommended range
- Gauge the efficacy and efficiency of management of dairy cattle during a critical stage of lactation
- Development and implementation of farm feed management plans
- Evaluation and quantification of impact of implemented feed management strategies

Cornell Cooperative Extension and Cornell University have developed software tool applications to aid in generating implementation of PFM on farms and to assist in the quantification of economic and environmental impact.

Quantified Impact of Precision Feed Management in New York

The Delaware County (New York) Precision Feed Management Program (www.cornellpfm.org), operating in both the Susquehanna and Delaware River Basins over the last ten years, has studied the impact of PFM on the over 40 farms engaged in their program. They have collaborated with Cornell University and USDA Agricultural Research Service (USDA-ARS) to assess the impact of PFM on farms using both actual data and modeled scenarios. The resulting environmental impacts of these efforts are presented in

Table 17: Impact of Precision Feed Management in New York State.

Table 17: Impact of Precision Feed Management in New York State

		Manure P Excretion Reduction	Manure N Excretion Reduction	Farm Mass P Balance Reduction	Farm Mass N Balance Reduction
Cerosaletti et al. 2004	actual	33%	NA[1]	50%	NA[1]
Ghebremichael et al. 2007	model	21%	NA[1]	52%	NA[1]
Cerosaletti, 2008	actual	22%	8%[2]	66%	65%

[1] Not applicable in this study.

[2] Nitrogen reduction was not original focus of the project, so reduction presented may not represent extent of N reduction possible.

In the pursuit of achieving WIP II Precision Feed Management goals, New York will use PFM benchmarking as a monitoring tool to seek opportunities on farms that improve profitability, nutrient efficiency, and provide documentation of a farm's performance when they meet the criteria to qualify for model input. Key indicators for Chesapeake Bay Program modeling purposes are Milk Urea Nitrogen (MUN) concentrations within a recommended range and ration P within 110% of NRC recommendation.

The PFM source reductions compliment other agricultural waste and stream corridor management practices, adding to their nutrient reduction potential. The Upper Susquehanna Coalition estimates that Precision Feed Management would need to be implemented on nearly 300 farms, or 50% of the mature dairy animal units to reach our goal.

According to the Chesapeake Bay Program, Dairy Precision Feeding reduces the quantity of P and N fed to livestock by formulating diets within 110% of Nutritional Research Council recommended level in order to minimize the excretion of nutrients without negatively affecting milk production. Effectiveness estimates are determined via direct testing, however, without test results, TP reduction is assumed to be 25% and TN reductions are assumed to be 24% with no TSS associated with dairy precision feeding. NYS estimates that PFM can be applied to approximately 45,000 mature dairy animal units (about 50%). Thirty-five thousand of these units will come from CAFO farms and the remainder from AFO farms.

BMP: Mortality Composting

Composting provides an inexpensive alternative for disposal of all dead animals, butcher wastes and other biological residuals. In addition to water quality benefits, mortality composting benefits both human and animal health. The temperatures achieved during composting will kill or greatly reduce most pathogens, reduce the risk of disease transmission, prevent nuisances such as flies, vermin and

scavenging animals, and combat odors resulting from the anaerobic breakdown of proteins. Properly composted material is environmentally safe and a valuable soil amendment for growing certain crops.

Mortality composters involve composting routine mortality in a designed, on-farm facility, with subsequent land application of the compost. This prevents the necessity to bury dead animals that could result in nutrient leachate, or rendering of dead animals for processing into animal feeds or incineration. Mortality composting can be, and is applied, to various species including poultry, swine and dairy cows.

The pollution reductions associated with mortality composting is calculated using a set of equations incorporating the average mortality weight, nitrogen and phosphorus composition, percent mortality, the number of animals each year and an effectiveness estimate. Mortality is not consistent, it increases with animal weight. To account for this, average mortality weight is within the 70th weight percentile. The average nutrient composition, percent mortality and number of animals each year is dependent on each animal type, although in New York it will primarily affect dairy farms.

The effectiveness estimate remains the same regardless of species with 40% reduction for N and a 10% reduction for P when compared to burial. New York's goal is to affect 80% of dairy mortalities.

3.8: The USC Approach to Conservation Practice Data Collection & Verification Protocol Development

New York reports Best Management Practice (BMP) implementation to the Chesapeake Bay Program (CBP) through the Upper Susquehanna Coalition. For the most part however, only practices that are cost-shared through the State via Soil and Water Conservation Districts (SWCDs) or Federal Farm Bill programs are accounted for. Furthermore all practices, regardless of cost share, are only given credit if they are described in the Chesapeake Bay Program's Scenario Builder Model.

The purpose of this section is to describe how the USC will more adequately account for all agriculture BMPs, including farmer initiated, non-cost shared conservation practices. The goals of collecting this information is to provide data to the CBP that will assist in a more accurate estimate of baseline practices and future conservation needs on agricultural lands in the New York portion of the Chesapeake Bay watershed. There are many things to consider when implementing a data collection system such as how to collect it, what to collect, ensuring reliability of the data and validating the data by comparing to other sources. The system is implemented through agricultural (ag) technicians who communicate directly with USC partners and farmers. It will be necessary to communicate a clear and consistent message throughout the system that every CBP BMP implemented in the watershed will have to be reported in order to meet the TMDL allocations. Small adjustments to the system that will make it more efficient and reliable will also need to occur. The USC approach to data collection methodology is outlined below.

How to Collect Farmer-Initiated Best Management Practices

The process for collecting farmer initiated BMPs starts with the state-funded Agricultural Environmental Management (AEM) program. AEM is the "umbrella program" that provides a

consistent format to efficiently identify environmental concerns and opportunities through a comprehensive on-farm assessment. AEM is administered and implemented by trained professionals at the local level through county SWCDs. AEM's on-farm framework is designed to be highly interactive and utilizes resource professionals and peers working with the farmer throughout the process. This framework and associated processes increases farmer awareness of the impact farm activities have on the environment; it encourages farmer participation and seeks behavioral changes, which are important overall goals for meeting TMDL allocations. AEM utilizes a five-tiered process that includes inventory, assessment, plan development, implementation and evaluation. The inventory and documentation of existing BMPs does occur as part of inventory, assessment, planning, or evaluation depending on where each particular farm is in the process.

The tiered approach has been in place for over a decade in New York and has strong Ag community support. However, in order to collect reportable non-cost shared data for the CBP, the AEM process within the watershed will need to evolve to accommodate new media for data collection and to change the scope of data that is collected and reported. The USC will move forward using AEM as the foundation for data collection but occasionally the USC may determine that additional layers are needed to provide information that will best help us to meet the TMDL. For example, the USC has already added an additional worksheet that has a list of acceptable EPA/CBP BMPs. With this sheet an ag technician runs down the list asking a farmer if each practice has been implemented on their farm and if so, what are the relevant details associated with that practice. This change has happened in some of the USC counties already. Another example of small changes to the existing program is when a technician asks about cover crops. The existing question on the AEM Soil Management worksheet- "Are cover crops used on the farm?" will need to have follow-up questions asked by USC technicians such as what type, when, and how much? In USC counties not already using the list of BMPs worksheet and/or as new information is required by the EPA/CBP, Ag staff will need to be informed and/or trained about the new data that will need to be collected and new ways to collect this data so that it can be reported to the CBP.

Within the AEM framework, other methods of data collection may be used such as regional AEM data collection meetings, phone surveys, farmer self-certifications, and using aerial imagery/dashboard surveying of cropland. The USC already works with the USDA to report FSA and NRCS data to the CBP.

What to Collect

It is the USC's goal to collect data on as many conservation practices on the ground as possible, whether the practice was cost-shared or paid exclusively for by the farmer. One limitation of the benefit of this goal stems from the CBP modeling not accounting for many of the conservation practices that farmers are doing today in the field. For example, farmers practicing continuous no-till (CNT) would fail to get credit if they have been doing it for only four instead of five continuous years. Furthermore, credit is given for CNT if cover crops were not planted in the continuous no-till acres every year or if the acreage didn't fall under a CNMP every year of the practice. There are many more examples like this. Therefore, it will be important to focus on collecting data that can be more easily counted with reasonable accuracy. These types of practices may include:

- Manure storage
- Buffers of all types
- Water control structures
- Barnyard runoff structures
- Nutrient management
- Stream fencing
- Off stream watering with fencing
- Off stream watering without fencing
- Rotational grazing
- Tillage practices
- Cover crops
- No nutrient application
- Soil conservation plan
- Mortality composters

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 and other jurisdictions are currently working with the CBP to account for these practices as well, with perhaps a modified efficiency. We recommend that information about these practices also be collected in the event that this effort is successful.

Reliability and Validity

To guarantee reliability and accuracy to the greatest degree possible, and as described above, most data collection will be performed or verified by trained ag technicians during individual farm assessments. The USC also uses GIS technology to place a data point on a map that identifies each practice and location. Additionally, aerial photography will be used in some cases to look at areas we may not be able to get to on the ground. Moreover, the USC has a strong partnership with the USDA in New York and obtains their data for reporting to the CBP.

If farmers report BMPs to the USC, then USC ag technicians can make a visit out to the farm to verify that information. The USC's own reported data can be validated to a degree by looking at other data. The USC can compare data to FSA information, NRCS information, and use the Ag Census data. We can also compare to New York State Department of Ag and Markets AEM reported data for each county in the watershed.

Communication

The USC currently communicates to its 19 member Districts using existing infrastructure and well established relationships and traditions. Furthermore, our strategies are shared through a basin-wide array of professional partnerships that are focused on the CBP effort. Additionally, we have had regional workshops or workshops in each individual county in the past and will have them again in the future. Other communication tools include USC Bi-monthly meetings, partnerships with New York Farm Bureau and the Northeast Dairy Producers Association. Moreover, the USC has a strong partnership with USDA in New York where NRCS and FSA professionals attend member District board meetings and the USC bi-monthly meetings. As a result, USC is in a strong position to communicate our approach or changes to it accurately and efficiently. This will be important to provide a clear, consistent message to farmers from the various agencies and provide a well-coordinated overall effort.

In summary, the AEM framework is the method of agricultural BMP data collection and reporting for the USC. The AEM process will be used as the basis for adding USC developed data forms to ensure farmer initiated, non-cost shared practices are documented. This may require more training for ag technicians and more time on the farms but this time will be covered under AEM base funding. The scope and depth of USC partnerships has created strong relationships with partner agencies to help the USC provide reliable, consistent data with a network to communicate strategy and outcomes.

3.9: Accounting for Growth in New York's Agriculture Sector

New York does not project significant growth within the agriculture sector. CAFO farm expansions are required to be accompanied by the addition of appropriate land base prior to additional animals being brought on. New York has an abundant land base available to handle additional expansions for CAFO size farms.

3.10: Gap Analysis

Specific USEPA WIP Questions

The Watershed Implementation Plan guidance from EPA Region 3 dated April 2, 2010 includes the following specific questions about agriculture:

Question: Is there a minimum set of management practices to be included in nutrient management plans? If so, how is the inclusion and implementation of these practices verified?

Answer: Yes. Comprehensive Nutrient Management Plans CNMPs and NMPs written in New York as part of the New York CAFO Program and AEM Program all utilize the minimum requirements of New York-NRCS Conservation Practice Standard 590 which includes the New York Land Grant University (Cornell) Guidelines for nutrient applications as well as soil conservation requirements. The Cornell nutrient guidelines are based on applied research and are actively maintained through on-going field trials with the goal of nutrient use and efficiency. Unlike the land grant university guidelines of some other states, Cornell recommendations do not allow for over application of nutrients under the guise of "insurance factors." Full CNMPs are developed according to NY-NRCS Conservation Practice Standard 312, which includes standard 590 as well as a long list of other standards to address

manure/process wastewater concerns on farmstead facilities. These CNMPs and NMPs are written by New York State Certified Planners that undergo a rigorous training and continuing education process including a quality assurance program.

Question: How is phosphorus managed in soils?

Answer: In accordance with the New York P Index as per the requirements of NRCS New York-590.

Question: How are appropriate agronomic rates determined for application of manure/biosolids/organic byproducts?

Answer: Manure application rates are developed as part of a New York CNMP. The certified planner developing this plan utilizes an iterative approach that looks to restrict applications based on the field specific characteristics and risk assessments assigned by the nitrogen and phosphorus indices.

Question: Contrary to some phosphorus indices, the New York phosphorus index does not allow for the disposal of manure. The New York phosphorus index considers phosphorus loss runoff risk based on both particulate and soluble phosphorus forms, reflecting predominant pathways for phosphorus runoff formation, and results in phosphorus application restrictions. The New York phosphorus index was developed at Cornell University, based on local research, knowledge and conditions, and with input from professionals in State and Federal agencies. The New York phosphorus index has been in place for several years and where soil test phosphorus and transport risk potential is high, it has caused farms to change management of that field or apply manure elsewhere. The New York phosphorus index continues to undergo changes as greater insights are gained into phosphorus movement in our landscapes, but it is an effective tool for environmental protection.[40]

Answer: Biosolid land application is extremely limited in New York. That which occurs is regulated via 6NYCRR Part 360.

3.11: Commitment and Strategy to Fill Gaps

New York has undertaken several initiatives to improve its agriculture program and improve best management practice implementation and reporting.

Initiative: Addressing Under-Reported Best Management Practices

DEC continues to work to implement enhanced technical requirements for agriculture. Many New York requirements far exceed the standards of the Chesapeake Bay model and need to be accounted for. Some 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.

[40] Czymmek, K.; Q. Ketterings; L.Chase, L. Geohring. (2010) The New York Phosphorus Site Index: The Sky is Not Falling. Bay journal (submitted)

- **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 by basing such information 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 watershed.

- **Enhanced Nutrient Management:** USEPA R3 baseline assumption that land grant universities all recommend fertilizer application rates 35% above agronomic needs is not true in New York. This holds true for all crops, including non-legume hay, because the Cornell nutrient guidelines 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).

- **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 adequate credit given 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.

New York is also proposing adjustments to already accepted interim best management practices and proposing additional best management practices to be included in the next model calibration and to be credited in the Phase II Watershed Implementation Plan. Specifically, New York is looking to address:

- Manure Incorporation

- Crop Nutrient Application

Initiative: Interim Best Management Practices

Manure Incorporation

On August 20, 2010, EPA published interim agricultural best management practice definitions and effectiveness values including for liquid manure injection.[41] EPA defines the Liquid Manure Injection BMP as:

- "The subsurface of liquid manure from cattle and swine has been demonstrated in research studies to significantly reduce nutrient losses for both surface runoff and ammonia emissions. Recent studies by Pennsylvania State University (PSU) and USDA-ARS indicate that the effectiveness of the practice is dependent on the technology used for injection, and that some systems are not consistent with the USDA-NRCS management requirements for high residue management systems; e.g. Continuous No-Till. This proposed practice is indicative of low disturbance soil injection systems and is not appropriate for tillage incorporation or other post surface application incorporation methods.

- The current placeholder effectiveness value for this practice has been proposed at 25% TN, 0%TP and 0%TSS, utilizing a conservative estimate in combined nutrient and sediment loss reductions by current university and ARS research as a reference. The proposed practice is applied on a per acre basis, and can be implemented and reported for cropland on both lo-till and hi-till land uses that receive manure, pasture and hay with manure."

Long-standing guidelines and recent studies by Cornell University and USDA-ARS document that incorporation of manure immediately after surface application conserves a significant portion of ammonium in manure from volatilization as ammonia and reduces surface runoff losses relative to surface application.

- http://nmsp.cals.cornell.edu/guidelines/nutrientguide.html
- http://nmsp.cals.cornell.edu/projects/manureapplicationmethods/year2summary.pdf
- http://www.ars.usda.gov/research/publications/publications.htm?seq_no_115=251340 (accepted JEQ)

The proposed practice of manure injection should also address manure incorporation. New York proposes to include immediate incorporation of surface applied manure into the soil with any non-injection incorporation method (see Liquid Manure Injection Interim BMP for injection methods) within the limits set by the NRCS 590 standard (i.e., nutrient and erosion goals met) and the conservation tillage standards set by NRCS and further defined conservation in the Chesapeake Bay Program BMP Assessment Report (http://archive.chesapeakebay.net/pubs/BMP_ASSESSMENT_REPORT.pdf). This shall be performed in

[41] Interim Agricultural BMP Definitions and Effectives Values, Chesapeake Bay Program Phase 5.3 Modeling Suite, August 20, 2010.

close proximity to planting to allow for effective utilization of the conserved ammonium (e.g., 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 hayland exist for manure application (e.g., areas of lower animal unit/acre densities).

The current placeholder effectiveness value for manure incorporation is proposed at 15% TN, 0%TP and 0%TSS, utilizing a conservative estimate in combined nutrient and sediment loss reductions by current university and USDA-ARS research as a reference. The TN effectiveness value is based on the Powell et al. (accepted JEQ) comparison of aerator incorporation (47% NH3 conserved relative to surface application) with injection (74% NH3 conserved relative to surface application). The difference between ammonia conservation with the aerator and the injector was applied to the 25% TN effectiveness value proposed for the Liquid Manure Injection interim BMP to arrive at 15% TN. New York proposes to increase the TN effectiveness value to 33% based on the ammonia conservation guidelines from Cornell University Research.

The proposed incorporation practice should be applied on a per acre basis, and can be implemented and reported for cropland on both lo-till and hi-till land uses that receive manure, pasture and hay with manure. The Manure Incorporation practice will be used as a transition pathway to manure injection practices over time.

Crop Nutrient Application BMP for New York[42] [43] [44] [45]

The Chesapeake Bay model calculates non-nutrient management application rates (lb/ac) as the upper limit yield (tons/ac) multiplied by the theoretical uptake (lb/ton). This calculation is overestimating nutrient application rates for the New York Upper Susquehanna River watershed and needs to be adjusted.

Consider the following: the theoretical nutrient uptake for corn silage or greenchop harvested area in the model is 10.235 lbs per ton for N and 1.535 lbs per ton for P. The Upper Susquehanna Coalition conservatively estimates an average of 18 tons per acre yield for corn silage. Therefore nutrient application rates for N and P would be estimated in the model as follows:

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[42] Brosch, C. 2010. Estimates of County-Level Nitrogen and Phosphorus Data for Use in Modeling Pollutant Reduction. Documentation for Scenario Builder Version 2.2. <www.chesapeakebay.net/content/publications/cbp_39284.pdf > Accessed November 8th, 2010.

[43] Swink, S.N., Q.M. Ketterings, L.E. Chase, and K.J. Czymmek, and J.C. Mekken (2009). Past and future phosphorus balances for agricultural cropland in New York State. Journal of Soil and Water Conservation 64(2):120-133.

[44] Swink, S.N., Q.M. Ketterings, K.J. Czymmek, L.E. Chase, and J. Mekken (2009). Upper Susquehanna River Watershed cropland P balances. What's Cropping Up 19(2):1-3. http://css.cals.cornell.edu/cals/css/extension/cropping-up/archive/upload/wcu_vol19no2_2009a1susquehanna.pdf

[45] Swink, N., Q.M. Ketterings, L.E. Chase, K.J. Czymmek, M.E. Van Amburgh (2010). Nitrogen balances for New York State: Implications for manure and fertilizer management. Journal of Soil and Water Conservation (*in press*).

10.235 lbsN/ton * 18 tons/acre = 184 lbsN/ac

1.535 lbsP/ton * 18 tons/acre = 28 lbsP/ac

However, based on a Cornell University evaluation of the N and P balances for the New York Upper Susquehanna River watershed, it was determined that the average N application is already below what is recommended by the land grant university. In addition, the study suggests that the watershed is now in balance for P. Using data from this study, it is reasonable to assume 81 lbs/ac of total nitrogen and 15lbs/ac of total phosphorus as the nutrient application rates for the NY portion of the watershed. This was calculated by taking the total amount of manure N and P, adding the total amount of fertilizer N and P, and dividing it by the total number of cropland acres, including legumes, in the NY portion of the watershed. Thus, the adjusted nutrient application rates for N and P would be as follows:

(33M lbsN + 10.5M lbsN) ÷ 534, 973 ac = 81 lbsN/ac

(5.3M lbsP + 2.9M lbsP) ÷ 534, 973 ac = 15 lbsP/ac

Therefore, the current placeholder effectiveness value for this practice as implemented in New York should be adjusted for TN and TP, utilizing the Cornell N and P balance studies. This practice is applied on a per acre basis and should be implemented and reported for the *Crop* land use grouping. There are approximately 651,649 *Crop* acres in New York according to the model p53_2009aveCSOAA run.

Initiative: Research

New York is actively engaged in new research to better the best management practices and technical standards for agriculture. New York is considering several practices that may be better at reducing nutrient or sediment loads to waters. These areas of current research include:

- Groundwater Guidance Revisions and Pilot Program
- Variable Source Area Hydrolgoy - Enhanced P index standard using VSA hydrology[46]
- Mass Balance for Agriculture

Groundwater Guidance Revisions and Pilot Implementation Program

Drinking water well contamination issues related to manure management occur in certain areas of New York State. “Karst” is the term used for areas associated with carbonate bedrock (limestone or dolomite), where cracks, fractures and other solution channel irregularities are present. Karst conditions enhance these bedrock features over time through the action of flowing water to create sinkholes, depressions in the land surface, disappearing streams, etc., which provide a direct connection between surface and groundwater. This type of landscape and geology allows water to rapidly flow into (or out of) bedrock with little or no filtration. In such areas where groundwater is under the influence of surface water, recharge waters influenced by residential, commercial, industrial,

[46] Hydrologically Sensitive Areas: Variable Source Area Hydrology Implications for Water Quality Risk Assessment by M.Todd Walter, Michael F. Walter, Erin S. Brooks, Tammo S. Steenhuis, Jan Boll, Kirk Weiler

wildlife, or agricultural activities may also generate a contaminant risk to surface and groundwater supplies. Protection of groundwater resources requires additional measures in these areas. DEC is currently working with Cornell University, USDA-NRCS and NYSDAM to develop guidance and a pilot implementation program for farmers and planners need to evaluate land conditions in karst areas and implement appropriate best management practices.

Variable Source Area Hydrology

A cost effective and meaningful watershed approach also relies on a firm understanding of how each watershed functions in relation to its hydrological characteristics, drainage patterns, topography, land cover, land uses and misuses, precipitation events and other parameters. Targeting implementation sites using a "Variable Source Area" (VSA) hydrology concept may further increase success. Details of the VSA concept can be found at this Cornell University website:
http://soilandwater.bee.cornell.edu/Research/VSA/extension.html

This concept asserts that is that a relatively small portion of the watershed that influences a majority of runoff exiting a watershed. By implementing practices in these areas, substantial water quality improvements can be accomplished in a more cost effective manner.

Mass Balance for Agriculture

Source control relies on understanding a farm's nutrient budget. Mass balance analysis (difference between nutrients entering the farm through feed, fertilizer, fixation etc. and the amount leaving the farm through sales of milk, meat, animals, crops, manure etc.) can determine excess nutrients based on nutrient inputs and outputs. Mass balancing information is useful because it:

- Provides important baseline information for all planning and many implementation projects
- Prioritizes practices where excess nutrients are documented
- Has outreach potential by showing nutrient loading to farmers in a more understandable format
- Demonstrates economic and yield benefits that should attract greater farmer participation
- Can be used to develop a mass balance for a watershed
- Can be used as a tool for documentation if nutrient trading is initiated

The USC and Cornell University are conducting mass balances on 20 farms under a NFWF grant to streamline how to develop a more extensive application. This is an important monitoring tool farms can use to check their balances. If their balance is, or becomes, inappropriate, then the tool is helpful in targeting areas on the farm that can be improved.

Initiative: Policy Changes and Program Implementation

Program Amendments

In 2010, the NYS Soil and Water Conservation Committee implemented three key policy provisions to the NYS Nonpoint Abatement and Control Grant Program scoring and eligibility criteria. These adjustments advance the implementation of agricultural best management practices in the Chesapeake Bay watershed. Historically, approximately 25 percent of program resources have been used to deploy conservation practices in the Chesapeake Watershed. The Committee estimates that approximately 40 percent of the active implementation occurring in the watershed on an annual basis is a direct result of the introduction or leveraging of these resources. The following changes are now being adopted:

1) The adoption of additional points (Bonus Points) for proposals that address waterbodies with an active TMDL or those included in the most recent New York State 303(d) List of Impaired Waters Requiring a TMDL, where the source of the impairment is agriculture, and the project will contribute to restoration of water quality. For the purposes of assigning additional points, the NY State portion of the Chesapeake Bay Watershed, namely the Upper Susquehanna River and all of its tributaries shall be considered an active TMDL.

2) Agricultural best management practices for Cover Crops and Mulching will now be available for cost-sharing over a three year term instead of the previous one year cost-share period to allow sufficient time to demonstrate the value of the practice to the farmer. This shift in program policy is being made in order to encourage adoption of these two agronomic practice systems for suitable farms and situations.

3) Agricultural best management practices for Pasture Management must demonstrate a water quality (WQ) benefit derived from the system and the individual component practices installed must collectively meet the definition of “Pasture Management – Prescribed Grazing Systems” found in the NYS Agricultural Management Practices Catalog. “Pasture Management: Prescribed Grazing System” is defined in the NYS Agricultural Management Practices Catalog as “a prescribed grazing management system using **five** or more paddocks for a grazing season, alternating paddocks to allow for forage vigor and re-growth and livestock graze for no more than a week before they are rotated to another paddock.”

4) Additionally, the Committee and the Department of Agriculture are actively researching policy adjustments, to direct funding toward resource concerns of statewide significance. The Chesapeake Bay Watershed effort would be designated as such.

Expanding Existing Programs

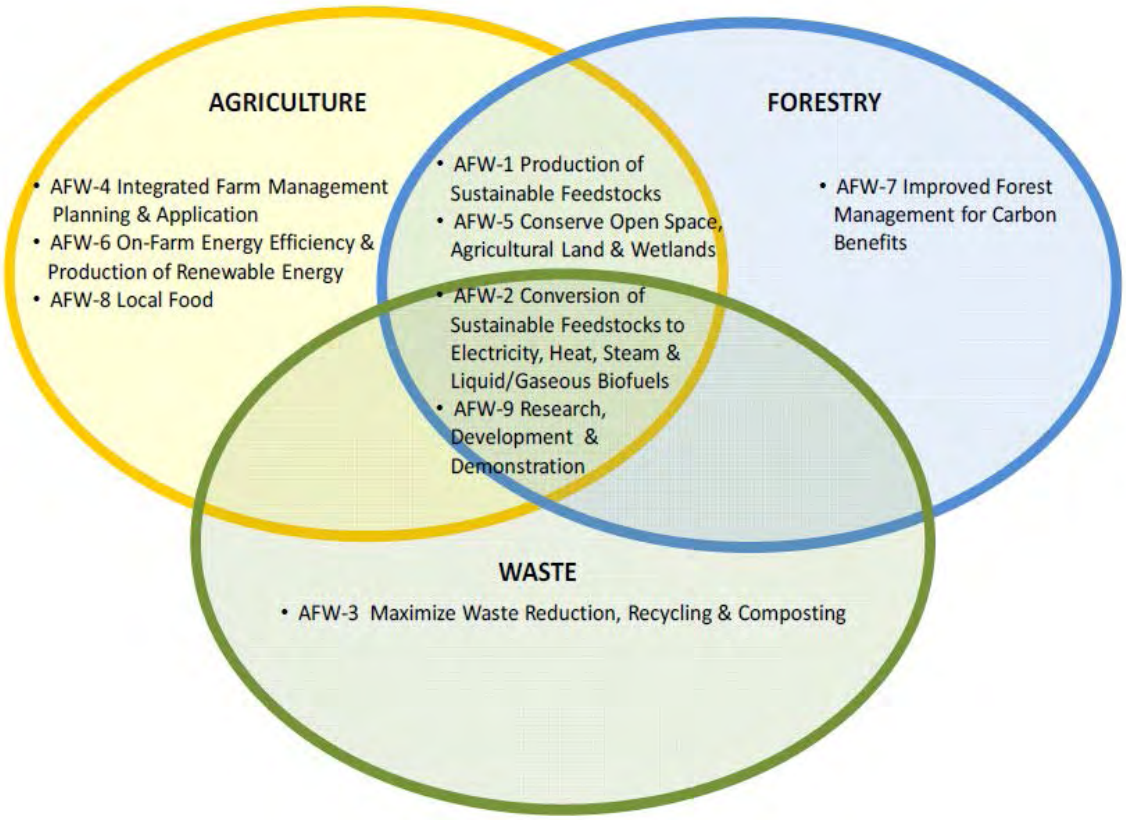
New York worked with State and Federal partners to expand the use of the NYS Conservation Reserve Enhancement Program (NYS CREP). The USDA/NRCS Conservation Reserve Enhancement Program is essential for the expansion of stream side buffers.

Manure Emissions Controls

Agricultural Innovation and Capacity to Conserve Resources

New York State, including the portion in the Chesapeake Bay Watershed, has a proven track record of advancing renewable energy, air quality, water quality, and greenhouse gas mitigation through agricultural solutions. Developing innovative approaches to provide multiple benefits is challenging. New York State has the critical mass of applied research and extension, farmer innovation, public policies and statutes, and private-public partnerships to continue to pursue simultaneous conservation of air, water, soil, energy, habitat and greenhouse gases via economically feasible approaches (as summarized below).

- 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 Climate Action Plan 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 Climate Action Plan was posted for review in Nov. 2010 (http://nyclimatechange.us/InterimReport.cfm). 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. (see figure below). http://nyclimatechange.us/index.cfm)



- The NYS Biomass Alliance, affiliated with the NYS Farm Viability Institute, is working in the area of grass biomass with a number of small pilot projects underway including: the Catskill Grass BioEnergy project (www.ccedelaware.org), the St. Lawrence Grass Energy project, Cornell University Grass BioEnergy Project (www.grassbioenergy.org), Hudson Valley Grass Energy and others. Woody grass biomass is a sustainable, low input initiative calling for a substantial increase in biomass from agriculture including short rotation woody biomass as well as grass biomass. The Alliance has set to achieve 75% of thermal renewable energy from biomass by 2025 in the Northeast.

- The original, year-2000 NYS Agricultural Environmental Management (AEM) Law focusing on water quality was expanded in 2008 to include risk assessment, planning, implementation and evaluation activities and cost-share funding for air quality, greenhouse gas mitigation, energy conservation, and renewable energy projects on farms, in coordination with traditional AEM water quality projects (www.agmkt.state.ny.us/SoilWater/aem/index.html).

- The Cornell Dairy Environmental Systems Program has been applying research and extension to help farms in New York develop solutions for conservation and renewable energy for the past two decades. Their website documents their efforts, by serving several case studies, papers, and on-going research projects for anaerobic digestion, manure treatment, nutrient management, greenhouse gas mitigation, etc. Anaerobic digestion is often a compatible system component with other manure treatment technologies (e.g., mechanical and chemical separation) aimed at partitioning nutrients for more targeted, efficient use. The Cornell Dairy Environmental Systems Program is also the principle investigator for the NYS component of the National Air Emissions Monitoring Study (www.manuremanagement.cornell.edu/index.html).

- Due to its record of supporting innovation, NYS was selected as a pilot state for the Dairy Power Initiative. The industry-led Dairy Power team includes more than 100 members from leading institutions, such as Cornell University, University of California-Davis, World Wildlife Fund, Walmart, Dean Foods, Dairy Farmers of America, National Milk Producers Federation and the USDA.

- Dairy Power Goals and Milestones: The milk production segment of the U.S. dairy supply chain contributes 51.5 percent to the fluid milk carbon footprint. Dairy Power will help achieve the Dairy 2020 goal to reduce this by 27 percent.

    - Phase 1 – Stakeholder Engagement Summit in New York: Bring together 200 stakeholders to set goals and identify an action plan to accelerate adoption of methane digesters in New York State. Summit attendees set a 2020 goal that 40 percent of all manure from New York dairy farms goes through the anaerobic digestion process.

    - Phase 2 – Facilitate Access to Resources and Financing: Helping farmers secure access to information and economic support is imperative. Work with USDA to connect farmers to tools and resources, including AgSTAR; and explore innovative financing vehicles such as loan guarantees and tax-exempt bonds.

  - Phase 3 – Develop Rural Electric Cooperative Partnerships: Partner with the National Rural Electric Cooperative Association to explore cooperative models that support digester-generated electricity and connections to the nation's power grid.

- ClimateAndFarming.org is another Cornell University collaboration of scientists and extension educators helping farmers make practical and profitable responses to climate changes (www.climateandfarming.org).

- The Morrisville State College Renewable Energy Training Center (RETC) provides technical short courses for employed and unemployed individuals seeking marketable skills in the renewable energy field. The RETC is an alliance of employers, training providers, economic development partners, and K-12 schools to address long-term and short-term needs of New York State's renewable energy sector. Course curricula are based upon employer-identified skill gaps and needs. RETC courses are available for all skill levels and those with previous training. Training sessions focus on renewable energy resources and systems, including wind, solar, micro hydro, geothermal and biofuels (http://retc.morrisville.edu/default.aspx).

- The New York State Energy Research and Development Authority (NYSERDA) continues its long track record of administering electricity rate-payer funds for stimulating agricultural renewable energy projects (e.g., anaerobic digesters) and energy conservation (e.g., energy audits), encompassing approximately $30 million to date with another estimated $70 million for renewable energy projects in agriculture and waste management sectors through 2015 via the State's Renewable Portfolio Standard program (www.nyserda.org).

- There are currently 19 operating anaerobic digesters on farms in NYS and another 14 in the planning phases. Three anaerobic digesters are currently operational in NYS' portion of the Chesapeake Bay Watershed (AA Dairy, New Hope View Dairy, and Morrisville State University Dairy), converting (and thereby destroying) methane from approximately 2750 animal units to 250 kW of electricity in the Watershed (enough to cover all farm electricity needs and sell excess to the grid).

- www.manuremanagement.cornell.edu/Pages/General_Docs/Case_Studies/AA_Case_Study.pdf

- www.manuremanagement.cornell.edu/Pages/General_Docs/Case_Studies/NHV_case_study.pdf

- www.manuremanagement.cornell.edu/Pages/General_Docs/Case_Studies/Morrisville_Case_Study.pdf

- The net-metering portion NYS Public Service Law was recently changed to increase the net-metering cap limit for on-farm electricity production from anaerobic digesters from 500 kW to 1 MW (http://assembly.state.ny.us/leg/?default_fld=&bn=A07987&Summary=Y&Actions=Y&Text=Y).

- New York State is a leader in the Regional Greenhouse Gas Initiative (RGGI), the first mandatory, market-based effort in the United States to reduce greenhouse gas emissions. Ten Northeastern and Mid-Atlantic states in total have capped and will reduce CO2 emissions from the power sector 10% by 2018. States sell nearly all emission allowances through auctions and invest proceeds in consumer benefits: energy efficiency, renewable energy, and other clean energy technologies. On-farm anaerobic digesters are recognized as an offset option for the power sector, although current CO2 prices have limited farm participation to date. (www.rggi.org)

- In line with New York State's Climate Action Plan, several focused efforts to heat New York State with renewable biomass are underway, including the NY Biomass Energy Alliance (www.NewYorkBiomass.org) and HeatNE.org, as well as several grassroots renewable biomass pilot projects such as the Catskill Grass BioEnergy project (www.ccedelaware.org), the St. Lawrence Grass Energy Project, Cornell University Grass BioEnergy Project (www.grassbioenergy.org), and the Hudson Valley Grass Energy Project.

Initiative: Regulatory Revision

DEC is proposing a comprehensive regulatory revision to Title 6, Subpart 750 of the Codes, Rules and Regulations of the State of New York. One of the objectives of this regulatory revision is to align New York's CAFO program with the CAFO federal rule found at 40 C.F.R. Part 122, which became effective on November 21, 2008.

3.12: Agriculture Best Management Practice Tracking and Reporting Protocols

The Upper Susquehanna Coalition collects and coordinates all agriculture BMP data collection to verify information and eliminate double counting. This is done by using a master list of farms that are geo-referenced to a GIS database. Each year County SCWD Staff update the BMP list. The USC is presently working on developing The National Environmental Information Exchange Network (NEIN) Node necessary for future data reporting to the Chesapeake Bay program. The database is also used for WIP planning and specific data needs.

3.13: Contingencies for Slow or Incomplete Implementation

See Compliance Chapter.

Section 4: Wastewater

For the purposes of the Phase II Watershed Implementation Plan, "wastewater" refers to the wastewater discharges from municipal and industrial point sources that are controlled by State Pollutant Discharge Elimination System (SPDES) permits. Wastewater includes Bay-significant municipal wastewater treatment plants, Bay-significant industrial wastewater treatment plants, Bay-non-significant municipal wastewater treatment plants, Bay-non-significant industrial wastewater treatment plants, negligible industrial wastewater discharges and Combined Sewer Overflows. Municipal wastewater treatment plants are considered significant if they have design flows of 400,000 or more gallons per day. Industrial wastewater treatment plants are considered significant if they have comparable nutrient loads to municipal plants of that size.

According to the Chesapeake Bay Watershed Model, New York's wastewater sector is responsible for 14% of the total delivered nitrogen load and 20% of the total delivered phosphorus load in 2009.

4.1: Bay-Significant Wastewater Treatment Plants

EPA's guidance and expectations for the Phase II Watershed Implementation Plan emphasize the documentation of actions to meet the 2017 reduction targets. Therefore, NYS is focusing implementation on interim limits that would apply to Bay-significant wastewater treatment plants identified in the TMDL by 2017.

The objective in proposing the individual waste load allocations (WLA) is to optimize load reductions and benefits. Individual waste load allocations will consider existing and applicable treatment technologies at each treatment plant and the site-specific feasibility of the waste load allocation. The assessment of benefits considers both local New York water quality as well as reduction in delivered load to Chesapeake Bay. The desire to achieve local benefits leads to greater and more immediate emphasis on phosphorus reduction, while the wide range of nitrogen delivery factors for the various discharge locations tempers the approach to nitrogen limits. As described below, the approach allows a permitted discharge to exchange phosphorus for nitrogen under certain conditions and will be implemented with a total aggregate load (called a "bubble") for nitrogen. All phosphorus limits could be impacted by the development of numeric nutrient criteria, described in Section 8.3 of this document under the *Numeric Nutrient Criteria* heading, and in more detail on the DEC website at: http://www.dec.ny.gov/chemical/77704.html.

The approach starts with existing permit limits for Kraft Foods, Binghamton-Johnson City (BJC) and Richfield Springs, as well as a proposed permit limit for another industrial facility – Chobani (formerly known as AgroFarma). It should be noted that because of a structural failure at the Binghamton-Johnson City treatment plant, re-construction is subject to an order of consent and attainment of the load limits for nitrogen may not happen by 2017. The interim (effective upon EPA approval of the WLA as meeting the intent of the adopted TMDL and permit reissuance for most facilities) waste load allocations (12 month load limits) for phosphorus for the remaining permits are based on what is expected to be reliably achieved by chemical addition with concentration tiers based on the size of the

facility. The allocation approach accounts for nitrogen optimizing opportunities where they have been identified.

Because loads require a consideration of flow and load, reductions are intended for the interim (by 2017) target before major capital construction. DEC considered two options:

- **Option 1: 12 Month Rolling Average (MRA) Flow.** To account for annual variations, DEC reviewed reported discharged flow from January 2006 through August 2011 to determine the maximum 12 month consecutive flow from each of the 30 Bay Significant permitted discharges (September 2011 flows were intentionally eliminated to not include results skewed by Tropical Storm Lee). The average daily flow for 12-month max was then multiplied by 1.0 mg/l phosphorus for facilities up to 0.8 MGD, and 0.9 mg/l phosphorus for the remaining facilities. Nitrogen values were also applied with considerations given to smaller facilities, which generally have lower delivery factors.

- **Option 2: Design and 3 year average.** To account for existing investment in design capacity, DEC used the mid-point of the flow limit and the average 3-year flow (July 2008 to June 2011). Because that results in higher flows overall (about 8 percent more), DEC considered more challenging phosphorus and nitrogen targets to develop the loads in this option.

The proposed interim (by 2017 or earlier) waste load allocation limits are included in *Table 18: Interim and 2025 WLA for Bay-Significant WWTPs*. The proposed interim waste load allocations for phosphorus are based on Option 1, unless the final WLA described below was higher, in which case, the 2025 WLA was used. The proposed interim waste load allocations for nitrogen are set at the higher of Option 1, Option 2, or the final WLA, which is based on the existing discharge load in some cases.

Neither option limits the design flow of facilities; rather the options utilized provide permittees with the maximum allowable flexibility in determining how to meet the required nutrient load reductions.

Table 18 also provides the final waste load allocations and provides anticipated interim compliance dates for all significant facilities. The final WLA are primarily based on design flow times a target concentration of 0.5 mg/l for phosphorus although for some industrial dischargers, the interim and final WLA is based on a comparable percent reduction required from municipal dischargers. For nitrogen, final WLA for the larger discharges are primarily based on design flow times a target concentration of 8 mg/l. For smaller municipal facilities with treatment processes not amenable to nitrogen reduction, the interim and final WLA would remain near the existing load level if it were higher. Where the existing treatment processes are more amenable to nitrogen reduction (Binghamton-Johnson City, Erwin, and Canisteo) a reduction in the nitrogen WLA is being exchanged for an increase in phosphorus allocation. Interim and final nitrogen WLA for some industrial dischargers are based on a comparable percent reduction required from large municipal dischargers. Permits will specify that final waste load allocations are to become effective in 2025, with exceptions where the final limit is, essentially, the same as the “interim” limit. Certain facilities are already compliant and others have projects underway such that compliance is expected in the near future.

Table 18: Interim and 2025 WLA for Bay-Significant WWTPs

		PHOSPHORUS				NITROGEN					
Facility Name	**Design flow**	**Interim TP WLA**	**Interim TP Delivered WLA**	**2025 TP WLA**	**2025 TP Delivered WLA**	**Interim TN WLA**	**Interim TN Delivered WLA**	**Effective Date of Interim TN WLA**	**2025 TN WLA**	**2025 TN Delivered WLA**	**N to P Ratio**
	MGD	***lb/year***	***lb/year***	***lb/year***	***lb/year***	***lb/year***	***lb/year***		***lb/year***	***lb/year***	
CHOBANI	1.15	**1,750**	670	1,750	670	**28,006**	6,469	2015	28,006	6,469	9.45
KRAFT FOODS	0.90	**9,582**	3,670	1,369	524	**27,378**	9,747	2016	21,903	7,797	6.13
AMPHENOL CORP[47]	0.3	**761**	291	761	291	**134,949**	57,353	2017	89,966	38235	5.14
LEPRINO FOODS[47]	0.33	**8,178**	3,132	4,089	1,566	**26,125**	14,970	2017	20,425	11,704	3.81
ADDISON (V)	0.42	**761**	291	761	291	**13,096**	3,418	2017	13,096	3,418	8.36
SHERBURNE (V) WWTP	0.43	**901**	345	761	291	**16,219**	7,672	2017	16,219	7,672	4.62
GREENE (V) WWTP	0.45	**1,023**	392	761	291	**18,411**	9,095	2017	18,411	9,095	4.42
PAINTED POST (V)	0.50	**761**	291	761	291	**14,270**	5,993	2016	14,270	5,993	5.20
RICHFIELD SPRINGS (V)	0.60	**913**	350	913	350	**24,164**	4,954	2016	24,164	4,954	10.65
CANISTEO (V) STP	0.70	**2,377**	911	1,917	734	**21,351**	4,633	2016	21,351	4,633	10.06
COOPERSTOWN	0.75	**1,954**	430	1,141	251	**27,360**	3,776	2016	27,360	3,776	9.09
CHENANGO NORTHGATE WWTP	0.80	**1,912**	732	1,217	466	**26,764**	14,292	2016	26,764	14,292	4.09
OWEGO (T) #1	0.85	**2,317**	887	1,290	494	**32,432**	18,129	2016	32,432	18,129	3.91

[47] The interim total phosphorus waste load allocations for Amphenol Corp. and Leprino Foods are not effective until 2016 because these facilities were not identified as Bay-significant until after the EPA Chesapeake Bay TMDL went into effect.

HAMILTON (V)	0.85	**1,991**	762	1,293	495	**32,362**	13,980	2016	32,362	13,980	5.16
ALFRED (V)	0.98	**1,491**	571	1,491	571	**25,376**	3,223	2016	25,376	3,223	17.19
BATH (V)	1.00	**1,956**	749	1,521	583	**29,941**	6,467	2016	29,941	6,467	10.11
OWEGO (V)	1.00	**1,734**	664	1,521	583	**31,676**	17,707	2016	31,676	17,707	3.91
WAVERLY (V)	1.35	**2,636**	1,010	2,053	786	**42,096**	21,722	2016	42,096	21,722	4.23
SIDNEY (V)	1.70	**2,586**	990	2,586	990	**41,371**	16,755	2016	41,371	16,755	5.39
ERWIN (T)	1.75	**4,063**	1,556	4,063	1,556	**33,965**	12,092	2016	33,965	12,092	6.13
OWEGO #2	2.00	**3,570**	1,367	3,042	1,165	**56,047**	31,330	2016	56,047	31,330	3.91
NORWICH	2.37	**7,296**	2,794	3,612	1,384	**177,775**	87,821	2016	177,775	87,821	4.42
CORNING (C)	3.08	**5,036**	1,929	4,685	1,794	**124,966**	52,486	2016	124,966	52,486	5.20
HORNELL (C)	4.00	**7,438**	2,849	6,084	2,330	**116,843**	25,355	2016	116,843	25,355	10.06
ONEONTA (C)	4.00	**7,509**	2,876	6,084	2,330	**134,233**	47,783	2016	134,223	47,783	6.13
CORTLAND (C)	9.00	**23,060**	8,832	13,698	5,247	**256,222**	125,293	2015	219,175	107,177	4.46
ENDICOTT (V)	10.00	**28,575**	10,944	15,221	5,829	**417,610**	217,575	2015	417,610	217,575	4.19
ELMIRA/CHEMUNG CO. SD #2	12.00	**23,553**	9,021	18,265	6,995	**294,364**	123,633	2015	292,234	122,738	5.20
LAKE STREET/CHEMUNG CO. SD #1	12.00	**25,320**	9,698	18,265	6,995	**292,234**	122,738	2015	292,234	122,738	5.20
BINGHAMTON-JOHNSON CITY	35.00	**96,102**	36,807	94,678	36,261	**489,491**	269,220	2017[48]	489,491	269,220	3.97
	MGD	***lb/year***	***lb/year***	***lb/year***	***lb/year***	***lb/year***	***lb/year***		***lb/year***	***lb/year***	
	110.2	**277,107**	**105,813**	**215,651**	**82,408**	**3,012,686**	**1,355,681**		**2,911,751**	**1,312,336**	

[48] Because of a structural failure at the Binghamton-Johnson City treatment plant, re-construction is subject to an order of consent and attainment of the load limits for nitrogen may not happen by 2017.

The interim waste load allocations would be implemented through 2017 and would start with immediate incorporation of the phosphorus limits upon EPA approval of the WLA as meeting the intent of the adopted TMDL and permit revision, which is likely to occur late in 2012. Consideration would be given for incorporating a compliance schedule where major capital improvements are needed. For two industrial discharges (Amphenol Corp. and Leprino Foods) which have only been determined to be "significant" since the TMDL was issued in 2010, compliance with the interim phosphorus limit will not be required until 2016. For local water quality benefits/needs, each plant would probably be required to meet its phosphorus limits, but a single municipality or industry with multiple discharges could be allowed to "bubble," or aggregate, their discharges within the same stream reach. Except for unusual conditions such as compensating phosphorus reductions by other discharges into the same stream that have already been factored into the waste load allocations, exchanges of nitrogen credits (from a discharge that is lower than the permitted limit) for relief from phosphorus limits would not be granted.

For nitrogen, implementation dates would be staged, beginning, with some exceptions, in:

- 2015 for plants of 9 MGD or higher capacity
- 2016 for plants from 0.5 to 4 MGD
- 2017 for the smallest plants

To calculate an exchange from phosphorus to nitrogen, say a discharger believes they will discharge at least 1,000 fewer pounds of phosphorus per year than the waste load allocation, they could multiply the 1,000 pounds by the nitrogen to phosphorus ratio noted in *Table 18: Interim and 2025 WLA for Bay-Significant WWTPs* to determine the nitrogen credit. If the nitrogen to phosphorus ratio is 10, the phosphorus limit would be reduced by 1,000 pounds per year and the nitrogen limit increased by 10,000 pounds per year. This procedure will be used to exchange nitrogen and phosphorus and will be reflected in applicable permit limits.

New York is proposing a "bubble permit" for all nitrogen discharges (see below, under "The New York "Bubble Permit" heading, for a sample of how the permit language would be constructed). This would be phased in from 2015 through 2017 to account for the effective date of the limits to various discharges. The idea behind the bubble permit concept is that discharges from facilities are aggregated so that excess load from one facility can potentially be offset by other facilities provided those facilities achieve better than required pollutant removal during that respective month, or running 12-month period. This same approach has been successfully utilized, with EPA support and approval, to implement the Long Island Sound TMDL.

It has been DEC practice to implement TMDLs adaptively by making minor adjustments to the WLAs in a TMDL when new information becomes available or circumstances arise during the implementation of the TMDL that suggests such modifications are appropriate. DEC will notify EPA and the public regarding any shifts in loading it makes within the sum of the WLAs of this TMDL. Subsequent to development of this plan, re-characterization of a source within a Load Allocation (LA) to a regulated

point source given a WLA of the same magnitude, character, and location as the original LA, will not require the submission of a revised WIP. Advance notification will be provided to EPA 30 days prior to such a re-characterization.

New information generated during TMDL implementation may include: monitoring data, BMP effectiveness information and land use information. DEC will make such adjustments only in the event that the adjustments will not result in a change to the sum of the Delivered WLAs, the sum of the Delivered LAs, or the total loading delivered to Chesapeake Bay. DEC may also consider the nature of the loads, e.g. bioavailable phosphorus content, when loads are reallocated between sources to ensure the reallocation will not cause adverse local water quality conditions. In addition, any adjusted WLAs will be set at a level necessary to implement the applicable water quality standards, including the implementation of phosphorus criteria. Reasonable assurance will be provided where appropriate.

As described below in *Section 4.3: New York's Wastewater Trading and Offset Program*, 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 these regulated point sources can use to meet the water quality-based effluent limits in their SPDES permits. Trades among individual WLAs may be implemented in the individual SPDES permits of those agreeing to the trade through corresponding adjustments among the SPDES permit limits. 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.

Some bubble permits are included in this TMDL. Additional bubble permits may be considered by DEC when re-issuing the permits, if requested by a single entity with multiple permits.

Consistent with the overall approach for minor adjustments above, DEC will notify EPA of any proposed water quality trading or additional bubble permits 30 days prior to their implementation. Public notice would be provided through the SPDES permitting process as per 6 NYCRR Parts 621 and 624.

The New York "Bubble Permit"

This limitation is an aggregate limit for the 30 Bay-significant wastewater treatment plants. The 12-Month Load (12-ML) is defined as the current monthly load added to the monthly load from the eleven previous months for each facility. Then, the delivered 12-month loads are calculated by multiplying the 12-ML by the delivery factor specific for each permittee. The individual 12-month delivered loads are then added to calculate the aggregate limit. The 12-month load is enforced as a 30-day limit, therefore any reported exceedance of the 12-month load will be considered 30 days of violation. For permits that become effective in a given year, for example 2015, monthly loads in January 2015 begin to count towards compliance with the first calculation of compliance occurring after December 2015.

DEC will calculate the aggregated 12-month delivered loads from the 12-ML result reported by each of the individual permittees on their Discharge Monitoring Report. See Table 19, Table 20 and Table 21 for the aggregate load limits effective in 2015, 2016 and 2017, respectively.

Table 19: WLA Effective 2015 for Bay-Significant Treatment Plants Under the NY Bubble Permit

Facility Name	SPDES Number	WLA Total Nitrogen *Discharged* (12-ML)	WLA Total Nitrogen *Delivered* (12-ML)
CORTLAND (C)	NY0027561	256,222	125,293
ENDICOTT (V)	NY0027669	417,610	217,575
ELMIRA/CHEMUNG CO. SD #2	NY0035742	294,364	123,633
LAKE STREET/ CHEMUNG CO. SD #1	NY0036986	292,234	122,738
CHOBANI	NY0004189	28,006	6,469
Total of Permits Effective in 2015			**595,708**
Note: Waste load allocations are in pounds per year.			

Table 20: WLA Effective 2016 for Bay-Significant Treatment Plants Under the NY Bubble Permit

Facility Name	SPDES Number	WLA Total Nitrogen *Discharged* (12-ML)	WLA Total Nitrogen *Delivered* (12-ML)
CORTLAND (C)	NY0027561	256,222	125,293
ENDICOTT (V)	NY0027669	417,610	217,575
ELMIRA/CHEMUNG CO. SD #2	NY0035742	294,364	123,633
LAKE STREET/ CHEMUNG CO. SD #1	NY0036986	292,234	122,738
CHOBANI	NY0004189	28,006	6,469
KRAFT FOODS	NY0004308	27,378	9,747
PAINTED POST (V)	NY0025712	14,270	5,993
RICHFIELD SPRINGS (V)	NY0031411	24,164	4,954
CANISTEO (V) STP	NY0023248	21,351	4,633
COOPERSTOWN	NY0023591	27,360	3,776
CHENANGO	NY0213781	26,764	14,292

Facility Name	**SPDES Number**	**WLA Total Nitrogen *Discharged* (12-ML)**	**WLA Total Nitrogen *Delivered* (12-ML)**
NORTHGATE WWTP			
OWEGO (T) #1	NY0022730	32,432	18,129
HAMILTON (V)	NY0020672	32,362	13,980
WAVERLY (V)	NY0031089	42,096	21,722
ALFRED (V)	NY0022357	25,376	3,223
BATH (V)	NY0021431	29,941	6,467
OWEGO (V)	NY0029262	31,676	17,707
SIDNEY (V)	NY0029271	41,371	16,755
ERWIN (T)	NY0023906	33,965	12,092
OWEGO #2	NY0025798	56,047	31,330
NORWICH	NY0021423	177,775	87,821
CORNING (C)	NY0025721	124,966	52,486
HORNELL (C)	NY0023647	116,843	25,355
ONEONTA (C)	NY0031151	134,223	47,783
Total of Permits Effective in 2016			**993,954**
Note: Waste load allocations are in pounds per year.			

Table 21: WLA Effective 2017 for Bay-Significant Treatment Plants Under the NY Bubble Permit

Facility Name	**SPDES Number**	**WLA Total Nitrogen Discharged (12-ML)**	**WLA Total Nitrogen Delivered (12-ML)**
CORTLAND (C)	NY0027561	256,222	125,293
ENDICOTT (V)	NY0027669	417,610	217,575
ELMIRA/CHEMUNG CO. SD #2	NY0035742	294,364	123,633
LAKE STREET/ CHEMUNG CO. SD #1	NY0036986	292,234	122,738

Facility Name	SPDES Number	WLA Total Nitrogen Discharged (12-ML)	WLA Total Nitrogen Delivered (12-ML)
CHOBANI	NY0004189	28,006	6,469
KRAFT FOODS	NY0004308	27,378	9,747
PAINTED POST (V)	NY0025712	14,270	5,993
RICHFIELD SPRINGS (V)	NY0031411	24,164	4,954
CANISTEO (V) STP	NY0023248	21,351	4,633
COOPERSTOWN	NY0023591	27,360	3,776
CHENANGO NORTHGATE WWTP	NY0213781	26,764	14,292
OWEGO (T) #1	NY0022730	32,432	18,129
HAMILTON (V)	NY0020672	27,872	11,790
WAVERLY (V)	NY0031089	32,362	13,980
ALFRED (V)	NY0022357	25,376	3,223
BATH (V)	NY0021431	29,941	6,467
OWEGO (V)	NY0029262	31,676	17,707
SIDNEY (V)	NY0029271	41,371	16,755
ERWIN (T)[6]	NY0023906	33,965	12,092
OWEGO #2	NY0025798	56,047	31,330
NORWICH	NY0021423	177,775	87,821
CORNING (C)	NY0025721	124,966	52,486
HORNELL (C)	NY0023647	116,843	25,355
ONEONTA (C)	NY0031151	134,223	47,783
AMPHENOL CORP	NY0003824	134,949	57,353
LEPRINO FOODS	NY0157295	26,125	14,970
ADDISON (V)	NY0020320	13,096	3,418
SHERBURNE (V) WWTP	NY0021466	16,219	7,672
GREENE (V) WWTP	NY0021407	18,411	9,095

Facility Name	SPDES Number	WLA Total Nitrogen Discharged (12-ML)	WLA Total Nitrogen Delivered (12-ML)
Total of Permits Effective in 2017			**1,086,461**
Note: Waste load allocations are in pounds per year.			

If the aggregate 12-month delivered loads limit is exceeded, the individual 12-month load limit (discharged) shall be used for purposes of compliance, to determine which permittee was the cause of the exceedance. However, the permittee will be allowed to exchange any discharged phosphorus load that is below their permitted 12-month phosphorus load limit for an adjusted reduction to their nitrogen load using the nitrogen to phosphorus ratio described above, that will be included in the permit. DEC will use the following approach to determine if a permittee is in compliance:

The **Total Nitrogen, available from excess P** is calculated as:

{[12 month load TP limit] - [actual TP load in previous 12 months]} * [N:P ratio]
Should the result of this calculation be zero or less than zero, the permittee shall report "0" for this parameter.

The **Total Nitrogen, Adjusted** load is calculated as [Total Nitrogen, as N, 12-month load] - [Total Nitrogen, available from excess P].

If the individual 12-month **Total Nitrogen, Adjusted** load for a facility exceeds the 12-month load TN limit, the facility will be in noncompliance.

To facilitate reporting and to assure accurate compliance calculation, DEC will format Discharge Monitoring Report forms to collect the appropriate monthly data from each permittee. Each month, DEC will perform the calculations of the bubble(s), the 12-month loads (discharged and delivered) for each facility, and automatically exchange TP for TN as allowed, to determine compliance for each permittee.

4.2: Bay-Non-significant Wastewater Treatment Plants

Non-significant municipal facilities are those sewage treatment systems with existing permitted flows less than 0.4 MGD. Non-significant industrial facilities are those estimated to discharge non-negligible loads of nitrogen and phosphorus less than the thresholds defining significant industrial facilities.

Table 22: New York Bay-Non-Significant WWTPs below displays the non-significant wastewater treatment plants in New York's portion of the Chesapeake Bay watershed.

Table 22: New York Bay-Non-Significant WWTPs

SPDES Permit No.	Facility Name	County	Municipality
0023302	BOCES OTSEGO AREA OCCUPATIONAL CENTER	OTSEGO	MILFORD
0028754	NYS GILBERT LAKE STATE PARK	OTSEGO	NEW LISBON/LAURENS
0034037	REINHARDT OIL CORP	OTSEGO	ONEONTA
0065005	TERRACE MOTOR INN	OTSEGO	OTSEGO
0088595	FIELDSTONE FARM	OTSEGO	RICHFIELD
0099228	ONEONTA FAMILY YMCA SUMMER CAMP	OTSEGO	ONEONTA
0124389	NY CENTRAL MUTUAL FIRE INSURANCE CO	OTSEGO	EDMESTON
0192279	UNADILLA ELEM SCHOOL	OTSEGO	UNADILLA
0192325	BAY SIDE MOTOR INN	OTSEGO	SPRINGFIELD
0205231	PLEASANT VIEW COTTAGES & BREAKFAST HOUSE	OTSEGO	CHERRY VALLEY
0205681	NYS DOT RES ENGRS OFFICE	OTSEGO	MARYLAND
0205940	SUSQUEHANNA SPCA	OTSEGO	HARTWICK
0222747	CHERRY VALLEY NEW KUMENSTOCK FARM K-12	OTSEGO	CHERRY VALLEY
0249262	BELVEDERE LAKE RESORT	OTSEGO	ROSEBOOM
0249637	RED BARREL TRAVEL CENTER	OTSEGO	OTEGO
0263010	HOWARD JOHNSON INN & SUITES	OTSEGO	HARTWICK
0263044	TOWN OF MORRIS HWY GARAGE	OTSEGO	MORRIS
0263141	DOT SPRINGFIELD MAINTENANCE SUBHEADQTRS	OTSEGO	SPRINGFIELD

SPDES Permit No.	Facility Name	County	Municipality
0263281	AALSMERE MOTEL AND COTTAGES	OTSEGO	SPRINGFIELD
0067342	MASONVILLE MOTOR LODGE	DELAWARE	MASONVILLE
0212903	JEFFERSON CENTRAL SCHOOL	SCHOHARIE	JEFFERSON
0222763	BRUNO'S RESTAURANT	SCHOHARIE	JEFFERSON
0257125	HANSON - JORDANVILLE QUARRY	HERKIMER	WARREN
0003808	ENDICOTT INTERCONNECT TECHNOLOGIES INC	BROOME	UNION
0003867	AES JENNISON	CHENANGO	BAINBRIDGE
0003905	GLENDALE TECHNOLOGY PARK	BROOME	UNION
0004006	COOPER TOOLS CORTLAND OPERATION	CORTLAND	CORTLAND
0004057	LOCKHEED MARTIN SYSTEMS INTEGRATION	TIOGA	OWEGO
0004073	BAE SYSTEMS CONTROLS	BROOME	UNION
0004138	NORWICH PHARMACEUTICALS INC	CHENANGO	NORTH NORWICH
0004146	AGRO FARMA CORPORATE CAMPUS	CHENANGO	NORWICH
0004243	KERRY BIO-SCIENCE	CHENANGO	NORWICH
0023981	JOHNSON CITY - V OVERFLOWS	BROOME	UNION
0026824	TULLY - V STP	ONONDAGA	TULLY
0027197	TOWN OF VIRGIL SEWER DISTRICT #1 WWTP	CORTLAND	VIRGIL
0028126	NYS BOWMAN LAKE STATE PARK	CHENANGO	MCDONOUGH

SPDES Permit No.	Facility Name	County	Municipality
0028363	MARATHON - V STP	CORTLAND	MARATHON
0028941	WAVERLY WAREHOUSE	TIOGA	BARTON
0029700	SUNY AT MORRISVILLE	MADISON	EATON
0030597	BAINBRIDGE - V STP	CHENANGO	BAINBRIDGE
0032344	NYS CAMP GEORGETOWN	MADISON	GEORGETOWN
0032620	CITGO VESTAL TERMINAL	BROOME	VESTAL
0036013	NYSDOT NICHOLS COMFORT STA	TIOGA	NICHOLS
0065901	LAKESIDE CAMPGROUND	BROOME	WINDSOR
0071111	ENTERPRISE HARFORD MILLS TERMINAL	CORTLAND	HARFORD
0072231	HADCO - OWEGO	TIOGA	OWEGO
0072974	BELDEN HILL GOLF CLUB	BROOME	COLESVILLE
0084964	TUSCARORA SCOUT RESERVATION	BROOME	SANFORD
0085308	WHITNEY POINT REST AREA	BROOME	LISLE
0086479	GREENE TECHNOLOGIES INC	CHENANGO	GREENE
0090484	BROOME CO GREENWOOD PARK	BROOME	NANTICOKE
0092231	NOWLAN RIDGE	BROOME	FENTON
0095788	CORTLAND BIBLE CLUB CAMP	CHENANGO	PITCHER
0100471	BROOME CO NATHANIEL COLE PARK	BROOME	COLESVILLE
0100641	CHASE MEMORIAL COMMUNITY CENTER	CHENANGO	NEW BERLIN
0101231	BINGHAMTON TRAVEL CENTER	BROOME	KIRKWOOD
0101427	BLUE RIDGE MOBILE HOME PARK	BROOME	CONKLIN

SPDES Permit No.	Facility Name	County	Municipality
0102997	FORESTVIEW MOBILE HOMES PARK	BROOME	KIRKWOOD
0106542	WEBER ASH DISPOSAL SITE	BROOME	FENTON
0107409	NATIONAL PIPE & PLASTICS	BROOME	VESTAL
0108227	NYSEG AFTON ASH SITE	CHENANGO	AFTON
0108995	INTERTEK TESTING SERVICES	CORTLAND	CORTLANDVILLE
0109339	AMERICAN PIPE AND PLASTICS INC	BROOME	KIRKWOOD
0110655	AMPHENOL INTERCONNECT PRODUCTS CORP	BROOME	UNION
0152161	FOREST MANOR MHP	BROOME	FENTON
0152200	FENTON MOBILE ESTATES	BROOME	FENTON
0152528	FOUNTAIN BLEAU COURT	BROOME	CONKLIN
0153206	CHENANGO HEIGHTS DISPOSAL	BROOME	CHENANGO
0154814	SONG MOUNTAIN SKI RESORT	CORTLAND	PREBLE
0154962	GERRIT SMITH RIVER RD APTS	MADISON	EATON
0155098	MAINE COIL AND TRANSFORMER CO	BROOME	UNION
0155331	PRIDE MANOR PARK (MHP)	BROOME	CONKLIN
0155772	QUALITY HILL MOBILE HOME PARK	BROOME	KIRKWOOD
0156191	BINGHAMTON BOYS CLUB CAMP SERTOMA	BROOME	KIRKWOOD
0156221	PLEASANT VALLEY TRAILER PARK	BROOME	WINDSOR

SPDES Permit No.	Facility Name	County	Municipality
0156299	FENTON - T PORTER HOLLOW RD SD	BROOME	FENTON
0156345	SHERBURNE METAL PRODUCTS, INC	CHENANGO	SHERBURNE
0156370	GOLLOGLY MOBILE HOME SITES	BROOME	BARKER
0156396	BUCKEYE TERMINALS LLC - BINGHAMTON TERMINAL	BROOME	VESTAL
0156418	BELDEN PARK LLC PROPERTY	BROOME	COLESVILLE
0156671	GREATER BINGHAMTON AIRPORT	BROOME	TRIANGLE
0156680	MEADOWBROOK MHP	BROOME	TRIANGLE
0156698	DONNELLY COMMUNITY 2	BROOME	NANTICOKE
0156876	OXFORD - V STP	CHENANGO	OXFORD
0157139	COUNTRY MANOR MOBILE HOME PARK	BROOME	COLESVILLE
0157228	MANNS MOBILE COMMUNITY	BROOME	MAINE
0157252	VESTAL TERMINAL	BROOME	VESTAL
0157287	FIRE FOX COURT	BROOME	NANTICOKE
0157406	WINDSOR SHOPPING PLAZA	BROOME	WINDSOR
0003875	AES WESTOVER	BROOME	JOHNSON CITY
0157490	MIRABITO FUEL GROUP	CHENANGO	GREENE
0213411	GREENE ACRES MOBILE HOME PARK	CHENANGO	GREENE
0213608	SPRINGBROOK LAKE DEVELOPMENT	BROOME	WINDSOR
0213624	SHADY MOBILE HOME PARK	BROOME	LISLE

SPDES Permit No.	Facility Name	County	Municipality
0213934	PARKWOOD SEWER DISTRICT	BROOME	BINGHAMTON
0213942	MORRISVILLE STATE COLLEGE - AQUACULTURE CENTER	MADISON	EATON
0216178	HERTZ CORP SERVICE FACILITY	BROOME	MAINE
0230936	FOREST LAKE CAMPGROUND INC	BROOME	WINDSOR
0231274	CHILDREN'S HOME RTF	CHENANGO	GREENE
0231746	SENIOR LIVING FACILITY	BROOME	BARKER
0231819	ARNOLD PARK COMFORT STATION	BROOME	VESTAL
0231941	WOOD ESTATES	BROOME	COLESVILLE
0232050	S & D PETROLEUM	CORTLAND	CINCINNATUS
0232297	HESS VESTAL TERMINAL	BROOME	VESTAL
0232734	ALBANY INTERNATIONAL	CORTLAND	CORTLANDVILLE
0232840	BINGHAMTON CO-GENERATION PLANT	BROOME	BINGHAMTON
0233111	VESTAL HILLS COUNTRY CLUB	BROOME	BINGHAMTON
0233153	SZCZEPANSKI APTS	BROOME	MAINE
0233200	TOWN OF CHENANGO SEWER DISTRICT # 10	BROOME	CHENANGO
0244139	MOHAWK HOME COMFORT SERVICES (CORTLAND TERMINAL)	CORTLAND	CORTLANDVILLE
0244325	AFTON CENTRAL SCHOOL	CHENANGO	AFTON
0244431	SOUTH OTSELIC FISH HATCHERY	CHENANGO	OTSELIC
0244554	INTERSTATE 81 INFORMATION CENTER	BROOME	KIRKWOOD
0244571	VIRGINIA CITY MOBILE	BROOME	FENTON

SPDES Permit No.	Facility Name	County	Municipality
	HOME PARK		
0244597	LOCKHEED MARTIN - IBM OWEGO	TIOGA	OWEGO
0244805	CORTLAND ASPHALT PRODUCTS	CORTLAND	CORTLANDVILLE
0244881	TIOGA DOWNS RACINO	TIOGA	NICHOLS
0244937	NYSDOT REGION 9 MAINTENANANCE SUBHQ	CHENANGO	BAINBRIDGE
0244945	DANIELS APARTMENT	BROOME	COLESVILLE
0245020	FENDICK'S CAMP GROUND	BROOME	CHENANGO
0245046	POLKVILLE CRUSHED STONE	CORTLAND	CORTLANDVILLE
0261742	MORRISVILLE VILLAGE WASTEWATER TP	MADISON	EATON
0262021	MADISON MARKETPLACE	MADISON	MADISON
0262196	MANLEYS MIGHTY MARTS #16	BROOME	COLESVILLE
0262234	NYS DOT MAINTENANCE SUBHEADQUARTERS	BROOME	CHENANGO
0262242	ST RTE 12 MAINTENANCE HEADQUARTERS	CHENANGO	OXFORD
0262315	NICHOLS ELEM SCHOOL	TIOGA	NICHOLS
0262374	PIT STOP TRAVEL CENTER	CORTLAND	CORTLANDVILLE
0262391	UNITED WATER OWEGO-NICHOLS	TIOGA	NICHOLS
0262480	NICHOLS DISTRIBUTION BEST BUY	TIOGA	NICHOLS
0262552	WHITNEY POINT STP	BROOME	TRIANGLE
0262706	HURON CAMPUS	BROOME	UNION
0024406	BINGHAMTON SEWER SYSTEM OVERFLOWS	BROOME	BINGHAMTON

SPDES Permit No.	Facility Name	County	Municipality
0262676	WEST WINDSOR WASTEWATER TREATMENT PLANT	BROOME	WINDSOR
0262749	VESTAL EMERGENCY SEWER OVERFLOWS	BROOME	VESTAL
0262358	BINGHAMTON WTR TREAT PLT	BROOME	BINGHAMTON
0262366	CASCADE VALLEY STONE PRODUCTS	BROOME	WINDSOR
0262498	GREEK PEAK	CORTLAND	VIRGIL
0075361	MACCORMICK CENTER	TOMPKINS	CAROLINE
0001007	PLEASANT VALLEY WINERY	STEUBEN	HAMMONDSPORT (V)
0032999	VILLAGE OF WAYLAND WASTEWATER TREATMENT PLANT	STEUBEN	WAYLAND (V)
0035424	BATH STATE FISH HATCHERY	STEUBEN	URBANNA (T)
0093076	SWITZERLAND INN	STEUBEN	WAYNE (T)
0099635	HANSON AGGREGATES BRD, GRAVEL PIT #2 - BATH	STEUBEN	BATH (T)
0159450	HAMMONDSPORT MAIN STREET SCHOOL	STEUBEN	HAMMONDSPORT (V)
0159484	PINE WOOD, CAMP	STEUBEN	HORNELLSVILLE
0160610	FREY & CAMPBELL INC.	STEUBEN	
0003859	AES HICKLING LLC	STEUBEN	CORNING
0003883	STEUBEN FOODS PRATTSBURG DIV	STEUBEN	PRATTSBURGH
0003921	CORNING GLASS REFRACTORIES	STEUBEN	CORNING
0003956	CORNING INC-HOUGHTON PARK FACILITY	STEUBEN	CORNING

SPDES Permit No.	Facility Name	County	Municipality
0003972	CORNING INC SULLIVAN PARK	STEUBEN	ERWIN
0003981	CORNING INC - FALLBROOK PLANT	STEUBEN	CORNING
0004081	MOTOR COMPONENTS LLC	CHEMUNG	HORSEHEADS
0004103	CBS CORPORATION	CHEMUNG	HORSEHEADS
0004278	INERGY MIDSTREAM SAVONA LPG FACILITY	STEUBEN	BATH
0021008	DRESSER-RAND RECIPROCATING PRODUCTS	STEUBEN	ERWIN
0035980	KANONA COMFORT STATION #34	STEUBEN	BATH
0035998	CAMPBELL COMFORT STATION #35	STEUBEN	CAMPBELL
0063622	ERWIN MANUFACTURING COMPLEX	STEUBEN	ERWIN
0066621	NYS DOT LOWMAN WAVERLY COMFORT STATION	CHEMUNG	CHEMUNG
0071234	CORNING LINDLEY PRESHO ELEM SCHOOL	STEUBEN	LINDLEY
0071242	FRANK E PIERCE CHILDHOOD CENTER	STEUBEN	CAMPBELL
0080152	NYS DOT HW MAINT SUBDIV	STEUBEN	CAMPBELL
0081744	WESTOVER ESTATES MOBILE HOME PARK	CHEMUNG	ASHLAND
0083453	YORKSHIRE APTS	CHEMUNG	BIG FLATS
0084468	CORNING INC- BIG FLATS PLANT	CHEMUNG	BIG FLATS
0085910	ANCHOR GLASS CONTAINER CORP	CHEMUNG	ELMIRA

SPDES Permit No.	Facility Name	County	Municipality
0095885	CHEMUNG CO POOL BATH HOUSE	CHEMUNG	BIG FLATS
0097004	CHEMUNG CO PARK STA RECREATION AREA	CHEMUNG	ERIN
0098418	CAMP MONTEREY SHOCK INCARCERATION FAC	SCHUYLER	ORANGE
0099155	NEWTOWN BATTLEFIELD RESERVATION	CHEMUNG	ELMIRA
0106216	ELMIRA SOUTHSIDE HIGH SCHOOL	CHEMUNG	ELMIRA
0106526	CORNING INC- W C DECKER BLDG	STEUBEN	CORNING
0107221	ERWIN MANUFACTURING COMPLEX	STEUBEN	ERWIN
0109363	BIG FLATS TERMINAL	CHEMUNG	BIG FLATS
0110531	SOUTH CORNING - V WWTP	STEUBEN	CORNING
0159930	KANONA TRUCK STOP	STEUBEN	BATH
0160873	RESIDENT ENGINEER HDQR	STEUBEN	BATH
0161136	CASTLE CREEK TROUT FARM	STEUBEN	AVOCA
0161926	COLUMBIA GAS GREENWOOD STORAGE FIELD	STEUBEN	GREENWOOD
0162957	GRIFFIN BUILDING	STEUBEN	CORNING
0228133	HARDINGE INC	CHEMUNG	HORSEHEADS
0228354	SUBURBAN HEATING OIL PARTNERS LLC - CAMPBELL BULK PLANT	STEUBEN	CAMPBELL
0228818	STATELINE MART	CHEMUNG	ASHLAND
0229016	MC INROY PROPERTY	CHEMUNG	BIG FLATS
0229512	ARKPORT BULK PLANT	STEUBEN	HORNELLSVILLE

SPDES Permit No.	Facility Name	County	Municipality
0244660	CANASAWACTA COUNTRY CLUB	CHENANGO	PLYMOUTH
0245364	JASPER-TROUPSBURG HIGH SCHOOL	STEUBEN	JASPER
0245526	CORNING INC CORPORATE HEADQUARTERS	STEUBEN	CORNING
0245739	COHOCTON ELEM SCH & BUS GARAGE	STEUBEN	COHOCTON
0245925	KENTUCKY AVE WATER TREATMENT FACILITY	CHEMUNG	HORSEHEADS
0246158	KAPRAL TRAILER PARK	STEUBEN	CAMPBELL
0246174	CUTLER HAMMER	CHEMUNG	HORSEHEADS
0246441	RESIDENT ENGINEERS SUBHEADQUARTERS	STEUBEN	JASPER
0246476	NYSP PAINTED POST POLICE STATION	STEUBEN	CAMPBELL
0246506	WORLD KITCHEN	STEUBEN	CORNING
0246701	CORNING HOSPITAL	STEUBEN	CORNING
0246743	ELMIRA WATER BOARD FILTRATION PLANT	CHEMUNG	ELMIRA
0246948	CHEMUNG CO ELMIRA SWR DIST BAKER RD WWTF	CHEMUNG	CHEMUNG
0246964	AVOCA CENTRAL SCHOOL	STEUBEN	AVOCA
0246999	TROUPSBURG WWTP	STEUBEN	TROUPSBURG
0247251	JASPER-T SANITARY SEWER	STEUBEN	JASPER
0202754	COSLOS RESTURANT	ALLEGANY	ALMOND
0258229	ALFRED-ALMOND CENTRAL SCHOOL DIST	ALLEGANY	ALMOND

The Aggregate Waste Load Allocations include sufficient estimated load to cover these small sources and are subject to a transparent verification program. These non-significant facilities represent less

than 17 and 11 percent of the WLA for nitrogen and phosphorus respectively. Most of these facilities have not been 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. DEC is preparing a permit modification to require nutrient monitoring at all of these facilities with a possible exception for suspended monitoring for those dischargers of exclusively sanitary wastewater less than a permitted flow of 50,000 gallons per day, or for those facilities that meet the definition of negligible nitrogen and phosphorus loadings, below.

An aggregate, edge-of-stream, and Chesapeake Bay delivered annual average wasteload allocation of nitrogen and phosphorus are prescribed at the New York watershed scale for non-significant municipal facilities. The aggregate wasteload allocations are based upon the summation of individual facility loads based upon measured loads, where available. Otherwise an estimate of load was made on several criteria including permitted flow and an estimate of the TN and TP 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. Pollutant reductions are not prescribed by the wasteload allocations for any existing facilities in this subcategory, although the implementation of numeric nutrient criteria may result in future phosphorus limits. By 2017, DEC will demonstrate, through continued review of discharge monitoring reports, compliance inspections, and targeted monitoring, that the aggregate waste load allocations from non-significant facilities is being met.

The facilities in this subcategory operate pursuant to individual SPDES permits. DEC performed a detailed evaluation of the existing permitted facilities meeting the non-significant definition and provided estimates of the wasteload that are intended to allow continued permitting of those existing sources without pollutant reductions. TMDL implementation will be accomplished through the verification of the aggregate loading for existing discharges at the time of permit reissuance.

After the Chesapeake Bay TMDL was issued, DEC identified certain permit omissions and characterization mistakes in New York's Phase I Watershed Implementation Plan. New York conducted a comprehensive review of all wastewater sources in the Phase II process which led to corrections of WIP appendices and also to substantive revision of the wastewater model input deck.

Table 22: New York Bay-Non-Significant WWTPs is the most accurate accounting of New York's existing non-significant municipal facilities and includes more discharges than were identified in the TMDL. Because of these additional dischargers, the aggregate loading from the non-significant discharges is somewhat higher than the Chesapeake Bay Watershed Model version 5.3.2 input as the aggregate loads for this source category. New York also discovered two industrial facilities that have loads comparable to the Bay-significant dischargers so they are now included with the Bay-significant wasteload allocation. By the end of 2012, DEC will provide EPA with a thorough and accurate list of all surface water discharges in the Chesapeake Bay watershed.

4.3: New York's Wastewater Trading and Offset Program

Accounting for Growth in New York's Wastewater Sector

No wasteload allocations are provided for new or expanded discharges from sewage treatment facilities of any size. All such discharges must offset 100% of new loadings and SPDES permits must include enforceable provisions to implement offsets. Municipal facilities may secure offsets by assimilation of existing onsite systems and other existing wastewater treatment systems for which wasteload allocations have been provided. Expansion of flow capacity can also be accommodated by improved treatment to meet the load limits. Additional offset mechanisms may be available upon the development and approval of a comprehensive trading program or through case-by-case offset evaluations as discussed in *Section 4.1: Bay-Significant Wastewater Treatment Plants*. 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.

If new or expanded sources with discharges less than 0.4 MGD are permitted in the future, they will be classified as significant facilities and subjected to individual tracking and reporting requirements consistent with the provisions for existing significant facilities. Upon the request of permittees or future trading/offset partners, existing individual non-significant municipal facilities may be classified and tracked as significant municipal facilities, provided that acceptable flow measurement and nutrient self-monitoring capability is demonstrated. If existing sources are reclassified or eliminated through assimilation by another facility, then their component loads will no longer be included in reported non-significant municipal loadings.

DEC has determined that nitrogen and phosphorus are not pollutants of concern for certain industrial SPDES permit types and/or discharge types because they contain negligible nitrogen and phosphorus loadings. Continued discharge is authorized without specific wasteload allocations. Future new discharges of similar types/characteristics are also allowable without specific wasteload allocations. This provision is necessary to avoid use of limited resources in permitting and/or tracking of sources for which no substantive water quality improvement opportunities exist and to avoid unpredictable complications relative to trading and offsets.

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 intake water.

Wastewater Trading and Offset Program Overview

This section defines the baseline loading reduction expectations for existing sources to achieve TMDL targets. Baseline definition is necessary for offset calculation in accordance with Appendix S of the TMDL. The concepts described in this section may be used in case-by-case offset evaluations or as the foundation for a future comprehensive trading program, however, NYS has not had sufficient time to work with stakeholders on the final details and is still evaluating whether such a program is warranted.

At this time, a comprehensive trading program has not been demonstrated to be needed to accomplish WIP objectives for existing facilities. Nor are resources available for program development or implementation. The primary focus of trading would be traditional point sources subject to SPDES permitting requirements for which the proposed trading methodology provides modest mechanisms to address short term growth at existing facilities. Significant municipal facilities have been granted 2025 waste load allocations taking into consideration existing design flow and with modest treatment upgrades, most have adequate capacity for the near future. Also the “no reduction” waste load estimates for existing non-significant municipal facilities provide direct offset mechanisms if capacity expansion is coupled with improved treatment to maintain established allocations. 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 Chesapeake Bay 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. Furthermore, DEC will consider a comprehensive trading program if resources for administration become available.

Wastewater stakeholders that participated in the public involvement process expressed concerns about the cost of making capital improvements to meet the TMDL waste load allocations dictated in their SPDES permits. Some of the stakeholders expressed interest in a near term focus on point source-to-point source trading, definition of baselines for point sources and recognition that grouping of individual waste load allocations (bubble permits) is an acceptable compliance mechanism. The following section proposes point source baseline requirements. Coupled with the control authority provided by the SPDES permitting process, the baselines will facilitate case-by-case offset assessment and may allow the implementation of allocation adjustments between point sources and in some limited cases nonpoint sources, through a readily definable offset such as a wetland bank or buffer/easement program. Provided the alternative under consideration results in the same delivered loads authorized by the TMDL and that implementation is ensured through NPDES permit requirements. Under those terms, the grouping of individual waste load allocations is an acceptable mechanism.

Stakeholder recommendations will be considered in determining if a comprehensive trading program is needed. Staff and financial resources will need to become available for development and implementation.

Wastewater Trading and Offset Program Baseline

Individual waste load allocations for existing significant municipal and industrial wastewater facilities are identified in *Section 4.1: Bay-Significant Wastewater Treatment Plants*. Similarly, waste load allocation components are provided for existing non-significant municipal and industrial wastewater facilities in *Section 4.2: Bay-Non-significant Wastewater Treatment Plants*. The baselines for existing wastewater sources are the prescribed nitrogen and phosphorus waste load allocations or components. The baselines for the four CSO communities are the loadings resulting from 85% reduction from 2009 NA as represented in the watershed model and the waste load allocations displayed.

Wastewater Offset Calculation and Implementation

The values of offsets are the pollutant reductions beyond baselines with the currency being delivered nitrogen and phosphorous loading. Exchanges between nitrogen and phosphorus are possible equal to the exchange ratios established for the Phase II WIPs - 5.7 N : 1 P in the Susquehanna Basin, but adjusted for delivery factors in sub-basins used in the 5.3.2 Chesapeake Bay Watershed Model. Offsets are not needed for TSS because TMDL TSS targets are model predicted loads associated with attainment of nitrogen and phosphorus caps.

In instances that involve loads from sources other than wastewater treatment plant discharges, offset value calculation will necessitate evaluation by the 5.3.2 Chesapeake Bay Watershed Model. The existing model has documented flaws and case-by-case scenario evaluations that may be somewhat cumbersome and time consuming. But the model is the primary tool available for evaluation of watershed loading until 2017 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 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 public notice and opportunity for comment will be afforded. The SPDES permit will also include requirements that ensure the actions by which offsets will be generated will be accomplished.

4.4: Combined Sewer Overflows

There are three municipalities with Combined Sewer Systems 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 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 installed in-line screens for floatables control, and flap gates on combined sewer overflow structures to prevent backflow from entering the collection system.

- **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 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.

DEC recommends that EPA Region 3 apply its default interim value for CSO waste load allocation based on its assessment of load and 85% 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. DEC projects that this CSO reduction would be in place to help meet the 2017 reduction targets.

CSO Tracking and Reporting Protocols

The three municipal Combined Sewer System facilities have annual reporting requirements. The permittees report the conditions at the WWTP's, the combined sewer overflows, and the amount and quality of stormwater discharged from the facility.

4.5: Outreach to New York's Wastewater Treatment Plants

DEC holds regular conference calls with representatives of the Bay-significant wastewater treatment plants located in New York's portion of the Chesapeake Bay watershed. The calls serve to keep plant superintendents, plant operators, local officials, and consultants up-to-date with the status of the Chesapeake Bay TMDL, New York's Watershed Implementation Plan, and the development of individual waste load allocations for phosphorus and nitrogen for each of the treatment plants.

Calls were held in: December 2011, March 2012, and July 2012. In addition to these conference calls, DEC Division of Water staff participated in a New York Water Environment Association meeting and committee conference calls and communicate individually with representatives of all of the Bay significant treatment plants on a regular basis.

4.6: Phosphorus-Free Dishwasher Detergent

The Dishwasher Detergent and Nutrient Runoff Law (Chapter 205 of the laws of 2010), was signed into law by the Governor of New York on July 15, 2010 and will reduce phosphorus entering the waste

stream. The Dishwasher Detergent and Nutrient Runoff Law amends section 35-105 and adds a new Title 21 to Article 17 of the Environmental Conservation Law.

Highlights of the Dishwasher Detergent and Nutrient Runoff Law include:

- Beginning August 14, 2010, the law prohibited the sale of newly stocked, phosphorus-containing dishwasher detergents for household use
- Starting on July 1, 2013, the law prohibits the sale of phosphorus-containing dishwasher detergents for commercial use.
- There is no change to the phosphorus limits for detergents used to clean dairy equipment or food processing equipment.

This law will help local governments to reduce phosphorus loads and meet water quality standards in areas where there is excessive phosphorus. It will also reduce costs to local governments and private entities required to remove excess phosphorus from stormwater and wastewater, and will improve recreational and other uses of the state's waters.

4.7: Two-Year Wastewater Milestones Narrative Description

In 2008, the Chesapeake Bay Executive Council charged the seven jurisdictions with developing two-year milestones for pollution reduction to the Chesapeake Bay to track the pace of restoration. The two-year milestones provide short-term objectives and are part of an overall accountability framework to assess progress on restoration goals.

New York plans to allow wastewater treatment plants in the Bay watershed to increase their flow over time up to their authorized volume capacity. This increase in flow will occur gradually and will depend on the local economy and growth patterns. According to U.S. Census data compiled by EPA Region 3, the population in New York's portion of the Bay watershed saw a slight decline from 1980 to 2008. This trend is expected to continue. Nonetheless, New York's wastewater milestone commitments are adjusted to reflect the legally authorized discharge flow versus the actual discharge (actual discharges are invariably less than legally authorized discharges). The effect of this adjustment is a nominal increase in nutrient loads at the end of the milestone period compared to the 2009 baseline.

Section 5: Urban Runoff

5.1: Current Loading Baseline and Program Capacity

Urban land use is about 6% of the watershed land use and accounted for approximately 12%, 13% and 30%, respectively, of the total delivered nitrogen, phosphorus and sediment loads from New York in 2009.

To implement the federal Phase II Stormwater Law, DEC developed two general permits: one for Municipal Separate Storm Sewer Systems (MS4) in urbanized areas, and one for construction activities. The permits are part of the State Pollutant Discharge Elimination System (SPDES) program. 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.

Stormwater Trading and Offset Program Baseline

Except for redevelopment in MS4 areas, the baselines for existing regulated and non-regulated urban stormwater sources (including areas for which stormwater associated with industrial activity is regulated by general permits) are the modeled 2010 NA loadings. The MS4 General NPDES Permit capture requirements are the baseline expectation for redevelopment in MS4 areas. The baselines are the loading reductions from 2010 NA associated with the BMPs applied to achieve capture requirements on the affected areas of urban pervious and impervious land.

Municipal Separate Storm Sewer Systems

Discharges from Municipal Separate Storm Sewer Systems (MS4s) in Urbanized or Additionally Designated Areas must be authorized in accordance with a permit for stormwater discharges from MS4s. The most recent MS4 permit is SPDES General Permit GP-0-10-002, available online at http://www.dec.ny.gov/chemical/43150.html. This permit was issued in April 2010, took effect on May 1, 2010, was modified in October 2011, and contains the bulk of EPA-recommended actions. The DEC requirements for regulated small MS4s are included in this document.

On January 10, 2012, the Westchester County (New York) Supreme Court issued its ruling in the lawsuit brought by NRDC, et al. challenging New York's 2010 MS4 General Permit. The Court annulled the general permit and ordered DEC to reissue it with changes made pursuant to their ruling. The portion of the order that annulled the 2010 MS4 permit has been removed from the court's decision, thus the current 2010 permit will remain in full effect while DEC takes an appeal to a higher court. MS4s are expected to continue to implement their programs and submit their annual reports.

The following forms are needed to comply with requirements of New York's *General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems* (GP-0-10-002):

- **Notice of Intent** to obtain coverage under the Municipal Separate Storm Sewer Systems General Construction Stormwater Permit – May 2010.
- **MS4 Stormwater Pollution Prevention Plan Acceptance Form Certification dated January 2010.** This form is used by a regulated, traditional land use control Municipal Separate Storm Sewer System (e.g. town, city, or village) to indicate acceptance of a Stormwater Pollution Prevention Plan (SWPPP) for discharges of stormwater from construction activities that have been reviewed by the regulated MS4.
- MS4 Municipal Compliance Certification and Annual Report Form for MS4s implementing their SWMP plan dated March 2010.

Instructions for Completing the Municipal Compliance Certification Form and MS4 Annual Report for 2009-2010, including;

- Evaluations of progress toward measurable goals

- Description of measurable goals accomplished
- Observations of overall effectiveness of measurable goals
- Monitoring data
- Future planned activities

DEC has a comprehensive enforceable program in place for covered areas. Highlights are:

- Only 6% of land area in New York Chesapeake watershed is urban/suburban
- 2 relatively small urbanized areas (Binghamton, Elmira), 26 municipalities
- The 26 municipalities are small Phase II MS4s
- The 2010 MS4 permit exceeds federal minimums by requiring post-construction stormwater management practices for new construction within the municipal boundaries. MS4s must incorporate SWPPP review into their local approval process
- Permit coverage for construction and post-construction controls extends beyond urbanized areas to municipal boundaries.
- Prescriptive requirements for compliance with the New York State Stormwater Management Design Manual (the Design Manual), including rigorous green infrastructure requirements

Construction Stormwater

According to the EPA Region 3 watershed model, about 0.3% of land in this part of New York is disturbed by construction activity.

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 State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (GP-0-10-001). This permit is available at: http://www.dec.ny.gov/chemical/43133.html. This permit was issued in January 2010, and became effective on January 29, 2010. 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.

Owners or operators with projects covered under the *SPDES General Permit for Stormwater Discharges from Construction Activity* are required to develop and implement a Stormwater Pollution Prevention Plan (SWPPP) that meets criteria set forth by New York State DEC. All SWPPPs must include an erosion and sediment control plan that addresses the potential for pollutants to be discharged during soil disturbance through implementation of practices consistent with the *New York Standards and Specifications for Erosion and Sediment Control*. Many construction sites must also comply with the

New York State Stormwater Management Design Manual to control post-construction stormwater discharges.

The following forms are needed to comply with requirements of New York's *General Permit for Stormwater Discharges from Construction Activity* (GP-0-10-001):

- **Notice of Intent** is a request for coverage under the construction stormwater general permit. The Instruction Manual for completing the Notice of Intent is found in the Construction Toolbox on the DEC website (http://www.dec.ny.gov/chemical/8694.html).
- **Notice of Termination for Construction Activities** dated January 2010. When a construction project is complete and has met the requirements of the construction permit, a Notice of Termination (NOT) form should be completed and submitted to DEC.
- **MS4 SWPPP Acceptance Form** dated January 2010. This form is used by a regulated, traditional land use control Municipal Separate Storm Sewer System (e.g. town, city, or village) to indicate acceptance of a SWPPP it has reviewed.

New York State has adopted a construction stormwater program that is more comprehensive than the national minimum. New York requires a full suite of post-construction water quality and quantity controls on any construction site over 1 acre in size, with few exceptions.[49] Highlights are:

- Requirements for Well Drilling Activities: On April 1, 2010 DEC issued *SPDES General Permit for Stormwater Discharges from Construction Activity* (GP-0-10-001) - *Requirements for Well Drilling Activities*. These requirements apply to well drilling activities that are consistent with the 1992 Generic Environmental Impact Statement (1992 GEIS) for oil and gas well drilling.
- DEC is requiring Construction Stormwater General Permit Coverage for Article 23 Drilling Activities (non-high volume hydraulic fractured wells) that are not covered by the Multi-Sector General Permit. Generally, this means that well activities requiring an Article 23 well drilling permit which disturbs one or more acres of land must also obtain coverage under the DEC General Permit for Stormwater Discharges associated with Construction Activity.
- High Volume Hydraulic Fracturing: DEC has written a draft SPDES General Permit for Stormwater Discharges from HVHF sites and made that draft permit available for public review.
- Comprehensive pre-development planning requirements.

[49]Construction activities that require stormwater pollution prevention plans that only include erosion and sediment controls include soil disturbances of 1 or more acres of land, but less than 5 acres for: 1) Single family home not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E, 2) Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E, and 3) Construction of a barn or other agricultural building, silo, stock yard or pen.

- Comprehensive Green Infrastructure requirements for post construction controls.

Determining Equivalence for Stormwater Practices

Under DEC's SPDES *General Permit for Discharges of Stormwater from Construction Activities* each authorized construction project is required to prepare a Stormwater Pollution Prevention Plan (SWPPP) as a condition of authorization, prior to submitting a Notice of Intent.

The Construction General permit includes requirements for SWPPPs as follows:

- Throughout New York State (not just in regulated MS4 areas), construction sites must comply with the New York State Standards and Specifications for Erosion and Sediment Control (the Blue Book) during construction or show the erosion and sediment control practices to be equivalent to Blue Book practices. The Blue Book is a comprehensive Erosion and Sediment Control Manual available for review at: http://www.dec.ny.gov/chemical/29066.html.

- Throughout New York State (not just in regulated MS4 areas), post construction stormwater management practices must be designed in accordance with the Design Manual or the practices must be shown to be equivalent to practices from the Design Manual. The Design Manual is a comprehensive document that was originally prepared for the Department by the Center for Watershed Protection and finalized in 2001. The Design Manual was updated in 2003 (technical corrections), 2006 (addressing redevelopment), 2008 (adding an Enhanced Phosphorus Removal Chapter), and 2010 (adding Green Infrastructure requirements). The Design Manual is available for review at: http://www.dec.ny.gov/chemical/29072.html.

- All post construction practices must be designed by a "qualified professional" (almost exclusively Professional Engineers). That engineer must sign the Notice of Intent (NOI) certifying the project meets all permit requirements, making the engineer liable for projects not designed in conformance with the Manual.

Sizing Criteria and Review of Notices of Intent

All post-construction practices must meet defined sizing criteria; there is no allowance for "equivalence" for sizing of practices. 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.

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 DEC staff. To be complete, all NOIs must demonstrate compliance with required sizing criteria. The NOI form is available for review at: http://www.dec.ny.gov/docs/water_pdf/noipgr10.pdf.

Review of SWPPPs Outside of Regulated MS4 Areas

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 DEC receives a complete Construction General Permit Notice of Intent.

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 DEC receives a complete NOI. The longer review period gives DEC more time to perform a detailed review of the SWPPP. In addition, DEC may suspend the review period to ask for more information. The longer review period and uncertainty of final acceptance of the project by DEC combined with the comprehensive nature of the Design Manual strongly influences projects to comply with all the requirements of the Design Manual. Tables 19, 20 and 21 summarize the projects that used stormwater management practices not included in the Design Manual.

Table 23: Chesapeake Bay Construction Stormwater Authorizations (2007-2011)

YEAR	TOTAL	NEED FULL SWPPP	DESIGN MANUAL	NON – DESIGN MANUAL	PERCENT NON-DESIGN MANUAL
2007	419	279	240	39	13.9
2008	392	261	223	38	14.5
2009	282	178	166	12	6.7
2010	362	227	206	21	9.3
2011[50]	321	224	212	12	5.4
TOTAL	1,776	1,169	1,047	122	10.4

When broken down to show projects reviewed by MS4s:

All projects:

Table 24: All Chesapeake Bay Construction Stormwater Authorizations

YEAR	TOTAL	NEED FULL SWPPP	DESIGN MANUAL	NON-DESIGN MANUAL	PERCENT NON-DESIGN MANUAL
4/1/09 – 3/31/10	316	202	184	18	9.7

[50] As of December 23, 2011.

4/1/10-3/31/11	407	272	258	14	5.1

Only in regulated MS4 areas:

Table 25: Chesapeake Bay Construction Stormwater Authorizations Reviewed by MS4s

YEAR	*WITHIN MS4	*NEED FULL SWPPP	*DESIGN MANUAL	*NON-DESIGN MANUAL	*PERCENT NON-DESIGN MANUAL
4/1/09 – 3/31/10	64	47	45	2	4.4
4/1/10-3/31/11	98	86	85	1	1.2

Counties: Allegany, Broome, Chemung, Chenango, Cortland, Delaware, Herkimer, Livingston, Madison, Oneida, Onondaga, Ontario, Otsego, Schoharie, Schuyler, Steuben, Tioga, Tompkins & Yates.

Review of SWPPPs by MS4s

Under the MS4 permit, Traditional Land Use Control (cities, towns and villages) MS4s are required to enact a law, equivalent to the New York State Sample Law, available for review at: http://www.dec.ny.gov/docs/water_pdf/localaw06.pdf. The sample law requires compliance with the Blue Book (during construction) and the Design Manual for post construction practices. MS4s may also include more stringent requirements. The MS4 permit requires that MS4s review every SWPPP and inspect every site.

For projects subject to review by regulated MS4s, the MS4 permit requires that the SWPPP be reviewed by a qualified professional and that the MS4s reviewer sign the NOI for authorization under the Construction General Permit signifying MS4 acceptance of the plan.

Key Provisions Added to EPA Model Stormwater Permits

Although the basic structure of New York's Phase II MS4 and Construction Stormwater General Permits was based on EPA model permits, the original architects of New York's Phase II stormwater program added key provisions that improved the effectiveness of New York's program when compared to the EPA base program. The most important of those additions are the robust foundation and connection with technical standards as noted above. Additionally, New York added:

- **Training requirements:** Under the SPDES General Permit for Stormwater Discharges from Construction Activity, certain contractors (Trained Contractor) and certain Qualified Inspectors are required to complete 4 hours of Department-endorsed training in the principles and practices of erosion and sediment control (E&SC) every 3 years. To satisfy this training requirement, DEC has partnered with County Soil and Water Conservation Districts to deliver a

4-hour E&SC training course. In addition, DEC accepts the following training options as meeting the 4-hour endorsed training requirement:

  - The NYS Builders Association online version of the DEC-endorsed 4-hour E&SC course.
  - The 1-day "CPESC Exam Review Course" for those taking the CPESC exam.

- **Owner self-inspection of sites.** This requirement provides a backstop of a third party Qualified Inspector (see below) on-site, preparing inspection reports that are reviewed by DEC inspectors when DEC inspectors visit a construction site.
- **Trained Contractor:** 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 Stormwater Pollution Prevention Plan (SWPPP), identify at least one employee from their company (Trained Contractor) that has received 4 hours of endorsed 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.
- **Qualified Inspector:** 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 NYS) are required to complete 4 hours of E&SC training under the General Permit.
- **Stop Work Order.** Under the Construction Permit, DEC has the authority to stop work at non-compliant sites through a 'Stop Work Order'. This has been an extraordinarily useful tool for regional staff to assure responsive corrections to site non-compliance.
- **Additional Designation for MS4s.** Additional Designation Criteria for areas where MS4s are required to have MS4 SPDES permits beyond urbanized areas (Additionally designated Areas). The Additional Designation Criteria issued in 2003 added MS4 permit coverage requirements to areas of Eastern Long Island and extended permit coverage requirements to the entire New York City, East of Hudson, Drinking Water Watershed. NYSDEC has expanded additional designations in 2008 and 2010.
- **Requirements for Public Review of MS4 Annual Reports.** This requirement allows interested parties input to the MS4 stormwater program development and implementation process.

DEC Teamwork to Implement the New York Phase II Stormwater Program

Implementation of New York's Phase II stormwater program was also marked by establishment of the Stormwater Implementation Team (SWIT). The SWIT is led by co-leaders, one from DEC's Albany headquarters, and one from a regional DEC office. The SWIT collaborates in development of requirements and guidance for stormwater program implementation and coordinates training, inspection, and review activities. Team communication is through the team leaders and is punctuated

by periodic conference calls to discuss implementation issues. The structure is more collaborative than traditional top down program implementation models and has been duplicated in other programs such as the Concentrated Animal Feeding Operation (CAFO) program.

Robust Inspection, SWPPP Review, Compliance Presence

Coordinated by the Stormwater Implementation Team, this has resulted in, at times, one sixth of the SWPPPs being reviewed by DEC staff and one sixth of active construction sites being inspected statewide. These commitments are shifting as construction stormwater oversight is shifting to MS4s and DEC staff becomes more committed to auditing MS4s and inspecting sites outside of the MS4 areas.

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

Mid-Course Improvements in the Phase II Program

In addition to the initial enhancements to the Phase II Stormwater Program, DEC made several mid-course program improvements as well.

- **Longer Construction Notice of Intent Including Design Details:** At the inception of the Stormwater Phase II program, the Notice of Intent (NOI) for authorization under the construction permit did not require particular design information, relying instead upon a simple question of whether the project meets the technical standards. DEC discovered that many applicants tended to check the box that said they met technical standards without confirming the details of that assertion. To better assure projects were actually meeting technical standards, the form was modified to require the applicant to summarize the practices employed during, and post, construction activities, as well as the sizing of the post-construction practices. That information is now available in the DEC NOI database for all projects authorized since 2004.

- **Adding a Redevelopment Chapter to the Design Manual:** The original Design Manual did not distinguish between Greenfield projects and Redevelopment projects. In recognition of the unique opportunity that Redevelopment projects provide for reductions in pollutant loadings, as well as the challenges of designing practices for retrofits, the DEC technology expert developed standards for Redevelopment projects. This chapter provided appropriate minimum standards for redevelopment as well as significantly reducing the number of Redevelopment projects that are submitted that deviate from the State's technical standards.

- **Adding an Enhanced Phosphorus Removal Chapter to the Design Manual:** In the New York City Watershed, the New York City Department of Environmental Protection (NYCDEP) was applying a standard under watershed protection rules for enhanced phosphorus removal that was technically in conflict with the Design Manual. To correct this conflict, DEC's technology expert

developed, with the support of the nationally recognized stormwater experts at Geosyntec, an enhanced phosphorus removal chapter for the Design Manual. This chapter required different sizing criteria (capture and treat the one year storm instead of the 90th percentile storm) as well as some qualitative design improvements and consideration of Green Infrastructure as a practice. This chapter is now the unified requirement of both the DEC construction permit and the NYCDEP watershed protection rules.

- **Stormwater Management Guidance Manual for Local Officials, including sample law:** DEC developed a guidance manual for Implementation of Minimum Measures 4 (Construction) and 5 (Post Construction). 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.

- **Illicit Discharge Detection and Elimination Assistance Document, including model law:** DEC developed an assistance manual for Illicit Discharge Detection and Elimination (IDDE), including a model law. The assistance document includes significant technical details about outfall, sewershed and sewer system mapping.

- **Municipal Pollution Prevention and Good Housekeeping Assistance Document:** This DEC-developed document provides local officials assistance in development of pollution prevention and good housekeeping programs for municipally-owned facilities including examples of programs for eight basic program areas.

2008 and 2010 Stormwater General Permit Renewal Adjustments

In 2008, after the first five years of stormwater program implementation, DEC renewed the Construction General Permit and the MS4 General Permit. In 2008, the Design Manual was also updated to include an Enhanced Phosphorus Removal Chapter (Chapter 10).

Prescriptive Requirements for MS4s

In the first permit term for Phase II stormwater requirements, the MS4 permit included best management practices (BMP) that all MS4s were required to meet (Required BMPs) and a menu of other BMPs that an MS4 could choose to implement (Optional BMPs). This structure followed closely the EPA model for MS4 program implementation. In the first five years of program implementation, DEC frequently encountered MS4s resistant to implementing optional BMPs that were essential to effective stormwater control. In addition, the Ninth Circuit Court rejected the EPA permit that was heavily reliant on BMPs proposed by the permittee. To address the issues that surfaced during the first five years of program implementation, as well as the concerns highlighted by the Ninth Circuit Court decision, DEC issued an MS4 permit with Required BMPs that ensure effective program implementation and Optional BMPs to allow for each MS4 to tailor their program to fit their unique needs. The prescriptive BMPs in New York's MS4 permit are:

- MS4s must make annual reports and Stormwater Management Program (SWMP) Plans available for public review. When a Watershed Improvement Strategy is developed, it would be part of the SWMP plan and thus would be available for public review.

- MS4s must utilize the DEC model Illicit Discharge Detection and Elimination law or equivalent.
- Consistent with the EPA IDDE Manual, MS4s must perform an Outfall Reconnaissance Inventory on all outfalls over the course of five years (approximately 20% per year).
- MS4s must eliminate illicit discharges.
- MS4s must use one of the DEC sample construction laws.
- MS4s must review all Stormwater Pollution Prevention Plans.
- MS4s must use the Design Manual and Blue Book, or equivalent.
- Post construction controls that involve engineering must be reviewed by Professional Engineers.
- MS4s must certify all construction Notices of Intent (NOI) prior to submittal of the NOI to DEC.
- MS4s must inspect all construction sites.
- MS4s must ensure ongoing maintenance of post construction controls.
- MS4s must perform municipal audits of Good Housekeeping and Pollution Prevention Practices every three years.
- MS4s must report explicit information for each minimum control measure to DEC annually.

Enhanced Requirements for Reasonable Potential Areas

For areas where DEC has determined stormwater discharges are a significant portion of the loading to waters with the reasonable potential to violate water quality standards, DEC has included enhanced requirements for MS4s. Those requirements depend on the nature and degree of pollutant contributions for a particular watershed that must meet the enhanced requirements. The types of enhanced requirements include septic inspections, small construction project review (5,000 square feet to 1 acre), enhanced treatment, retrofits, pet waste programs, goose population management, sewer system mapping, catch basin cleaning, and enhanced public education programs.

Public review of MS4 Notices of Intent

DEC offers an opportunity for public review of MS4 Notices of Intent by publishing an announcement in the DEC Environmental Notice Bulletin when a Notice of Intent is received and then posting the NOI on the DEC website. When comments are received, DEC evaluates and addresses them and either proposes a change to the NOI, or explains why no change is necessary.

Revised Annual Report Format

DEC has modified the annual report format to include the data elements in EPA's report format, as well as data required to determine compliance with New York's MS4 permit.

Public Review Process for Stormwater General Permits

In response to public interest in both stormwater permits and the Design Manual, the DEC renewed the Construction General Permit and MS4 General Permit for two years instead of five, and embarked on an unprecedented and demanding two year permit review process. Twelve public meetings were held where parties that commented on the 2008 permit drafts were invited to provide input to development of renewal permits and changes to the Design Manual. Nine of the public meetings were dedicated to discussions about: Better Site Design, Low Impact Development, Green Infrastructure, Inter-municipal agreements, Retrofit Requirements, Public Participation, Numeric Effluent Limits, MS4 Funding, Steep Slopes, Other Impaired Waters Issues, Revisit Retrofits, TMDLs, and Effluent Limitation Guidelines. The final three meetings were dedicated to review of proposed additions to the Design Manual, the draft renewal Construction General Permit, and the draft renewal MS4 General Permit.

From the two year review process, the DEC proposed a revised Design Manual, and draft Construction and MS4 General Permits for renewal. Those documents were public noticed in the Environmental Notice Bulletin in October 2009. Each of the draft documents were reviewed at public meetings conducted during the public comment period in Rochester, Albany, Stony Brook, Carmel, and Syracuse.

Requirements Included in the Design Manual and Blue Book

DEC includes construction and post construction requirements in comprehensive technical standards that are referenced in the MS4 and Construction Permits. DEC chooses to structure the requirements as references because the comprehensive nature (several hundred pages each) of the Design Manual and Blue Book do not lend themselves to be included in permits. If any parts of the requirements are included as explicit permit requirements, the remaining aspects of the design would be considered less important. Whereas all aspects of the technical standards are important for effective stormwater controls, devaluing aspects of design requirements that would diminish program effectiveness.

More Additionally Designated Areas, Including Extending Coverage to Municipal Boundaries for Minimum Measure 4 and 5

Since the renewal in 2008, several Total Maximum Daily Loads (TMDL) were approved by EPA that required MS4s to address the pollutants controlled under the TMDL. For those watershed areas (chiefly far eastern Long Island and the Oscawanna Lake watershed), New York designated those areas as areas that require MS4 permit coverage. In addition, because parties to the two year permit review process recognized the benefit of increased review of construction projects and all construction projects are reviewed by regulated MS4s under Minimum Measures 4 and 5, New York required regulated MS4s to extend coverage to municipal boundaries for Minimum Measures 4 and 5. A map showing the expansion to municipal boundaries is presented as Figure 7: NYS Chesapeake Bay MS4 Areas.

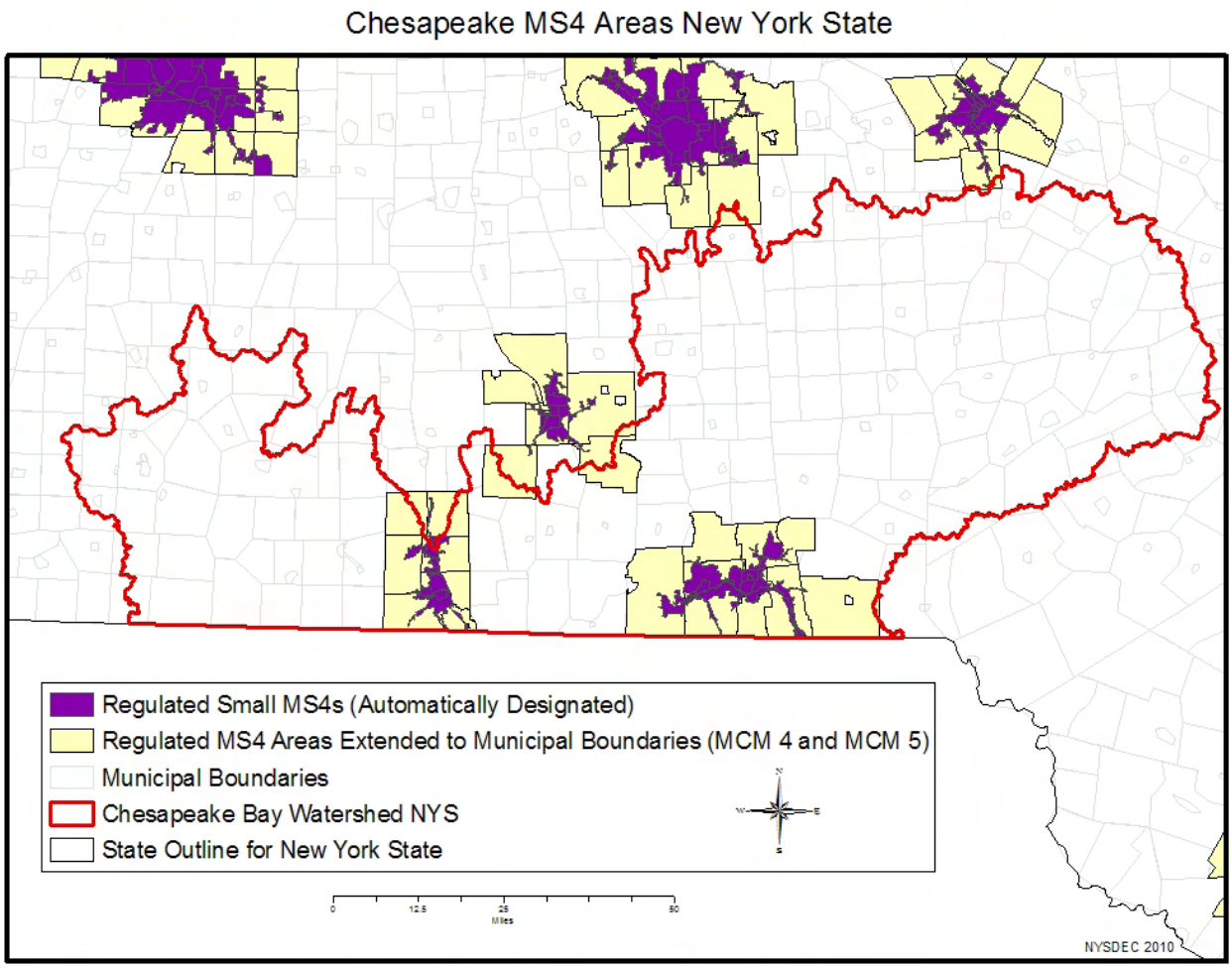
Green Infrastructure Requirements in the MS4 Permit

In addition to the green infrastructure requirements that apply to construction sites and that must be implemented by MS4s, MS4s must also consider implementation of green infrastructure on all municipal construction projects and in development of local codes and plans. In addition, MS4s must assure that local officials receive training on green infrastructure.

Green Infrastructure Stormwater Practices

In 2012, DEC will begin tracking new green infrastructure stormwater practices as required by the 2010 NYS Stormwater Management Design Manual. Tracked practices will include green roofs, rain barrels, and rain gardens.

Figure 7: NYS Chesapeake Bay MS4 Areas



5.2: Commitment and Strategy to Fill Gaps in New York's Stormwater Program

New York does not have any gaps in Urban Stormwater because New York based reductions on implementation of the existing statewide program enhanced by the increased oversight and inspections funded by the Chesapeake Bay Regulatory and Accountability Program (CBRAP).

5.3: Contingencies for Slow or Incomplete Implementation

Urban Runoff

- 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 information EPA Region 3 contractor is developing regarding the cost and effectiveness of urban retrofit practices, including tree planting, riparian buffers, and green infrastructure, to provide guidance to municipalities regarding the implementation of practices that may meet the "maximum extent practicable" standard.

- Consider information being developed by EPA to bolster the detection and elimination of illicit connections.

- Regarding construction stormwater:

    - Consider application of Enhanced Phosphorus Design Guidance

    - Consider excluding stream setback area from General Permit coverage

- Work with EPA Region 3 to help ensure the comprehensive nature of the New York MS4 and construction stormwater programs are adequately reflected in the watershed model.

- Work to help ensure urban BMPS are documented and annually reported to CBP

- Work to better understand contribution from industrial stormwater

Roadside Conveyances

- Work with EPA Region 3 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 for use as bio-retention structures. The large network of rural roads makes roadside ditches an important pathway and innovative opportunity to abate stormwater runoff for both quality and quantity issues.

- Although many do already, seek to expand hydro-seeding and mulching capacity so that all County Soil and Water Conservation Districts have the capacity to assist local road maintenance.

- Investigate need to develop management practice regarding disposal practices for soil excavated from roadside ditches.

5.4: Reporting NYS Stormwater BMPs to the EPA Chesapeake Bay Program

EPA has contracted with Tetra Tech to support better reporting of DEC stormwater best management practice (BMP) data to the Chesapeake Bay Program for inclusion in the Chesapeake Bay watershed model. The work performed by Tetra Tech is divided into two tasks: **Stormwater Practice Reporting** and creation of a **Stormwater Decision-Making Tool**.

- **Stormwater Practice Reporting:** Tetra Tech has developed a stormwater BMP reporting tool that will convert New York construction stormwater BMP data into a format that can be reported to the Chesapeake Bay Program through the National Environmental Information Exchange Network (NEIEN) for inclusion in the Chesapeake Bay Watershed Model.

- **Stormwater Decision-Making Tool:** Tetra Tech will create a version of the Spreadsheet Tool for Estimating Pollutant Load (STEPL) customized with New York-specific data (e.g. soil type, precipitation, and land-use information). Using data collected through New York's construction and MS4 general permits, the decision-making tool will help DEC and local MS4 employees calculate nutrient load estimates, reduction estimates (resulting from implementation of stormwater BMPs), and pollutant load scenarios for New York's MS4s.

5.5: Outreach, Partnerships and Support through New York's Stormwater Programs

Outreach and Coordination with Local Partners

Through funding and shared goals and responsibilities, the architects of New York's Phase II stormwater program also inculcated the principal of partnership into program implementation. DEC works closely with regulated Municipal Separate Storm Sewer Systems, but has also developed assistance programs with other partners such as Soil and Water Conservation Districts (SWCD) through the State Committee and the NYS Department of Agriculture and Markets; Regional Planning Councils through the NYS Association of Regional Councils (NYSARC); and County Water Quality Coordinating Committees, through the Regional Planning Councils. 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.

The DEC partnership with the SWCDs helped train over 2,000 contractors in erosion and sediment control to meet the additional requirements added to the Construction Stormwater General Permit in 2008.

Important partners in the Susquehanna and Chemung river basins, from the NYS Association of Regional Councils, include the Southern Tier Central (STC), Southern Tier West (STW), and Southern Tier East (STE) Regional Planning and Development Boards. Support for County Water Quality Coordinating Committees is a priority for all three regional planning councils. 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 Soil and Water Conservation Districts to implement strategies that identify and set local priorities.

Southern Tier Central provides technical support for improved management of stormwater runoff in order to prevent local drainage problems, avoid escalating flood risks, and protect water quality. STC

also supports the Chemung County Stormwater Coalition[51], which was established in 2002 to assist urbanized municipalities in the Elmira area meet New York MS4 permit requirements, and the Rural Stormwater Coalition[52], which enables regional delivery of stormwater education and training programs. The Coalition enables regional delivery of stormwater education and training programs.

The following are examples of local programs led by the Rural Stormwater Coalition:

- **Storm drain markers:** With funding from the STC Rural Stormwater Program, the Coalition purchased storm drain markers to let people know that whatever goes down the grate drains into nearby lakes and streams in Chemung, Schuyler and Steuben counties.

- **Improved residential stormwater management:** Funding from a Finger Lakes – Lake Ontario Watershed Protection Alliance Special Projects Grant enabled the Coalition to promote improved management of runoff from home sites. Several workshops provided training in the use of rain barrels and rain gardens to reduce the volume and velocity of stormwater runoff. More than 150 rain barrels have been distributed to homeowners throughout Chemung, Schuyler, and Steuben counties and each county built a rain garden demonstration area with educational signs.

- **Educational handouts:** STC staff developed educational handouts for the Rural Stormwater Coalition and others to distribute: "Rainwater: A Resource for Homeowners", "Building a Rural Driveway", Rural Stormwater Flow Chart for construction sites (for Schuyler and Steuben County Code Enforcement Officers), and Illicit Discharge Protocol for Chemung, Schuyler, and Steuben Counties.

Funding to Support New York's Local Stormwater Programs

Three salient areas of funding provide support to stormwater programs:

- **Water Quality Improvement Projects:** Non-agricultural non-point source grants are provided through the Division of Water's Water Quality Improvement Projects (WQIP) grant program (see http://www.dec.ny.gov/pubs/4774.html for more information on WQIP). Under this program, $14.9 million has been committed to MS4s to assist in MS4 program development.

- **MOU with NYSDAM:** Through a Memorandum of Understanding with the NYS Department of Agriculture and Markets, DEC has provided significant funding to Soil and Water Conservation Districts for training, plan review and site visits and to Syracuse University and the State

[51] Information about the Chemung County Stormwater Coalition can be found on the Southern Tier Central Regional Planning and Development Board website at: http://www.stcplanning.org/index.asp?pageId=34 and on the Chemung County Stormwater Coalition website at: http://chemungstormwater.org/.

[52] The Rural Stormwater Coalition includes Chemung, Schuyler, and Steuben counties. Information about the Rural Stormwater Coalition can be found on the Southern Tier Central Regional Planning and Development Board website at: http://www.stcplanning.org/index.asp?pageId=122.

University of New York, College of Environmental Science and Forestry for training and development.

- **Clean Water Act Section 604(b):** The 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 make awards 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, DEC supports regional planning councils around the state, including Southern Tier West, Central, and East.[53]

Stormwater Training Programs

The training of designers and reviewers is an informal, preventative compliance activity that is very cost effective. Designers generally want to develop designs that comply with all applicable requirements. Training allows designers to better understand the requirements and reviewers to better understand what to accept.

Since the inception of the Phase II stormwater program, New York has invested substantial resources in stormwater training through DEC staff; Syracuse University; The State University of New York, College of Environmental Science and Forestry; Soil and Water Conservation Districts; Regional Councils; Cornell Cooperative Extension; NYS Department of State; NYS Department of Transportation; Cornell Cooperative Extension; and other agencies. Training targets Developers, Design Professionals, Municipal Officials, and Construction Inspectors. Design professionals and professionals that review Stormwater Pollution Prevention Plans receive between 500 and 1,000 training days per typical year.

Under the SPDES General Permit for Stormwater Discharges from Construction Activity, certain contractors (Trained Contractor) and certain Qualified Inspectors are required to complete 4 hours of DEC-endorsed training in the principles and practices of erosion and sediment control (E&SC) every 3 years. To satisfy this training requirement, DEC has partnered with County Soil and Water Conservation Districts across New York to deliver a 4-hour E&SC training course.[54]

Outreach on the DEC Website

DEC's Division of Water maintains a "Public Review Documents" webpage[55] where information is posted about documents that are available for public review and comment. Documents posted on this webpage are usually announced through DEC's Environmental Notice Bulletin[56], a weekly publication required by New York's Environmental Conservation Law. DEC also uses the MakingWaves email

[53] Information about the 604(b) funding program is on the DEC website at: http://www.dec.ny.gov/lands/53122.html.

[54] DEC maintains a calendar of stormwater training opportunities online at: http://www.dec.ny.gov/chemical/8699.html.

[55] The Public Review Documents webpage is available at: http://www.dec.ny.gov/chemical/41392.html.

[56] The Environmental Notice Bulletin is available at: http://www.dec.ny.gov/enb/enb.html.

listserv[57] and an email list of all MS4 permit holders as outreach tools to announce activities of the Division of Water. Stormwater topics are among the items announced via the MakingWaves listserv and are the focus of the MS4 permit holder email list.

5.6: Residential Fertilizer Use

Legislation was signed into New York law on July 15, 2010[58], to limit the use of fertilizer containing phosphorus on lawns and non-agricultural turf. This legislation holds promise to reduce phosphorus in urban runoff.

A new Environmental Conservation Law §17-2103 will prohibit 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. A new ECL § 17-2103 requires retail stores to comply with the requirements of Agriculture and Markets Law § 146-g related to the display of phosphorus fertilizer and the posting of educational signs. It would also prohibit 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. This new Title 21 will not impair or supersede the authority of the Commissioner of Agriculture and Markets under Articles 10 and 25-AA of the AML. ECL §17-2105 will allow local governments to adopt more stringent standards for non-agricultural fertilizer applications after demonstrating to the Department that such action is necessary to address local water quality conditions.

Section 4 of this bill will add a new ECL § 17-1945 to provide for the enforcement of Title 21 of Article 17. This new section will provide that a New York owner, owner's agent or occupant of a household who violates a New York provision of Title 21 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 a New York provision of Title 21 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.

Section 6 of this bill will add a new section AML § 146-g 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, and to post a sign in the location where phosphorus-containing specialty fertilizer is displayed stating that phosphorus runoff poses a threat to water quality, and therefore phosphorus-containing fertilizer may only be applied to

[57] The MakingWaves listserv is available at: http://lists.dec.state.ny.us/mailman/listinfo/makingwaves.

[58] http://open.nysenate.gov/legislation/bill/S3780B.

lawn or non-agricultural turf when a soil test indicates a phosphorus deficiency or new lawn or non-agricultural turf is being established.

Section 6:Compliance and Enforcement

6.1: Introduction to the DOW Compliance and Enforcement Program

DEC protects New York's water resources through various regulations, policies, and partnerships. The agency's Division of Water, Bureau of Water Compliance (BWC), with support from the Office of General Council and the Division of Law Enforcement, manages the compliance and enforcement elements of the State Pollution Discharge Elimination System (SPDES) Permit Program and enforcement against those discharging to the waters of the state without a permit or beyond the authority of their permit.

6.2: Water Quality Management

To address current challenges and ongoing needs, DOW implements its policy and priorities on a continuous basis through the water management cycle (see *Figure 8: Watershed Management Cycle*). This cycle consists of five basic steps, each interdependent upon one another. These steps are:

- Monitoring
- Assessment
- Planning and Management
- Implementation and Permitting
- Compliance and Enforcement

Figure 8: Watershed Management Cycle

Monitoring

DEC gathers information on the health of the state's waters by monitoring important characteristics such as pH, dissolved oxygen, temperature, and numerous chemical and biological components in key locations throughout the state. This data is supplemented with the results of aquatic organism sampling, as the type and number of these organisms assist in determining the health of a waterbody. Monitoring data become part of DEC's The DEC Waterbody Inventory/Priority Waterbody List.

Assessment

A key element of assessment includes assigning a 'best use' for a waterbody, such as being a source of drinking water or being used for swimming or fishing. Water quality standards establish criteria for defining the maximum level of pollutants allowable for a waterbody to still meet its best-use classification. DEC maintains a The DEC Waterbody Inventory/Priority Waterbody List[59] of the waters that do not meet standards, or are unable to support their designated best uses and a CWA Section 303(d) list of those non-supporting waters that require development of a Total Maximum Daily Load (TMDL).

Planning and Management

Water resources found on the Priority Waterbodies List (PWL) have problems attributable to different sources of pollution such as malfunctioning sewage treatment plants, street runoff during storm events, or contaminated runoff from industrial, farming, or construction activities. DEC uses the PWL to manage water resources and plan staff assignments. Examples of water quality management plans currently underway are upgrades to municipal wastewater systems discharging to Onondaga Lake and the Long Island Sound. Upgrades will enhance the removal of phosphorus and nitrogen. Excessive amounts of these nutrients in wastewater discharge support undesirable plant growth and reduce oxygen available to aquatic life.

Implementation and Permitting

Monitoring, assessment, and management planning all contribute to implementation of the SPDES Permit Program. SPDES permits issued for discharges to waters of the state may contain performance standards that protect water quality. They also may include schedules of compliance that require the permittee to upgrade or install new treatment technology by a specific date. In addition, DEC works cooperatively with local governments and organizations to encourage control of non-point sources of pollution, such as polluted runoff from stormwater and agriculture operations.

Compliance and Enforcement

Compliance assurance and enforcement includes the evaluation of discharge monitoring reports that dischargers submit as a condition of their SPDES permit. DEC evaluates these reports to determine the compliance status of a facility. DEC also relies on facility inspections and other reports, such as monthly operating reports, to determine compliance status. Upon identifying a minor violation of a SPDES

[59] Visit the DEC Waterbody Inventory/Priority Waterbodies List webpage (http://www.dec.ny.gov/chemical/23846.html) for more information.

permit, DEC may initiate informal enforcement action by sending a warning letter or a Notice of Violation (NOV) to promote a voluntary return to compliance. When a voluntary return to compliance does not occur, or as conditions may warrant, formal enforcement action is considered. Formal enforcement actions include an Order on Consent, Notice of Enforcement Hearing and Complaint, Cease and Desist Directive, Commissioner's Order, or a ticket issued by an environmental conservation officer (ECO).

6.3: SPDES Program Overview

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

DEC implements the SPDES program through the issuance of wastewater discharge permits, including both individual permits and general permits. These permits establish stringent performance standards and operating conditions designed to protect the state's waters.

- 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.

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

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 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 6 NYCRR Part 750-2. This regulation contains requirements that are applicable to all permittees, including records retention, proper operation and maintenance of a treatment plan, and requirements to report treatment plant bypasses and non-compliance events to DEC.

One unique feature of the SPDES program is the self-monitoring requirement for each permittee. Because of this DEC receives, each month, a vast amount of data indicative of the quality of wastewater discharged throughout the state from SPDES-permitted facilities. A SPDES permit requires

the owner to use a laboratory approved by the Environmental Laboratory Approval Program (ELAP)[60], a New York State Department of Health (DOH) program, for the analysis of samples required by the SPDES permit.

To further ensure compliance with SPDES permits DEC maintains an active field presence through nine regional offices, with additional support from staff in the Albany headquarters. 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.

When non-compliance and/or violations occur, DEC has a variety of enforcement measures to encourage or compel the facility to return to compliance. For less serious violations DEC may take informal enforcement action requiring follow-up action by making a phone call or site visit, or by sending a letter. For more serious violations DEC may commence formal enforcement action involving legal staff.

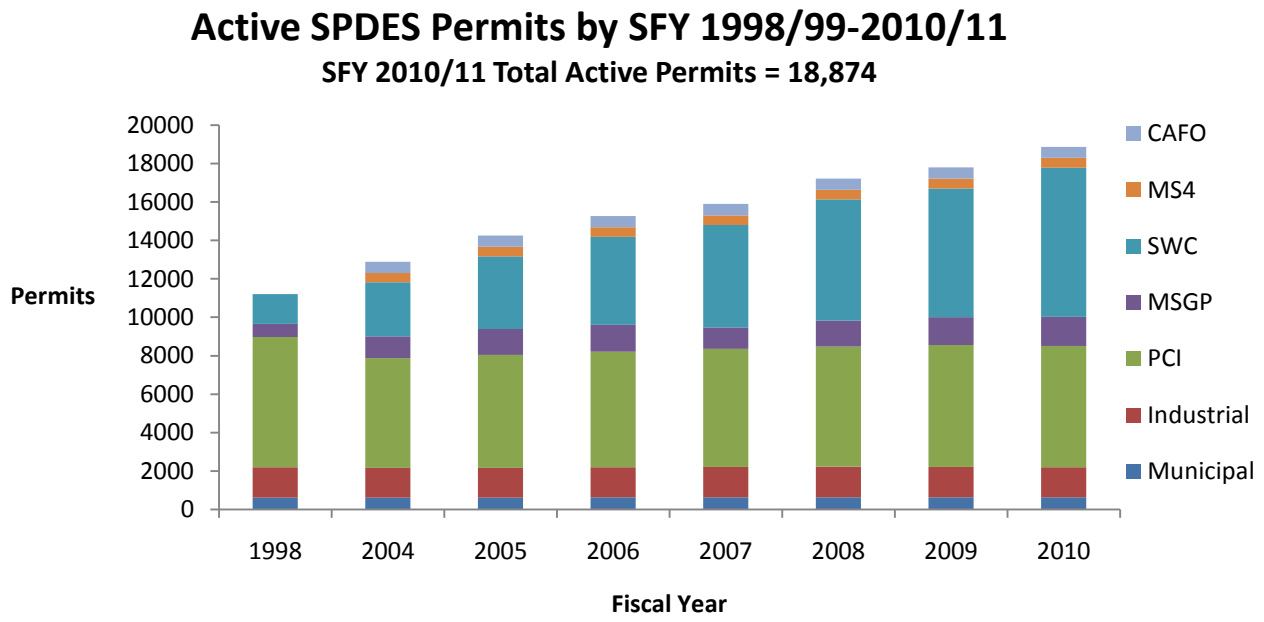
6.4: SPDES Permits in Effect

The purpose of a SPDES permit is to regulate the discharge of wastewater and protect the receiving water's quality. Since 1998, the number of facilities covered under an individual or general SPDES permit in New York State has increased significantly from 11,210 facilities in state fiscal year (SFY) 1998/99, to 18,874 facilities in SFY 2010/11, an increase of 68%. *Figure 9: Active SPDES Permits by SFY (1998/99-2010/11)* below, shows the recent trend for SPDES permits, including the baseline total in 1998. Nearly all of this growth is attributable to the addition of four new classifications of General SPDES Permits, covering the following types of facilities:

- Concentrated Animal Feeding Operation (CAFO)
- Municipal Separate Storm Sewer System (MS4)
- Multi-Sector General Permit (MSGP)
- Stormwater Discharges from Construction Activities (SWC)

[60] http://www.wadsworth.org/labcert/elap/elap.html

Figure 9: Active SPDES Permits by SFY (1998/99-2010/11)



DEC issues individual SPDES permits for three discharge categories:

- **Municipal:** This category includes all Publicly Owned Treatment Works (POTW, as defined by Section 201 of the CWA[61]), 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. In SFY 2010/11, there were 633 POTWs in New York.

- **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. In SFY 2010/11, there were 1,556 industrial facilities in New York.

- **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 wastewaters 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. PCI facilities requiring individual SPDES permits are classified as minor or non-significant. In SFY 2010/11, 6,321 PCI facilities discharged under an individual SPDES permit.

[61] http://epw.senate.gov/water.pdf

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. DEC has issued general permits covering the following categories of dischargers:

- **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. In SFY 2010/11, there were 7,763 sites covered under this SPDES general permit.

- **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 DEC designates as requiring this type of permit. In SFY 2010/11, there were 1,518 MSGP sites covered under this SPDES general permit.

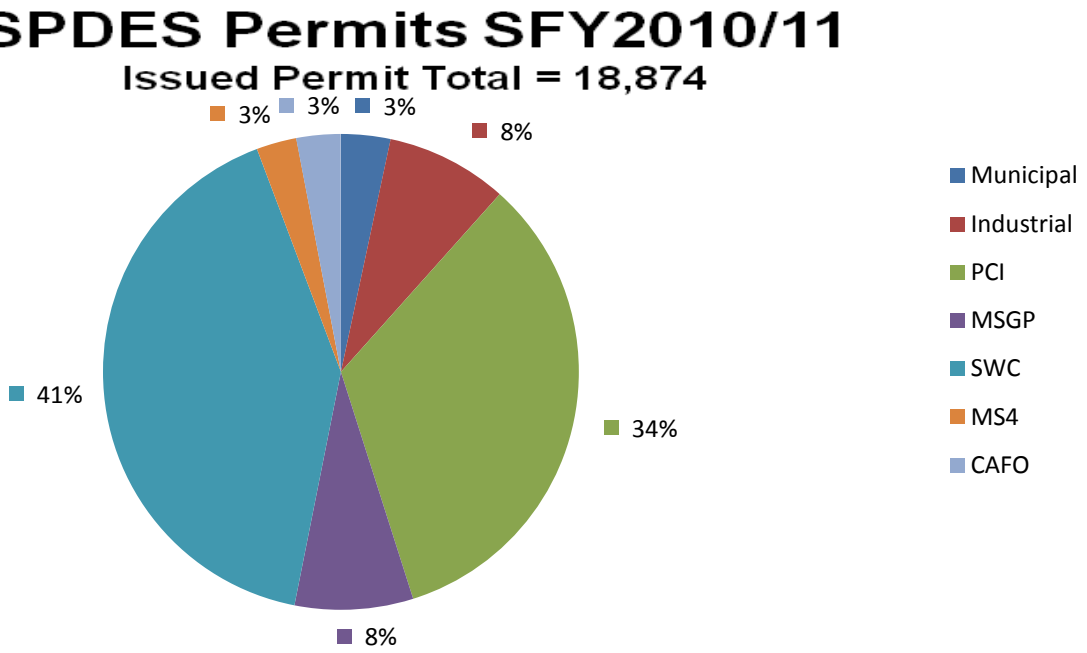
- **Municipal Separate Storm Sewer System (MS4):** This general permit covers separate storm sewer systems carrying stormwater and runoff from a city, town, or village that are not part of a combined sewage system and that discharge to surface waters of the state. In SFY 2010/11, there were 514 MS4s in New York.

- **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). In SFY 2010/11, there were 569 permitted CAFOs in New York.

- **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.

The percentage of SPDES-permitted facilities in each discharge category is shown in *Figure 10: SPDES-Permitted Facilities by Discharge Category (SFY 2010/11)* below.

Figure 10: SPDES-Permitted Facilities by Discharge Category (SFY 2010/11)



The following general permits are under development by DEC:

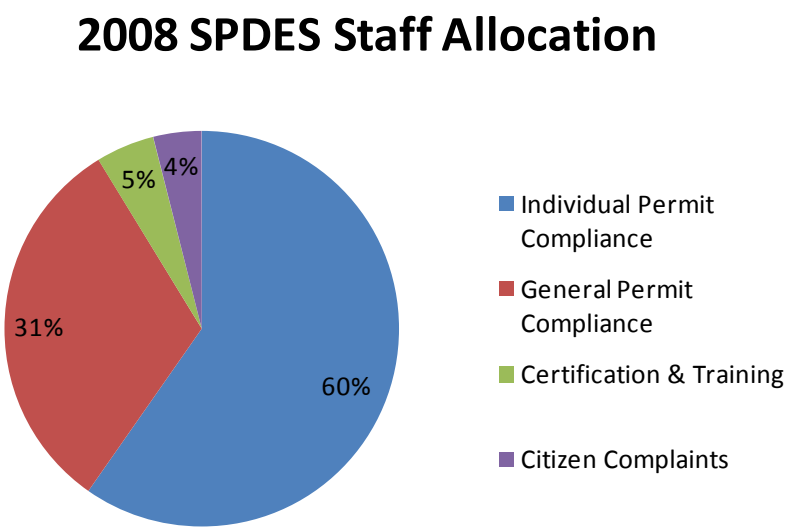
- **Winery:** To regulate wastewater originating from the production of wine.
- **Aquatic pesticides:** To regulate the application of pesticides registered for use on surface waters.

DEC will evaluate the resources necessary to ensure compliance with these categories of dischargers as part of the work planning process. Additional information about SPDES permits is available online at: www.dec.ny.gov/permits/6054.html.

6.5: SPDES Work Planning and Staffing

A significant activity of Division of Water staff is to ensure compliance with SPDES permits. Activities relating to compliance assurance include inspection of SPDES-permitted facilities, review of discharge data, sampling and water quality analysis, certifying wastewater treatment facility personnel, investigating citizen complaints, and supporting staff at DEC's nine regional offices. Figure 11 details staff time expenditures for 2008 during which there were 70 full-time employees focusing on SPDES compliance and enforcement activities.

Figure 11: 2008 SPDES Staff Allocation



Although the number of permits has risen nearly 100% over the past 10 years, staff overseeing the activities of these permittees has been nearly constant.

Goals for DEC's compliance assurance activities are defined in the annual work planning process. This work plan identifies such components as the number of facility inspections to conduct, the specific permit classes to target for enforcement action, and the response to those discharges causing impairment within a specific water basin. The work plan also sets priorities to meet the compliance goals set by DEC and EPA. This plan is an integral part of DEC's water activity commitments in the annual Performance Partnership Grant from EPA. This grant funds a substantial portion of DEC's water quality programs relating to the water management cycle.

Support for DEC SPDES Program from EPA CBRAP Grant

DEC received an EPA Fiscal Year 2010 Chesapeake Bay Regulatory and Accountability Program (CBRAP) grant to increase staff resources to support – among other activities – compliance monitoring, enforcement follow-up, reviews, reporting, inspections, investigations, audits, corrective actions, and assistance visits. DEC Division of Water central and regional office staff will use these activities to ensure compliance with the terms and conditions of State Pollutant Discharge Elimination System (SPDES) permits. These activities will focus on the control of significant sources of nutrients and sediment and the implementation of the 1987 DEC/EPA Enforcement Agreement for Water.

The CBRAP grant is described in more detail in *Section 7: Chesapeake Bay Regulatory and Accountability Program Grant*.

6.6: SPDES Program Monitoring and Compliance

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 and situations
- Requiring certification of wastewater treatment plant operators and providing technical and regulatory assistance and training

Discharge Monitoring Reports

The cornerstone of DEC's surveillance program involves receiving a DMR on a recurring basis. Any SPDES-permitted facility identified as being a "significant" facility is required to periodically report sample results representative of the discharge from that facility. Each month, DEC receives nearly 1,600 DMRs reporting data on a monthly, quarterly, semi-annual, or annual basis, depending on the requirements of the SPDES permit for that facility. In SFY 2010/11, DEC received over 20,000 DMRs that contained nearly 500,000 data points.

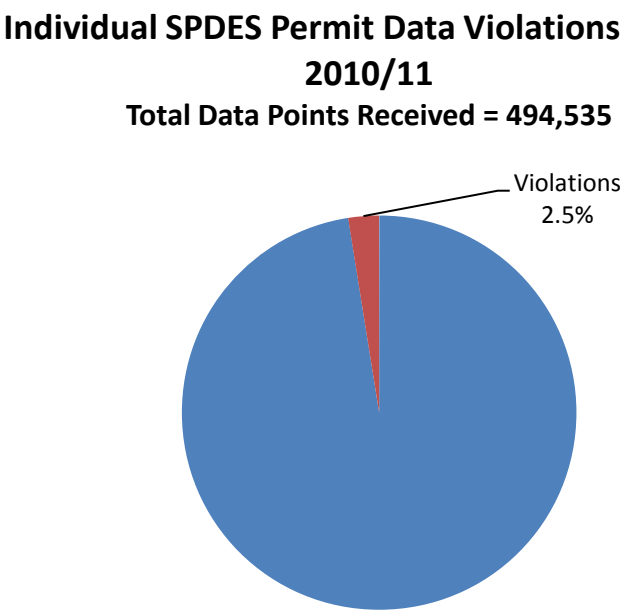
The DMR provides DEC with sampling data that is evaluated to determine the compliance status of a permitted facility by comparing actual effluent discharge quality to the SPDES permit limits. DEC enters this effluent quality data into EPA's compliance data system. DEC and EPA use this data system to detect violations and support further compliance and enforcement activities. As shown in *Figure 12: Individual SPDES Permit Data Violations (SFY 2010/11)*, data received by DEC indicates that 97.5% of all monitored effluent values comply with the respective permit limits.

A distinctive feature of the SPDES program is the requirement of the permitted facility to monitor discharge water quality and report these findings to DEC. Once DEC receives these data from the facility owner or permit holder it is entered into a nationwide information management system operated by EPA. Through this system 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 an ELAP accredited laboratory to analyze a representative sample being discharged. Generally, smaller facilities or those discharging to groundwater must maintain these data results for DEC review during an inspection, while larger facilities and those discharging to surface waters must report directly to DEC the results of these laboratory tests.

Using EPA's data system, each violation is further scrutinized by DEC (and EPA) staff to determine the severity of the violation. DEC is responsible for initial response to any violation, although EPA can take action through the federal CWA and its agreement with DEC.

Figure 12: Individual SPDES Permit Data Violations (SFY 2010/11)



Reported discharge data for SPDES-permitted facilities is accessible from the EPA Enforcement and Compliance History Online (ECHO) webpage at: www.epa-echo.gov/echo/index.html.

EPA/NYSDEC Enforcement Agreement

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 Significant Non-Compliance (SNC)
- Identifying facilities that require enforcement action to restore compliance
- 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 Significant Non-Compliance (SNC). SNC consists of more severe violations, including:

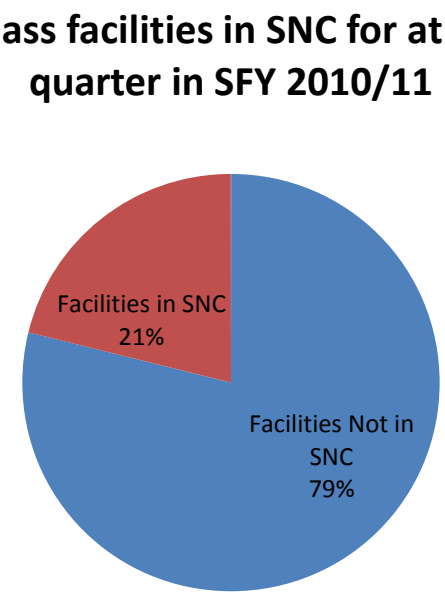
- Discharge monitoring values exceeding an EPA-accepted threshold
- A facility's failure to provide a specific document or report required as a condition in a legally binding Order on Consent or other enforcement action

- 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. 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 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.

To learn more about the compliance history of a SPDES permitted facility, visit the EPA Enforcement and Compliance History Online (ECHO)[62] website.

Figure 13: Major-Class Facilities in SNC for at Least One Quarter (SFY 2010/11)



The SNC rate provides a summary of facilities that met the SNC criteria at least once during the entire year. As shown in *Figure 13: Major-Class Facilities in SNC for at Least One Quarter (SFY 2010/11)* above, the SNC rate for the 346 major SPDES-permitted facilities in NYS was 21%. This is a slight increase from the previous year's rate of 19%, but still compares favorably to the national average of 24%, as reported in the EPA Clean Water Act Enforcement Action Plan.[63]

Given this rate of SNC, it is notable that the majority of facilities comply with the requirements of their SPDES permit. The SNC rate presented here provides a summary of facilities which met the SNC criteria at least once during the entire year.

[62] http://www.epa-echo.gov/echo/.

[63] http://www.epa.gov/oecaerth/civil/cwa/cwaenfplan.html.

A facility can have a violation or meet the SNC criteria for a variety of reasons. These reasons may include operational issues, temporary process upsets caused by illegal dumping into the sewer system, or factors that remain unknown until thoroughly investigated. However, with properly trained personnel and good operational and maintenance programs, treatment facility operators usually make corrective actions before a violation becomes SNC.

While the rate of SNC in New York State is comparable to the national figure, New York is unique in the number and ages of facilities it permits through the SPDES program, primarily municipal wastewater treatment facilities. Having long been leaders in providing water quality protection through the collection and treatment of wastewater, many of New York's systems are reaching the end of their effective lives. Presently, they serve over 15 million state residents.

Once a collection and treatment system reaches the end of its useful life, unexpected or even catastrophic failure may occur, potentially impacting public health and the environment. Recent efforts at the federal and state level have sought to identify these impacts and obtain the necessary public investment to ensure continuation of effective treatment and disposal of wastewater.

In 2008, DEC released the report, Wastewater Infrastructure Needs of New York State,[64] which details the history and outlook for municipal wastewater collection and treatment in the state. This report indicates that the projected 20-year needs of New York's municipal wastewater treatment facilities are in excess of $36 billion. A national review of wastewater collection and treatment needs is available from EPA at: http://water.epa.gov/scitech/datait/databases/cwns/.

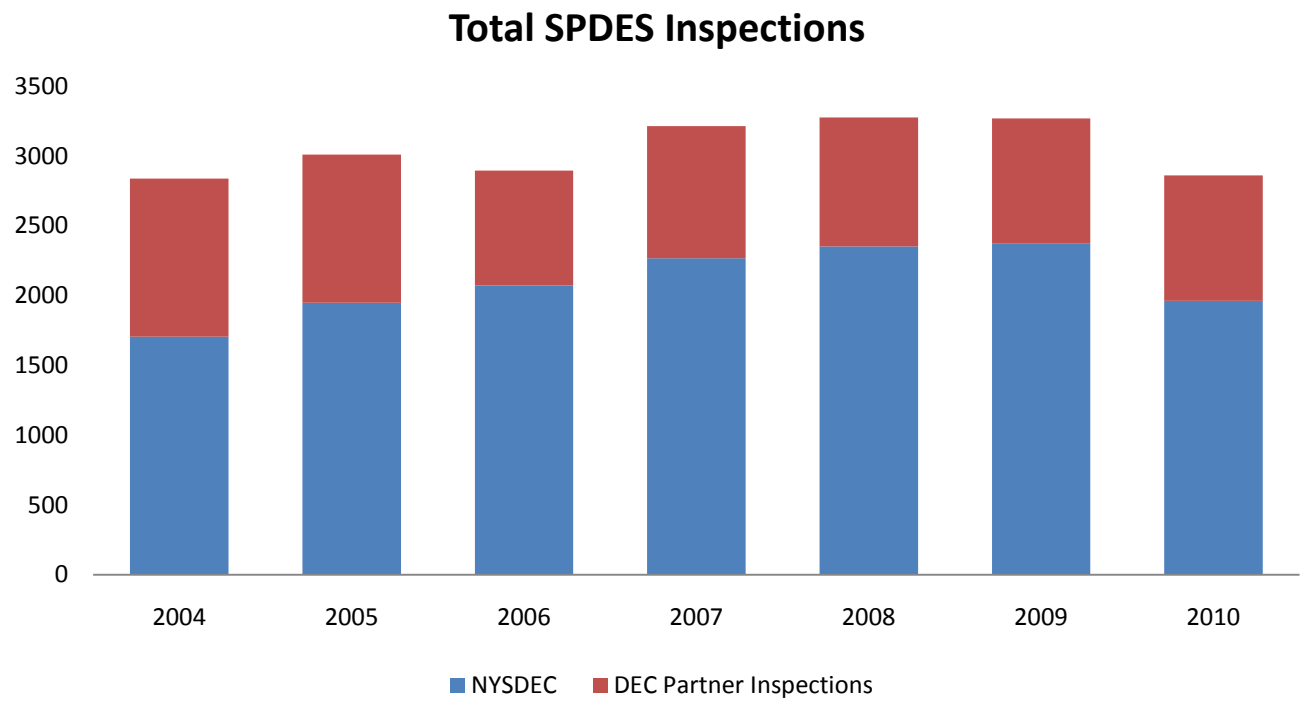
Inspections

Inspections are an essential component in DEC's approach to facility compliance. These visits allow for on-site review of self-monitoring data and relevant laboratory data, observation of the treatment process and discharge characteristics, and assessment of health and safety issues.

In the last 3 years, DEC has conducted an average of nearly 2,400 compliance inspections, with an additional 900 performed by partner organizations such as county health departments. Inspections can be brief to observe only critical elements of the operation, more comprehensive and involving sampling of water discharged for comparison to DMR data, or they can occur in tandem with other regulatory organizations such as EPA. The DOW annual work plan commits staff to focus on facilities having a greater potential for impact to the receiving water. *Figure 14: Total SPDES Inspections (2004-2010)* depicts SPDES inspection activity over the past 7 years by DEC and partner organizations, including EPA and county health departments.

[64] http://www.dec.ny.gov/docs/water_pdf/infrastructurerpt.pdf.

Figure 14: Total SPDES Inspections (2004-2010)



Citizen Complaints

Inquiries and complaints by citizens and observations of possible violations assist DEC's SPDES program compliance and enforcement efforts. DEC investigates these complaints to determine any impact upon the environment or public health. If staff finds a violation, DEC seeks corrective action to minimize impacts and, if necessary, pursues enforcement through the Office of General Counsel or Division of Law Enforcement.

Certification and Training

Competent and credentialed operators serve as frontline defenders of public health in their own communities. Since 1937, New York State has required certification of municipal wastewater treatment plant operators. Part 650[65] 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 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 DEC-approved training. Over 3,100 individuals currently possess DEC-issued wastewater treatment operator certificates.

[65] http://www.dec.ny.gov/regs/4624.html.

A reduction in staff led Division of Water management to find alternative solutions in implementing the operator certification program. DEC works cooperatively with the New York Water Environment Association (NYWEA) and New England Interstate Water Pollution Control Commission (NEIWPCC) to assist in meeting some of the operator training needs. During SFY 2010/11, DEC, with assistance from NYWEA and NEIWPCC, delivered a total of 12 seminars and workshops. These outreach events were held in locations across the state and focused on topics such as:

- Operations and maintenance
- Process control
- Nutrient removal
- Sample collection and laboratory analysis
- Control of fats, oils, and grease (FOG)
- Energy consumption efficiency
- Troubleshooting and problem solving

Overall, about 265 operational, administrative, and managerial local officials attended the events. In addition to providing training which meets DEC's recertification requirements these events allow for an operator to remain knowledgeable with changes in the management and operation of a treatment facility. Of significance is DOW's effort to provide training to municipal elected officials, including mayors, supervisors, and board members. This training recognizes the community-wide commitment necessary to effectively provide sewage collection and treatment to over 15 million state residents.

Due to staff reductions, DEC will no longer be able to provide training for wastewater treatment plant operators or technical assistance to wastewater treatment plants. In December 2010, DEC began discussions with NYWEA to have that organization administer the wastewater treatment plant operator program. Discussions focused on NYWEA reviewing and approving wastewater treatment plant operator certification applications and renew operator certificates.

6.7: SPDES Program Enforcement

When 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. DEC has many formal enforcement tools at its disposal. The most commonly used are tickets issued by an 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 DEC and agreed to by the SPDES permit holder.

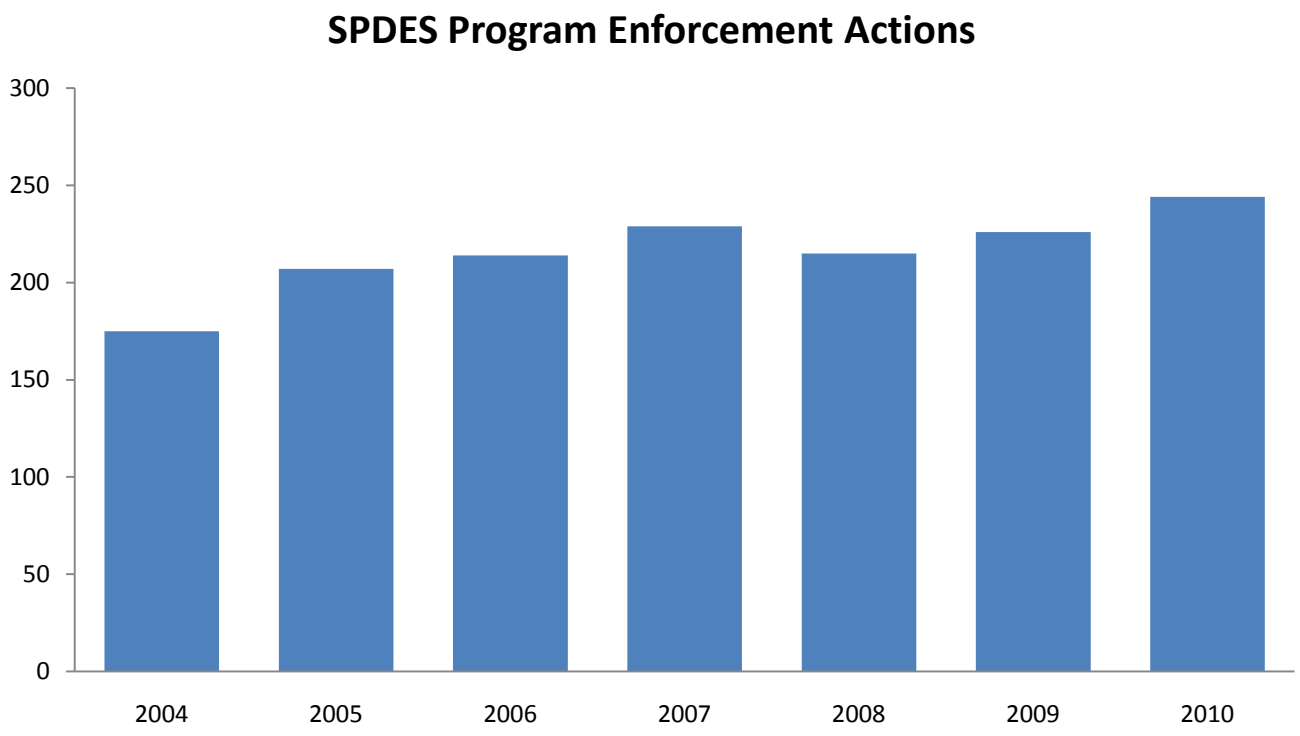
An Order on Consent commonly includes some or all of the following:

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

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

Refer to *Figure 15: SPDES Program Enforcement Actions (2004-2010)* for a summary of SPDES enforcement actions over the past 7 years (consisting of ECO tickets and Orders on Consent).

Figure 15: SPDES Program Enforcement Actions (2004-2010)



6.8: How Enforcement Improves Water Quality

SPDES permits are issued with discharge limits designed to protect public health and water quality. New or revised policies or regulations may require SPDES permits to be modified to include more

stringent limits than were previously in place. In these cases, DEC establishes a schedule of compliance that allows the permitted facility to meet the new discharge limits over time.

A schedule of compliance may include specific deadlines for the facility to design and install equipment or features necessary to comply with new limits. If elements of the schedule of compliance are not met, DEC may initiate enforcement action such as an Order on Consent. This imposes a financial penalty and may adjust the discharge limits that the facility must adhere to under the revised SPDES permit.

6.9: Contingencies for Slow or Incomplete Implementation

Chesapeake Bay Watershed Program Compliance Assurance

For those implementation items that are part of any of DEC's permits, the DEC follows its enforcement guidance:

- Enforcement TOGS: 1.4.1 Integrated Compliance Strategy System
- June 1996 Edition, and 1.4.2 Compliance/Enforcement of SPDES Permits June 2010 Edition

DEC will use the adaptive management framework provided by the two milestones to help correct for slow or incomplete implementation.

Department Guidance

DEC has developed a number of guidance documents to provide staff with a consistent plan and approach on compliance and enforcement activities for all of the State Pollutant Discharge Elimination System (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):* Compliance and Enforcement of SPDES Permits[66]. 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.

[66] http://www.dec.ny.gov/chemical/62557.html.

The Compliance and Enforcement response guide contained in TOGS 1.4.2 specifies what actions need to be taken and in what timeframes for violations of reporting requirements, failure to meet permit requirements and water quality standards violations. DEC used EPA's "Interim Wet Weather SNC Policy" (dated 10/23/07), as a guide when determining the appropriate permit violations to include in DEC guidance for the stormwater programs. Additionally, this document provides DEC staff with the enforcement options and guidance to implement the compliance component of the SPDES programs across New York. Significantly, this guidance addresses the needs of the newer General SPDES Permit programs, such as stormwater and CAFO that have been added since the previous version of this TOGS was released in 1988.

The DOW also has separate Compliance Assurance Strategies for many of the SPDES programs. These provide additional details on implementation of the program and the appropriate compliance and enforcement response. Such strategies exist for the CAFO, MS4 and construction storm water programs. They provide the basic framework for compliance assurance by staff with respect to inspections, response to citizen complaints, and review of Storm Water Pollution Prevention Plans (SWPPPs). Included in the strategies, as well as in TOGS 1.4.2, is the compliance and enforcement response to violations of permit requirements and violations of water quality standards.

Division of Law Enforcement Initiative

In July of 2010, the DOW worked with DEC's Division of Law Enforcement (DLE) to perform a statewide compliance check of construction sites to determine whether they were properly permitted and see if they had their permit authorization and Storm Water Pollution Prevention Plan (SWPPP) on-site. The DLE also checked to see if there were obvious water quality standard violations in the receiving water.

As result of this initiative, DLE conducted 806 site visits and issued 32 warnings, 19 notices of violation and 22 tickets. Initiatives like this help increase DEC field presence at construction sites outside of the routine inspections the DOW conducts on an annual basis.

EPA Cooperation

Compliance data obtained from the Integrated Compliance Information System (ICIS) for the wastewater treatment plants in the Chesapeake Bay watershed shows that there is a 97% compliance rate with permit limits. Included in these treatment plants are 35 EPA majors which we monitor with EPA Region II through the Significant Noncompliance Action Program (SNAP). SNAP is outlined in a 1983 Memorandum of Understanding (MOU) between DEC and EPA Region II and is a process which provides for EPA oversight of the New York State NPDES enforcement activities. In quarterly meetings, DEC and EPA review a docket of facilities which includes: EPA majors with Significant Non-compliance (SNC) violations, citizen concerns, Sanitary Sewer Overflows (SSOs) and bypasses. The MOU sets forth an expectation that timely and appropriate enforcement is taken for noncompliance. SNAP has been working very successfully for DEC and EPA Region II for 27 years.

DEC Central Office and the nine regional offices work together to create the DEC inspection work plan each fiscal year. Inspection targets are identified for each inspection type by DEC and these numbers are distributed to EPA Region II to be used in their Compliance Monitoring Strategy (CMS) for New York State. DEC also works with EPA Region II when they are setting their annual inspection work plan. EPA

Region II is able to provide additional inspection resources and a regulatory presence in New York State which aids in compliance. The current EPA Region II inspection work plan includes a focus on the Chesapeake Bay watershed.

Inspection Statistics

The Division of Water has added a Chesapeake Bay-specific data code to its inspection database to make it much easier to generate reports on inspections performed in the Bay watershed. As shown by *Table 26* below, the Division of Water is meeting inspection targets outlined in the inspection workplan.

Table 26: Inspections in the Upper Susquehanna Watershed (SFY 2007-2011)

Permit Type	Number of Inspections				
	SFY 2007-2008	SFY 2008-2009	SFY 2009-2010	SFY 2010-2011	SFY 2011-2012[67]
EPA Major	39	58	28	25	39
EPA Minor	47	87	59	62	49
CAFO	15	14	10	11	27
Construction Stormwater	5	2	2	4	15
Industrial Stormwater	3	1	6	2	0
MS4	0	2	4	3	3

6.10: Compliance and Enforcement Highlights

The following sections describe examples of enforcement actions undertaken by DEC around the state for the following SPDES categories: Municipal Wastewater Treatment Plant; Municipal Wastewater Collection System; CAFO Facility; Construction Stormwater; Industrial Facility; Private Wastewater Treatment Facility; and Multi-Sector General Permit.

SPDES Category: Municipal Wastewater Treatment Plant

City of Oswego, Oswego County

On August 5, 2010, DEC and EPA entered into a Consent Decree with the City of Oswego. This Consent Decree is a negotiated response to violations of the federal Clean Water Act, specifically the unpermitted discharge of raw sewage through the west side of the City's publicly owned treatment

[67] Through January 24, 2012.

works. A consent decree is a legally binding decision that is similar to an Order of Consent typical at the state level for SPDES program enforcement.

The City owns and operates two wastewater treatment systems, one each on the east and west side of the Oswego River. The 2010 Consent Decree resulted in a financial penalty of $99,000, with $49,500 payable to both DEC and the U.S. Department of Justice, and includes specific operational and maintenance improvements the city must undertake.

The Consent Decree contains a Schedule of Compliance for engineering improvements that the city must complete to greatly reduce or eliminate SSO events within the City. Additionally, the city agrees to undertake a comprehensive, system-wide program that will bring the city into compliance with the Clean Water Act. Specific measures include:

- A 75 % separation of the combined system into sanitary and stormwater components to prevent high volumes of rain water and snowmelt from overwhelming the treatment plant
- A 50 % expansion of the west side waste water treatment plant's treatment flow-through capacity
- Disconnection of catch basins to reduce the inflow of rain water and snowmelt into the existing sanitary sewer system
- Major improvements to operational and maintenance programs and sewer financing reforms

SPDES Category: Municipal Wastewater Collection System

Town of Vestal, Broome County, Sanitary Sewer Overflows

In 2010, EPA performed a Sanitary Sewer Overflow (SSO) inspection in the Town of Vestal. The inspection found several Type I and Type III Sanitary Sewer Overflows. The Town signed a consent order with DEC that requires the Town to apply for permits for all Type I SSOs and to implement Capacity, Management, Operation and Maintenance (CMOM) and Fats, Oils and Grease (FOG) programs and eliminate the Type III SSOs. The Town was assessed a payable penalty of $5,900 and a suspended penalty of $23,350.

SPDES Category: CAFO Facility

Boxler Dairy Farm: Improper Manure Management

Questionable manure management practices and a failure to implement a Comprehensive Nutrient Management Plan (CNMP) led DEC to take enforcement action against Boxler Dairy Farm, a large Concentrated Animal Feeding Operation in Wyoming County. Investigations and sampling by DEC, state and local departments of health, and the state Department of Agriculture and Markets revealed questionable manure spreading activities at a satellite manure land-spreading site in Genesee County. The site is in the vicinity of several homes served by private water supply wells. Additionally, site investigators discovered a direct discharge of process wastewater to a Class A tributary of Tonawanda Creek in the vicinity of the farmstead in Wyoming County.

Figure 16: Improper Manure Spreading Leading to Well Contamination

Boxler Dairy Farm and DEC entered into an Order on Consent, requiring the farm to pay a penalty of $40,000, fully implement the site CNMP, correct deficiencies noted during agency inspections, and cease manure application on the fields where the water well problems occurred. Prior to entering into this agreement with DEC, Boxler Dairy Farm provided bottled water, and then water treatment systems, to address the immediate needs of several residents who had contaminated water wells.

Follow-up inspections revealed that Boxler Dairy Farm was in compliance with the Order on Consent, had eliminated the cited deficiencies, and had fully implemented their CNMP. The residents with contaminated water wells are now served by a public water supply.

SPDES Category: Construction Stormwater

AgroFarma, Inc., Chenango County

On August 22, 2011, DEC executed an Order on Consent with AgroFarma, Inc. in response to violations of its SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-10-001). The violations included:

- AgroFarma failed to develop an acceptable Stormwater Pollution Prevention Plan (SWPPP) before submitting a Notice of Intent (NOI) for construction of a refrigerated warehouse. The SWPPP did not meet the minimum requirements of the SPDES General Permit for Stormwater Discharges from Construction Activity or DEC's technical design standards.
- AgroFarma began construction without DEC's acceptance of the SWPPP and before adequate stormwater control measures were in place.
- AgroFarma disturbed more than five acres of soil at one time at the construction site without prior DEC approval.

- The SWPPP did not include documentation that archaeological issues at a site had been resolved prior to soil disturbance. AgroFarma submitted its NOI and commenced soil disturbance and construction without first resolving archaeological issues at the construction site. Archaeological issues included the presence of numerous Native American artifacts and a requirement by the New York State Office of Parks, Recreation, and Historical Preservation's State Historic Preservation Office (SHPO) that AgroFarma undertake Phase I, II, and III archaeological studies.

Because a portion of the runoff from the warehouse was planned to be treated in a stormwater management pond within the area of SHPO interest, the phasing design contained in the SWPPP was invalid. Stormwater management facilities were required to be implemented prior to the start of any ground disturbance at the construction site.

AgroFarma submitted a temporary phasing plan to provide sufficient stormwater capacity in an alternate area of the construction site during project construction to avoid installation of the stormwater detention pond in the SHPO area of sensitivity before resolution of the archaeological issues.

AgroFarma was assessed a penalty of $75,000, with $25,000 payable and $50,000 suspended, pending completion and implementation of an approvable SWPPP including erosion and sediment control and stormwater management practices, submission of a final SHPO determination, and execution of the "Avoidance Plan and Covenant for the Protection of Archaeological Sites" for the archeologically sensitive area of the project site. AgroFarma completed these items and the refrigerated warehouse was constructed in compliance with all General Permit and Consent Order requirements.

SPDES Category: Industrial Facility

AgroFarma, Inc., Chenango County

On August 31, 2010, DEC executed an Order on Consent with AgroFarma, Inc., an upstate yogurt manufacturer. This Order was in response to several violations, including:

- Exceeding effluent limits detailed in its SPDES permit
- Failure to submit monthly discharge monitoring reports (DMRs) as required by its SPDES permit
- Expanding production at its production facility without notifying the DEC
- Receiving waste at its wastewater treatment facility beyond its design capacity without DEC approval

The Order on Consent assessed a penalty of $270,000 of which $170,000 was payable with the remaining $100,000 suspended pending completion of an EBP. The EBP, totalling $80,000, was approved by DEC and requires AgroFarma to provide environmental education to the public and enhance species habitat in the vicinity of their treatment facility. Additionally, the Order on Consent

required the firm to construct a new wastewater treatment system sufficient to match growing demand for its products.

A new treatment facility has been completed and has been performing within permit limits. The Order on Consent recognized that the facility's SPDES permit expired on August 31, 2010 and provided interim limits during construction of the new treatment system. Prior to the new treatment system becoming operational, AgroFarma submitted a complete SPDES permit application and received DEC approval.

SPDES Category: Private Wastewater Treatment Facility

Carteret Group, Inc. (Rushmore Wastewater Treatment Plant/Brigadoon Estates)

On September 14, 2009, DEC issued a Summary Abatement Order mandating that the owners of the Rushmore Wastewater Treatment Plant (Orange County) immediately comply with the state Environmental Conservation Law. This action was in response to a history of SPDES permit violations and discharge of insufficiently treated sewage into the Woodbury Creek watershed.

Figure 17: Discharge from Rushmore/Brigadoon Estates WWTP

The Summary Abatement Order demands immediate corrective actions, including replacement and repair of failed treatment system components and greatly improves system oversight.

SPDES Category: Multi-Sector General Permit

Ben Weitsman and Sons Scrap Yards

Division of Water staff in Region 7 worked with other DEC divisions to address compliance issues at three Ben Weitsman and Sons scrap yards. Two of the three sites – Owego and Binghamton – are located in the Upper Susquehanna watershed.

An investigation by DEC regional law enforcement staff showed that the scrap yards were not in compliance with the Multi-Sector General Permit and requirements to drain fluids from vehicles and

inspect the vehicles for mercury switches. DEC regional staff reviewed and commented on Stormwater Pollution Prevention Plans for the scrap yards.

6.11: Planned Program Improvement

Information Management System Assessment

The current data management infrastructure used by DEC staff hinders the SPDES program in many ways, requiring duplication of data entry and making common access to data cumbersome. In 2009, DEC conducted an assessment of 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. Finally, DEC defined a vision for future information management and developed a specific implementation plan consisting of a series of phased actions designed to achieve that vision. This plan focuses on an integrated program repository, centralized data capture, automated data collection and support tools, public access to information, and electronic document management. Currently DEC is seeking funding to begin the modernization of these information management systems.

Section 7:Chesapeake Bay Regulatory and Accountability Program Grant

DEC received EPA Fiscal Years 2010 & 2011 Chesapeake Bay Regulatory and Accountability Program (CBRAP) grant primarily for increased staff resources to accomplish the following activities listed as eligible activities in EPA's March 2010 Addendum to its October 2009 Grant Guidance:

- Develop permits and ensure consistency with water quality needs, including TMDL waste load allocations
- Compliance monitoring, enforcement follow-up, reviews, reporting, inspections, investigations, audits, corrective actions and assistance visits
- TMDL watershed implementation plan development
- Improved tracking and accountability

DEC expects these activities will contribute to the "Protect and Restore Water Quality" goals of the Chesapeake Bay Program, including reduced nutrient (and sediment where appropriate) from:

- Municipal and industrial wastewater facilities
- Agricultural lands and animal operations
- Developed lands
- Streamside riparian areas

The goal of the DEC Chesapeake Bay Regulatory and Accountability Program is to provide enhanced levels of permit development while ensuring consistency with water quality needs, compliance monitoring, enforcement, enforcement follow-up, inspections, TMDL watershed implementation plan development, and improved tracking and accountability.

DEC is the agency responsible for compliance assurance, permit development and issuance, and TMDL development and TMDL implementation planning. Responsibilities rest with both regional field offices and the central office in Albany. DEC will be targeting actions at facilities, entities and activities within the Susquehanna and Chemung River Basins in New York which contribute nutrient and sediment to Chesapeake Bay.

In principal part, DEC will focus its work on the facilities, entities and activities it regulates, including wastewater treatment plants, concentrated animal feeding operations and municipal separate storm sewer systems. In addition, although not directly regulated, DEC will also augment its work, under contract with the Federal Emergency Management Agency (FEMA), to audit and assist local government administration of floodplain development regulations enacted for participation in the

National Flood Insurance Program. All of this work will be located within the Susquehanna and Chemung River basins in New York[68] and will emphasize nutrient and sediment reduction.

This will result in improved performance through enhanced oversight of facilities, activities, entities in the Susquehanna and Chemung River Basins regulated by DEC State Pollutant Discharge Elimination System (SPDES) permits. Such permits include wastewater discharges, concentrated animal feeding operations, municipal separate storm sewer systems and construction sites.

7.1: CBRAP Program Objectives

DEC expects to meet the following objectives as stated in the CBRAP workplan:

Objective 1: Compliance and Enforcement of SPDES Permits

DEC Division of Water central and regional office staff will ensure compliance with the terms and conditions of State Pollutant Discharge Elimination System (SPDES) permits through data and plan review, site inspections, and compliance assurance activities including technical assistance and formal enforcement actions. These activities will focus on the control of significant sources of nutrients and sediment and the implementation of the 1987 DEC/EPA Enforcement Agreement for Water.

Objective 2: Water Quality Protection in Floodplains

In New York State, local governments oversee development in floodplains. Most New York municipalities have enacted Flood Damage Prevention Laws as a prerequisite for participation in the National Flood Insurance Program. These laws govern not only encroachment and construction standards, they include requirements for the storage of materials and the placement of disposal systems, such as septic systems.

Under contract with the Federal Emergency Management Agency (FEMA), DEC conducts audits of local government administration of its floodplain development regulations and provides technical assistance. Effective administration of these laws will help to improve and protect nutrient and sediment water quality. There are 262 municipalities in the Susquehanna and Chemung River Basins in New York.

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 inevitably lead to deposition of large quantities of sediment and other debris that contribute to violations of the state narrative water quality standard for deposition (none in amounts that will impair the best usage of the water body). Further, such sediments will carry nutrients and other contaminates that have the reasonable potential to cause or contribute to violations of water quality standards.

[68] For reference, whereas the EPA Chesapeake Bay Program describes the New York portion of the Chesapeake Bay watershed as "Susquehanna–New York," DEC describes it as two separate drainage basins, the Susquehanna and Chemung River basins.

The goal of this objective is to improve local government administration of its floodplain development regulations and thereby reduce nutrients and sediments transported downstream during flood events. This will be accomplished by enhancing the current FEMA/State program, whereby DEC conducts Community Assessment Visits and Community Technical Assistance Contacts, works with municipalities to take corrective actions and reports resulting findings to FEMA.

Objective 3: Individual Permitting, MS4, Construction and CAFO Permitting, and Non-point Source Technology

Under this Phase II Watershed Implementation Plan for the Chesapeake Bay TMDL, DEC will modify the wastewater discharge permits of Bay-significant facilities. This is largely a centralized function within the Division of Water's Bureau of Water Permits. These modifications are likely to contain a schedule of compliance that requires the submission of engineering plans to DEC and/or NYSEFC for approval that describe how their respective nutrient waste load allocations will be achieved. Some modifications to the wastewater discharge permits of Bay non-significant facilities will also be necessary.

The Bureau of Water Permits also develops the general permits issued for MS4s, Construction stormwater and CAFOs. Due to the traditional non-point source nature of these general permits, this bureau houses the DEC's technical work group for non-point source controls. The goal of this objective is to issue individual discharge permits in accordance with the *New York State Tributary Strategy* and EPA's expectations for watershed implementation plans associated with the Chesapeake Bay TMDL and to improve the technical and administrative provisions of the general permits. The latter will be targeted to nutrient and sediment control technologies and the tracking and reporting of resulting management practice implementation.

Objective 4: Watershed Planning and Implementation

A principal element of accountability in the Chesapeake Bay Program is the development and achievement of 2-year implementation milestones. DEC's Division of Water, Bureau of Water Resource Management coordinated the development of the *New York State Tributary Strategy* and its initial 2009-2011 milestones. The Bureau of Water Resource Management also coordinated the development of the Chesapeake Bay TMDL Phase I Watershed Implementation Plan and subsequent 2-year milestones and oversees implementation efforts. Both the Phase I and Phase II WIP, and 2-year milestones have been developed with appropriate stakeholder and technical resource input.

Progress toward achieving the initial New York 2009-2011 Chesapeake Bay milestones have been regularly assessed and lessons learned are being adaptively applied and included in the subsequent milestones for the 2012-2013 time frame. This adaptive approach will continue through the implementation of the 2012-2013 milestones and establishment of subsequent milestone goals. Quarterly coordination meetings of the DEC Chesapeake Bay Program team are held to maximize information sharing and innovation regarding technical advances and other opportunities for greater sediment and nutrient control and to ensure all workplan tasks are completed, documented and reported to EPA.

The DEC Chesapeake Bay Program team also actively seeks opportunities to reach out to and coordinate with, stakeholders outside of DEC who have an interest in the Chesapeake Bay and the Chemung and Susquehanna watersheds. The DEC Chesapeake Bay team already regularly participates in meetings of the Upper Susquehanna Coalition and the Upper Susquehanna Conservation Alliance (USCA). The USCA is a partnership of federal and state agencies and non-governmental organizations that help coordinate conservation efforts in the Susquehanna and Chemung watersheds in New York.

The Chesapeake Bay team has created a matrix of funding opportunities available to organizations working in the Susquehanna and Chemung basins. When finished, the intent is to share this list both internally amongst DEC staff, and externally with other organizations to support restoration efforts throughout the Bay watershed and beyond.

Objective 5: Data Management

Because a large fraction of pollutant loading to Chesapeake Bay is from non-point sources, it is important to maintain a high degree of confidence in the accounting of best management practice implementation and the processing of available water quality measurements. The goal of this objective is to facilitate the collection of best management practice implementation through improved management of data found in the plans and reports submitted to DEC by permittees covered by the SPDES general permits, especially construction stormwater and municipal separate storm sewer systems.

Stormwater Program Data Management

Recommendations for data management system improvements will be made, and improvements to permit data management systems will be evaluated to make information collected within the Susquehanna and Chemung river basins more readily available for submission to EPA. In addition, various sources of water quality data will be effectively amassed to facilitate appropriate technical assessments.

Information Management Systems

The DEC Division of Water is currently engaged in a review of the information management processes used to support the SPDES program.

The Division of Water committed a number of years ago to using national EPA systems as its primary data management tool rather than maintaining separate state databases. The Division played a key role in the design of the replacement system: the *Integrated Compliance Information System – National Pollutant Discharge Elimination System* (ICIS-NPDES), has completed the data migration to ICIS-NPDES, and is a direct user of the ICIS-NPDES system.

Data Security and Procedures for Emergency Situations

Water quality data is stored electronically on secure Division of Water network drives that are part of the Storage Area Network (SAN) in the DEC's data center. The SAN is a redundant array of drives that is backed up nightly to tape. A set of tapes is rotated once a week to the New York State Archives for secure off-site storage. Physical access to the data center is restricted by electronic card-key locks.

Network access is restricted to DEC employees with individual password-protected user accounts. Password security is established through mandatory employee Cyber Security training and quarterly password changes. Access to specific information and files on the Division of Water network drives is limited through permissions granted by Project Managers and managed by the Division System Administrator's application of read and/or write authorization.

Objective 6: Grant Administration

DEC staff will provide supervision and administrative oversight and support to the Chesapeake Bay Regulatory and Accountability Program. This will assure that the outputs of this grant are conducted consistently, timely, accurately, and completely. The multiple and complex aspects of this program necessitate a concerted effort for program efficiency and effectiveness.

Quality Assurance Project Plan

DEC's Division of Water developed a Quality Assurance Project Plan (QAPP) that will govern the operation of the project at all times. Each responsible party listed in the Program Management section of the QAPP will adhere to the procedural requirements of the QAPP and will ensure that subordinate personnel do likewise.

General CBRAP Reporting Requirements

DEC will provide semi-annual status reports to EPA on CBRAP-funded activities such as compliance and enforcement, wastewater treatment plant inspections, quality assurance project plans, and progress in meeting workplan objectives and milestones.

7.2: Management Practice Tracking and Reporting Protocols

Through the workplan under the CBP State Implementation Grant and through New York State Agricultural Environmental Management, the Upper Susquehanna Coalition has developed and implemented a model program to document and submit agricultural management practice implementation data. This is expected to continue.

The DEC collects data on a statewide basis from the Notices of Intent it receives from applicants seeking coverage under the states' general permits for construction stormwater, Municipal Separate Storm Sewer Systems and Concentrated Animal Feeding Operations. DEC also receives monthly Discharge Monitoring Reports from wastewater treatment facilities. The CBRAP inspection/verification grant will help DEC to compile this data at the watershed scale and to field-verify management practice implementation data.

Section 8: Remaining Source Categories and Other Key Program Areas

8.1: Septic Systems

EPA Region 3 estimates 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).

According to U.S. Census data compiled by EPA Region 3, from 1980 to 2008 the population in New York's portion of the watershed has decreased from 654,499 to 629,767. This essentially static population is not expected to change and is reflected in EPA Region 3 estimates of the future number of septic systems.

Because studies show that most of the nitrogen from OWTS is removed by natural processes in soil, the Bay Watershed Model attributes only about 10 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 (DOH), or are delegated to county health departments. DOH construction standards for new and replacement systems were updated in 1996. Larger on-site wastewater treatment systems, including private, commercial and institutional systems, are regulated by DEC. Construction standards for these systems are found in DEC's *Design Standards for Intermediate-Sized Wastewater Treatment Systems*. These design standards are currently under revision by DEC's Division of Water.

DEC and DOH have worked together to identify and prioritize resolution of rural areas with clusters of sub-standard systems and/or direct discharges. The *Susquehanna and Chemung Watershed and Restoration and Protection Action Strategy* (WRAPS, 2002) was based on such a process and identified six municipalities that applied for or received funding to correct the OWTS problems. Several of these sites have since been corrected. The WRAPS also recommended that 12 areas should begin studies and obtain funding to develop centralized wastewater treatment facilities and/or OWTS management districts. Remaining sites are a priority. The State Revolving Fund, Environmental Protection Fund and County Water Quality Committee Mini-Grants are available to communities to help resolve OWTS problems.

In addition, DEC has identified sub-standard OWTS as a significant contributor to pollutants in urban stormwater runoff. Municipal separate storm sewer system operators 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 developed. In some areas, such as Lamoka – Waneta Lakes and Otsego Lake, local inspection and enforcement programs exist. The Otsego Lake watershed is also the site of a demonstration project intended to increase the knowledge and understanding of advanced OWTS, including increased phosphorus removal capability.

As a means to protect water resources in a cost-effective manner, municipal management of OWTS is encouraged. DEC encourages municipalities to conduct OWTS inspections and to develop OWTS management strategies. Nine such projects were awarded state grants in 2005. A local initiative in Schuyler County has used funding from various sources to cost-share replacement of failing or antiquated septic system components.

To further assist municipalities, DEC is involved in the development of a statewide training program for OWTS professionals. A largely volunteer industry group called the Onsite Wastewater Treatment Training Network (OTN) has been formed. DEC has provided financial and staff support to the OTN.

A GIS-based inventory and tracking software now includes a module that local officials, watershed professionals and consultants can use to inventory and map septic systems. In addition to attributes such as tank size and material, the module allows linking photographs, plans and inspection records to each system. An inspection form has been developed by the OTN and is available for use in this system.

Because OWTSs make up a minor fraction of the total nitrogen load and because de-nitrifying systems are expensive (about $10,000/system), 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 standards (codified at Title 6, Subpart 703 of the Codes, Rules and Regulations of the State of New York, found at http://www.dec.ny.gov/regs/4590.html), de-nitrifying systems are not included in this plan.

Program highlights:

- New residential systems less than 1,000 gpd are required to achieve specific design criteria in New York State Department of Health regulations (Part 75-A)
- DEC requires all subsurface discharges greater than 1,000 gpd to obtain State Pollutant Discharge Elimination System permits and to adhere with New York State groundwater water quality standards
- For sanitary subsurface systems greater than 30,000 gpd, compliance with groundwater effluent standards for nitrate is required
- Proposed Enhancement: Seek aggressive pursuit of eliminating direct discharges or inadequate systems with emphasis on areas identified in the 2002 Susquehanna and Chemung River Basin Watershed Restoration and Protection Action Strategy.

Septic Trading and Offset Program Baseline

The nitrogen baseline for existing on-site septic systems is the 2009 nitrogen loadings of approximately 8 pounds of nitrogen per year per system. The EPA Chesapeake Bay Program projects that there will be a decrease in the number of on-site septic systems in the NYS portion of the watershed. In the years since the Susquehanna-Chemung Watershed Restoration and Protection Strategy, several communities (Jasper, Whitney Point, West Windsor, etc.) have been sewered to replace sub-standard on-site

systems. Because additional sewering transfers the load from septic systems to a new or existing treatment plant, an offset credit will be allowed as discussed in Section 4.3.

8.2: Forestry Conservation Practices

Forest Harvesting

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

The DEC BMP Field Guide, found at http://www.dec.ny.gov/lands/5240.html, is a practical tool for loggers, foresters and landowners. 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 (and phosphorus), water and timber resources from loss or degradation.

Such BMPs are installed due in part to recommendations of a forest management plan (through the 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. 7,006 acres or about 23% of total acres harvested in the watershed fall under this category. Strong anecdotal evidence supports that BMPs are being implemented on at least as many acres on 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 Program has risen dramatically in the region over the last two years, and this has likely increased awareness and implementation of BMPs. Furthermore, some municipalities in the watershed require the use of forest harvest BMPs on all harvesting, and not all of this may be captured in the state's data.

The BMP installation figure may be underestimated. NY plans to improve its BMP monitoring methodology to capture unaccounted data, and develop a more formalized monitoring protocol based on methods provided by the USFS and utilized by other Chesapeake States. Barriers exist to implementing this protocol due to the fact that NY does not have a method to track and locate timber harvesting operations in the watershed. In addition, staffing to provide the monitoring is a difficulty.

Figure 18: NYS Logger Training Program Participation by Year[69]

Program Participation			
Total Enrolled:			**4540**
Total Certified:			**700**
Total Workshops:			**1224**
Year	**Loggers Certified**	**Workshops Offered**	**Workshop Attendance**
<1994	-	9	69
1994	-	11	130
1995	-	6	133
1996	97	35	530
1997	293	66	995
1998	387	42	330
1999	423	26	575
2000	351	33	461
2001	353	55	636
2002	277	55	503
2003	295	36	328
2004	316	57	683
2005	344	65	575
2006	367	66	623
2007	372	55	519
2008	386	52	417
2009	475	65	747
2010	685	68	799
2011 (year to date)	706	59	527

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. This is expected to provide a benefit on harvests of private land as well as state and public lands.

Land Conservation

In the Upper Susquehanna Watershed, 9% or approximately 350,000 acres of land are under state protection through DEC Lands and Easements, NY State Parks, and NY 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 Open Space Plan identifies and targets high-priority open space lands, including forests, for acquisition and preservation using State Environmental Protection Funds. The Susquehanna River Valley Corridor, Chemung River Greenway, Finger Lakes Emerald Necklace and other areas of the Upper Susquehanna Watershed are identified high-priority areas. Conservation easements are annually being placed on these high value forest lands to permanently preserve them for forest use. Forest land easements are

[69] Source: New York Logger Training, Inc., December 2011.

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.

8.3: Other Key Program Areas

Federal Facilities in the Upper Susquehanna Watershed

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 Table 27 below.

Table 27: 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

DEC, with support from EPA Region 2 (New York City) and Region 3 (Philadelphia), will work with federal agency partners that have facilities in the Upper Susquehanna watershed to account for best management practices on federal lands. Once accounted for, DEC expects to include those BMPs in future milestones and Chesapeake Bay Program Watershed Model progress runs.

The first step in DEC's coordination efforts with federal partners, will be to hold a coordination meeting in 2012 to build relationships that will help achieve goals outlined in this Watershed Implementation Plan.

Floodplains

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.[70] 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 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, 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. DEC will also assist municipalities with implementation of flood damage reduction programs that exceed federal standards and protect floodplain functions.

A focus will be 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.

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. A recently funded project in the Chemung River Basin promotes the vision of a "Flood Resistant Southern Tier Central Region" by providing training and technical assistance to:

- improve floodplain management;
- adopt higher standards for floodplain development;
- incorporate flood resilience principles into land use regulations;
- integrate flood mitigation into local plans;
- facilitate public education.

This effort to promote safe development and land use decisions will also help protect water quality.

[70] New York's narrative water quality for deposition is: "None in amounts that will impair the best usage of the water body."

Hurricane Irene/Tropical Storm Lee Recovery

In the aftermath of Hurricane Irene and Tropical Storm Lee in 2011, DEC – in collaboration with the NYS Empire State Development Corporation – created the Hurricane Irene/Tropical Storm Lee Flood Mitigation Grant Program.[71] Thirty-seven New York counties, including much of NY's portion of the Chesapeake Bay watershed, were designated as federal disaster areas following the storms and were eligible for $300,000-500,000 for flood mitigation and flood control projects in creeks, streams and brooks impacted by the two storms. The funding can be used for:

- Removal of flood debris from stream channel and/or floodway
- Removal of gravel in, or directly around public and/or private infrastructure
- Installation or repair of stream bank stabilization measures
- Stream channel restoration to pre-flood depth, width, gradient, and where appropriate, channel characteristics
- Stream bank restoration involving the removal of side cast bed load material, reconnecting a stream to its floodplain
- Culvert repair and/or replacement
- Non-federal match to an approved Natural Resources Conservation Service (NRCS) Emergency Watershed Protection project

The application period for this grant program closed on April 11, 2012 and DEC and the Empire State Development Corporation are currently reviewing applications and award announcements are anticipated in May 2012.

DEC Post-Storm Stream Response Outreach and Training

Hurricane Irene and Tropical Storm Lee, like other storms before them, demonstrated that flood response work, while well-intentioned, sometimes can make future floods worse and can damage aquatic habitat. In response, DEC and the NYS Department of Transportation (DOT) are developing a program of outreach, education and capacity-building to help local communities and contractors respond to flood damage in ways that will not make future floods worse.

DEC and DOT intend the outreach and training program to lead to improved land use planning, proper implementation of floodplain regulations, improved stream corridor management, and comprehensive habitat conservation, all in the context of a changing climate that may result in more frequent, and stronger, storms.

[71] More information about the Irene/Lee Flood Mitigation Grant Program is on the DEC website at: http://www.dec.ny.gov/lands/79243.html.

In the short term (2012-2013), DEC and DOT are organizing a 3-phase approach to the training program (many elements of the training program are already underway):

- **Awareness-building:** Phase one will focus on using existing events and conferences to provide literature and presentations to raise awareness of how storms affect streams and their associated infrastructure; how some post-storm responses can exacerbate flood risks and habitat loss; and simple steps communities can take to respond to storm impacts properly.
- **Education:** Phase two will focus on educating municipal officials and heavy equipment operators on the proper response to stream impacts after a flood. This will include a component to develop a better understanding what worked well, and what did not work well in the 2011 and earlier floods.
- **Information:** Phase three will focus on providing basic technical information that will serve as a reference for the public on the best possible outcomes of flood protection and stream restoration work.

In the Susquehanna and Chemung region of New York, the Upper Susquehanna Coalition is a key partner in this effort to educate and train local officials and consultants and will be involved in all aspects of the program.

Stream Processes: A Guide to Living in Harmony with Streams

Developed by the Southern Tier Central Regional Planning and Development Board and Chemung County, this innovative guide describes how streams work and why functioning floodplains are integral parts of stream systems. The guide contains photographs that help promote the need for sound management practices. It already has had a positive effect on decisions made by Chemung County landowners and local highway departments. It can be found at the Chemung County Soil and Water Conservation District website, http://www.chemungcountyswcd.com/homepage.html.

Wetland Restoration and Streambank Rehabilitation

Flooding, streambank erosion, gravel deposition and nutrient loading are common problems in New York's portion of the Chesapeake Bay watershed. Addressing these issues takes a firm understanding of how the watershed functions in relation to its hydrological characteristics, drainage patterns, topography, land cover, land uses and misuses, precipitation events and other parameters. The Upper Susquehanna Coalition (USC) has Wetland Restoration and Stream Rehabilitation programs to help address these issues.

The USC Wetland Program

The USC Wetland Program is "vertically and horizontally integrated," meaning that it locates, designs, builds, and secures funds for wetland projects. It has developed a successful wetland program tailored to meet local needs and watershed characteristics. It works closely with other wetland agencies and identifies sites appropriate for the USDA Natural Resources Conservation Service's Wetland Reserve Program and the U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program.

The USC collaborates with a host of other partners on wetland design and construction, including the U.S. Army Corps of Engineers, EPA Region 2, DEC, Binghamton University, the State University of New York campuses including Otsego Lake Biological Field Station and College of Environmental Sciences and Forestry (ESF), Cornell University, Chesapeake Bay Foundation, Finger Lakes Land Trust, Northeast Wetland Restoration Institute and local watershed organizations. Wetland restorations are implemented on both public and private lands. Key goals include:

- **Attenuating Floods:** Wetlands, especially in the headwaters of a watershed, through their water holding capabilities and vegetation, can desynchronize rainfall runoff events, thus reducing flood peaks and downstream erosion. Novitzki (1985) found that a watershed with about five percent wetlands could have a 50 percent reduction in peak flood flows compared to a watershed that had none.

- **Enhancing Water Quality:** Wetlands retain sediment and nutrients during rainfall events and can be an important nutrient and sediment sink.

- **Increasing Wildlife and Habitat Diversity:** Wetland complexes provide unique habitats that increase species diversity and habitat connectivity.

The USC Stream Rehabilitation Program

The USC's Stream Rehabilitation Program[72] is based on its Stream Team, which takes a circuit rider approach for providing support services on stream issues. The Stream Team goals are to:

- **Reduce excess sediment:** The presence of sediment is a natural and necessary part of a healthy stream. The addition of excess sediment, however, can cause great harm to the aquatic ecosystem, including:
    - Disruption of natural stream order and flow
    - Damage to fish species through direct abrasion to body and gills and loss of fish spawning areas due to the filling in of gaps in streambeds
    - A breakdown in the aquatic food chain as sediment suffocates small organisms living in the streambed
    - Accelerated filling in of dams and reservoirs
    - A change in the water composition

[72] The USC is developing a "Watershed/Stream Corridor Strategy" the guide programs to address stream channel and bank instability in the Susquehanna and Chemung river basins. When finished, the Strategy will be available on the USC website at http://www.u-s-c.org/html/index.htm.

- **Address stream instability and its changes to watershed hydrology:** Poorly understood stream intervention further aggravates stream stability and increases flooding potential, which can impact human health and welfare, including:
    - Severe bank erosion that threatens homes, transportation systems and other structures
    - Increased flooding events
    - Loss of utilities
    - Loss of economic viability of stream corridors

Funding Sources for the USC Wetland Restoration and Streambank Rehabilitation Programs

- **National Fish & Wildlife Foundation Chesapeake Bay Stewardship Fund ($150,000):** Reconnecting floodplains through streamside berm removal.
- **NYS Environmental Facilities Corporation ($920,000):** Wetland construction and floodplain enhancement. The USC received a Green Innovation Grant Program (GIGP) award to construct and restore 120 acres of wetlands, and remove 48,000 feet (about 9 miles) of streamside berms to reconnect streams to their natural floodplains. Wetlands will be constructed on NYS lands in partnership with DEC. These projects will help attenuate floods, improve water quality and maintain habitat corridors. The berm removal component will target Southern Tier counties that were recently impacted by Tropical Storm Lee and will allow streams to once again access their natural floodplains during storms – reducing the force of flood waters. With the advent of continuing climate change and larger, more frequent rainfall events, there is need to ensure watersheds can function correctly by implementing projects that address flood waters by "slowing them down, spreading them out and soaking them in."
- **USC Wetland Endowment:** Approximately $22,000 per year at current funding level.

Susquehanna Basin Headwaters Wetland In-Lieu Fee Mitigation Program

This program is under development (anticipated start is 2012) and will be a basin-wide approach to mitigate impacted wetlands. It will be run by The Wetland Trust (TWT) and have strong connections to the Upper Susquehanna Coalition.

The primary goal of the Susquehanna Basin Headwaters In-Lieu Fee Program will be to provide wetland restoration and protection services on a watershed scale to compensate for wetland loss. More specifically it will:

- Match restoration needs with opportunities and priorities in New York's portion of the Chesapeake Bay watershed
- Target specific sites or sub-watersheds that increase long term wetland sustainability and better watershed functionality

- Provide high quality wetland mitigation by using NY Natural Heritage Program analyses as a guide to ensure biological quality (Edinger et al. 2002) and an assessment protocol (i.e., a modification of Jacobs 2007) to quantify functional values and guide restoration efforts
- Match mitigation requirements with specific project opportunities

A secondary goal is to provide other aquatic resource services, namely stream restoration. More specifically, to:

- Protect and restore headwaters streams
- Reconnect streams to their floodplains
- Reduce barriers to movement of aquatic organisms
- Buffer streams to protect their functionality

The Wetland Trust will be the program sponsor and primary land steward. It will establish and operate the ILFP. The Upper Susquehanna Coalition will provide technical support to develop the ILFP instrument, site selection and development of mitigation plans, and be the implementation lead.

DEC "Trees 4 Tribs" Program

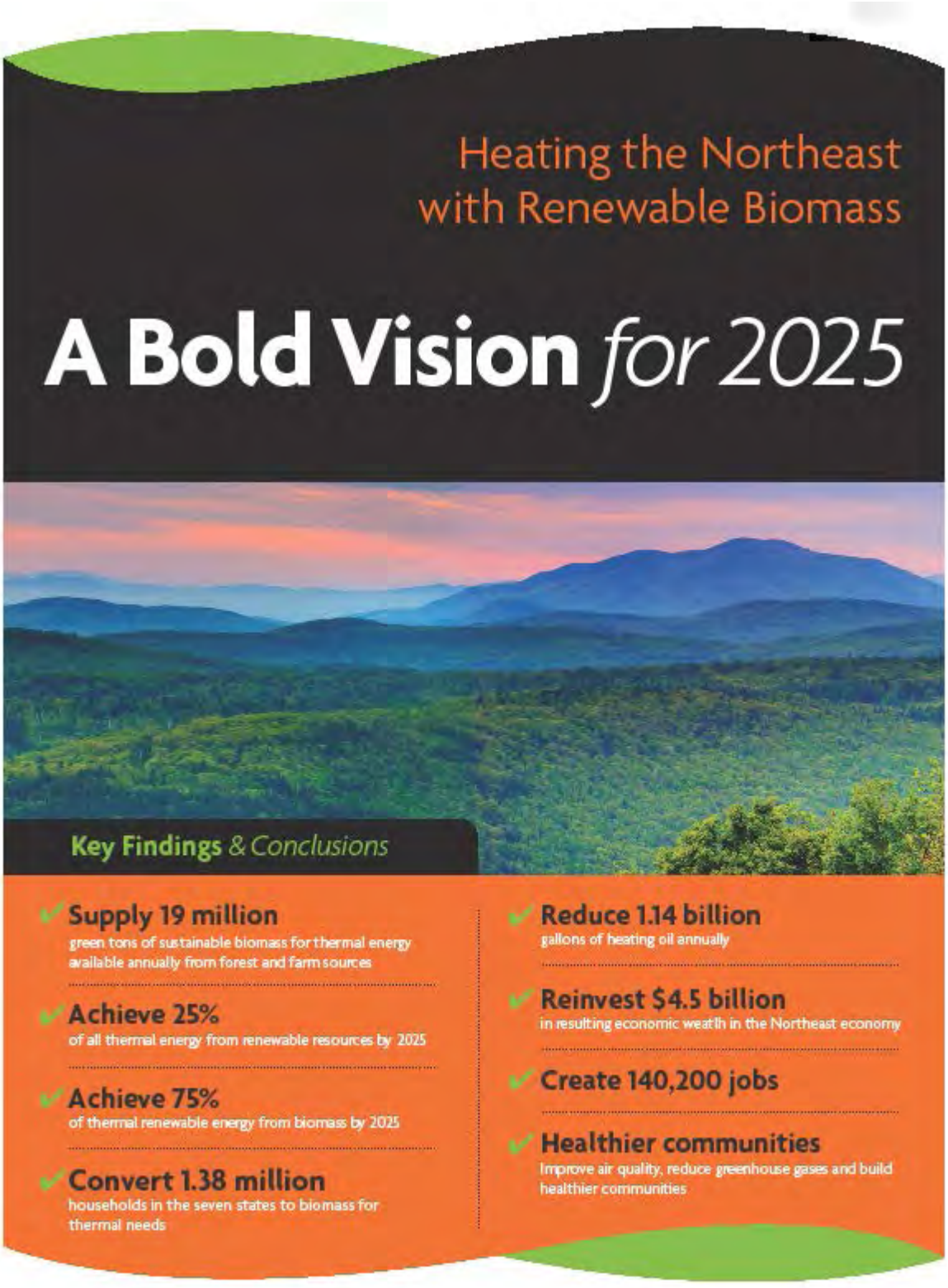
In addition with the Upper Susquehanna Coalition's Streambank Rehabilitation Program, DEC's Division of Lands and Forests is seeking to create a statewide "Trees for Tribs" program modeled on the successful Trees for Tribs program already developed by DEC's Hudson River Estuary Program. Both programs seek to restore riparian buffers by planting trees along streambanks and shorelines.

Riparian buffers are a major component to maintaining healthy streams and watersheds, and their conservation is an important element of watershed programs. Buffers help reduce pollution entering waterbodies by slowing down and filtering runoff. Buffers also stabilize streambanks and shorelines and absorb high-velocity flows.

The first step in the process of creating a statewide program happened in October 2011 when a Lake Champlain Basin Trees for Tribs program was kicked off. DEC employees and volunteers from local watershed groups planted trees from DEC's Saratoga State Tree Nursery along 20,000 feet of streambank.

The goal of the DEC Chesapeake Bay Program is to obtain funding to create a Trees for Tribs program in the Upper Susquehanna basin to restore riparian buffers and complement the work of the Upper Susquehanna Coalition.

Heating the Northeast with Renewable Biomass

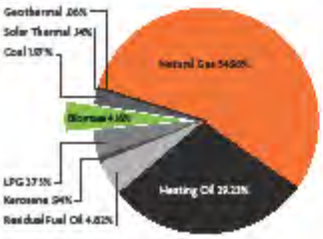


the Vision

We, the five proposing organizations, call for an American Revolution to domestically produce the thermal energy consumed in the six New England states and New York. We propose that 25% of all thermal energy requirements in the Northeast are met with renewable energy resources by the year 2025. This shift in our sources for thermal energy will produce extraordinary economic, social and environmental benefits for the region, which currently relies on fossil fuel for 96% of its thermal energy. Furthermore, we call for three quarters of the renewable energy to come from sustainably produced biomass from forest and farm resources transformed into heat with clean and efficient technology, and for solar and geothermal technologies to provide the balance. Today, renewable energy accounts for 4.3% of the total thermal energy sources for the region, and forest biomass comprises 96% of all renewable thermal energy in the region.

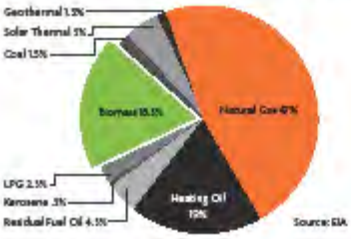
2010

New England and New York thermal energy from:



2025

New England and New York thermal energy from:



This vision is consistent with consensus national and regional goals to reduce reliance on non-renewable fossil energy. A robust market economy will provide tens of thousands of new jobs in forest and farm production of biomass feedstocks, manufacturing, distribution and maintenance of clean, high efficiency thermal energy combustion systems, along with fuel processing, production and delivery. Leading academic institutions in the region will provide cutting edge research and development for continuous improvement of technology. State and local governments will recognize and support the continued expansion of biomass thermal through favorable tax, regulatory and incentive policies. The northeast will be recognized as a global leader in the advancement of biomass thermal energy.


Flow Diagram of Sustainable Biomass for New England and New York
in Green Tons
Analysis by RenewMetrics
Not Available for Harvest
Potential Annual Sustainable Forest Harvest
Sawlogs
Pulpwood
Potential Annual Dedicated Energy Crops Harvest
Half of remaining potential removed to keep estimate conservative
Potential Forest Biomass for Energy
Half of potential energy crops removed to keep estimate conservative
Potential Crop Biomass for Energy
Total Potential Annual Biomass for Energy Applications
19,092,000 Green Tons
the imperative of
Sustainable Supply
If sourced responsibly, biomass from forests, crops and clean waste streams can be sustainable, have a low-carbon footprint, protect sensitive ecosystems, and benefit local communities. Overall, we must ensure that biomass for thermal energy reduces carbon in the atmosphere. We must avoid converting the most mature forests to forest plantations harvested for energy. And, we must maintain healthy forests for water quality, soil productivity, wildlife habitat and bio-diversity.
the Benefits Economic, Social & Environmental Benefits of Achieving the Vision
By 2025, the Northeast would have more than $4.5 billion new dollars per year injected into the regional economy
This retention of wealth and expansion of the thermal biomass industry will result in a total of 140,200 permanent jobs
The conversion to biomass thermal will displace over 1.14 billion gallons of oil annually by 2025. This represents over 20% of all heating oil consumed in the Northeast.
The use of biomass greatly reduces mercury and acid rain causing sulfur emissions as compared to the heating oil it can replace
Replacing oil (a high carbon fuel) with biomass (a low carbon fuel) reduces greenhouse gas emissions that contribute to climate change
Achieving the vision will result in the conversion of 1.39 million homes and businesses enabling the retention of more than $1.6 billion in annual income in our economy instead of exporting overseas
The enhanced value of biomass will contribute to healthy rural communities through improved economics of forest and farm ownership

Ecosystem-Based Watershed Planning

Using an American Reinvestment and Recovery Act water quality planning grant from DEC, the Southern Tier Regional Planning and Development Board developed the *Susquehanna-Chemung Action Plan* (http://www.stcplanning.org/index.asp?pageId=155) based on an ecosystem approach to watershed planning. The *Action Plan* was completed in February 2012. The plan is a concise, highly

accessible public document that provides a unified vision for the region and promotes funding for water resource projects that benefit the Basin's residents.

Its draft goals include:

- Capitalizing on water resources as economic assets
- Maintaining clean and abundant water supplies
- Living in harmony with streams
- Being prepared for floods
- Preserving the rich diversity of plant and animal life
- Slowing rainwater down, spread it out and soak it in
- Supporting sustainable agriculture and forestry
- Navigating toward better roadway drainage
- Connecting people to nature
- Cultivating a watershed ethic

While not readily translatable into USEPA Bay Watershed Model inputs, this project is expected to yield demonstrable water quality and water quantity related benefits.

Marcellus Shale

The environmental review process for natural gas exploration in the Marcellus Shale and other low-permeability gas reservoirs is underway. Current uncertainty regarding the details of how this vast natural gas reserve will be developed in New York and its impact on the landscape makes nutrient and sediment-related watershed implementation planning uncertain. The uncertainty and potential results are significant enough to warrant EPA Region 3 to consider this Phase II Watershed Implementation Plan to be an interim plan pending completion of New York's regulatory framework for high volume hydraulic fracturing.

The issuance of drilling permits for high volume hydraulic fracturing is currently suspended pending completion of New York State's comprehensive review of the potential environmental impacts of oil and gas drilling and production and how they are mitigated prior to permitting high volume hydraulic fracturing (Ref: http://www.dec.ny.gov/energy/46288.html).

New York expects a full suite of environmental controls to apply, including:

- Prohibition on drilling:
    - Within 500 feet of primary aquifers

- Within 4,000 feet of unfiltered water supply watersheds
- Within 100-year floodplains
- Within 2,000 feet of any public water supply

- Eligible Sites must apply for coverage under a new State Pollutant Discharge Elimination System General Permit for Stormwater Discharges from High Volume Hydraulic Fracturing. General Permit (HVHF GP) coverage is not available for sites in certain sensitive environmental areas as follows:
  - HVHF GP coverage is not available for well sites that utilize centralized flow impoundments; all flowback and production brine must be stored in tanks.
  - HVHF GP coverage is not available for well sites on undisturbed land with slope greater than 25% that is tributary to AA or AAs waters.
  - HVHF GP coverage is not available for well sites where the top of the fracture zone at any point along the wellbore is less than 2,000 feet from the surface and less than 1,000 feet below known fresh water supplies.
  - HVHF GP coverage is not available for well sites that are located:
    - Within 500 feet of principal aquifers
    - Within 500 feet of private water wells
    - Within 100 feet of wetlands
    - Within 500 feet of streams tributary to surface public drinking water supplies
    - Within 150 feet of all other streams
- The HVHF GP requires the development of a Construction Stormwater Pollution Prevention Plan (SWPPP) consistent with the SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-10-001) prior to commencing construction which will include erosion and sediment control and post-construction stormwater management control on all facets of well-site construction and gas extraction, including well pads and access roads.
- The HVHF GP also requires the development of a HVHF SWPPP to address the industrial aspect of the activity. This HVHF SWPPP must contain structural (e.g. peripheral berms, secondary containment, et…) and non-structural (e.g. good housekeeping, preventative maintenance, routine site inspections, etc…) best management practices (BMPs), as well as activity-specific BMPs for activities such as vehicle fueling and storage, chemical cleaning, mixing, transfer and storage, flowback and production water containment areas and pipelines.

- The HVHF GP requires fluid disposal plans to demonstrate that all flowback water and production brine will be treated, recycled or disposed of at a certified disposal facility.

- The HVHF GP requires that stormwater Best Management Practices constructed in the Susquehanna and Chemung watersheds must comply with Chapter 10 (The Enhanced Phosphorus Removal Supplement) of the New York State Stormwater Design Manual (NYSDM) http://www.dec.ny.gov/chemical/29072.html. The Enhanced Phosphorus Removal Supplement requires that:

    - All BMPs must be sized to meet the one-year, 24-hour post-development design storm. BMPs sized using the (more protective WQv requirement for enhanced phosphorus treatment) one-year post-development design storm are expected to provide treatment resulting in a maximum 0.16 mg/l effluent total phosphorus concentration, a concentration similar to that measured in untreated runoff from undeveloped forested areas.

    - Green infrastructure techniques must be used to maximize infiltration and evapotranspiration and to reduce the total water quality volume (WQv) to pre-development conditions by source control, implementation of green infrastructure, or standard stormwater management practices (SMPs) with runoff reduction capacity (RR).

    - Green infrastructure principles must be used in site planning and design to:

        - Avoid or minimize land disturbance by preserving natural areas

        - Evaluate the feasibility and benefits of the use of source control to reduce runoff to achieve a volumetric reduction of the WQv.

        - Define, delineate and preserve naturally vegetated stream buffers

        - Limit clearing and grading of the site

        - Choose sites to avoid sensitive resource areas

        - Restore disturbed soils

        - Minimize impervious areas, parking areas, roadway lengths and widths

Chesapeake Bay Executive Order 13508

Several natural resource objectives that stem from the issuance of the Chesapeake Bay Executive Order in May 2009 and the subsequent release of a Basin Protection and Restoration Strategy in May 2010 will contribute to sediment and nutrient reduction in New York. These principally include land conservation, brook trout and black duck habitat restoration and wetland restoration objectives. New York State is beginning work with various federal agencies to attain these basin goals in New York.

The United States Forest Service and United States Fish and Wildlife Service are working closely with New York in pursuit of these goals. USFWS held a kick off meeting with multiple local, state and other

stakeholder in June 2010. The USFS is presently conducting work planning with DEC Division of Lands and Forests to effect a comprehensive forest conservation strategy for the Susquehanna/ Chemung region focused on maintaining and enhancing water quality. DEC also expects to work closely with the United States Army Corps of Engineers and others to locate and develop watershed restoration project implementation opportunities.

Local Roads

Streams and roads are closely related in the Upper Susquehanna region. It is generally hilly terrain with many roads and a long history of settlement along its valley streams. There are about 13,800 miles of streams and 17,000 miles of roadways

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. Stream road crossings frequently contribute to stream instability due to channel alterations and floodplain encroachments that may occur. Dredging and other maintenance activities intended to protect this infrastructure may also contribute to stream destabilization.

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 Cornell Local Roads Program LTAP Center (http://www.clrp.cornell.edu/) provides training, technical assistance, and information to municipal officials and employees responsible for the maintenance, construction, and management of local highways and bridges in New York State. It is one of 58 Centers established under the Local Technical Assistance Program (LTAP) of the Federal Highway Administration. Soil and Water Conservation Districts also provide technical assistance with road bank stabilization and erosion prevention associated with road systems.

The DEC Waterbody Inventory/Priority Waterbody List

The DEC Division of Water maintains an extensive inventory of the state's water resources called the Waterbody Inventory/Priority Waterbodies List (WI/PWL). The WI/PWL provides summaries of general water quality conditions, tracks the degree to which the waterbodies support a range of uses and monitors progress toward the identification and resolution of water quality problems, pollutants and sources.

The Priority Waterbodies List (PWL) supplements the 303(d) list and serves as an early warning system to protect good water quality and address problems before they reach the level of impairment of best usage of the waters. It serves as the basis for New York State Environmental Protection Fund funding

programs such as Ag-nonpoint source. All of the Susquehanna and Chemung Basins (Chesapeake Bay watershed in New York) are listed as *threatened* for nutrients due to the impairments in the Chesapeake Bay downstream. This assessment elevates their eligibility for funding improvements related to the Chesapeake Bay. This is despite the fact that relatively few waterbodies in NYS are themselves listed as *impaired* by phosphorus (none are impaired for nitrogen) on the 303(d) list. Other waterbodies are listed in the PWL as *stressed* or *threatened*, but such assessments reflect impacts that are less severe than *impaired*, which would make the waters candidates for the 303(d) list. WI/PWL lists for the Susquehanna and Chemung rivers are on the DEC website:

- Susquehanna at http://www.dec.ny.gov/chemical/36734.html
- Chemung at http://www.dec.ny.gov/chemical/36746.html

Numeric Nutrient Criteria

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. Numeric criteria provide more definitive nutrient thresholds for the regulation of nutrients in NYS waters.

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.

DEC is currently working to identify nutrient criteria values – initially focusing on phosphorus in fresh waters – that are protective of water quality in New York State. DEC is aware of the impact that more strict nutrient controls could have on the regulated community and will develop an implementation strategy that recognizes the need to phase in new criteria over time. The scientific and technical basis for the draft specific criteria as well as implementation plans and a formal nutrient criteria proposal is not expected until 2013. As these efforts move forward over the next couple years, DEC will conduct public outreach to inform stakeholders and solicit their feedback.

More on our approach to nutrients including the New York State Nutrient Standards Plan (Revised July 7, 2011) can be found on the DEC website at: http://www.dec.ny.gov/chemical/77704.html.

The Nutrient Standards Plan, initially focusing on phosphorus in fresh waters, has been developed in consultation with, and mutually agreed upon by the EPA. Note that all dischargers, but particularly those with low dilution ratios would be affected by the criteria in elements 2.b. Recreation - Flowing Waters and 3.a. Aquatic Life - Flowing Waters. Additionally, those dischargers upstream of the public water supply intakes at Binghamton and Elmira could also be affected by 1.b. Human Health - Flowing Waters.

The science supporting the development of numeric phosphorus criteria for flowing waters points to concentrations (and loadings) during the growing season as being of highest concern. Wastewater

treatment plants have a higher effect than other sources both because wastewater loads occur continuously during the growing season and secondary treated effluent is highly bio-available.

Susquehanna Comprehensive Wildlife Conservation Strategy (SCWCS)

President Bush signed the Department of the Interior and Related Agencies Appropriations Act, 2002, into law on November 5, 2001. This bill included $80 million for wildlife conservation grants to states. The Fish and Wildlife Service is apportioning funds to New York under the State Wildlife Grants portion of Public Law 107 63. New York's strategy is based on major watersheds. The SCWCS was developed by the DEC and other interested organizations and individuals, including the USC. It describes actions that will protect, support and enhance species of greatest conservation need. To the extent possible, goals of the SCWCS are integrated into the Tributary Strategy. The SCWCS can be viewed at http://www.dec.ny.gov/animals/30483.html

2009 Open Space Conservation Plan

The 2009 Open Space Conservation Plan (http://www.dec.ny.gov/lands/47990.html) takes a fresh approach to conserving our vital natural and recreational areas. Small or large areas; urban, suburban, rural or wilderness; can be protected with a combination of public land protection and thoughtful use of our own land. It incorporates the example of riparian areas; lands that line waterways, when protected and managed properly, can filter runoff, absorb stormwater and reduce catastrophic flooding downstream.

Climate Change

Note: The content for this section is from the Responding to Climate Change in New York State Synthesis Report produced by the New York State Energy Research and Development Authority (NYSERDA) in 2011.[73]

Climate change is already beginning to affect the people and resources of New York State, and these impacts are projected to grow. At the same time, the state has the potential capacity to address many climate-related risks, thereby reducing negative impacts and taking advantage of possible opportunities.

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

[73] The full report is available for download on the NYSERDA website at http://nyserda.ny.gov/Publications/Research-and-Development/Environmental/EMEP-Publications/Response-to-Climate-Change-in-New-York.aspx.

The author team for this report is composed 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.

Cleaner Greener Southern Tier Plan

A coalition representing 8 New York counties[74] received a grant in 2012 to create the *Cleaner Greener Southern Tier Plan* – 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.

Water and Floodplains

- **Goal 12:** 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 13:** 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 14:** 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.

Working Lands and Open Space

- **Goal 17:** 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 18:** Preserve and connect natural resources, open spaces and access to waterways, to protect regional environment, ecology, habitat and scenic areas, and support outdoor

[74] 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.

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.

Green Infrastructure for Wet Weather

What is Green Infrastructure?

The term green infrastructure (GI) describes a variety of site design techniques and structural practices used by communities, businesses, homeowners and others for managing stormwater. On a larger scale, green infrastructure includes preserving and restoring natural landscape features (such as forests, floodplains and wetlands), and reducing the amount of land covered by impervious surfaces. On a smaller scale, GI practices include green roofs, pervious pavement, rain gardens, vegetated swales, planters and stream buffers.

Why is Green Infrastructure Important?

As it flows over the ground and impervious surfaces, stormwater (rain and melting snow) collects debris, chemicals, sediment and other pollutants. Those pollutants may then end up in nearby lakes, rivers, and streams where people swim, fish, play and draw drinking water, or in local sewer systems where more problems can arise.

While some sewer systems are capable of handling large volumes of stormwater, many are not. In particular, combined sewer systems that carry stormwater, domestic sewage and industrial wastewater can be overwhelmed by rainwater and melting snow. These combined sewer overflows (CSOs), can send untreated waste into nearby waterbodies. GI practices help control stormwater at its source, remove pollutants, and reduce the amount of runoff and waste that ends up in sewer systems and local waterbodies.

Benefits of Green Infrastructure

When managing stormwater, green infrastructure practices can be less expensive than expanding, or building new, sewer and water treatment systems. GI practices also have a number of secondary benefits including aesthetic improvements, cleaner air, energy savings, urban cooling, climate change mitigation and improved human health.

Regional Economic Development

In July 2011, New York State established 10 Regional Economic Development Councils to support economic growth and job creation. The Regional Councils represent a fundamental shift in the state's approach to economic development from a top-down development model to a community-based, performance driven approach, which empowers individual areas to develop comprehensive strategic plans that invest in regional solutions to create jobs and economic growth. In addition to the strategic planning process, a Consolidated Funding Application (CFA) was created to give businesses and other entities streamlined and expedited access to economic development funding from 9 state agencies and 29 existing programs.

In December 2011, $785 million was awarded through the Regional Economic Development Council initiative to entities across the state. In the Southern Tier of New York (New York's portion of the Chesapeake Bay watershed covers much of the Southern Tier Region), $49.4 million was awarded to 58 projects, several of which will have a direct impact on water quality in the Susquehanna and Chemung river basins and the Chesapeake Bay. Examples of the projects with water quality impacts include:

- **Upper Susquehanna & Delaware River Watershed Plan:** Broome County will develop a countywide mitigation strategy to address causes and effects of chronic and extreme flooding events, including an inventory of the Upper Susquehanna River and Delaware River watersheds and a strategy for reducing drainage and flooding problems.

- **Garden of Ideas Porous Pavement Parking Lot:** The Center for Technology and Innovation will install pervious paving in the parking lot and the Garden of Ideas at the TechWorks! Museum of Invention and Upstate Industry. Porous pavement will enable officials, residents, and developers to see first-hand the benefits and costs of replacing traditional asphalt parking lots with pervious paving.

- **Strategy for a Flood Resistant Southern Tier Central Region:** The Town of Big Flats and the Southern Tier Central Regional Planning and Development Board will work with the 42 municipalities located along designated inland waterways in Chemung, Steuben, and Schuyler counties in the preparation of a Strategy for a Flood Resistant Southern Tier Central Region.

- **Southern Tier Wetland Construction and Floodplain Enhancement:** The Upper Susquehanna Coalition will construct and restore 120 acres of wetlands in the Southern Tier counties and will reconnect streams with floodplains, allowing streams to overtop their banks and spread water safely where adequate space is available. This will allow water to safely spread out onto adjacent floodplains without damaging nearby infrastructure.

- **Schuyler County Well & Septic Replacement Program:** Replace and repair substandard septic systems and well-water systems for 12 units of single-family housing in Schuyler County.

- **Steuben County Well & Septic System Program:** Install 5 new private wells and replace 10 septic systems serving up to 10 low- and moderate-income owner-occupied units in Steuben County.

Resource Guide for NYS Farm Owners and Operators

The *2011-2012 Resource Guide for New York State Farm Owners and Operators* was created by the Environmental Finance Center at Syracuse University, with support from USDA Rural Development. The guide is intended to help NYS farmers and agricultural Technical Service Providers identify available funding programs and other resources available to them. The guide identifies federal, state, and local funding resources by the name of the funding program, the source agency or organization, and the source agency's contact information, as well as eligible applicants, funding cycles, program description, and other relevant information.

The list of source agencies includes:

- USDA Farm Services Agency
- USDA Rural Development
- USDA Agriculture Marketing Service
- USDA National Institute of Food and Agriculture
- USDA Natural Resources Conservation Service
- NYS Department of Agriculture & Markets
- NYS Department of Environmental Conservation
- NYS Energy Research and Development Authority
- NYS Soil and Water Conservation Committee
- Northeast Sustainable Agriculture Research and Education

The full *Resource Guide* is available for download on the Environmental Finance Center website at http://efc.syracusecoe.org/efc/sub.html?skuvar=7.

About the Environmental Finance Center

The Environmental Finance Center at Syracuse University facilitates the development of sustainable and resilient communities across EPA Region 2. Located at the SyracuseCoE Center for Sustainable Community Solutions, EFC enhances the administrative and financial capacities of state and local government officials, nonprofit organizations, and private sectors to make changes toward improved environmental infrastructure and quality of life.