

# Black River

## Nine Element Watershed Management Plan:

### Reducing Phosphorus, Nitrogen, and Sediment

#### Loading in Priority Sub Watersheds



View of Fulton Chain of Lakes, the headwaters of the Black River, from the summit of Rocky Mtn. Photo by Emily Sheridan.

Developed by the New York State Department of Environmental Conservation, in cooperation with the Tug Hill Commission and Jefferson and Lewis County Soil and Water Conservation Districts and Water Quality Coordinating Committees, to meet NYSDEC requirements for Nine Element Watershed Management Plans.

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## **I. Executive Summary**

The Black River Watershed, like many other Great Lakes watersheds, attracted early use and eventual settlement and industrialization due to its abundant natural and recreational resources, such as forests, fast flowing waters, quality timber, and productive agricultural lands. As development and industrialization increased through the 1900's, the water quality and natural resources of the watershed became increasingly degraded. In 1892, the Adirondack Forest Preserve was created, which included the Southeast reach of the upper Black River watershed, to protect the water and recreation resources of New York State, and the Adirondack Park Agency was charged with regulating the park as "forever wild". In the 1960's and 1970's, growing interest in protecting the environment and Black River watershed resources led to citizens becoming increasingly interested in reducing past impacts caused by industry and other resource use, to ensure the benefits of drinking water, recreational resources, and protection of human health. To continue on efforts to restore and remediate past industrial activities, protect resources to ensure their benefits are sustained, restore degraded fish and wildlife habitats, and enhance water quality and natural resources for beneficial uses such as drinking water and recreation, ongoing, measurable management through collaboration among stakeholders and community members is needed. In 2010 a Black River Watershed Management Plan (the Plan) was developed, with support from the NYS Department of State and other partners, which recommends management actions to achieve these goals throughout the watershed. This document serves as an update to the Plan in order to make it consistent with the requirements to be approved by NYSDEC as a nine element watershed plan. This document incorporates the nine key elements identified by EPA:

Element A. Identification of causes of impairments and pollution sources or groups of similar sources that need to be controlled to achieve needed load reductions and any other goals identified in the watershed plan.

Element B. Estimates of load reductions expected from management measures.

Element C. Description of non point source management measures that need to be implemented and critical areas in which they need to be implemented.

Element D. Estimate of the amount of technical and financial assistance needed, associated costs, and/or sources of authorities that will be relied on to implement plan.

Element E. Information and education component used to enhance public understanding of the project and encourage their early and continued participation in selecting/designing and implementing the non-point source management measures that will be implemented.

Element F. Schedule for implementing plan that is reasonably expeditious.

Element G. Description of Interim measurable milestones

Element H. Set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made toward attaining water quality standards.

Element I. Monitoring component to evaluate effectiveness of implementation efforts over time

By meeting these minimum 9 elements, Black River Watershed management plan implementation efforts will be strengthened, and provide more specific, measurable actions and tracking mechanisms to ensure progress is being made.

## **II. Purpose/Background**

As part of an initiative to enhance the social, economic, and environmental character of the Black River Watershed, the New York State Department of Environmental Conservation (DEC), Tug Hill Commission, the Town of Greig, and the Lewis County Soil and Water Conservation District, developed the Black River Watershed Management Plan (the Plan)<sup>1</sup>, groundwater assessment, and socio-economic characterization in 2010. The Black River Watershed Management Plan (the Plan) development was funded by the NYS Department of State and contracted through Bergmann and Associates and is available online: <http://www.tughill.org/projects/black-river-projects/watershed-initiative/>.

In developing the Plan, Bergmann and Associates followed the New York State Department of State's (DOS) Watershed Management Plan Guidebook.<sup>2</sup> Since completion, partners have leveraged state funding and implemented projects that achieve recommendations established within the Plan, including redevelopment of abandoned properties, improving storm water management, updating wastewater treatment facilities, managing floodplains, reducing agricultural non-point source pollution, improving and marketing recreational opportunities, and managing and controlling invasive species. Partners have engaged additional stakeholders and strengthened a sense of pride for the natural resources of the region. With its headwaters located in the Adirondack Forest Preserve, and its drainage through seven eco-zones and into Lake Ontario, the Black River is a model of how communities in an area of 1.2 million acres can work together to sustain the many beneficial uses that a watershed provides. Through the initiative, communities have been able to enjoy quality drinking water, water dependent recreational activities such as fishing, boating, and swimming, and a successful agricultural economy that produces dairy and maple syrup. The Plan ensures that decision making is guided by sound science, stakeholders are educated and engaged, and social, economic, and environmental goals are balanced.

This initiative applied an ecosystem based management approach as recommended by the New York State Ocean and Great Lakes Ecosystem Conservation Act in 2006<sup>3</sup>, and consistent with the recommendations for an ecosystem approach within the 2012 Great Lakes Water Quality Agreement.<sup>4</sup> The Plan also achieves goals for the Black River Watershed as identified by the Lake Ontario Lakewide Action and Management Plan.<sup>5</sup> The LAMP Biodiversity Conservation Strategy<sup>6</sup> identified the Black River as a priority action site for advancing riparian buffers to protect habitat for native species, such as lake Sturgeon.

Population increases in the City of Watertown and surrounding area were documented in the 2010 U.S. Census<sup>7</sup> and led to the area being designated as urbanized in 2013. Watertown and surrounding areas are now being required to regulate municipal separate storm water sewer systems (MS4's). and comply with minimum control measures established by the DEC storm water permitting program.<sup>9</sup> Progress towards meeting these requirements have included securing a grant to support education and outreach, the appointment of Jefferson County Soil and Water Conservation District<sup>11</sup> as the storm water program coordinator, the formation of the Jefferson County Storm water Coalition, development of the Jefferson County Storm Water Coalition website<sup>12</sup> and outfall mapping. The municipalities were also recently awarded a DEC Water Quality Improvement Grant<sup>13</sup> in 2015 to develop a storm water management

plan, and have leveraged a US Forest Service Great Lakes Restoration Initiative<sup>14</sup> Grant in 2015 to install green infrastructure and plant trees in MS4 communities.

The City of Watertown's sewage treatment plant<sup>15</sup> is currently in the process of undergoing improvements in wastewater treatment operations to comply with new requirements of the Federal Clean Water Act.<sup>16</sup> Under the new requirements, wastewater treated with chlorine will be de-chlorinated to reduce discharges to the environment. Funding for the project is primarily through city taxes with some state funding. The facility includes an anaerobic digester that was installed in the 1960's, which reduces the volume of solid waste disposed of at the regions landfill, saves money by reducing the amount of oil and fuel that was previously used to power the wastewater treatment facilities, and reduces greenhouse gas emissions. In 2013, the City completed a study and design for modifications to its sludge disposal system with funding from the New York State Energy Research and Development Authority (NYSERDA)<sup>17</sup>. The Sludge Disposal Modification would eliminate sewage sludge incineration, install methane gas engines to run large pumps, enhance and increase the digester processes for proper disposal of growing wastes. Wastewater treatment upgrades are recommended by the Plan, and state programs continue to identify issues with wastewater treatment and provide resources to support improvements to wastewater management within the watershed.

The Black River is an important drinking water resource for the City of Watertown and surrounding areas, including Fort Drum, and the City's water treatment plant<sup>18</sup> ensures clean drinking water for approximately 65,000 people in the City and surrounding area, according to information from the City of Watertown. The DEC's protection of waters program<sup>19</sup> is a regulatory mechanism to ensure that drinking water and recreational resources are protected. The DEC Black River Priority Waterbodies List<sup>36</sup> identifies the section of the Black River from the Watertown water treatment plant to Black River Village as a class A waterway supporting drinking water use. The priority waterbodies list also identifies this class A section as being stressed from sewage and on-site septic systems, municipal runoff, agricultural runoff, hydrologic fluctuations due to damming for hydroelectric facilities, and natural erosion. Ongoing efforts and broad collaborative actions are needed to protect and sustain this important drinking water resource.

A significant majority of the Black River lies within Lewis County. Lewis County is a premier location for dairy farming, and much of the Black River Valley within this county is intensively farmed. There are 14 Concentrated Animal Feeding Operations (CAFO's)<sup>20</sup> within the watershed that are regulated by the NYSDEC and are required to have a Comprehensive Nutrient Management Plan. The Jefferson, Oneida, Herkimer and Lewis County Soil and Water Conservation Districts<sup>21</sup> work with farmers throughout the watershed to promote Agricultural Environmental Management<sup>22</sup> and the implementation of Agricultural Best Management Practices according to national conservation practice standards<sup>23</sup> on county farms. Soil and Water Conservation Districts throughout the state assist farmers with complying with necessary regulations and also assist voluntary landowners with identifying and implementing Agricultural BMP's. For example, in 2013, Lewis County SWCD had 21 AEM farm locations.

Past industrial contamination impacts the groundwater resources and habitat of the Black River Watershed and ongoing efforts to maintain momentum towards cleanup efforts have been addressing these issues. The EPA Superfund<sup>24</sup> program designated a Superfund site at the former St. Regis Paper Company and Crown Cleaners industrial complex in Herrings, NY and have developed a Record of Decision in 2012 for remediating the site. EPA began site clearing activities in 2014 and plans for 2015 include building demolition and the excavation and removal of contaminated soils. EPA has committed



\$3.1 million dollars to fund this cleanup. EPA, DEC and NYS Dept. of Health efforts are underway to assess the Black River PCB's superfund site in Carthage and West Carthage, NY. Additional DEC Remediation at Sewell's Island and a DOS Brownfield Opportunity Assessment at Lyon Falls is further remediating and enhancing sites that have been degraded and contaminated by past industrial activities.

Atmospheric deposition of mercury and acid rain are cause for concern in the upper Black River Watersheds. Federal and state initiatives to reduce emissions from fossil fuels that contribute to this source, as well as DEC liming of priority lakes affected in the upper watershed are addressing these concerns. A Northeast Area TMDL (Total Maximum Daily Load) is in effect for the Northeast to minimize mercury loads to watersheds of the northeast. The Department of Health has advisories for fish consumption due to the bioaccumulation of mercury in fish. The consumption advisories in NYS have improved and in 2014 DOH changed consumption recommendations to 4 meals per month.

Invasive species threaten the biodiversity and watershed health of the Black River Watershed. The New York State DEC funded St. Lawrence- Eastern Lake Ontario and the Adirondack Park's Partnership for Regional Invasive Species Management<sup>26</sup> work with stakeholders and implement actions to manage invasive species within the Black River Watershed. Ongoing efforts will be needed to ensure that the ecological integrity of the watershed is not compromised by invasive species.

While the Black River Watershed Management Plan and collaborative efforts to implement recommendations have been successful in leveraging state and local funding to promote goals identified within the Plan, additional resources are needed to ensure that water quality and natural resources are protected and that valuable drinking water resources are sustained for the benefit of communities throughout the watershed. In order to better leverage federal resources (including Clean Water Act funding) from the Environmental Protection Agency, stakeholders and partners within the Black River Watershed are seeking to add this addendum to the existing Black River Watershed Management Plan in order to meet the minimum 9 elements required by the EPA for Watershed Management Plans.<sup>27</sup>

The development, state approval, and partner support of the addendum does not intend to require any new regulatory oversight within the watershed communities. The intent is to provide more targeted, measurable implementation of the existing Watershed Management Plan through its use in leveraging federal EPA resources, and it's successful implementation is contingent upon funding leveraged, community and stakeholder support, local and regional capacity, and landowner and community participation, which will be encouraged, but not required.

### **III. Public participation and public input process**

#### **a. Agencies and organizations**

The following partners and stakeholders supported the development of the EPA Black River Watershed Management Plan to reduce sediment, phosphorus and nitrogen loading in the watershed (EPA plan), and will work collaboratively to leverage necessary funding, provide technical expertise, and implement projects:

NYS Tug Hill Commission

NYS Department of Environmental Conservation  
Lewis County Soil and Water Conservation District  
Jefferson County Soil and Water Conservation District  
City of Watertown  
Jefferson County Storm Water Coalition  
Development Authority of the North Country  
Jefferson County Water Quality Coordinating Committee  
Lewis County Water Quality Coordinating Committee

b. Description of how stakeholders were engaged and will be engaged

Stakeholder outreach activities were undertaken to gain support for this plan in the development process, including sharing and discussing the draft plan at Jefferson and Lewis County Water Quality Coordinating Committee meetings, sharing the draft plan with DOS Watershed Management Program staff, working with local stakeholders to identify additional stakeholders to reach out to, and holding a meeting to discuss the draft EPA 9 element plan. An article concerning the development of the plan was disseminated among over 400 stakeholders that were involved in the development of the original plan and included municipal representatives, code enforcement officials, community planners, and other interested citizens. Further activities, including presenting on the plan at the annual Black River Watershed conference, will be undertaken to gain further support for and contribution to the draft plan. The following activities after the state approval process will further promote and support implementation of the plan:

- Jefferson County and Lewis County Soil and Water Conservation Districts, through their Agricultural Environmental Management program, reaches out to agricultural landowners and provides technical and financial support to assist farmers with implementing BMP's. SWCD's also host an annual outreach event, the Envirothon, which engages schools and local communities in understanding and taking actions to reduce water quality and agricultural issues.
- The Black River Watershed Conference is an annual public outreach and engagement event hosted by the Tug Hill Commission, that provides updates, news, and identifies stakeholder priorities for the Black River Watershed. The Black River Watershed Management Plan 9 element addendum will be presented to stakeholders at the 2016 watershed conference to promote awareness and support for implementing activities that reduce water quality issues in priority sub watersheds. Tug Hill Commission's annual Local Government Conference additionally provides training relating to priority environmental and other local issues for the Black River and other area watershed residents and municipalities, and will provide another venue to share the addendum with local stakeholders and municipalities.
- Black River Steering Committee includes participation from the SWCD's, DOS, DEC, and Tug Hill Commission, and identifies priority actions and further engages stakeholders and partners to encourage participation in identifying priorities and meeting goals and recommendations of the Black River Watershed identified in the Plan. The steering committee publishes an annual newsletter that provides updates on Black River Watershed projects that implement recommendations of the Black River Watershed Management Plan, promotes stewardship among community members and awareness of emerging issues in the basin. The



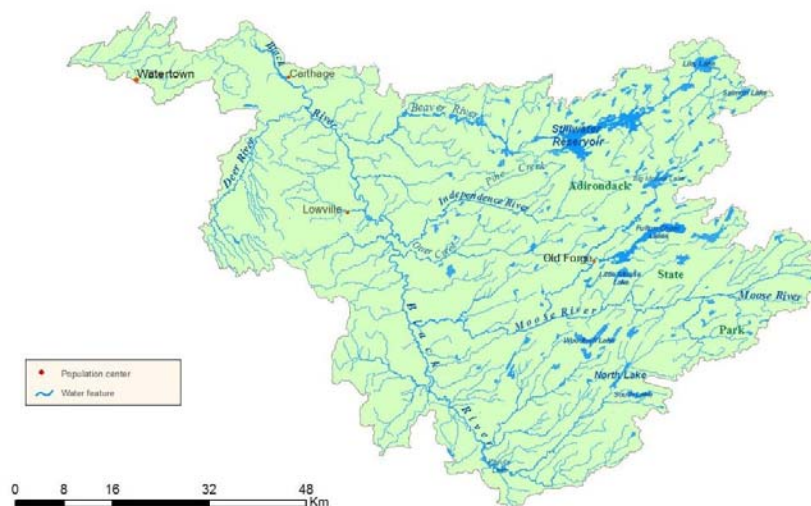
steering committee will publish an article educating stakeholders and the public about the 9 element addendum.

- Sewage Pollution Right to know law<sup>28</sup>, enacted in 2013, creates awareness among the public about sewage pollution and where it is entering waterbodies. The law also aids in documenting wastewater infrastructure needs. The law helps the public avoid contact with waterbodies that are likely to contain bacteria that can cause illness while boating, fishing or swimming.

#### IV. Watershed description

On page 3 of the Plan, an overview of the watershed is provided. It identifies the watershed as draining approximately 1.2 million acres, with its headwaters in the Western Adirondack Park, a state forest preserve, draining northwest through the Tug Hill Plateau and into Lake Ontario, the eastern most Great Lake.

##### c. Study area



<http://www.dec.ny.gov/lands/48374.html>

The Black River watershed, HUC 04150101, spans 1.2 million acres, or 1920 square miles, and drains into Eastern Lake Ontario. Rivers and streams within the watershed include the Moose River, Beaver River, Independence River, and Deer River. Major lakes within the watershed include the Fulton Chain of Lakes, Big Moose Lake, and Woodhull Lake. Stillwater reservoir is also located within the watershed. Page 5 of the Plan identifies sub watersheds of the Black River, using Hydrologic Unit Codes 11, and identifies 19 unique sub watersheds.

##### d. Soils

On page 29, the Plan states that the watershed has 28 different soil series. The 3 major soil series that comprise 53% of the basin are the Adams series (deep, excessively

drained), the Becket series (very deep, well drained), and the Potsdam series (very deep, well drained). Additional information on soils within the Black River watershed can be explored on the NRCS Web Soil Survey.<sup>29</sup>

e. Climate & Hydrology

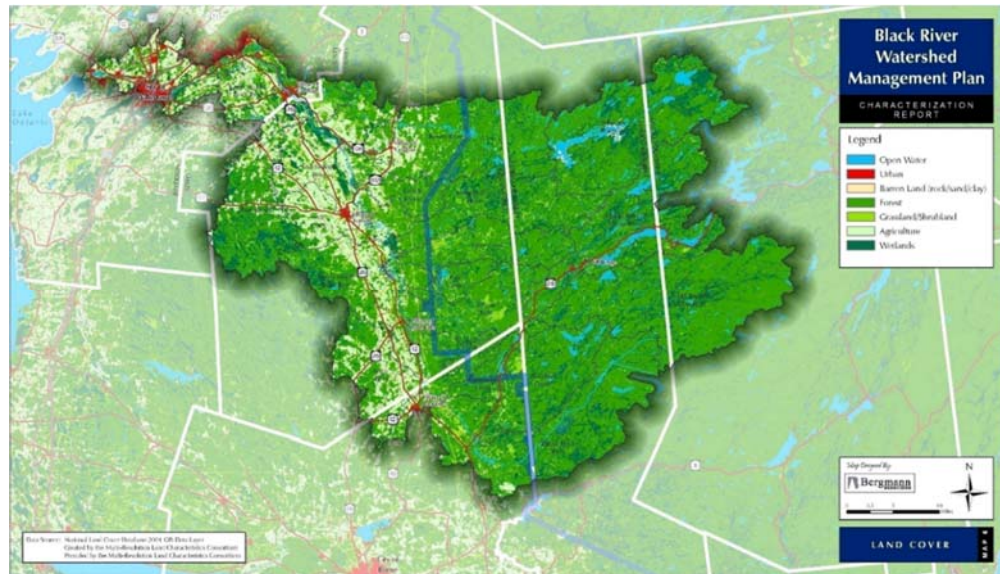
On page 31, Plan characterizes the climate of the watershed as having long, cold winters and short cool summers, and has one of the highest precipitation rates in New York State. The area can receive anywhere from an average of 100 to over 200 inches of snowfall annually. Page 32 depicts the average annual precipitation by sub watershed. The surface hydrology of the watershed on page 33 depicts a high elevation of 2143 ft. in the Western Adirondack Mountains, and a low elevation of 246 ft. where it drains to Lake Ontario. The average slope is approximately .164%. The Black River flows are regulated by the Hudson River- Black River regulating district to allow for water supplies, irrigation, and hydro-electric power generation. The annual mean flow of the Black River is approximately 4,212 cubic feet per second. Class A and Class AA streams, as classified by the NYSDEC Water Quality Standards Program, that provide drinking water supplies comprise 146.5 miles of the watershed. There are 178 dams throughout the Black River watershed. Most of the basin has good water quality, but there are some water quality problems. Based on NYSDEC surface water classification, 71.3% of stream miles within the watershed are trout waters or suitable for trout spawning. Non-point source loadings within the watershed were modeled using the Arcview Generalized Watershed Loading Function (AVGWLF) model (page 46). Page 51 identifies wetland acres within each sub watershed, with a total of 212,319 woody and emergent wetland acres. Flood Insurance Rate Maps were used to identify floodplains and were found to be incomplete for the watershed (page 52). Groundwater resources are described on page 53, and identify that the watershed is comprised of 11,143 acres of confined aquifers, and 475,508 acres of unconfined aquifers.

f. Land use

On page 12 of the Plan, land use within the watershed is described, and includes 9 categories:

- Agriculture (14.1%)
- Residential (15.2%)
- Vacant (7.09%)
- Commercial (0.4%)
- Recreation and entertainment (0.5%)
- Community services (0.5%)
- Industrial (0.3%)
- Public Services (1.0%)
- Wild, forested, conservation lands and public parks (59.3%)

The following map portrays land use in the Black River watershed, and can be found in the Appendix of the Plan.



Urbanized areas are concentrated in Watertown, Carthage, Lowville, and Boonville. The Black River valley is highly used for agricultural lands, and the eastern Black River watershed is characterized by forested, undeveloped lands, within the Adirondack Park. More information on land use is available in section 2 of the Plan.

g. Demographics

According to section 2.3 of the plan, five counties are traversed by the Black River watershed, including Jefferson, Lewis, Oneida, Herkimer, and Hamilton counties. The total population in 2010 was 438,616, and is projected to decline to 416,145 in 2020. Jefferson County is projected to see population growth of 2.7% through 2020. More information on demographics is available within section 2.3 of the plan.

h. Recreation

The Black River is a popular destination for whitewater rafting and kayaking, and its watershed is popular for hunting, fishing, bird watching, snowmobiling, and all-terrain vehicle use.

Through an initiative funded by the NYS Environmental Protection Fund, a website and brochures were developed to promote area tourism, available here:

[www.BlackRiverNY.com](http://www.BlackRiverNY.com)

In addition, the NYSDEC maintains information related to Black River recreation opportunities and use of state lands, including the popular Tug Hill and Adirondack region destinations. More information about recreational opportunities, state lands and management, can be found in NYSDEC's outdoor activities section of the website.

I Love NY additionally promotes tourism throughout the state and is useful in identifying and planning recreational opportunities in the area.

## V. Water quality condition

### a. Historical conditions/previous studies

Two Native American groups, the Mohawks (one of the five nations of the Iroquois Confederacy) and the Algonquin's (of Canada), frequented the Black River and a large section of the Adirondacks Mountains for hunting and trapping, and left few traces. The area provided game during harsh winters and transportation routes via waterways. In 1799 the area that is now Watertown was explored by the French crossing the Black River. Settlers gradually moved into the area, attracted by the abundance of cheap hydropower. Dams were constructed and Watertown prospered through the 19th century as an industrial center, with local paper mills producing most of the nation's newsprint and a variety of paper products. The upper Black River watershed was settled more gradually due to obstacles inherent to the more rugged, mountainous terrain. Logging of the forest (particularly for spruce) was one of the main forces that eventually opened the area up to development. New York State designated public land in the Adirondacks as Forest Preserve, and in 1892 the State Legislature created the Adirondack Park, with the purposes of protecting timber supply, major watersheds, and providing for the "free use of all the people for their health and pleasure" (Jamieson 1985). In 1894 a constitutional amendment, known as the "forever-wild" amendment, strengthened the preservation of the Forest Preserve. The 1960s witnessed proposals for extensive second-home developments in the Adirondacks. The Adirondack Park Agency (APA) administers land use policy within the Park "blue-line" boundaries (see map in land use section). Much of the past century's use of the Black as a working river led to water quality decline and habitat destruction. Recreational interest in the river has grown in recent decades, and a successful white water rafting industry takes advantage of the Class IV rapids afforded by the river.<sup>3</sup> In addition to the studies below, the Natural Resource Conservation Service completed a Rapid Watershed Assessment Profile for the Black River in 2010, which details watershed statistics, physiology, geography, common resource areas, precipitation, land use/land cover, and describes detailed information about the soil characteristics and uses.

### i. Biological surveys

The NYSDEC routinely conducts biological sampling through the Rotating Integrated Basin Studies program<sup>31</sup>, and considers citizen science water quality monitoring from the Water Assessments by Volunteer Evaluators program<sup>32</sup> in its biological monitoring efforts. Lakes throughout the state are monitored by citizen scientists by the Citizen Statewide Lake Assessment Program. Water quality monitoring by professionals that is coordinated with the DEC, and includes development of a Quality Assurance Project Plan, occurs through the Professional External Evaluations of Rivers and Streams program<sup>34</sup>.

## ii. TMDLs

In the most recent publication of the NYS 303(d) impaired waterways listing (2014)<sup>35</sup> within the Black River watershed, Mill Creek, South Branch and tributaries, within Lewis county, were listed as water segments requiring TMDL development.

## iii. Watershed plans

- Black River Watershed Management Plan<sup>1</sup>, developed by Bergmann Associates in 2010.
- DEC Priority Waterbodies List<sup>36</sup>, last updated for Black River in 2007.
- FL-LOWPA The State of the New York Lake Ontario Basin: Report on Water Resources and Local Watershed Management Programs. Section for Black River Basin. Developed in 2000.<sup>37</sup>
- New York's Interim Great Lakes Action Agenda, released in 2014.<sup>38</sup>
- Lake Ontario Phosphorus Loading by Macarewicz et al. in 2012.<sup>39</sup>

## iv. Regulatory programs

### 1. LTCP

Long Term Control Plans (LTCPs) are required under the Environmental Protection Agency's combined sewer overflow (CSO) Control Policy and part of DEC's CSO control strategy to reduce the frequency, duration, and intensity of CSO events. Municipalities with CSOs are required to have a State Pollutant Discharge Elimination System (SPDES) permit. More information is available on the DEC Long term control plan website. Communities in the Black River Watershed requiring an LTCP include: The City of Watertown is the only municipality with a CSO that is required to have a long term control plan in the Black River basin, and an LTCP for the City of Watertown was approved in 2011.

### 2. SPDES program

The Plan identifies 15 wastewater treatment facilities that discharge 24.2 million gallons per day of treated wastewater into the Black River Watershed (Table 8.8-27, p 397). In the Great Lakes watershed, municipal sewage State Pollutant Discharge Elimination system (SPDES)<sup>41</sup> permits over 1 MGD are required to meet a phosphorus limit of 1mg/l. The DEC's State Pollution Discharge

Elimination System permitting program identifies and enforces compliance with state water quality standards. In addition, the EPA recently developed a tool, called Drinking Water Maps, to inform drinking water protection that allows the public and stakeholders to view SPDES permits, and information on any violations. The tool can be accessed at:

[www.epa.gov/sourcewaterprotection/dwmaps](http://www.epa.gov/sourcewaterprotection/dwmaps)

The Plan identifies municipal wastewater treatments plants and their daily discharges. Watertown, Carthage and West Carthage, Lowville, Boonville, and Brownville have the highest daily discharges into the Black River. As previously mentioned, Watertown is in the process of identifying opportunities to improve their wastewater treatment facilities.

### 3. MS4 program

Population increases in the City of Watertown and surrounding area were documented in the 2010 U.S. Census<sup>7</sup> and led to the area being designated as urbanized in 2013. Watertown and surrounding areas are now being required to regulate municipal separate storm water sewer systems (MS4's) and comply with minimum control measures established by the DEC storm water permitting program.<sup>8</sup> The towns of Leray, Rutland, Watertown, Villages of Black River, Brownville, West Carthage, Carthage and Dexter, the City of Watertown and Jefferson County have signed an inter-municipal agreement to work together to meet these requirements. Progress towards meeting these requirements have included securing a grant to support education and outreach, the appointment of Jefferson County Soil and Water Conservation District as the storm water program coordinator, the development of the Jefferson County Storm Water Coalition website<sup>10</sup> and outfall mapping. The municipalities were also recently awarded a 2015-2016 DEC Water Quality Improvement Grant<sup>11</sup> to develop a storm water management plan, and have leveraged a US Forest Service Great Lakes Restoration Initiative<sup>12</sup> Grant in 2015 to install green infrastructure and plant trees in MS4 communities. Development and implementation of the storm water management plan will improve water quality in the high priority lower Black River sub watershed, by reducing runoff containing pollutants and nutrients and educating community members to be stewards of the land and water resources.

### 4. Sewer service areas & septic systems

Outside of major development areas, such as Watertown and the surrounding area, Lowville, Carthage, Boonville, Forestport, and Old Forge, the watershed is characterized by rural, unsewered land where residential areas are serviced by septic systems and wells. According to the Plan (Appendix 8.9) septic loadings into the Black River Watershed contribute 4,464 kg/yr. of nitrogen, and 693 kg/yr. of phosphorus, with the highest sub watershed nitrogen and phosphorus



loads from septic's in Middle Branch Moose River, Upper Black River, Stillwater Reservoir, and South Branch Moose River. The New York State Department of Health and local health departments are involved with inspection and code enforcements of septic systems, in communities that have regulatory programs.

b. Present conditions

The Lake Ontario tributary loading study by Macarewicz et al in 2012<sup>39</sup> identifies the most up to date Black River watershed loading information. The study indicates that the Black River total phosphorus load was 135.06 metric tonnes per year in 2012. Ongoing efforts by the DEC, Soil and water districts, and USGS are further updating water quality data to inform the new priority waterbodies list.<sup>36</sup>

## **VI. Designated and desired uses**

a. Designated uses in the watershed & status (i.e., met, impaired or threatened)

The DEC's Classification of Waters Programs<sup>30</sup> designates best usage of waterways in the state. The Priority Waterbodies List<sup>36</sup> identifies impaired or impacted use of waterways. All waters in New York State are assigned a letter classification that denotes their best uses. Letter classes such as A, B, C, and D are assigned to fresh surface waters. Best uses include: source of drinking water, swimming, boating, and fishing. The letter classifications and their best uses are described in regulation [6 NYCRR Part 701](#). The best use of Class GA groundwater (all fresh groundwater in New York State is Class GA) and Class A, A-Special, AA, and AA-Special surface waters is a source of potable water supply. Standards and guidance values of the Health (Water Source) Type are established for these waters to protect this use. Separate standards for drinking water are promulgated by the New York State Department of Health (NYS DOH). In the Black River basin, Lower Black River sub watershed has a Class A designated waterway that supports drinking water resources in the City of Watertown and surrounding area, including parts of Fort Drum.

b. Desired uses in watershed

Desired uses in the watershed include drinking water, swimming, boating, fishing, and aquatic life, as classified by the NYSDEC classification of waters program. Drinking water supplies should be protected. Economic and agricultural development and production that benefits local communities, and considers ecosystem services, water quality, and natural resource impacts is also important to stakeholders within the watershed.

## **VII. Water quality goals and objectives**

a. Sources of impairments and threats to designated uses

In Part 1, Section 3 (page 77-92), the Plan identifies issues impacting water quality in the Black River Watershed. The Plan identifies the following as causes of impairments to water quality:

- Atmospheric deposition
- Contaminants (Mercury, PCB's)
- Failing on site septic's and wastewater treatment systems
- Agricultural runoff
- Invasive species
- Climate change
- Flow regulation
- Urban growth
- Flooding, erosion, and storm water

Additional information on the water quality and impairments is available from the DEC website and monitoring efforts.

b. Causes of impairments and threats

The sources of this pollution within the Black River Watershed, as identified by the Plan, are from agricultural runoff, municipal and private wastewater treatment (sewage systems and on site septic's), and erosion of streams and rivers that occurs due to shoreline and stream bank disturbances from development and from storms, floods, and ice. In addition, past industrial activities (superfund and brownfield sites) have contaminated groundwater with PCB's in the Lower Middle Black River sub watershed in Herrings and Carthage, NY. Invasive species threaten biodiversity and water quality. Section 8.9 of the Plan (p. 399-409) models nitrogen, phosphorus, and sediment loading from each source.

c. Pollutants addressed by plan

The watershed plan addresses nitrogen, phosphorus and sediment. Continued efforts to address Northeast area atmospheric deposition and acid rain should be addressed through the Northeast Area TMDL<sup>25</sup>, and collaboration and coordination on a global scale. Efforts to address Legacy contaminants such as PCB's should continue to be addressed by EPA superfund<sup>24</sup>, DEC remediation, and DOS Brownfield programs.

d. Quantify pollutant source loads in watershed

The Black River Watershed encompasses 1,218,075 acres. Total Nitrogen loads are 1,535,852 kilograms per year, total phosphorus loads are 116,384 kilograms per year and total sediment loads are 20,357 mega grams per year. This information is available in section 8.9 of the Plan. According to the Lake Ontario study the total phosphorus loading to Lake Ontario from the Black River was 135.06 metric tons per year<sup>39</sup>. When

converted to kilograms, this is equal to approximately 135,060 kg/yr. These on the ground monitoring results are in close alignment with the modeling results.

e. Water quality goal or target

The water quality goal for nitrogen and phosphorus loads (per acre) in sub-watersheds is to reduce the kg/acre loading to below the impairment thresholds identified by the Plan: average total nitrogen loads above 3.49 kg/acre and average total phosphorus loads above .12 kg/acre. Sub watersheds above these impairment thresholds were considered impaired and were prioritized higher than those with loads below these thresholds. The plan did not identify a sediment impairment threshold. See page 47 of the plan for more information on these impairment thresholds.

The Black River Watershed Management Plan utilized the [AVGWLF](#) model to determine total nitrogen, phosphorus, and sediment loads to the watershed and model reductions that would be achieved by implementing recommended Best Management Practices for agriculture within the Black River basin's priority sub watersheds. Best Management Practices and estimated load reductions are identified in Section 8.5 of the Plan (page 297). This addendum will further identify additional management actions, including green infrastructure, which could further reduce nutrient loading.

Management actions should be aimed at reducing average loads per acre to below the impairment thresholds identified in the Plan in high priority sub watersheds, as indicated in the next section.

f. Expected load reductions needed to meet water quality goal or target

The modeling results indicate that Lower Black River and Lower Middle Black River Phosphorus loads are above the threshold, and Mill Creek nitrogen and phosphorus loads are above the threshold. Lower Black River phosphorus loads need to be reduced by 53% (from 8457 kg/acre to 4500 kg/acre), Lower Middle Black River Phosphorus loads need to be reduced by 30% (from 8442 kg/acre to 5926 kg/acre) and Mill Creek Nitrogen loads need to be reduced by 17%, or from 93776 kg/yr. to 78342 kg/acre, and phosphorus loads would need to be reduced by 54%, or from 4798 kg/acre to 2589 kg/acre. Through targeted implementation of BMP's in priority sub watersheds, the following reductions will be achieved:

Priority Sub watershed	Phosphorus Reductions target	Nitrogen Reductions target
Lower Black R.	Phosphorus load reduction of 53%- from 8457 kg/yr. to 4500 kg/yr.	None needed- phosphorus reduction activities will reduce
Lower Middle Black River	Phosphorus load reductions of 30%, from 8442 kg/yr. to 5926 kg/yr.	None needed- phosphorus reduction activities will reduce
Mill Creek	Phosphorus load reduction of 54%, from 4798 kg/yr. to 2589 kg/yr.	Nitrogen load reduction of 17%, from 93776 kg/acre to 78342 kg/yr.

\*Although sediment is not identified as an impairment in the watershed plan, reductions in sediment that will be achieved due to activities targeting phosphorus reductions will provide additional water quality improvements, including lowering costs for drinking water treatment by reducing total suspended solids and total organic carbon.

## VIII. Priority areas within watershed

### a. How priority/critical areas were determined

Section 3 of the Plan prioritizes sub-watersheds using a prioritization model that considers conditions of water quality, land cover, land use, ownership, and natural resources. Sediment per acre, total nitrogen per acre, and total phosphorus per acre were the primary metrics for prioritizing sub watersheds. The prioritization model for the Black River Watershed Management Plan ranked the following sub watersheds as high priority for reducing water quality and natural resource issues. Modeling results used to identify priority sub watersheds can be found in section 8.9 of the Plan.

#### High Priority Sub watersheds

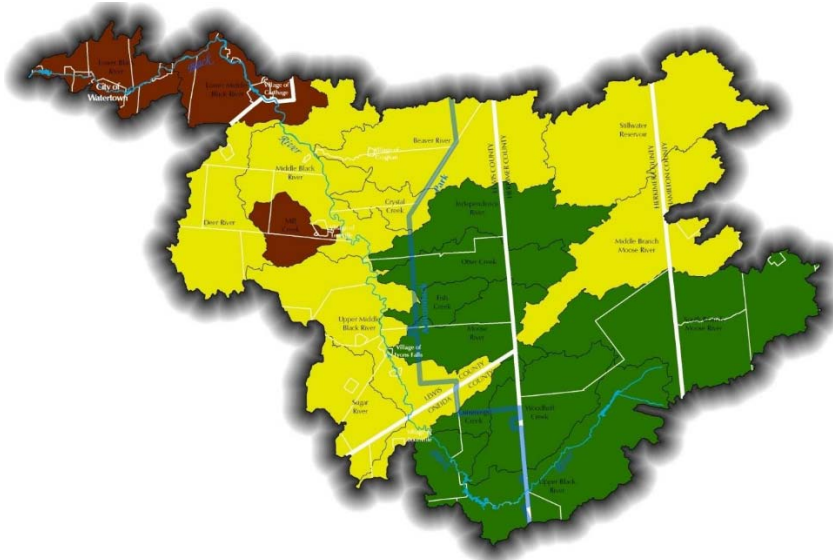
HUC -11	Sub watershed	Acres	Load sources	Load type	Total Load	Average load per year
04150101190	Lower Black River*	39,532	Agricultural runoff, sewage, on site septic's, municipal runoff, hydrologic fluctuations	Nitrogen Phosphorus Sediments	128,386 kg/yr. 8,457 kg/yr. 1,411 Mg/yr.	3.30 kg/acre .21 kg/acre* .04 Mg/acre
04150101180	Lower Middle Black R.	51,985	Agricultural and municipal runoff, sewage and on site septic's	Nitrogen Phosphorus Sediments,	135,729 kg/yr. 8,442 kg/yr. 1,822 Mg/yr.	2.68 kg/acre .17 kg/acre* .036 Mg/acre
04150101120	Mill Creek	22,512	Agricultural and municipal runoff	Nitrogen Phosphorus Sediments	93,776 kg/yr. 4,798 kg/yr. 686.6 Mg/yr.	4.16 kg/acre* .21 kg/acre* .03 Mg/acre

\*The Lower Black River sub watershed is a Class A waterway and the source of the municipal drinking water supply for the City of Watertown and surrounding areas. Protection of this important water resource is an additional priority, and the DEC's Protection of Waters Program regulations ensures it's protection.

**The prioritization model ranked the following sub watersheds as medium priority:**

HUC- 11	Sub watershed	Acres	Load Type	Total Load	Average Annual Load
04150101040	Sugar River	44,732	Nitrogen Phosphorus Sediment	166,792 kg/yr. 9,879 kg/yr. 917 Mg/yr.	3.73 kg/acre .22 kg/acre* 0.02 Mg/acre
04150101160	Middle Black R.	81,353	Nitrogen Phosphorus Sediment	230,413 kg/yr. 9,879 kg/yr. 1,627 Mg/yr.	2.85 kg/acre .14 kg/acre* 0.02 Mg/acre
04150101100	Upper Middle Black River	102,016	Nitrogen Phosphorus Sediment	244,684 kg/yr. 14,353 kg/yr. 2,827 Mg/yr.	2.42 kg/acre .14 kg/acre* .03 Mg/acre
04150101150	Beaver River	98,761	Nitrogen Phosphorus Sediment	108,232 kg/yr. 8,522 kg/yr. 1,157 Mg/yr.	1.12 kg/acre .09 kg/acre .01 Mg/acre
04150101130	Crystal Creek	17,085	Nitrogen Phosphorus Sediment	23,727 kg/yr. 1,735 kg/yr. 179 Mg/yr.	1.40 kg/acre .102 kg/acre .01 Mg/acre
04150101170	Deer River	62,270	Nitrogen Phosphorus Sediment	108,445 kg/yr. 6,738 kg/yr. 683 Mg/yr.	1.75 kg/acre .109 kg/acre .01 Mg/acre
04150101060	Middle Branch Moose R.	94,880	Nitrogen Phosphorus Sediment	32,032 kg/yr. 4,855 kg/yr. 1,281 Mg/yr.	0.37 kg/acre .056 kg/acre .015 Mg/acre
04150101140	Stillwater Reservoir	109,992	Nitrogen Phosphorus Sediment	31,210 kg/yr. 5,191 kg/yr. 1,168 Mg/yr.	.32 kg/acre .053 kg/acre .01 Mg/acre

\*Marks those sub watersheds with average loads above the impairment threshold



Map of priority sub watersheds (from the Plan, page 93)

(brown=high, yellow= medium, green=low)

## IX. Proposed BMPs

### a. Best management practice (BMPs) recommendations

#### Agricultural Best Management Practice Implementation

To achieve reduction targets, Agricultural Best Management Practices (Ag BMP's) should be implemented on agricultural lands in high and medium priority watersheds. Lewis and Jefferson County Soil and Water Conservation Districts have been and will continue to work with agricultural landowners to promote and implement Ag BMP's identified in the plan in accordance with Natural Resource Conservation Service Conservation Practice Standards<sup>43</sup>. They will provide technical assistance and leverage financial assistance as they are able, and will seek to target and inform landowners in priority areas of local water quality issues and how landowners can alleviate these issues. Examples of Ag BMP's recommended by the plan include cover crops, vegetative filter strips, no till crops, Comprehensive Nutrient Management Plans (CNMP's) and reducing livestock access to streams. The following information identifies Ag BMP's, current loadings from agricultural sources, and estimated load reductions that will be achieved to reduce loadings that are above impairment thresholds and achieve water quality goals in high priority sub watersheds:



1. Cover crops are crops sown after harvest of the main crop that provide protective cover for soil, and reduce erosion and nutrient runoff. Cover crops can only be implemented on cropland. The Plan identifies that cover crops on 50% of croplands would reduce sediment loads by 18.5%, nitrogen loads by 21.4%, and phosphorus loads by 21.2%. Using information identifying the percentage of croplands in each sub watershed in section 5 (p 123-128) to calculate croplands and the modeling results in section 8, the

following loads for cropland were identified in high priority sub watersheds:

Photo © USDA NRCS

	Total acres age lands (acres of cropland)	Total N loads (kg/yr.) from Cropland	Total P load (kg/yr.) from cropland	Total Sediment (mg/yr.) from cropland
Lower Black R.	15812 (3953 acres of cropland)	6524	1122	535
Mill Creek	13507 (4457 acres of cropland)	5897	960.2	385
Lower Middle	15595 (4678 cropland)	6273	861	438



- In the Lower Black River, implementation of cover crops on 50% of croplands (1976 acres) would reduce the overall sub watershed phosphorus load by 3% (235 kg/yr.).
- In the Lower Middle Black River sub watershed, cover crops on 50% of croplands (2339 acres) would reduce the overall phosphorus load by 2%, or 181 kg/yr.
- In the Mill Creek sub watershed, cover crops on 50% of croplands (2228 acres) would reduce phosphorus loads by 4%, or 192 kg/yr. and would reduce nitrogen loads by 1%, or 1238 kg/yr.



2. Vegetative filter strips are areas of planted vegetation (usually grasses) located along agricultural land edges that remove pollutants from runoff, provide habitat, and offer an area for turn rows and haymaking.

Photo © <http://www.extension.umn.edu/>

Vegetative filter strips require the landowner to take the lands out of production and thus are not highly favored due to the loss of working lands and associated income. A reasonable

target for implementation of this BMP would be 25% of agricultural lands. The Plan identifies that vegetative filter strips on 25% of Agricultural lands would reduce sediment loading by 19.8%, nitrogen loading by 21.7%, and phosphorus loading by 23.1%.

- In the Lower Black River sub watershed, implementing vegetative filter strips on 3953 acres of Ag lands would reduce the overall phosphorus load by 10%, or 881.6 kg/yr.
- In the Lower Middle sub watershed, implementing vegetative filter strips on 3898 acres of Ag lands would reduce the overall phosphorus load by 8%, or 689 kg/yr.
- In the Mill creek sub watershed, vegetative filter strips on 3376 acres would reduce the overall phosphorus load by 8.5% or 409 kg/yr. and the overall nitrogen load by 2.6%, or 2443 kg/yr.



3. No till crops is a production system where the field is left virtually undisturbed from harvest to planting. Fields are no longer plowed and plant residues remain in the soil to offer protection from erosion.

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No till crop implementation on 50% of high priority sub watershed croplands (Lower Black River, Middle Black R., Mill Creek) would reduce sediment loads in those sub watersheds by 33.1%, total nitrogen loads by 24.9%, and total phosphorus loads by 25.1%.

- In the Lower Black River, implementation of no till crops on 50% of croplands (1976 acres) would reduce the overall sub watershed phosphorus load by 3% (281 kg/yr.).
- In the Lower Middle Black River sub watershed, no till crops on 50% of croplands (2339 acres) would reduce the overall phosphorus load by 2.5%, or 216 kg/yr.

- In the Mill Creek sub watershed, no till crops on 50% of croplands (2228 acres) would reduce phosphorus loads by 5%, or 240 kg/yr. and would reduce nitrogen loads by 1.5%, or 1468 kg/yr.



4. Reducing livestock access to streams involves installing fencing along a waterway to prevent livestock from accessing the stream and providing livestock with off stream watering tanks. According to the Plan, reducing livestock access to streams is estimated to reduce phosphorus loading on hay/pasture land by 78%, nitrogen loading by 56%, and sediment loading by 76%. By reducing livestock access to streams on 25% of all hay/pasture lands, phosphorus loads would be reduced by 39%, and nitrogen loads would be reduced by 28%.
  - Reducing livestock access to streams on 25% of hay and pasture lands in the Lower Black River would reduce total phosphorus loadings by 528 kg/yr.
  - Reducing livestock access to streams on 25% of hay pasture lands in the Lower Middle Black R. would reduce total phosphorus loadings by 399 kg/yr.
  - Reducing livestock access to streams on 25% of hay/pasture lands in Mill Creek would reduce phosphorus loadings by 160 kg/yr. and nitrogen loads by 803 kg/yr.

5. Comprehensive nutrient management plans (CNMP's) – Agricultural landowners can work with certified Nutrient management planners and Soil and Water Conservation Districts to develop comprehensive nutrient management plans beyond what is required by Concentrated Animal Feeding Operations (CAFO's- farms with 300 cows or more). CNMP's guide how animal waste is managed, stored and spread. The plan identifies that a CNMP will achieve an estimated 3% reduction in phosphorus and nitrogen runoff. The following map portrays CAFO's in the Black River Watershed that are required to have a CNMP:



If half of agricultural landowners were to develop and implement CNMP's, the following reductions would be achieved:

- Lower Black River: 7906 acres of hay/pasture lands would reduce Agricultural phosphorus loads by 114.99 kg/yr.
- Lower Middle Black River: 7797 acres of agricultural lands implementing CNMP would reduce phosphorus load by 87.33 kg/yr.
- Mill Creek: 6753 acres, 53.46 kg/yr. phosphorus, 349.02 kg/yr. nitrogen.

6. Riparian/Forest Buffers: As identified by the plan (appendix 8.5), riparian or forest buffers can achieve significant nitrogen reductions, depending on their width. These buffers are planted or allowed to grow in the space between agricultural or loadings sources and a waterway, and intercept runoff, including nitrogen, phosphorus, and sediment, before it can enter the waterway. Modeling data from Devereux et al (Appendix I) identifies that forest buffers can reduce phosphorus by 1.5 lb./acre (.68 kg/acre), nitrogen by 34 lb./acre (15.42 kg/acre), and sediment by 758 lb./acre (344 kg/acre). The Mill Creek sub watershed agriculture adjacent land would be high priority for implementation due to the significant nitrogen reductions of forested buffers. By implementing forested buffers on 10 acres of land adjacent to agricultural land use, nitrogen would be reduced by 154 kg/yr., and phosphorus would be reduced by 15 kg/yr. Stakeholders can additionally seek opportunities and interest in other priority sub watersheds to achieve additional fish and wildlife habitat, recreational, air quality and aesthetic benefits of forest buffers.

The chart provides estimated total reductions that may be achieved in priority sub watersheds through implementation of Agricultural BMP's:

Sub watershed and current loading:	Lower Black River Phosphorus 8457 kg/yr.	Lower Middle Black River Phosphorus 8442 kg/yr.	Mill Creek Phosphorus 4,798 kg/yr.	Mill Creek Nitrogen 93776 kg/yr.
Ag BMP implemented	Reduction kg/yr.	Reduction kg/yr.	Reduction kg/yr.	Reduction kg/yr.
1. Cover crops on 50% of croplands	235	181	192	1238
2. Vegetative filter strips on 25% of Ag land	881.6	689	409	2443
3. No till crops on 50% of Ag land	235	216	240	1468
4. Livestock access reduction to 25% of hay/pasture land	528	399	160	803
5. CNMP on 50% of Ag land	115	87	53	349
6. Forest buffers on 10 acres in Mill Creek sub watershed	N/A	N/A	15	154
<b>Estimated total load(kg/yr.) with BMP implementation</b>	<b>5934</b>	<b>6476</b>	<b>3569</b>	<b>86458</b>
<b>Estimated total load (kg/acre) with BMP implementation</b>	<b>.15</b>	<b>.12</b>	<b>.16</b>	<b>3.84</b>

#### Wastewater treatment plants and on site septic's maintenance and upgrades

To reduce wastewater loadings into the Black River, communities should identify opportunities to maintain or upgrade failing on site septic's and wastewater treatment plants. Stakeholders can further identify communities that would benefit from being sewered as opposed to having on site septic's. The NYS Environmental Facilities Corporation and the EPA have programs to fund wastewater infrastructure facilities that improve water quality. The NYS EFC Clean Water State

Revolving Fund<sup>44</sup> and the EPA Water Pollution Control Grant<sup>45</sup> Programs are examples of funding that communities can leverage for wastewater treatment maintenance and upgrades.

1. A robust education and outreach program to educate the public about the importance of maintaining on-site septic systems to protect water quality would help the public understand this issue and implement practices to reduce nutrient and phosphorus loading from on-site systems. Communities can explore funding sources to incentivize on-site septic maintenance or replace failing systems with sewer or cluster systems. Funding programs that can support these efforts are identified in Appendix IV. Interested communities can additionally explore regulations such as watershed inspection programs that require landowners to comply with land use standards that are put in place to protect drinking water resources, such as those established in the Skaneateles Lake Watershed<sup>46</sup>.
2. The Plan identifies 15 wastewater treatment facilities that discharge 24.2 million gallons per day of treated wastewater into the Black River Watershed (Table 8.8-27, p 397). In the Great Lakes watershed, municipal sewage State Pollutant Discharge Elimination system<sup>41</sup> (SPDES) permits over 1 MGD are required to meet a phosphorus limit of 1mg/l. Information about SPDES permits and access to discharge information for permittees throughout the watershed is available on the NYSDEC SPDES program website. The recently passed Sewage Pollution Right to know law<sup>47</sup> requires permit holders to alert the public when discharge exceeds permitted values. Communities (including Watertown, Carthage, Lowville, Lyons Falls, and Port Leyden) will seek to meet SPDES requirements for effluent discharge and identify opportunities to further reduce discharges, depending on funding available and community participation. The Environmental Facilities Corporation<sup>44</sup> grants and state revolving loan programs can assist communities with meeting SPDES permit requirements.

### Improved Storm water Management

MS4 regulated communities will implement minimum measures to improve storm water management. Minimum measures include education and outreach, public participation, illicit discharge detection and elimination, construction site runoff control, post construction runoff control, and pollution prevention/good housekeeping, such as the use of green infrastructure and street sweeping. The Lower Black River and Mill Creek sub watersheds are high priority for implementing improved storm water management practices.

Communities can additionally maintain and improve sewer infrastructure and explore green vs. gray approaches to storm water management to further reduce polluted runoff from entering the Black River beyond the requirements. More information use, design, and performance of green infrastructure is available from EPA's Green Infrastructure collaborative<sup>48</sup>, and DEC's Stormwater Management Design Manual<sup>49</sup>.

Green infrastructure can be used to improve storm water management and reduce runoff while also enhancing fish and wildlife habitats and improving air quality and aesthetics. Green infrastructure practices include bio retention (rain gardens), pervious pavement, tree planting, bios wales, and



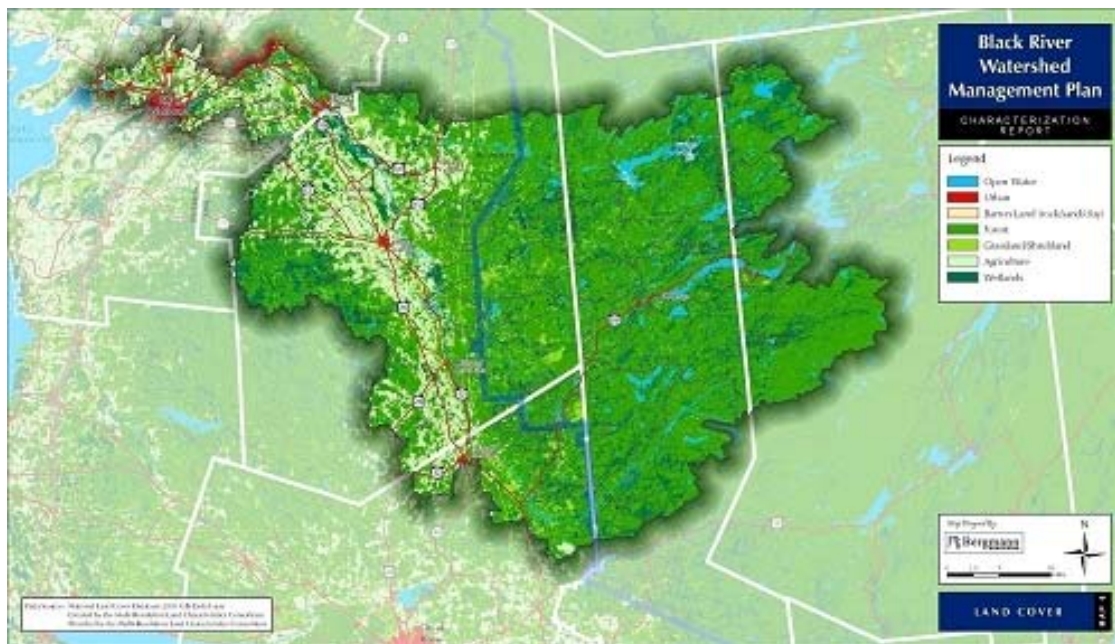
wetland creation. Lower Black River and Mill Creek are priority sub watersheds to improve storm water management. The DEC has identified the percent of runoff that will be reduced by installing these practices intended to capture rainwater from impervious sources. DEC guidance<sup>49</sup> can be used for green infrastructure designs.

According to the modeling result identified in the Plan (section 8.9), high intensity development contributes to the following loads in the priority sub watersheds:

Priority sub watershed	Load from high intensity development	Load from low intensity development
Lower Black R.	Nitrogen 8,074 kg/year Phosphorus 895.4 kg/year Sediment 56.38 Mg/yr.	Nitrogen 826.8 Phosphorus 120.3 Sediment 14.76
Lower Middle Black R.	Nitrogen 2,974 kg/year Phosphorus 329 kg/yr. Sediment 12.72 Mg/yr.	Nitrogen 464.3 Phosphorus 67.5 Sediment 7.36
Mill Cr.	Nitrogen 91 kg/yr. Phosphorus 77.8 kg/yr. Sediment 7 Mg/yr.	Nitrogen 55.2 Phosphorus 8 Sediment 2

\*Note that inclusion of groundwater sources in high and low intensity development sources would result in loadings from these sources being much higher.

The following map portrays areas of development (red) where green infrastructure practices can be targeted:



By implementing green infrastructure practices in these high priority sub watersheds, pollution loads from high intensity development could be reduced by 5%, depending on stakeholder participation



and feasibility. Implementation of green infrastructure would reduce loadings from development. Outfall mapping and high intensity and low intensity land use maps can help identify where to implement green infrastructure practices to reduce runoff. Stakeholders should promote green infrastructure and land use stewardship to private landowners through outreach and education.

The following chart portrays the estimated reductions of green infrastructure practices, based on the chart in Appendix I, and conversion of lbs. to kg/acre:

Green infrastructure practice	Phosphorus load reduction	Nitrogen load reduction
Bioretention/rain garden	.45 kg/acre	4.4 kg/acre
Pervious pavement	.4 kg/acre	4.5 kg/acre
Bioswale	.4 kg/acre	4 kg/acre
Tree planting	.2 kg/acre	5 kg/acre

In addition, green roofs, or vegetated roof tops, are increasingly being used to reduce runoff from rooftops in urbanized areas. The EPA has Green Infrastructure modeling tools<sup>50</sup> and calculates that on average green roofs can reduce runoff up to 60%. A green roof can cost approximately \$20,000 more than a regular roof over its lifetime for construction and maintenance, however, can create significant energy savings by providing added insulation in addition to storm water capture that reduces runoff to waterways. Municipalities can explore opportunities to leverage funding for green roof practices to reduce storm water runoff. Estimated reductions are specific to a site, and green roof design standards can be used to determine reductions at a site specific level.

Using this information, and the BMP guidance document in Appendix I, we can estimate the reductions from implementing these green infrastructure practices. For example, installing 20 acres of rain gardens in the Lower Black River would reduce phosphorus loadings by 9 kg/yr. By replacing impervious pavement with pervious pavement on 10 acres in the Lower Black River, phosphorus loads would additionally be reduced by 4 kg/yr. Installing bioswales on 10 acres in the Lower Black River would reduce phosphorus loads by 4 kg/yr. Native tree plantings on 20 acres in the Lower Black River Watershed would reduce phosphorus loadings by 4 kg/yr. These practices, combined, would result in 21 kg/yr. in phosphorus reductions and reduce overall phosphorus loading from high intensity development in the Lower Black River from 894 to 873 kg/yr, and overall loadings from all sources, after Ag BMP implementation, to 6002 kg/yr., and reduce the overall estimated loadings to .14 kg/acre per year. This does not meet the .12 kg/acre per year threshold goal. This could be due to the margin of error associated with best management practice efficiencies or modeling calculations. However, additional projects will be identified as the watershed plan is implemented.

In the Lower Middle Black River and Mill Creek sub watersheds, installing 10 acres of rain gardens in each sub watershed would reduce phosphorus by 4.5 kg/yr. and nitrogen by 44 kg/yr., replacing 5 acres of impervious pavement with pervious pavement would reduce phosphorus by 2 kg/yr. and nitrogen by 22.5 kg/yr., installing bios wales on 5 acres would reduce phosphorus by 2 kg/yr. and nitrogen by 22.5 kg/yr., and tree planting on 10 acres in each sub watershed would reduce each sub watersheds phosphorus loading by 2 kg/yr. and nitrogen loading by 50 kg/yr. The total phosphorus load that would be reduced by installing these green infrastructure practices in the Lower Middle Black River would be 10.5 kg/yr. and after Ag BMP implementation the new phosphorous loading

would be 6421 kg/yr. For the Mill Creek sub watershed, installing these green infrastructure practices would reduce phosphorus loading after Ag BMP implementation to 3518 kg/yr. and would further reduce nitrogen loading to 85686 kg/yr., and nitrogen loads in Mill Creek would be below the threshold (3.39 kg/acre) after green infrastructure implementation.

Soil and Water Conservation Districts and municipalities are currently identifying opportunities to implement green infrastructure practices to improve storm water management in the Lower Black River and Mill Creek sub watersheds. The Jefferson County Soil and water Conservation District, in partnership with the Jefferson County Storm water Coalition, recently leveraged funding from the US Forest Service Great Lakes Restoration Initiative<sup>14</sup> to install rain gardens and plant trees within the lower Black river sub watershed. Funding for green infrastructure is available through a variety of state and federal programs, as identified in Appendix IV. Implementation of green infrastructure practices identified in this addendum will be contingent on local capacity, willingness of landowners, funding availability, and technical support.

b. Rationale for the selection of recommended BMPs

In selecting BMP's for implementation in the plan, stakeholders, including SWCD's, planners, municipalities, and Water Quality Coordinating Committees<sup>51</sup> were consulted to identify realistic practices that could be quantified by the modeling information. Consideration of existing programs, and landowner support for practices, as well as financial and technical constraints were also considered.

c. Description and performance (reduction of pollutant) of recommended BMPs

Modeling of reduction efficiencies can be found within the Black River Watershed Management Plan, NYSDEC Storm water Management Design manual, and the State Pollutant Discharge Elimination Systems permitting program.

## **X. Implementation Plan**

a. Action plan for short-term objectives

Implementation of actions will be dependent on funding. Partners will actively seek to fund projects and anticipate implementation of Agricultural Best Management Practices, improved storm water management practices, on-site septic maintenance and upgrades, and wastewater treatment infrastructure upgrades and maintenance in high priority and then medium priority watersheds within 10-20 years, subject to funding availability and stakeholder participation.

b. Action plan for intermediate objectives

Lower Black River sub watershed, Mill Creek, and Lower Middle Black River projects, including Agricultural BMP implementation, green infrastructure installation and improved storm water management, on-site septic maintenance and upgrades, and wastewater

treatment upgrades will be targeted for implementation within 10 years of the approval of the addendum.

- 6543 of acres of cover crops implemented (approximately 654 per year for 10 years)
- 43,000 acres of agricultural lands with vegetative filter strips (4300 per year for 10 years)
- 15874 acres of no till crops (1500/yr. for 10 years)
- Reducing Livestock access to streams on 25% of hay and pasture lands (7956 acres, 790 acres per year for 10 years.)
- Riparian buffers on 10 acres of riparian lands in the Mill Creek sub watershed.
- Comprehensive nutrient management plans and implementation (22,456 acres, 2200 acres per year for 10 years.)
- 2-3 Wastewater treatment upgrades and maintenance projects will be implemented at priority wastewater treatment sites within 10 years, depending on funding availability and stakeholder participation.
- 25-50% of onsite septic systems will be improved and runoff from these systems will be reduced within 10 years, depending on funding available and landowner participation.
- Green infrastructure practices implemented including tree planting (400 acres) rain gardens (30 acres) bios wales (200 acres) and permeable pavement (200 acres) within 20 years. Half of these targets will be implemented within 10 years.

c. Action plan for long-term objectives

Remaining middle priority sub watershed projects will be targeted for implementation within 20 years of the approval of the addendum.

d. Technical and financial assistance

i. Sources of technical assistance

Jefferson, Lewis, Oneida, and Herkimer County Soil and Water Conservation District's work with agricultural landowners to educate, promote, and provide assistance in leveraging funding for projects that implement agricultural best management practices. Cost estimates in this section are derived from the reference document in Appendix I, unless otherwise noted. Management actions were identified in section X. of this document. SWCD's can work with landowners to leverage funding to implement BMP's in priority sub watersheds. County Planners, Towns, municipalities, and not for profit organizations can identify opportunities to leverage funding for green infrastructure, wastewater treatment infrastructure, and on-site septic infrastructure practices:

ii. Estimate of financial assistance needed

Agricultural Best Management Practices and green infrastructure management practices cost estimates, unless otherwise referenced, are based on the cost estimates identified in appendix I.

- Cost of 6543 acres of cover crops: The cost of cover crop implementation is estimated to be \$73/acre per year. Based on this information, the annual cost of implementing cover crops on 6543 acres within priority Black R. sub watersheds would be \$477,639.
- Cost of vegetative filter strips for 11,227 acres: The DEC estimates the cost of grass buffer implementation at \$147/acre. This considers the loss of production value of the land. The annual cost of implementing grass buffers on 11,227 acres would be \$1,650,369.
- Cost of 15874 acres of no till crops: The cost of no till crops is minimal, and could likely save costs due to the nature of implementation being that the land is left to grow naturally rather than tilling.
- Cost of livestock exclusion from stream: \$4.26/yr./ft. to install and maintain fencing. Estimates could be refined by buffering stream boundaries adjacent by Ag Lands to determine how many feet are along waterways. Cost to install around the perimeter of 25% of hay/pasture lands adjacent to streams, or 7956 acres, would be \$42,222,492. Since only one side would be required that is facing the stream, the fencing would likely only cost one quarter of this, or \$10,555,623.
- Cost of Comprehensive Nutrient Management Plans: \$3.9 per acre for 15,912 acres would cost \$62,056.
- Cost of forest buffer implementation in Mill Creek sub watershed: \$2310 for 10 acres.
- Cost of Green infrastructure installations:  
According to the 2007 DEC Storm water management guidance, rain garden installations cost \$10-12 per square foot (\$479,160 per acre). Installing a total of 40 acres of rain gardens in the top 3 priority sub watersheds at outfalls to reduce runoff would cost \$19,166,400. Pervious pavement installations on 20 acres at \$14220/acre would be \$2,844,000. Creating bio swales on 20 acres would cost \$184,400 and planting trees on 40 acres would cost \$28,000. Total costs of green infrastructure practice implementation in priority sub watersheds would be \$22,222,800.
- Cost of septic system maintenance and upgrades: The cost of pumping on site septic's is \$88 annually. The cost of replacing on site septic's is up to \$8000.
- Wastewater treatment upgrades: Estimated at \$200k-1M each depending on size and ongoing labor, permitting and maintenance costs. The cost of upgrading 5 WWTP's would range from at least \$1-5 million or more.

### iii. Potential funding sources for action plan items

State and Federal resources are widely available to support implementation of actions identified in this plan, including funding from the Environmental Protection Agency, United States Department of Agricultural and Natural Resource Conservation Service, United State Forest Service, State Department of Environmental Conservation and

Department of State, as well as the State Environmental Facilities Corporation. Additional information on funding programs that can be leveraged to implement management actions are available in Appendix IV.

e. Evaluation of plan and plan updates

Annual reporting on implementation of actions identified in the plan will be achieved through the existing Black River Initiative Newsletter and ongoing partner outreach efforts. SWCD annual reports will highlight efforts towards implementation. Review of plan and implementation efforts will be completed as significant implementation occurs towards short term goals to evaluate effectiveness of partners in implementing actions and identify necessary next steps or strategies to further achieve necessary actions.

f. Evaluation of the implementation actions

Stakeholders will work in coordination to track implementation using existing mechanisms, and qualitative and quantitative criteria will be used to evaluate the effectiveness of implementation actions.

i. Mechanism to track implementation actions

Soil and Water Conservation Districts track BMP's implemented through the Agricultural Environmental Management Program. DEC regulatory programs track progress of municipalities meeting regulatory programs. Stakeholders will work collaboratively to develop reports on progress as implementation activities occur, through existing outreach mechanisms such as the Black River Initiative newsletter. In tracking results of these activities, the following criteria will be considered:

Qualitative evaluation criteria

It is anticipated that continued beneficial uses including drinking water, swimming, fishing, and contact recreation within the Black River Watershed will be restored, improved or maintained. Water quality complaints by area users will be minimized. Beneficial uses will be monitored through the NYSDEC water quality monitoring and protection of waters programs.

Quantitative evaluation criteria

- The average kg/acre of nitrogen and phosphorus loading thresholds identified in the Plan will be used to determine if load reductions are being achieved over time. The average nitrogen loads threshold is 3.49 kg/acre, and average phosphorus loads thresholds is .12 kg/acre. Those watersheds that have average loads that are above these thresholds (Lower Black R., Mill Creek, and Lower Middle Black River,) are anticipated to have average loads below these thresholds within 20 years.

- For the Lower Black River watershed, phosphorus loading after Ag BMP and green infrastructure implementation is estimated to be 5758 kg/yr. or .14 kg/acre. Lower Middle Black River phosphorus loading is estimated to be 6421 kg/yr. (.12kg/acre and under threshold). Mill Creek phosphorus loading is estimated to be 3518 kg/yr. or .15 kg/acre and nitrogen load is estimated to be 85686 kg/yr. (3.39 kg/acre which is under threshold). Note that inclusion of groundwater would lead to further reductions and that the new loadings would likely be lower than the threshold after implementation of these management practices. Future modeling within 10 years or as significant implementation has occurred will demonstrate loading as being reduced, with the target being below the threshold, dependent on availability of technical and financial resources.
- Storm water management will reduce loading from high and low intensity development by installing green infrastructure and meeting Minimum control measures of the MS4 requirements. Successful implementation of green infrastructure practices depend on funding available and local stakeholder and private landowner participation, which will be promoted.
- Wastewater treatment upgrades- SPDES monitoring will ensure effluent is within acceptable levels (85% reduction or greater; 1mg/l).
- On-site septic maintenance and upgrades – future water quality monitoring will indicate reduced loads from septic systems and removal as a source of impairment, as well as reducing issues of drinking water contamination and lowering costs of treatment.

## ii. Monitoring plan

- The NYSDEC Rotating Integrated Basin Studies<sup>31</sup> (RIBS) assesses water quality of all waters of the state, including the documentation of good quality waters and the identification of water quality problems; identifies long-term water quality trends; characterizes naturally occurring or background conditions; and establishes baseline conditions for use in measuring the effectiveness of site-specific restoration and protection activities. Parameters monitored by the RIBS assessments include Total Phosphorus, Total Nitrogen, Total Suspended Solids, stream chemistry, toxicity, aquatic life, and stream condition. The program is designed so that all major drainage basins in the state are monitored every 5 years. The Black River will be studied again from 2017-2019, and from 2022-2024. Results from these studies are used to develop the state priority water bodies list. DEC and partners will compare results of future water quality reports against prior reports to determine progress of efforts to improve water quality from implementation of management actions identified in this addendum. It is anticipated that the management actions will begin to reflect improved water quality in the basin when studies are conducted in 2022-2024, and in monitoring nutrient trends will demonstrate reduced phosphorus, nitrogen, and sediment loading within this sampling time frame as a result of the implementation of management practices. The delisting of impaired waterways or



improved condition of waterways (i.e. impaired waterway improves to having minor impacts) within the Black River watershed on the priority waterbodies list will additionally demonstrate the effectiveness of management actions. Stakeholders involved with professional water quality data collection efforts can consider participating in DEC's Professional External Evaluators of Rivers and Streams<sup>34</sup> program to ensure that the data they collect is included and used in statewide water quality monitoring and management efforts.

- The DEC's Water Assessments by Volunteer Evaluators (WAVE) program engages citizens in monitoring ecological conditions to determine water quality in local watersheds. The program trains citizen volunteers to assess conditions of local waterways and identify macro invertebrates that can be used to determine water quality. Citizens can report concerns, such as stream bank erosion and high abundance of pollution tolerant macro-invertebrates such as leeches and worms, and low abundance of intolerant macro-invertebrates such as mayflies and dragonflies. This information is used by the DEC RIBS program to prioritize sites that need to be studied to further identify and address water quality issues. Monitoring by citizen scientists after implementation of management actions in 10 or more years will demonstrate that macro invertebrates tolerant of improved water quality are able to survive and thrive in streams within the priority sub watersheds.

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#### IV. Appendices

**Appendix I :** Estimates of cost to install management measures on agricultural land and the phosphorus and sediment load reductions estimated for basin wide implementation. Costs are annualized over the expected life of the project (Devereux & Rigelman, 2014).

			Annual	Annual	Annual	Annual
Management Practice	Lifespan	Unit	Cost	Nitrogen Reduction	Phosphorus Reduction	Sediment Reduction
	Years		\$/unit	lb./unit	lb./unit	lb./unit
Barnyard Runoff Control	15	acre	567	83.6	12.6	237.0
Bio retention/rain gardens	25	acre	1127	9.9	1.0	737.6
Bios wale	50	acre	922	8.7	0.9	655.7
Cover Crop	1	acre	73	10.5	0.1	76.2
Dirt & Gravel Road Erosion & Sediment Control	20	feet	0.83	0.0	0.0	2.4
Dry Ponds	50	acre	365	2.5	0.2	491.7
Forest Buffers	75	acre	231	34.0	1.5	758.2
Grass Buffers	10	acre	147	28.1	1.0	518.9
Intensive Rotational Grazing	3	acre	74	0.6	0.2	55.4
Land Retirement to pasture	10	acre	169	33.5	1.5	683.3
Nutrient Management Plan	3	acre	3.9	1.2	0.1	0.0
Permeable Pavement	20	acre	14220	9.9	0.9	696.6
Prescribed Grazing	3	acre	13	0.6	0.2	55.4
Septic Connection	25	system	527	8.2	5.3	0.0

Septic Pumping	3	system	88	0.4	0.3	0.0
Stormwater Retrofit	10	acre	1545	3.0	0.4	569.3
Stream Fencing	10	acre	5307	53.0	6.3	2388.1
Stream Restoration-Ag	20	feet	6.92	0.3	0.1	51.3
Stream Restoration-Urban	20	feet	60	0.2	0.1	53.0
Street Sweeping 25 times a year	20	acre	916	0.4	0.1	177.1
Tree Planting	75	acre	70	11.1	0.4	318.0
Wet Ponds	50	acre	352	2.5	0.5	491.7
Wetland Restoration	15	acre	544	10.3	0.5	264.2

## Appendix II. Funding Resources

### Non-Agricultural Nonpoint Source Funding Programs

*Updated December 2015*

#### Water Quality Improvement Project (WQIP) Program

**Eligible applicants:** Municipalities, municipal corporations, soil and water conservation districts.

**Summary of program:** Provides funding statewide for non-agricultural nonpoint source projects implementing best management practices.

**Project state funded:** Implementation.

**Frequency grant released:** Annual

**Tracking/reports:** Awarded projects are listed in press releases for each round, and the press release is posted on the DEC website. Quarterly reports and final reports are required from grant recipients.

**Website:** <http://www.dec.ny.gov/pubs/4774.html>

**Contact:** Susan Van Patten, Division of Water, 518-402-8179, [DOWinformation@dec.ny.gov](mailto:DOWinformation@dec.ny.gov)

#### Clean Water Act Section 604(b) Funding

**Eligible applicants:** Regional public comprehensive planning organizations in New York State and interstate planning organizations working in New York State.

**Summary program:** Provides funding for to regional planning organizations for planning activities.

**Project stage funded:** Planning.

**Frequency grant released:** Every 3-5 years.

**Tracking/reports:** All awarded projects are listed on the below website, and progress is tracked with quarterly reports submitted by the award recipient.

**Website:** <http://www.dec.ny.gov/lands/53122.html>

**Contact:** Susan Van Patten, Division of Water, 518-402-8179, [DOWinformation@dec.ny.gov](mailto:DOWinformation@dec.ny.gov)

### **Finger Lakes – Lake Ontario Watershed Protection Alliance (FOLLOWPA)**

**Eligible applicants:** 25 counties in the Finger Lakes and Lake Ontario watershed receive FOLLOWPA funding. Those eligible to receive a portion of the funding distributed to the 25 counties varies by county.

**Summary program:** FOLLOWPA is a membership of 25 counties, represented by County Planning Departments, Soil and Water Conservation Districts, County Health Departments and Water Quality Management Agencies within the Finger Lakes and Lake Ontario drainage basin. FOLLOWPA receives an annual appropriation from the Environmental Protection Fund, which is divided among the 25 counties. Each county then uses that funding to implement water quality-related programs and projects. Some counties have funded green infrastructure projects with their portion of the funding. How the counties disburse their funding for particular projects varies by county. Interested municipalities or others interested in receiving funding from a FOLLOWPA county should contact the appropriate county coordinator found on this webpage:

<http://www.followpa.org/county.html>.

**Project stage funded:** Planning, pilot and implementation.

**Frequency grant released:** Annually.

**Tracking/reports:** N/A.

**Website:** <http://www.followpa.org/index.html>.

**Contact:** Susan Van Patten, Division of Water, 518-402-8179, [DOWinformation@dec.ny.gov](mailto:DOWinformation@dec.ny.gov)

### **Urban & Community Forestry Program Cost Share Grants**

**Eligible applicants:** Municipalities and not-for-profit corporations acting on behalf of a public ownership interest in the property or acting on behalf of a public property owner.

**Summary of program:** Street tree planting, one eligible project type, may fit well with green infrastructure projects.

**Project stage funded:** Implementation

**Frequency grant released:** Varies.

**Tracking/reports:** Not available at this time.

**Website:** <http://www.dec.ny.gov/lands/5285.html>

**Contact:** Debra Gorka, Division of Lands and Forests, DEC, [LF.Lands@dec.ny.gov](mailto:LF.Lands@dec.ny.gov), 716-851-7010

### **Environmental Facilities Corporation Green Innovation Grant Program (GIGP)**

**Eligible applicants:** Any county, city, town, village, district corporation, county or town improvement district, Indian reservation wholly within NYS, any public benefit corporation, public authority and certain New York State agencies, as well as other organizations empowered to develop a project, as described on the below website.

**Summary of program:** Provides funding for eight specific green infrastructure practices: permeable pavement; bio-retention; green roofs and green walls; stormwater street trees/urban forestry programs; riparian buffers, floodplains and/or wetlands; downspout disconnection; stream daylighting; and stormwater harvesting and reuse.

**Project stage funded:** Planning, pilot and implementation. All projects must include implementation.

**Frequency grant released:** Annually.



**Tracking/reports:** Previously funded projects are posted on this website:

<http://www.efc.ny.gov/Default.aspx?tabid=228>.

**Website:** <http://www.efc.ny.gov/Default.aspx?tabid=461>

**Contact:** Suzanna Randall, New York State Environmental Facilities Corporation, 518-402-7461, [GIGP@efc.ny.gov](mailto:GIGP@efc.ny.gov)

### **Department of State Local Waterfront Revitalization Program (LWRP) Grants**

**Eligible applicants:** Villages, towns, or cities, and counties which are located along New York's costs or inland waterways designated pursuant to Executive Law, Article 42.

**Summary of program:** The LWRP grant program provides matching grants on a competitive basis to revitalize communities and waterfronts. Funding is available for both planning and implementation, and funded projects may include green infrastructure components.

**Project stage funded:** Planning and implementation.

**Frequency grant released:** Annually.

**Tracking/reports:** The list of awards for each year are listed on the below website.

**Website:** [http://www.dos.ny.gov/opd/grantOpportunities/epf\\_lwrpGrants.html](http://www.dos.ny.gov/opd/grantOpportunities/epf_lwrpGrants.html)

**Contact:** Department of Planning and Development, New York State Department of State, 518-474-6000

### **NYS Energy, Research and Development Authority Cleaner Greener Communities Program Phase II Implementation Grants**

**Eligible applicants:** Local governments, private companies, non-governmental organizations, and other entities with projects in NYS.

**Summary of program:** This program is an effort to fund implementation of large-scale, high-profile projects that support the goals of each region's sustainability planning efforts. Category 2 (Planning Initiatives) Projects may include green infrastructure planning. Some Category 3 (Community-Scale Sustainability) Projects are required to meet green infrastructure prerequisites.

**Project stage funded:** Planning, pilot and implementation.

**Frequency grant released:** The current application due date for categories 2 and 3 has passed. NYSEDA expects to offer up to two more rounds of funding for this grant, but when future rounds may be announced is uncertain.

**Tracking/reports:** N/A at this time.

**Website:** <http://www.nyserda.ny.gov/All-Programs/Programs/Cleaner-Greener-Communities/Implementing-Smart-Development-Projects>

**Contact:** New York State Energy Research and Development Authority, [CGC@nyserda.ny.gov](mailto:CGC@nyserda.ny.gov)

### **NYS Homes & Community Renewal Community Development Block Grant – Public Infrastructure Funds**

**Eligible applicants:** Town, City or Villages with population less than 50,000, counties with a population less than 200,000 designated principal cities of Metropolitan Statistical Areas.

**Summary of program:** Funding is available for drinking water, clean water and stormwater; and public works. Green infrastructure components may be a part of these larger public infrastructure projects.

**Project stage funded:** Implementation

**Frequency grant released:** Annually.

**Tracking/reports:** Award recipients are listed on this website:

<http://www.nyshcr.org/Programs/NYS-CDBG/FundingHistory.htm#2010>

**Website:**

<http://www.nyshcr.org/AboutUs/Offices/CommunityRenewal/FundingOpportunities.htm>

**Contact:** New York State Homes and Community Renewal, Office of Community Renewal, 518-474-2057, [HCRinfo@nyshcr.org](mailto:HCRinfo@nyshcr.org)

**Greenway Communities Grant Program**

**Eligible applicants:** Municipalities that have adopted a resolution stating the community's agreement with the Greenway criteria.

**Summary of program:** Site planning/design projects may include green infrastructure.

**Project stage funded:** Planning

**Frequency grant released:** Quarterly

**Tracking/reports:** <http://www.hudsongreenway.ny.gov/GrantFunding/GrantsAwarded.aspx>

**Website:** <http://www.hudsongreenway.ny.gov/GrantFunding/CommunityGrants.aspx>

**Contact:** Hudson River Valley Greenway, 518-473-3835, [hvrg@hudsongreenway.ny.gov](mailto:hvrg@hudsongreenway.ny.gov)

**EPA Urban Waters Small Grants**

**Eligible applicants:** States, local governments, territories, Indian Tribes, and possessions of the U.S., public and private universities and colleges, public or private nonprofit institutions/organizations, intertribal consortia, and interstate agencies.

**Summary of program:** Grants are available to fund research, investigations, experiments, training, surveys, studies, and demonstrations that will advance the restoration of urban waters by improving water quality through activities that also support community revitalization and other local priorities. Depending on each fiscal year's Request for Proposals, this may include green infrastructure.

**Project stage funded:** Planning, pilot, implementation

**Frequency grant released:** Varies.

**Tracking/reports:** All projects documented on website. Outcomes of some successful projects are documented on the website.

**Website:** <http://www2.epa.gov/urbanwaters/urban-waters-small-grants>

**Contact:** Not available.

**EPA Great Lakes Shoreline Cities Green Infrastructure Grants**

**Eligible applicants:** Cities with shoreline that directly touches one of the Great Lakes or a connecting channel, with a population greater than 25,000 and less than 50,000.

**Summary of program:** Grants to eligible shoreline cities to fund green infrastructure projects that will improve Great Lakes water quality. Green infrastructure projects must be within ½ mile of the shoreline of a Great Lake or connecting channel. Available funding for each application was capped at \$250,000.

**Project stage funded:** Implementation

**Frequency grant released:** Two rounds have been awarded so far, and have been on an annual basis.

**Tracking/reports:** Funded projects are documented on the below website.

**Website:** <http://www.epa.gov/grtlakes/fund/shoreline/index.html>

**Contact:** Michael Russ, EPA, 312-886-4013, [russ.michael@epa.gov](mailto:russ.michael@epa.gov)

**EPA Great Lakes Restoration Initiative (GLRI)**

**Eligible applicants:** Non-federal governmental entities, including state agencies, interstate agencies, federal-recognized Indian tribes and tribal organizations, and local governments; institutions of higher learning; and nonprofit organizations. In 2014, green infrastructure projects conducted by a municipality located directly on the shore of a Great Lake or a Great Lakes connecting channel are ineligible. Green infrastructure projects conducted by other eligible applicants are eligible.

**Summary of program:** Green infrastructure projects that improve habitat and other ecosystem functions in the Great Lakes are eligible for funding.

**Project stage funded:** Planning and implementation.

**Frequency grant released:** Annually.

**Tracking/reports:** Summary information about GLRI funded projects is available on the Great Lakes Restoration Initiative website: <http://greatlakesrestoration.us/projects/index.html>.

**Website:** <http://www.epa.gov/grtlakes/fund/2014rfa02/index.html>

**Contact:** [EPA, GLRI-RFA@epa.gov](mailto:EPA,GLRI-RFA@epa.gov)

### Challenge Cost Share Grant Program

**Eligible applicants:** U.S. non-Federal organizations and Tribal agencies.

**Summary of program:** The fiscal year 2015 grant included funding for: incorporating urban forests as green infrastructure into urban planning practices that will result in improvements for ecologically underserved communities and regions; green infrastructure jobs analysis; and utilizing green infrastructure to manage and mitigate stormwater to improve water quality. Projects must have national or multi-state application and impact.

**Project stage funded:** Planning and pilot.

**Frequency grant released:** Annually.

**Tracking/reports:** Grant recipients and projects are listed in a press release for each funding period, and recipients are required to submit bi-annual progress reports.

**Website:** <http://www.fs.fed.us/ucf/nucfac.shtml>

**Contact:** Phillip Rodbell, U.S. Forest Service Northeastern Area Office, 610-557-4133, [prodbell@fs.fed.us](mailto:prodbell@fs.fed.us)

### National Fish and Wildlife Foundation Environmental Solutions for Communities

**Eligible applicants:** Non-profit 501© organizations, state government agencies, local governments, municipal governments, Indian tribes, and educational institutions.

**Summary of program:** Funding priorities include facilitating investments in green infrastructure. In 2015, priority is given to projects that address 'greening' traditional infrastructure and public projects such as storm water management and flood control, public park enhancements, and renovations to public facilities.

**Project stage funded:** Pilot.

**Frequency grant released:** Annually.

**Tracking/reports:** Award recipients are listed in a press release for each funding period.

**Website:** <http://www.nfwf.org/environmentalsolutions/Pages/home.aspx#.VDbjf1OZ1gp>

**Contact:** Carrie Clingan, National Fish and Wildlife Foundation, [carrie.clingan@nfwf.org](mailto:carrie.clingan@nfwf.org)

### National Fish and Wildlife Foundation Urban Waters Restoration

**Eligible applicants:** Any entity that can receive grants. While partnerships are encouraged to include state and federal agencies as partners, those entities **may not** serve as the grantee

**unless** the community partners demonstrate that the state or federal agency is best suited to coordinate the community-based project.

**Summary of program:** In 2014, project priorities include addressing developing educational programs to provide training to schools, businesses, community groups and homeowners on how to implement green infrastructure practices including sustainable forestry practices; or designing projects intended to control rain water through green infrastructure tools such as tree canopy, permeable pavement, green street designs, bioswales, planter boxes and green roofs, to reduce stormwater flow, controlling flooding and slowing run-off into surface water.

**Project stage funded:** Planning.

**Frequency grant released:** Annually.

**Tracking/reports:** Award recipients are listed in a press release for each funding period.

**Website:** <http://www.nfwf.org/fivestar/Pages/home.aspx#.VDbIP1OZ1gp>

**Contact:** Sarah McIntosh, National Fish and Wildlife Foundation, [sarah.mcintosh@nfwf.org](mailto:sarah.mcintosh@nfwf.org)

## FEMA Hazard Mitigation Grants

**Eligible applicants:** States, local governments, tribes, private non-profit organizations

**Summary of program:** Provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. FEMA Hazard Mitigation grants will fund green infrastructure if a benefit-cost analysis shows that the damages saved from the project exceed the cost of the project.

**Project stage funded:** Planning and implementation

**Frequency grant released:** Following a disaster declaration, the state will advertise that Hazard Mitigation Grant Program funding is available to fund mitigation projects in the state.

**Tracking/reports:** N/A

**Website:** <https://www.fema.gov/hazard-mitigation-grant-program>

**Contact:** Richard Lord, New York State Office of Emergency Management, 518-292-2370, [rlord@dhses.ny.gov](mailto:rlord@dhses.ny.gov)

## Agricultural Nonpoint Source Funding Programs

### New York State Agricultural Environmental Management (AEM) Program

**Eligible applicants:** County Soil and Water Conservation Districts administer and implement AEM at the local level through. SWCDs engage local partners such as Cooperative Extension, NRCS, AEM Certified Planners, Certified Crop Advisors, USDA Technical Service Providers, and agri-businesses

**Summary of program:** The New York State Agricultural Environmental Management (AEM) Program supports farmers in their efforts to protect water quality and conserve natural resources, while enhancing farm viability. 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 on the farm.

**Website:** [www.nys-soilandwater.org](http://www.nys-soilandwater.org)

## Agricultural Nonpoint Source Abatement and Control Program (ANSACP)

<b>Eligible applicants:</b>	Soil and Water Conservation Districts
<b>Summary of program:</b>	Competitive financial assistance program available to Soil and Water Conservation Districts that provides funding to plan, design, and implement priority BMPs, as well as cost-share funding to farmers to implement BMPs.
<b>Website:</b>	<a href="http://www.nyssoilandwater.org/aem/nonpoint.html">www.nyssoilandwater.org/aem/nonpoint.html</a>

## USDA Farm Service Agency (FSA) Programs

### Conservation Reserve Program (CRP)

<b>Eligible applicants:</b>	Landowners with eligible land
<b>Summary of program:</b>	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.
<b>Website:</b>	<a href="http://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/index">http://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/index</a>

### Conservation Reserve Enhancement Program (CREP)

<b>Eligible applicants:</b>	Landowners with eligible land
<b>Summary of program:</b>	The Conservation Reserve Enhancement Program (CREP) is an offshoot of the Conservation Reserve Program (CRP). CREP targets high-priority conservation issues identified by local, state, or tribal governments or non-governmental organizations. In exchange for removing environmentally sensitive land from production and introducing conservation practices, farmers, ranchers, and agricultural land owners are paid an annual rental rate and incentive payments.
<b>Website:</b>	<a href="http://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-enhancement/index">http://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-enhancement/index</a>

### Debt for Nature (DFN) Program

<b>Eligible applicants:</b>	Landowners with eligible FSA loans and land
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**Summary of program:**

Debt for Nature (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.

**Website:** [https://www.fsa.usda.gov/Internet/FSA\\_File/debtfornature07.pdf](https://www.fsa.usda.gov/Internet/FSA_File/debtfornature07.pdf)

**Farmable Wetlands Program (FWP)**
**Eligible applicants:**

Landowners with eligible land

**Summary of program:**

The Farmable Wetlands Program (FWP) is a voluntary program is designed to restore previously farmed wetlands and wetland buffer to improve both vegetation and water flow. Participants must agree to restore the wetlands, establish plant cover, and to not use enrolled land for commercial purposes.

**Website:**

<http://www.fsa.usda.gov/programs-and-services/conservation-programs/farmable-wetlands/index>

**USDA Natural Resources Conservation Service (NRCS) Programs**
**Agricultural Conservation Easement Program (ACEP)**
**Eligible applicants:**

Landowners with eligible land

**Summary of program:**

The Agricultural Conservation Easement Program (ACEP) provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits. Under the Agricultural Land Easements component, NRCS helps Indian tribes, state and local governments and non-governmental organizations protect working agricultural lands and limit non-agricultural uses of the land. Under the Wetlands Reserve Easements component, NRCS helps to restore, protect and enhance enrolled wetlands.

**Website:**

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/acep/>

**Agricultural Management Assistance (AMA) Program**



<b>Eligible applicants:</b>	Landowners with eligible land
<b>Summary of program:</b>	The Agricultural Management Assistance (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.
<b>Website:</b>	<a href="http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/ama/">http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/ama/</a>

### Conservation Stewardship Program (CSP)

<b>Eligible applicants:</b>	Landowners with eligible land
<b>Summary of program:</b>	The Conservation Stewardship Program (CSP) helps agricultural producers maintain and improve their existing conservation systems and adopt additional conservation activities to address priority resources concerns.
<b>Website:</b>	<a href="http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/csp/">http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/csp/</a>

### Environmental Quality Incentives Program (EQIP)

<b>Eligible applicants:</b>	Landowners with eligible land
<b>Summary of program:</b>	The Environmental Quality Incentives Program (EQIP) is a voluntary program that provides financial and technical assistance to agricultural producers to plan and implement conservation practices that improve soil, water, plant, animal, air and related natural resources on agricultural land and non-industrial private forestland. EQIP may also help producers meet Federal, State, Tribal, and local environmental regulations.
<b>Website:</b>	<a href="http://www.nrcs.usda.gov/wps/portal/nrcs/main/ny/programs/financial/eqip/">http://www.nrcs.usda.gov/wps/portal/nrcs/main/ny/programs/financial/eqip/</a>

### Healthy Forests Reserve Program (HFRP)

<b>Eligible applicants:</b>	Landowners with eligible land
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**Summary of program:** The purpose of the Healthy Forests Reserve Program (HFRP) is to assist landowners, on a voluntary basis, in restoring, enhancing and protecting forestland resources on private lands through easements, 30-year contracts and 10-year cost-share agreements.

**Website:** <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/forests/>

### **Regional Conservation Partnership Program (RCPP)**

**Eligible applicants:** Agricultural or silvicultural producer associations, farmer cooperatives or other groups of producers, state or local governments, American Indian tribes, municipal water treatment entities, water and irrigation districts, conservation-driven nongovernmental organizations and institutions of higher education

**Summary of program:** The Regional Conservation Partnership Program (RCPP) promotes coordination between Natural Resource Conservation Service (NRCS) and its partners to deliver conservation assistance to producers and landowners. NRCS provides assistance to producers through partnership agreements and through program contracts or easement agreements.

**Website:** <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/farmbill/rcpp/>

### **Watershed and Flood Prevention Operations (WFPO) Program**

**Eligible applicants:** States, local governments and Tribes

**Summary of program:** The Watershed and Flood Prevention Operations (WFPO) Program provides technical and financial assistance to plan and implement authorized watershed project plans for the purpose of: watershed protection, flood mitigation, water quality improvements, soil erosion reduction, rural, municipal and industrial water supply, irrigation, water management, sediment control, fish and wildlife enhancement, and hydropower.

**Website:** <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/wfpo/>

## **Wastewater Infrastructure Funding Opportunities**

*Updated September 2014*

### **Introduction**

This document summarizes the funding opportunities that may be available to communities to fund sewerage projects and/or build a wastewater treatment plant (WWTP).

Sewering is expensive, but is a critical part of improving water quality as outlined in many clean water implementation plans. The success of moving forward with a sewerage project depends on the level of local support. By sharing funding and assistance information with these communities early in the process, they may be more willing to consider sewerage.

Having a rough schedule for a sewerage project may help with local understanding of a project. Below is a typical schedule:

- Developing interest and coordination between impacted municipalities (1 yr)
- Conducting an initial feasibility study (1 yr)
- Executing an inter-municipal agreement and forming a sewer district (2 yrs)
- Securing funding (3 yrs)
- Developing the project design and implementing the project (3 yrs)

Funding or technical assistance may be available for any of the above steps. The funding opportunities described in this document are competitive and open/available to all eligible applicants. Please note that none of the funding sources described below are certain.

## Key Terms

**Grants** – do not need to be repaid, but a match from the applicant may be required

**Loans** – need to be repaid over a given time period. Interest rates from 0% and up.

## Engineering Planning Grant (EPG)

**Administered by:** New York State Environmental Facilities Corporation (EFC) and New York State Department of Environmental Conservation (DEC)

**Program Description:** Funding for municipalities to complete preliminary engineering reports. Most community's first step for building a WWTP is to complete a preliminary engineering report. The report provides a municipality with information about the feasibility and cost of a project. An engineering report is also necessary for projects to be listed on the Clean Water State Revolving Fund Intended Use Plan. Eligibility for other funding sources may also require a preliminary engineering report. EPG funds are available for municipalities that need to construct or improve their municipal wastewater system. Grant funds can be used to pay for engineering and/or consultant fees for engineering and planning services for the production of an engineering report. Eligible applicants are municipalities with Median Household Income statistics (per 2010 Census data) equal to or less than \$65,000.

**Funding available:** Grants up to \$50,000. Municipalities with a total population of 50,000 persons or greater are eligible to receive up to \$50,000. Municipalities with a population of less than 50,000 are eligible to receive a maximum grant award of \$30,000. Grant recipients are required to provide a local match equal to 20% of the total cost of the engineering planning activity.

**Applying:** Applications are through the Consolidated Funding Application (CFA). Information on the CFA process can be found on the Regional Economic Development Council website at:  
<http://regionalcouncils.ny.gov/>

**Contacts:** DEC Regional Water Engineers (<http://www.dec.ny.gov/about/558.html>)

**Website:** <http://www.dec.ny.gov/pubs/81196.html>  
<http://www.efc.ny.gov/Default.aspx?tabid=485>

## Clean Water State Revolving Fund (CWSRF)

**Administered by:** New York State Environmental Facilities Corporation (EFC) and New York State Department of Environmental Conservation (DEC)

**Program Description:** This program provides low-interest rate financing (loans) to municipalities for the construction of sewers and wastewater treatment facilities.

**Funding available:** Various categories of loans: subsidized interest rate financing, market rate financing, hardship financing and additional subsidization/principal forgiveness. Short term financing for project development and construction, as well as long term financing, may be available to eligible applicants. For communities with demonstrated financial hardship, interest rates can be as low as 0%.

**Applying:** Applicants must submit project information to EFC prior to May 1<sup>st</sup> to be considered for financing in the following federal fiscal year, which begins in October. All eligible projects are scored and listed in EFC'S Intended Use Plan Annual List or Multi-Year List. Applications for financing may be submitted for projects on that year's annual list for subsidized or unsubsidized funding. EFC should be contacted for details on the information needed for project listing and funding applications.

**Contacts:** EFC Community Assistance staff:

Fred Testa  
Environmental Project Manager  
625 Broadway -7th Floor  
Albany, N.Y. 12207-2997  
(p) 518-402-7396; (f) 518-402-7456; email: Fred.Testa@efc.ny.gov  
Counties covered: Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester, Albany, Columbia, Greene, Montgomery, Rensselaer, Schenectady and Schoharie

J.C. Smith  
Environmental Project Manager, Statewide Co-funding Coordinator  
7291 Coon Road  
Bath, N.Y. 14810  
(p) 607-776-4978; (f) 607-776-4392; email: JC.Smith@efc.ny.gov  
Counties covered: Chemung, Genesee, Livingston, Monroe, Ontario, Orleans, Seneca, Steuben, Schuyler, Wayne, Yates, Allegany, Cattaraugus, Chautauqua, Erie, Niagara, and Wyoming

Terry Deuel  
Environmental Project Manager  
1285 Fisher Ave.  
Cortland, NY 13045  
(p) 607-753-3095, ext 252; (f) 607-753-8532; email: Terrance.Deuel@efc.ny.gov  
Counties covered: Delaware, Otsego, Jefferson, Lewis, Oneida, Broome, Cayuga, Chenango, Cortland, Madison, Onondaga, Oswego, Tioga, and Tompkins

Jason Denno  
Environmental Project Manager  
PO Box 220, 232 Golf Course Road  
Warrensburg, N.Y. 12885  
(p) 518-623-1244; (f) 518-623-1311; email: Jason.Denno@efc.ny.gov

Counties covered: Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren, Washington, Herkimer, and St. Lawrence

Dwight Brown  
SRF Program Services Coordinator  
625 Broadway -7th Floor  
Albany, N.Y. 12207-2997  
(p) 518-402-7396; (f) 518-402-7456; email: [Dwight.Brown@efc.ny.gov](mailto:Dwight.Brown@efc.ny.gov)  
Counties covered: Bronx, Kings, Nassau, New York, Queens, Richmond, and Suffolk

**Website:** [www.efc.ny.gov](http://www.efc.ny.gov)

## **NYS Community Development Block Grant (CDBG)**

**Administered by:** New York State Division of Homes and Community Renewal - Office of Community Renewal (OCR)

**Program Description:** The CDBG provides financial assistance for water and sewer infrastructure projects to cities, towns, and villages with populations under 50,000 and counties with an area population under 200,000.

**Funding available:** Grants are available for public infrastructure projects including wastewater infrastructure. Grant awards up to \$600,000 can be made to a single town or village applicant for a water or sewer project. Awards up to \$900,000 can be made to joint town/village applicants. Up to \$750,000 can be awarded to county applicants.

**Applying:** Applications are through the Consolidated Funding Application (CFA). Information on the CFA process can be found at: <http://regionalcouncils.ny.gov/>

**Contacts:** Charles Phillion, Senior Community Developer, 518-474-2057 or [cphillion@nyshcr.org](mailto:cphillion@nyshcr.org)

**Website:** <http://nysdhcr.gov/AboutUs/Offices/CommunityRenewal/>

## **USDA Rural Development Utilities Service Water and Environment Program**

**Administered by:** USDA Rural Development

**Program Description:** This program provides loans and grants to public bodies, non-profit organizations and Native American tribes with the design, construction, and improvements of wastewater systems for rural communities. Eligibility of municipal applicants is restricted to jurisdictions in rural areas with a total population less than 10,000.

**Funding available:** Announced loan rates as of July, 2014 are 2.375% (poverty), 3.25% (intermediate) and 4% (market).

**Applying:** Applicants submit an application for an initial funding estimate that includes summary information about the applicant, a reviewable project engineering report and an Environmental Report summarizing potential environmental impacts. Applicants receiving an initial funding estimate are directed to make a full application for funding within 90 days of the estimate date. The major components of the application are similar to that for the CWSRF program.

**Contacts:** State and Regional office information: [http://www.rurdev.usda.gov/NY\\_Office\\_Locations.html](http://www.rurdev.usda.gov/NY_Office_Locations.html)

**Website:** <http://www.rurdev.usda.gov/NYHome.html>

## **Local Government Efficiency Program (LGE)**

**Administered by:** New York State Department of State

**Program Description:** The LGE provides technical assistance and competitive grants to local governments for the development of projects that will achieve savings and improve municipal efficiency through shared services, cooperative agreements, mergers, consolidations and dissolutions. Applicants must include at least two involved municipalities.

**Funding available:** Grants of up to \$200,000 are available for implementation projects (i.e. construction of shared infrastructure) for each local government involved in the project, up to a maximum of \$1,000,000. Grants of up to \$12,500 are available for planning projects (i.e. development of engineering reports, evaluation of consolidation) for each local government involved in the project, up to a maximum of \$100,000. A local cash match is required, which varies based on project type.

**Applying:** Applications are through the Consolidated Funding Application (CFA). Information on the CFA process can be found on the Regional Economic Development Council website at: <http://regionalcouncils.ny.gov/>

**Contacts:** Kyle Wilber, 518-473-3355 or [LGEprogram@dos.state.ny.us](mailto:LGEprogram@dos.state.ny.us)

**Website:** <http://www.dos.ny.gov/lg/lge/index.html>

## **Water Quality Improvement Projects (WQIP)**

**Administered by:** New York State Department of Environmental Conservation (DEC)

**Program Description:** WQIP is a competitive, statewide reimbursement grant program open to local governments for projects that directly address documented water quality impairments. WQIP funds can be used towards municipal wastewater treatment infrastructure improvement. This can be mentioned as a potential funding source, but please note that the frequency of grant availability is uncertain, and that the amount of funding available for wastewater is typically very limited, and likely insufficient for constructing a new system.

**Funding available:** Grants up to 85% of the total project cost with a 15% local share required.

**Applying:** Applications are available through DEC.

**Contacts:** Water Quality Improvement Project Program, 518-402-8179 or [user.water@dec.ny.gov](mailto:user.water@dec.ny.gov)

**Website:** <http://www.dec.ny.gov/pubs/4774.html>