TOMPKINS COUNTY
WATER QUALITY STRATEGY

2022-2024

Tompkins County Water Resources Council
Adopted: November 15, 2021

Water Resources Council Members

Voting Members

Seat	Member
Agriculture	A. Fay Benson
Business and Industry	Charles Tauck
Cornell Cooperative Extension	Vacant
Environment	Linda Wagenet
Environmental Management Council	Michelle Henry
Recreation	Elizabeth Thomas
Soil and Water Conservation District	Jonathan Negley
Tompkins County Environmental Health	Elizabeth Cameron
Tompkins County Legislature	Amanda Champion
Tompkins Co. Planning & Sustainability Dept.	Darby Kiley
Water Purveyor	Steve Riddle
Watershed Organization	Barry Goodrich, Caroline Watershed Committee
Municipal Government:	Kristen Hychka, Town of Caroline Cynthia Brock, City of Ithaca Lynn Leopold, Village of Lansing
At-Large Members:	Annie Bastoni Emelia “Mia” Jumbo Frank Proto Stephanie Redmond Linda Wagenet

Non-Voting Members

Associate Members	Chris Bordlemay Padilla, Cornell University Roxy Johnston, City of Ithaca Water Treatment Plant Jose Lozano, Ithaca Area Wastewater Treatment Facility Cedric Mason Steve Penningroth, Community Science Institute Elaine Quaroni Joanne Trutko Tom Vawter

Tompkins County Water Resources Council Water Quality Strategy
2022-2024

Executive Summary

The Tompkins County Water Resources Council (WRC), an advisory board to the County Legislature, updates the Water Quality Strategy (WQS) every three years. The purpose of the WQS guide policy and actions to protect and enhance quality of water resources in Tompkins County. The WRC will focus on the following 11 actions in 2022 through 2024.

	Action
A	**Support development of Cayuga Lake Watershed Rules and Regulations (WRR) and Drinking Water Source Protection Program Plans for specific watersheds.** Track Owasco Lake WRR through state review process. Convene drinking water purveyors, municipalities, county health departments, and county planning departments to discuss options. If warranted, seek funding for a facilitator to conduct outreach and solicit stakeholder input from public and private entities, urban and rural landowners, tourism-based businesses, etc.
B	**Continue participation in the DEC's TMDL/clean water plan development activities**. This includes regular discussions with DEC about the details and implementation of a clean water plan and possible Nine Element Plan for Cayuga Lake.
C	**Host municipal official training sessions that alternate between classroom and site visit settings. Topics include stream corridors, wetlands, floodplain management, and aquifer recharge areas**. Workshops should be developed so as to be replicable every few years, and a rotating schedule of workshops should be established.
D	**Annually identify one to three priority areas for water quality treatment or best management practices, focusing on bioavailable or soluble reactive phosphorus.** Evaluate existing water quality data for locations and subwatersheds to prioritize locations.
E	**Create and annually update Tompkins County-specific educational materials on the connection between HABs and phosphorus** and promote best management practices to control phosphorous leaving agricultural lands. Work with SWCD and CCE to present and disseminate information. Provide updates related to HABs to TCCOG and County Legislature.
F	**Develop and disseminate educational materials on the importance of soil health to the protection and enhancement of water quality.** The WRC will act to bring together information on programs, funding opportunities, and educational resources from various local soil health organizations to disseminate to farmers and the public. The focus will be on Tompkins County but will strive to exchange resources with other agencies that work beyond the county borders
G	**Develop a conservation loan bank account program to cover upfront costs of agriculture best management practices.** Funds would be repaid upon reimbursement from state grant programs (expanding on funds already provided by Tompkins County), and would support/augment conservation reserve programs. Determine the mechanics of such a program and proposals for foundations, lake users (recreation, tourism, and property owners), and others to contribute funds to the account.
H	**Develop a groundwater monitoring program to monitor groundwater level and water quality in unconsolidated and bedrock aquifers throughout the county.**
I	**Annually convene entities within Cayuga Lake, Owasco Lake, and Susquehanna River watersheds to share monitoring and research results, review status of actions and funding recommended in this strategy, evaluate results, and identify next steps.**
J	**Promote best management practices for timber harvesting**. Review towns of Ithaca and Ulysses timber harvest regulations for possible recommendation to other municipalities.
K	**Promote and publicly thank local farmers who implement best management practices.** Action should be used to raise awareness and make the connection between HABs and best management practices.

TABLE OF CONTENTS

I. INTRODUCTION

The preservation and improvement of the waters of Tompkins County are of increasing and vital importance to the health, welfare, and economic well-being of the present and future inhabitants of the County. The water resources of the County — including both surface water and groundwater — play several important roles as

- a source of drinking water;
- an economic resource for tourism and recreation;
- a necessary component for supporting agriculture, water-based businesses, and other businesses;
- a crucial source of sustenance for the flora and fauna of the region; and
- a part of the system for treating human, industrial, and agricultural waste.

Integral parts of the environmental fabric, these water resources add to the quality of life for residents and visitors alike.

The land area of Tompkins County sits in three watersheds: Cayuga Lake and Owasco Inlet, both of which flow north into the Oswego River basin and then into Lake Ontario, and the Susquehanna River basin, which flows south into the Chesapeake Bay. Over 350 square miles (223,792 acres) of Tompkins County are in the Cayuga Lake basin, 34 square miles (21,753 acres) are in the Owasco Inlet basin, and over 96 square miles (61,459 acres) are in the Susquehanna River basin.

Water Quality Strategy Purpose

To protect and enhance the quality of local water resources, Tompkins County must establish partnerships and collaborate with local, regional, state, and national government entities, as well as with other organizations, groups, and individuals. To do so effectively, it is important to establish a strategy for allocating financial resources and determining future work related to water resources in the County. The Water Quality Strategy (WQS) guides policy and activities related to water issues in Tompkins County by setting goals and defining action. The WQS also seeks to reduce conflicts and redundancy and to promote the sharing of information and resources among agencies, organizations, and public interest groups with significant water-related programs.

The Water Resources Council of Tompkins County, with input from the public and interested agencies, is responsible for revising and updating the WQS every three years.

Background

New York State has agreements with the U.S. Environmental Protection Agency (EPA) to implement the various provisions of the federal Clean Water Act and the Safe Drinking Water Act. As part of this effort, and in conjunction with the NYS Soil and Water Conservation Committee, the NYS Department of Environmental Conservation (DEC) encouraged the creation of county-level Water Quality Coordinating Committees.

In 1992, the Tompkins County Board of Representatives appointed a Water Quality Steering Committee consisting of persons with technical backgrounds in water resources issues. Their initial task was to draft a Water Quality Strategy Plan. The Board of Representatives adopted this first plan on June 16, 1992.[1] This initial concept has evolved to include planning for comprehensive water resources management. That document is now known as the Tompkins County Water Quality Strategy (WQS).

Tompkins County Water Resources Council (WRC)

The Tompkins County Board of Representatives created the WRC and related Technical Committee in 1997[2] to advise the Board of Representatives on matters affecting the preservation, enhancement, and use of water

[1] Resolution No. 192 of 1992.
[2] Resolution No. 181 of 1997.

resources in the County. In 2000, the WRC was restructured by the Board of Representatives[3] to merge technical and policy memberships and provide for participation by any person with expertise or interest in the County's water resources.

The WRC also serves as the County's Water Quality Coordinating Committee, while maintaining its role as an advisory committee to the Tompkins County Legislature.[4] In addition, the WRC strives to stay informed about, and comment on, topical issues with a strong relationship to water quality and/or quantity. It participates in opportunities to comment on related projects and issues and is alert to emerging contaminants and responds as deemed appropriate.

Another important function of the WRC is to provide a venue for water organizations to communicate with one another and the public, as well as to collaborate with other organizations and agencies on activities that further WQS goals.

Updates and Accomplishments on Priority Action Items from 2019-2021 WQS

While the three-year period of the 2019-2021 WQS included major work and meeting disruptions due to the COVID-19 pandemic, the WRC and its committees were able to advance actions as detailed below.

Action Item from 2019-2021 WQS	Description of progress on action
Establish a regular meeting among groups implementing various portions of the Harmful Algal Bloom (HAB) actions plans in Tompkins County.	The WRC's HABs Committee was established as an opportunity for groups to report on HABs monitoring and outreach and to advance actions in the state's HABs Action Plans. Given the vagueness of the state's HABs Action Plan, the committee developed a Tompkins County HAB Strategy that was approved by the WRC in 2021.
Develop and disseminate educational materials on the importance of soil health to the protection and enhancement of water quality.	The WRC's Soil Health Committee organized a public meeting in 2019 on the importance of regenerative farming to protect water quality. The committee also developed an educational brochure (approved by the WRC in February 2021) for the farming community on improving soil health and water quality.
Anticipate the availability of water supply in public water systems during potential drought conditions.	Efforts are underway with Tompkins County Health Department (TCHD), Tompkins County Department of Planning and Sustainability (TCDPS), and the water purveyors to advance this item.
Participate in the update of the NYS Section 303(d) List of Impaired/Total Maximum Daily Load (TMDL) Waters.	The WRC and the Monitoring Partnership (MP) submitted comments on the draft TMDL for Phosphorus in Cayuga Lake. The MP considered the opportunity to submit comments during the Department of Environmental Conservation (DEC) data solicitation for the 2020/2022 Integrated Report, which is used to update water body assessments in the state's 305(b) Water Quality Report and the Clean Water Act Section 303(d) List of impaired Waters.

[3] Resolutions No. 57 of 2000 and No. 211 of 2000.
[4] The Tompkins County Board of Representatives, prior to April 2003.

Keep municipal and county officials informed of existing federal/state/local wetland regulations and changes to those regulations.	WRC members provided a wetlands presentation to planning and zoning board members in Groton (October 2019), the Cayuga Lake Watershed Intermunicipal Organization (September 2020), and the Caroline Watershed Committee (August 2021). The federal wetlands regulations continue to be in flux.
Continue participation in the DEC's TMDL development activities.	New York State released the draft TMDL in April 2021 with a 45-day comment period. Many groups requested a longer comment period, which was extended to 90 days. The WRC, MP, and many other departments and organizations in the watershed submitted comments on the draft TMDL.
Review existing watershed rules and recommend appropriate changes.	The WRC's Watershed Rules and Regulations (WRR) Committee, water purveyors, and relevant agencies met in November 2019 to discuss the process and implications for WRR in Cayuga Lake, Fall Creek, and Six Mile Creek. Meanwhile the Owasco Lake WRR were revised, endorsed, and supported by the City of Auburn and Town of Owasco in October 2020 and are under review at the state level. The committee has been tracking Owasco Lake's WRR revision and anticipating next steps when the state completes its review.
Develop a series of workshops for municipal officials on water quality, including road ditching, to protect water quality and stress the importance of local actions to protect stream corridors, wetlands, and aquifer recharge areas.	The WRC's Municipal Training Committee held a stream buffer workshop in November 2019 and a site visit training to a stream restoration project in Caroline in October 2021.
Evaluate the level of protection of existing groundwater sources used for municipal and individual supplies.	The WRC's Water Withdrawal Committee reviewed commercial and municipal water withdrawal permits and the WRC requested notification directly to the WRC for these water withdrawal permit requests. The committee is developing a groundwater monitoring proposal. Current efforts with the Drinking Water Source Protection Program will also address protections of public water supplies.

II. WATER RESOURCES

For the purposes of this document, it is useful to distinguish between surface water, for which there is a substantial body of information, and groundwater, about which much less is known. However, it is important to note that surface water and groundwater interact, making them part of the same system and, ultimately, one resource. Wetlands and riparian corridors are transition zones between aquatic and terrestrial environments and play a critical role in maintaining water quality.

Surface water and groundwater are extensively used for:

- Drinking water for individual wells and municipal and other large systems
- Agriculture
- Recreation
- Water-based businesses
- Wastewater disposal

- Cooling and heating
- Plant and animal habitat, and
- Stormwater transport

Maps of Tompkins County watersheds, aquifers, and wetlands are provided at the end in this document.

Surface Water

Surface water (lakes, streams) is the drinking water source for over half of Tompkins County residents. Three water treatment facilities in Tompkins County use surface water as their source:

- Bolton Point, which is run by the Southern Cayuga Lake Intermunicipal Water Commission using Cayuga Lake as its water source;
- Cornell University Water Filtration Plant, which uses Fall Creek; and
- City of Ithaca Water Treatment Plant, which uses Six Mile Creek.

In addition, several public drinking water systems rely on groundwater sources (springs, wells, or infiltration galleries) that have been identified by the TCHD as "groundwater under the direct influence of surface water" (GWUDI). This means that the quality of this water is similar to that of surface water. To make it safe for drinking, it must be treated to achieve the required standards for clarity and the reduction of microorganisms. True groundwater may only need disinfection to meet water quality regulations.

Surface water is vulnerable to contamination from a host of point and non-point pollution sources. There is almost no activity in the County that does not in some manner have the potential to impact our surface water resources. (For more details see "Surface Water" in section IV.)

Regulations.
Regulations intended to protect surface waters can be and are enacted at every governmental level. The federal government has passed the Water Pollution Control Act (Clean Water Act) and the Safe Drinking Water Act, both of which are enforced by the EPA. The EPA has empowered local wastewater pretreatment programs to enforce federal, state, and local sewer discharge regulations. New York has Public Health Law and Environmental Conservation Law enforced, respectively, by the Health Department and the DEC. These laws and regulations affect the taking and use of water from, and the discharges back to, the environment. Tompkins County has its Sanitary Code, which regulates drinking water systems and provides protection from on-site sewage systems and other discharges. There are no requirements for on-site sewage system inspections as there are in other counties. In addition, under NYS Public Health Law, public water purveyors can enact watershed rules and regulations (WRR) to protect their sources of water (the City of Ithaca and Cornell University did so decades ago), but enforcement of these regulations has been nearly nonexistent. However, in 2008, the City of Auburn and Town of Owasco in Cayuga County began enforcing the Owasco Lake WRR, which affect the Village of Groton, a large part of the Town of Groton, and smaller parts of the towns of Lansing and Dryden. In 2020, the City of Auburn and Town of Owasco passed revised WRR and sent those to New York State for approval. At the time of this writing, the State has not provided feedback on the revised Owasco Lake WRR.

Invasive Species.
In 2014, New York State passed new regulations targeting aquatic invasive species. Boaters in New York, including on Cayuga Lake, are now required to clean and drain boats both prior to launching from and when exiting boat launches. These regulations are part of an aggressive effort to prevent invasive species from entering and damaging New York waterbodies. The harmful impacts that aquatic and terrestrial invasive species have on water quality can be profound. Invasive species can degrade water quality in numerous ways, including:

- Out-competing beneficial native species;
- Causing excessive growth in waterbodies, which can lead to decreased light penetration, reduced flow,

increased nutrient load and biomass decomposition, and decreased dissolved oxygen;
- Increasing erosion by out-competing or killing native vegetation that helps to secure stream banks and soil; and
- Providing conditions conducive to the growth of harmful cyanobacteria.

The Tompkins County Environmental Management Council maintains and updates a "Regional Invasive Species List."

Stormwater.
Stormwater has a strong influence on surface water quality. When it rains, water flows over forests, fields, driveways, lawns, roads, parking lots, and farms throughout the watershed as it travels to streams, lakes, and ponds. Along the way, stormwater picks up soil, chemicals, and other pollutants. Polluted stormwater degrades our lakes, rivers, wetlands, and other waterways. Nutrients, such as phosphorus, can cause the overgrowth of aquatic plants and algae. Toxic substances from motor vehicles and the application of pesticides and fertilizers threaten water quality and can kill fish and other aquatic life. Bacteria from animal waste and improper connections to storm sewer systems can make lakes and waterways unsafe for wading, swimming, and fish consumption. Eroded soil in the form of sediment is a pollutant as well, and can cloud waterways and interfere with the habitat of fish and plant life.

Since 2010 per National Pollutant Discharge Elimination System requirements, developments that disturb more than 1 acre of land must use design practices (green infrastructure) to control stormwater quality by filtration and reduce runoff by providing for infiltration of a portion or all of the increased volume of stormwater due to the increased impervious area.

Dams.
Dams play several important roles in Tompkins County, including as mechanisms for stormwater management and flood attenuation. They also serve as drinking water reservoirs and help reduce sediment load downstream. Dams and reservoirs require regular maintenance to fulfill these roles so that they do not become a source of downstream issues (e.g. flooding, sediment, invasive species).

Groundwater

Groundwater resources are an important source of water for residential, commercial, and industrial uses. In Tompkins County, groundwater is a primary source of drinking water for slightly less than half of residents. The TCHD maintains a list of public groundwater systems in the County. It includes restaurants, mobile home parks, schools, campgrounds, apartment buildings, and municipal water systems. In addition, thousands of rural residents receive their drinking water from individual private wells.

In many areas, the groundwater interacts with surface water. Therefore, the water in these areas should be considered a single system. At these interfaces, each system can contaminate the other, requiring careful and prudent protection of both. Contaminated aquifers that discharge to streams can result in long-term contamination of surface water; conversely, streams can be a major source of contamination to aquifers. Groundwater typically contributes more than half of the total annual flow to local streams and creeks.

Aquifers.
Unconfined aquifers are replenished (recharged) by infiltration of precipitation from the ground above and, in some areas, by seepage loss of surface water to the aquifers below. Impervious surfaces (such as paved roads and parking lots, roofs, buildings) increase runoff. These impervious surfaces threaten to reduce the amount of recharge to aquifers by inhibiting the percolation of precipitation. Confined aquifers are partially protected by an impermeable soil or rock layer that prevents water from entering the aquifer directly from the ground surface. These aquifers are recharged from areas (sometimes miles away) called aquifer recharge areas where the impermeable layer does not exist.

Compared to surface water supplies, groundwater supplies are better protected from contamination by their overlying geologic materials. However, once an aquifer is contaminated, it is very difficult to clean up. Often the solution to a contaminated groundwater supply is not remediation of the aquifer. Rather, it is often more effective, but still expensive, to treat the pumped water prior to distribution and human consumption. Sources of groundwater contamination include fuel and other chemical spills; unmaintained on-site wastewater treatment systems; chemicals applied to land surfaces, such as fertilizers, manure and pesticides; unlined landfills; illegal informal dumps; chemical injection for drilling hydraulic fracturing of wells and for disposal of related wastes; and road salt application. Taking proactive measures is important to protect groundwater supplies. Such measures might include:

- Preventing the loss of natural wetlands, with their beneficial services for purifying water;
- Minimizing chemical use;
- Utilizing best management practices (BMPs) for fertilizers and manure application (such as testing soil before applying fertilizer and timing applications for maximum uptake);
- Reducing pesticide use by practicing integrated pest management;
- Properly designing and maintaining landfills;
- Remediating spills and abandoned dumpsites;
- Properly siting, designing, and maintaining on-site wastewater treatment systems;
- Maintaining petroleum storage facilities;
- Reviewing plans for expansion of salt mining;
- Preventing or properly managing underground injection or use of chemicals; and
- Ensuring stormwater infiltration practices control or prevent contamination of groundwater.

Unlike surface water, which flushes contaminants downstream relatively quickly, groundwater in aquifers moves slowly and can take from a couple of years to decades to move from the point of origin to the point of discharge. Once contaminated, an aquifer can become unusable, and often remediation is not technologically or economically feasible, especially for small or rural communities.

Because of the paucity of information about groundwater resources in Tompkins County, efforts to collect additional data and information about these resources have been ongoing since 2002 through a cooperative study program of confined aquifers done jointly by Tompkins County, the applicable town(s), and the United States Geological Survey (USGS). (Aquifer studies are available through the USGS publications warehouse.) To date, the studies of seven aquifer reaches have been completed, another is in preparation for publication, and one is presently under investigation.

Riparian Corridors

Riparian corridors are the lands bordering streams and represent a transition zone between aquatic and terrestrial ecosystems. Though riparian areas and stream buffers generally comprise a small proportion of the landscape, they provide a disproportionately high amount of habitat and ecosystem benefits, including protecting water quality, stabilizing streams, minimizing flood damages, and enhancing ecological diversity.

Adequately vegetated riparian corridors can help improve water quality by capturing and filtering out sediments, nutrients, and other pollutants and by moderating stream temperatures. Buffers support aquatic ecosystems and enhance habitat and biodiversity by providing a supply of plant detritus as food for aquatic food webs, structural complexity for aquatic habitat, and shade for stream channels in summer. Other non-water resource benefits include providing terrestrial wildlife habitat and travel corridors, minimizing property damage from flooding, and reducing municipal investment in stormwater management infrastructure.

Scientific recommendations for appropriate buffer widths vary considerably and depend on the management goal. The minimum width of a vegetated stream buffer should be 100 feet to provide water quality and aquatic habitat protection benefits, 165 feet for stream bank stabilization and detrital input benefits, and 330 feet for wildlife habitat for terrestrial mammals.[5]

Wetlands

Wetlands such as swamps and marshes are often easily recognizable, but some wetlands, such as forested wetlands and wet meadows, are not obvious because they are dry during part of the year. The quality and quantity of wetlands also vary greatly depending on local conditions such as soil type, climate, hydrology, level of precipitation, and human disturbance.

According to the DEC, "Freshwater wetlands are those areas of land and water that support a preponderance of characteristic wetlands plants that out-compete upland plants because of the presence of wetlands hydrology (such as prolonged flooding) or hydric (wet) soils. Freshwater wetlands commonly include marshes, swamps, bogs, and fens."

Wetlands are a critical component of natural ecosystems and provide a variety of benefits, such as (1) filtering harmful toxins, nutrients, and sediment from surface and stormwater runoff; (2) storing floodwaters and reducing the magnitude of flood events; (3) providing valuable habitat for a diverse array of flora and fauna, including many rare, threatened, or endangered species; and (4) maintaining surface water flow during dry periods. Landscape position influences wetland function, with headwater wetlands providing stream base-flow augmentation, and lower elevation wetlands providing floodwater storage. The recreational uses associated with wetlands are also very diverse and include bird watching, hunting, fishing, and botanical tourism, all of which provide direct economic benefits to local communities.

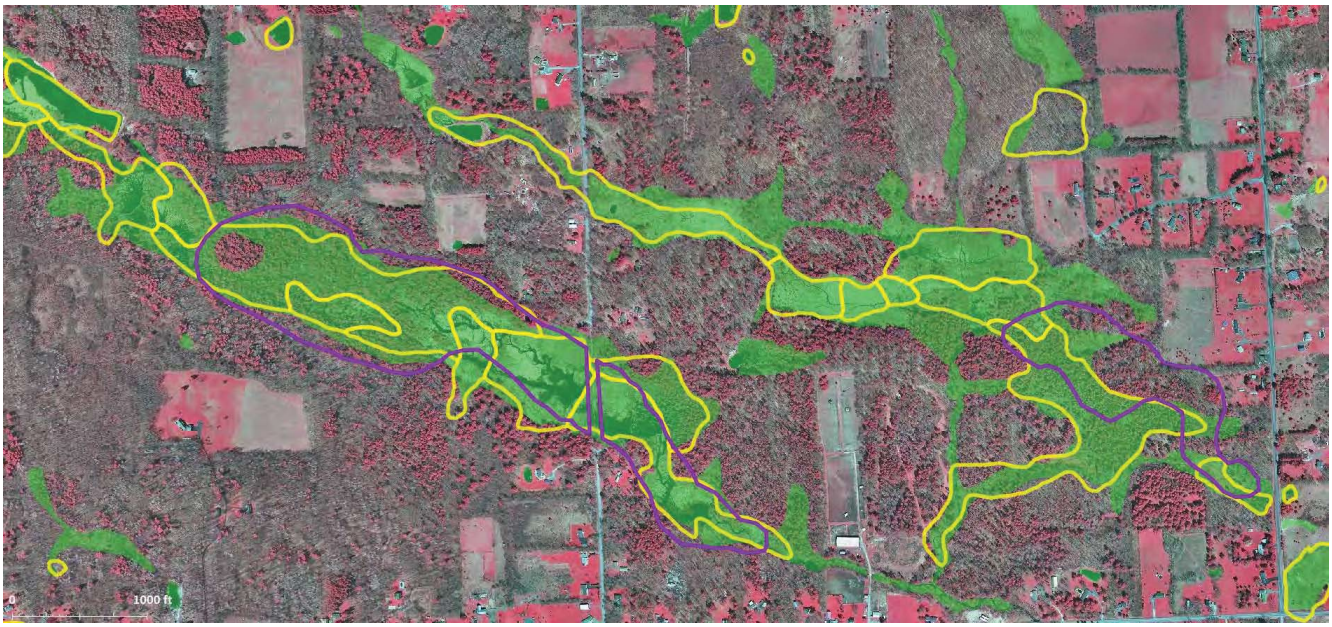
In 2016, the Cayuga Lake Watershed Network (CLWN), with additional financial support from the Park Foundation and Tompkins County, published *Wetland Mapping for Tompkins County, New York* (referred to as the CLWN analysis). Based on more detailed, up-to-date information than that available to the DEC or the U.S. Army Corps of Engineers (USACE) when they produced wetland maps, and using currently available technology, a new wetland map was developed for the entire County. In total, more than 15,000 acres of wetlands were mapped.

The DEC-regulated wetlands cover approximately 5,600 acres, and the National Wetlands Inventory (NWI) (which includes many of the DEC-regulated wetlands) shows approximately 10,800 acres of federally identified wetlands (per CLWN analysis, 2016). While historically the federal government — through the USACE — played an important role in protecting wetlands, U.S. Supreme Court decisions in 2001 and 2006 confused and complicated which streams and wetlands are protected by the Clean Water Act.

As of the preparation of this WQS, federal definition of "waters of the United States" is a moving target. In June 2021, the EPA and USACE began a new rulemaking process that is expected to be completed in 2022.

As an example of the wetlands mapping project, the image below shows wetland boundaries identified by the DEC (purple outline), NWI (yellow outline), and CLWN analysis (green). This demonstrates the spatial inaccuracy of existing maps used by local municipalities and state and federal agencies when initially identifying wetland locations.

[5] Enhancing Water Resources in Tompkins County: Benefits of Riparian Areas and Stream Buffers. 2006. Tompkins County Planning Department.



While the DEC and the USACE regulate certain wetlands, additional steps can be taken locally to protect and enhance wetlands:

- Wetland restoration projects can help provide some of the benefits provided by natural wetlands that may have been lost.
- Communities can educate landowners on the importance of wetlands.
- Municipalities can consider wetlands in their comprehensive plans, zoning ordinances, and subdivision and site plan reviews.
- A municipality can adopt and enforce a wetland protection ordinance to protect wetlands that might not be protected under state and federal laws. The WRC drafted a model ordinance available on the WRC website.
- A local government can establish a wetland conservation easement program, similar to agricultural easement programs.

Protecting Water Resources

Protecting water quality is of vital importance. This requires protecting the tributaries and other surface water and groundwater sources, riparian corridors, and wetlands within a watershed. It follows that it is important to identify existing and likely sources of pollution. These include, but are not limited to:

Non-point sources:

- Fuel and other chemical spills;
- Illegal dumping (via sewer or public access to streams);
- Failing on-site wastewater treatment systems;
- Proper and improper application of fertilizer (including manure) and pesticides (both agricultural and residential);
- Runoff from concentrated livestock operations, fertilizer, and pesticides;
- Pet waste;
- Erosion from construction and logging sites;
- Runoff and erosion from agricultural practices;
- Erosion from improper road bank and ditch maintenance (erosion from all sources significantly increases during severe storm events);

- Invasive species (both aquatic and terrestrial);
- Toxins from cyanobacteria blooms;
- Riparian development;
- Road and airplane deicing materials;
- Runoff from parking lots and other impervious surfaces, treated or not;
- Air pollutant deposition (e.g. heavy metals from combustion, acid rain, and salt fines from Cargill;
- Leachate routinely discharged from Cayuga power station coal ash waste piles; and
- Microplastics (plastic <5 mm long) and emerging contaminants.

Point sources are a source of pollution when State Pollution Discharge Elimination System (SPDES) permits are violated or not enforced:

- Treated wastewater discharges, municipal and private, containing many unregulated emerging contaminants;
- Municipal Separate Storm Sewer Systems (MS4);
- Manufacturing;
- Mining;
- Power plants;
- Landfills (including ash landfill and closed county landfill);
- Cornell Lake Source Cooling;
- Concentrated Animal Feeding Operations (CAFOs – large and medium).

Actions to minimize these pollutants include:

- Maintain natural wetlands with their beneficial services for purifying water;
- Utilize BMPs for nutrient management;
- Reduce fertilizer and pesticide use by practicing integrated pest management;
- Implement BMPs to reduce both agricultural, non-agricultural, and urban runoff and erosion;
- Prevent the introduction and spread of aquatic and terrestrial invasive species;
- Properly site and maintain on-site wastewater treatment systems;
- Re-vegetate road ditches and banks (e.g., hydro-seeding);
- Protect, restore, and expand riparian corridors and wetlands; and
- Support wastewater treatment plant upgrade initiatives.

III. WATER RESOURCE PROTECTION DOCUMENTS

The actions developed by the Water Resources Council in this Water Quality Strategy area based on issues and concerns raised in the DEC Priority Waterbodies List (PWL) and other watershed plans.

Waterbody Inventory/Priority Waterbodies List

The DEC maintains water resources information through its Waterbody Inventory/Priority Waterbodies List (WI/PWL) database. The Waterbody Inventory (WI) refers to a listing of all waters, identified as specific individual waterbody segments, or assessment units, within the state. The WI includes both assessed and currently unassessed waters. The PWL is a subset of waters in the WI that have documented water quality impairments, minor impacts, and/or threats. The WI/PWL assessments provide the foundation for both the state's compilation of the biennial Section 305(b) Water Quality Report on all waters of the state, and for the development of the Section 303(d) List, which is comprised of waters that do not meet water quality standards, do not support water uses, and require development of a TMDL (Total Maximum Daily Load) or other clean water plan.

The DEC develops and updates the PWL using a combination of stakeholder input and DEC monitoring results. The PWL is updated on a statewide, five-year rotating schedule, and is used by the DEC and other agencies as a primary resource for water resources management and funding. In Tompkins County, the southern end of Cayuga Lake is listed as impaired for bathing and recreation due to algal/weed growth, nutrients, and silt/sediment. Until 2014, Cayuga Lake was also listed as impaired by pathogens. This listing was removed based on data submitted to the DEC by WRC members representing the Ithaca Area Waste Water Treatment Facility (IAWWTF) and the Community Science Institute (CSI).

TMDL. For waters that are determined to be impaired, states must consider the development of a TMDL or other strategies to reduce the input of the specific pollutants. Impaired waterbodies and their related pollutants are published by the DEC on the NYS Section 303(d) List of Impaired/TMDL Waters. The most recent list, published in 2020, identifies the southern end of Cayuga Lake as impaired by two pollutants: phosphorus and silt/sediment (Cayuga Lake, Southern End Fact Sheet).

Most of the phosphorus that enters the southern end of Cayuga Lake is bound up with sediment carried by Fall Creek, Cayuga Inlet, and Six Mile Creek. This sediment is largely the result of stormwater runoff and erosion of stream banks. The loss of natural wetlands in the valley at the south end of the lake that would act as sediment traps has contributed to sedimentation in the southern end of Cayuga Lake. A TMDL or other strategy to address phosphorus will likely need to address methods to reduce the amount of phosphorus found in these tributaries. In addition to sediment-bound phosphorus, phosphorus also enters the southern end of the lake from point sources, including wastewater treatment plants and the Cornell Lake Source Cooling heat exchange facility. It is easier to control/regulate point sources than non-point sources. In recent years, tertiary phosphorus treatment systems have been installed at the IAWWTF and Cayuga Heights Sewage Treatment Plant, significantly reducing their contributions of phosphorus.

As a condition of continuing the NYS discharge permit for the Lake Source Cooling facility, the DEC and Cornell University conducted a detailed study of the sources and ultimate use of phosphorus in Cayuga Lake. The study built a mathematical water quality model of Cayuga Lake and its watershed and a detailed analysis of the shallow southern end of the lake in order to provide a better understanding of where phosphorus comes from and how it affects the lake ecosystem. Based on the results of the model, the DEC determined that a TMDL is necessary to address the amount and concentration of phosphorus in the southern end of Cayuga Lake as well as threats to public drinking water supplies throughout the lake. In April 2021, DEC released a draft Total Maximum Daily Load for Phosphorus in Cayuga Lake. WRC and many other agencies submitted comments on the draft TMDL, and as of this writing,[6] the DEC is reviewing comments. A TMDL for silt/sediment has not yet been developed.

Classification of Waters. All waters of the state are provided a class and standard designation based on existing or expected best usage of each water or waterway segment.

- Classification AA or A is assigned to waters used as a source of drinking water.
- Classification B indicates a best usage for swimming and other contact recreation, but not for drinking water.
- Classification C is for waters supporting fisheries and suitable for non-contact activities.
- The lowest classification and standard is D.

Waters with classifications A, B, and C may also have a standard of (T), indicating that the waters may support a trout population, or support trout spawning (TS). Special requirements apply to sustain these waters that support these valuable and sensitive fisheries resources.

[6]November 2, 2021

Certain waters of the state are protected on the basis of their classification. Streams and small waterbodies located in the course of a stream with a classification of AA, A, or B, or with a classification of C with a standard of (T) or (TS) are collectively referred to as "protected streams," and are subject to the stream protection provisions of the Protection of Waters regulations.

Small ponds and lakes with a surface area of 10 acres or less, located within the course of a stream, are considered to be part of a stream and are subject to regulation under the stream protection category of the DEC Protection of Waters program.

Environmental Resource Mapper. This web-based interactive mapping application developed by the DEC can be used to identify protected streams based on their classification. It can also be used to create simple maps that can be submitted as part of the Protection of Waters Permit Application process.

Watershed Plans

This and previous versions of the WQS used the following watershed plans to develop goals and actions:

- Upper Susquehanna Coalition's Phase III Watershed Implementation Plan
- Owasco Lake Watershed Management Plan
- Owasco Lake Watershed Rules and Regulations
- Cayuga Lake Watershed Restoration and Protection Plan
- Tompkins County Agricultural Environmental Strategic Plan
- Harmful Algal Bloom Action Plan – Cayuga Lake and Owasco Lake
- Tompkins County Harmful Algal Bloom Strategy

Upper Susquehanna Coalition's Phase III Watershed Implementation Plan

The U.S. Environmental Protection Agency's (EPA) Chesapeake Bay Total Maximum Daily Load (TMDL) requires New York to reduce nutrient and sediment pollutant loads to the Chesapeake Bay (in New York, the Susquehanna and Chemung rivers flow south to the Chesapeake Bay). In May 2021, New York state released the Final Amended Phase III Watershed Implementation Plan, which outlines the 2020 nutrient and sediment contributions by section, and details local engagement strategies, best management practices, funding, etc. for each source sector. The Upper Susquehanna Coalition (USC) has been DEC's primary local partner since New York formally joined the effort to restore the Chesapeake Bay in 2000. New York's efforts to meet its Chesapeake Bay restoration goals rely heavily on the work of the Upper Susquehanna Coalition (USC) to implement BMPs to reduce pollutant loads and to collect data about BMPs that are implemented.

Established in 1992, the USC is a coalition of 22 soil and water conservation districts (18 in New York and four in Pennsylvania) whose mission is to protect and improve water quality and natural resources in the Upper Susquehanna River watershed. Tompkins County SWCD is a member of the USC.

Owasco Lake Watershed Management Plan

The Owasco Lake Watershed Management and Waterfront Revitalization Plan (2016) examines the state of Owasco Lake and its watershed, how water quality and habitat conditions are changing, and the challenges of meeting community goals for continued use and enjoyment of the lake. The plan recommends specific actions needed to restore and protect Owasco Lake and its watershed for future generations.

Owasco Lake and its tributaries are an important resource to the communities within the watershed. Owasco Lake provides municipal water to 44,000 Cayuga County residents via the City of Auburn and Town of Owasco

water filtration plant. Tompkins County is the headwaters of the Owasco Lake Inlet watershed, a large portion of which falls within the Town of Groton and smaller portions within the towns of Dryden and Lansing.

According to the plan, cyanobacterial blooms, also known as harmful algal blooms (HABs), have been detected in Owasco Lake in recent years and are of great concern for recreational users and suppliers of potable water. Water quality monitoring data suggest that the lake's conditions are deteriorating, and that nutrient enrichment is a presumed cause. Based on the decline in water quality conditions and the increasing frequency of HABs, in 2014 the DEC listed Owasco Lake as impaired for both water supply and recreational uses. The DEC also reported the types and sources of pollutants interfering with recreational and water supply uses. Pollutant types are listed as pathogens and HABs; pollutant sources are listed as agriculture (as a source of phosphorus promoting HABs) and waterfowl (as a source of pathogens).

The plan includes recommendations grouped into eight broad categories:

- Planning (which includes development of a Nine Element Plan to be completed by the end of 2021);
- Measures to reduce non-point source pollution;
- Lake level management;
- Monitoring and assessment;
- Recreation and waterfront revitalization;
- Water and wastewater infrastructure;
- Institutional structure for lake and watershed management; and
- Outreach and education.

According to the plan, the portion of the Owasco Lake watershed located in Tompkins County is considered of low priority since less than half of the subwatershed is devoted to agriculture and is of relatively low susceptibility to non-point source pollution.

Owasco Lake Watershed Rules and Regulations

The watershed rules and regulations (WRR) for Owasco Lake are enforced by the watershed inspector. The Watershed Inspection Program was established through an agreement between the City of Auburn, Town of Owasco, Cayuga County agencies, and other Owasco Lake advocates and works closely with the Cayuga County Soil and Water Conservation District. The program operates in accordance with NYS Public Health Law and employs both a watershed specialist and inspector. The specialist and inspector perform a variety of tasks to ensure the ecological health of Owasco Lake and its tributaries. After a multi-year process to update the WRR, the Auburn City Council and Owasco Town Board adopted the final draft WRR in December 2020. The draft is currently under review at the state level.

Cayuga Lake Watershed Restoration and Protection Plan

In 2017, the Cayuga Lake Watershed Restoration and Protection Plan (RPP) was updated through the joint efforts of the Cayuga Lake Watershed Intermunicipal Organization (CWIO) and the CLWN under the sponsorship of the Town of Ithaca, with a grant from the NYS Department of State. The process drew in hundreds of people, dozens of agencies, and numerous experts to update the plan and develop new recommendations for action.

The central 2017 goals of the RPP are "to inspire, to prioritize actions and strategies, and to bring about legislative change vital to protecting and preserving Cayuga Lake and its watershed."

The IO's top priority recommendations for action are drawn from the 2017 plan's individual chapters and the work of water quality experts. The recommendations fall into four broad categories:

- Monitoring of the lake and its tributaries for the restoration and protection of the watershed;

- Stormwater management and erosion control to minimize the contributions of pollutants and sediment associated with runoff;
- Collaboration and coordination among the six counties, 34 towns, nine villages, and one city in the Cayuga Lake watershed;
- Public education and engagement to help preserve, protect, and restore Cayuga Lake and its watershed.

Tompkins County Agricultural Environmental Management Strategic Plan

The Agricultural Environmental Management (AEM) program is managed by the NYS Department of Agriculture and Markets, in partnership with the United States Department of Agriculture, the NYS Soil and Water Conservation Committee, and the 53 County Soil and Water Conservation Districts (SWCDs) across the state. Part of New York State Agriculture and Markets Law, the AEM program provides all state SWCDs with a consistent level of non-competitive funding and a uniform methodology to help manage farms in an environmentally responsible manner. As a statewide recognized planning and implementation tool, the AEM program makes it possible for a greater number of farms to access various cost-share grant programs to improve environmental practices while also documenting current best management strategies as they pertain to natural resources.

The Tompkins County AEM five-year strategic plan was adopted by the Tompkins County SWCD Board of Directors in 2020 to guide the program through 2025. The plan breaks out by watershed important water quality issues and concerns that can be addressed by improved agricultural BMPs. The priority watersheds that will be addressed on a farm-by-farm basis are Fall Creek, Salmon Creek, Owasco Inlet, Cayuga Inlet, and Taughannock Creek. The priority resources, issues, and concerns contained in the document were identified from the NYS PWL, stakeholder meeting input, and other plans mentioned above.

Harmful Algal Bloom Action Plans – Cayuga Lake and Owasco Lake

In early 2018, the Governor's Office announced the creation of an expert panel and local steering committees to develop action plans to address HABs. The $65 million initiative to combat HABs in Upstate New York includes Cayuga and Owasco Lakes. The State's Water Quality Rapid Response Team, national experts, and local stakeholders developed action plans for each waterbody to identify contributing factors fueling HABs and action plans to reduce the sources of pollution that spark algal blooms.

The DEC's Harmful Algal Bloom Action Plan - Cayuga Lake listed 17 Priority 1 Projects considered necessary to manage water quality and reduce HABs in Cayuga Lake. Two of these actions are identified as actions to undertake in the short term and are summarized here. Many of these recommendations have already been identified as important actions to address other water quality issues.

1. Implement runoff reduction BMPs on agricultural and non-agricultural lands. These BMPs would be implemented by local SWCDs and other partners and include:
    - Cover crops on cropland that is prone to erosion and nutrient runoff when left unprotected;
    - Field erosion control systems;
    - Stabilization of drainage swales through establishment of vegetation;
    - Installation of check dams;
    - Stream bank stabilization using both hard armoring and natural stream design methods;
    - Installation of control facilities at the outlets of drainage swales;
    - Implement runoff reduction BMPs for farmsteads;
    - Conduct a pilot test on drainage tile BMPs;
    - Establish vegetated riparian buffers; and
    - Rehabilitate degraded vegetated buffers to improve riparian habitat function.

2. Implement roadside ditch and culvert improvement projects on currently failing ditch systems. Best management practices could include:
    - Timing of cleanout;
    - Properly sizing culverts and channels;
    - Use of erosion control practices; and
    - Installation of check dams or other facilities.

The Harmful Algal Bloom Action Plan - Owasco Lake listed 15 Priority 1 Projects. Seven of these actions are identified as actions to undertake in the short term:

1. Maximize coordination and equitable allocation of resources through the Owasco Lake Watershed Management Council.
2. Increase SWCD staffing through appropriations to focus capacity to plan and implement projects.
3. Implement various erosion and sediment control and land conservation projects. These would be implemented by local SWCDs, municipalities, and non-profit organizations, and include:
    a. Implementation of cover crops on cropland that is prone to erosion and nutrient runoff when left unprotected.
        i. Utilize a cost-share program where the State provides financial and technical support to farmers to plant cover crops on agricultural fields.
    b. Implementation of a cost-share program where the State provides financial and technical support to farmers for manure storage, transfer, and application.
    c. Establishment of vegetated riparian buffers.
    d. Rehabilitation of degraded vegetated buffers.
4. Establish a program to work with crop farmers that accept manure from Concentrated Animal Feeding Operations (CAFOs) to properly store and apply the material.
5. Implement AEM Tier 3A Resource Management Plans and AEM Tier 3A Nutrient Management Plans for non-CAFO beef/dairy operations.
6. Implement a livestock exclusion program, including:
    a. Installation of fencing on stable portions of the stream banks.
    b. Installation of livestock watering stations outside the limits of riparian areas.
    c. Installation of stable stream crossings.
    d. Establish vegetated riparian buffers within the fenced exclusion limits.
    e. Rehabilitate degraded vegetated buffers within the fenced exclusion limits.
7. Perform a pilot study to evaluate the phosphorus removal efficiency of stormwater management techniques.

Tompkins County Harmful Algal Bloom Strategy

In June 2021, the WRC approved the Tompkins County Harmful Algal Bloom Strategy, which includes 20 actions in four topic areas: agriculture, ditch management, stream buffers and wetlands, and collaboration. Some of the actions are underway, and others, where the WRC is listed as the lead, are included in the actions of this WQS update.

IV. GOALS AND ACTION ITEMS

The action items of the Water Quality Strategy are in accordance with the six goals established in prior WQS documents:

Goal A: Protect and enhance surface water quality.
Goal B: Protect and enhance groundwater quality and quantity.
Goal C: Protect and restore riparian corridors.

Goal D: Protect and restore wetlands.
Goal E: Participate in the creation and implementation of relevant watershed plans and initiatives that impact Tompkins County.
Goal F: Educate and inform municipal officials, the public, professionals, agency staff, and the media about water quality concerns and protective policies and practices.

The action items below have been selected, prioritized, and listed in ranked order in consideration of the purview and resources of the WRC as well as their timeliness and Council member interests and abilities.

Priority Action Items for the Water Resources Council for 2022-2024

	Action	Level of Effort	Likely Schedule	Committee; Partners
A	**Support development of Cayuga Lake Watershed Rules and Regulations (WRR) and Drinking Water Source Protection Program Plans for specific watersheds.** Track Owasco Lake WRR through state review process. Convene drinking water purveyors, municipalities, county health departments, and county planning departments to discuss options. If warranted, seek funding for a facilitator to conduct outreach and solicit stakeholder input from public and private entities, urban and rural landowners, tourism-based businesses, etc.	Moderate-High	2022-2024	WRR; CWIO, TCHD, TCDPS, other counties
B	**Continue participation in the DEC's TMDL/clean water plan development activities**. This includes regular discussions with DEC about the details and implementation of a clean water plan and possible Nine Element Plan for Cayuga Lake.	Moderate	Ongoing	Monitoring Partnership (MP); DEC, CWIO
C	**Host municipal official training sessions that alternate between classroom and site visit settings. Topics include stream corridors, wetlands, floodplain management, and aquifer recharge areas**. Workshops should be developed so as to be replicable every few years, and a rotating schedule of workshops should be established.	Moderate	Annual	Municipal Training; Varies based on topic
D	**Annually identify one to three priority areas for water quality treatment or best management practices, focusing on bioavailable or soluble reactive phosphorus.** Evaluate existing water quality data for locations and subwatersheds to prioritize locations.	Moderate	2022-2024	HABs/MP; SWCD, CSI
E	**Create and annually update Tompkins County-specific educational materials on the connection between HABs and phosphorus** and promote best management practices to control phosphorous leaving agricultural lands. Work with SWCD and CCE to present and disseminate information. Provide updates related to HABs to TCCOG and County Legislature.	Moderate	Annually	Education; SWCD

F	**Develop and disseminate educational materials on the importance of soil health to the protection and enhancement of water quality.** The WRC will act to bring together information on programs, funding opportunities, and educational resources from various local soil health organizations to disseminate to farmers and the public. The focus will be on Tompkins County but will strive to exchange resources with other agencies that work beyond the county borders	Moderate	2022	Soil Health; SWCD, CCE, NRCS, WRI
G	**Develop a conservation loan bank account program to cover upfront costs of agriculture best management practices.** Funds would be repaid upon reimbursement from state grant programs (expanding on funds already provided by Tompkins County), and would support/augment conservation reserve programs. Determine the mechanics of such a program and proposals for foundations, lake users (recreation, tourism, and property owners), and others to contribute funds to the account.	High	2022	NEW; CCE, SWCD
H	**Develop a groundwater monitoring program to monitor groundwater level and water quality in unconsolidated and bedrock aquifers throughout the county.**	Moderate	2022	Water withdrawals; TCHD
I	**Annually convene entities within Cayuga Lake, Owasco Lake, and Susquehanna River watersheds to share monitoring and research results, review status of actions and funding recommended in this strategy, evaluate results, and identify next steps.**	Low (1-2 meetings to prepare)	2022-2024	Education; TCDPS, other counties and watershed groups
J	**Promote best management practices for timber harvesting**. Review towns of Ithaca and Ulysses timber harvest regulations for possible recommendation to other municipalities.	Low	2023	NEW; DEC
K	**Promote and publicly thank local farmers who implement best management practices.** Action should be used to raise awareness and make the connection between HABs and best management practices.	Low	2022-2024	NEW; SWCD, CCE, CWIO

General On-Going/Administrative WRC Tasks

In addition to the action items identified above, the WRC undertakes other actions, some unrelated to water quality and others of an on-going or administrative nature, as listed below.

- Update the Tompkins County WQS every three years, and for each update, evaluate the mission/purpose, prioritized water quality concerns, and WRC role in implementing the strategy.
- Report annually (in April) to the relevant committee of the Tompkins County Legislature about the accomplishments of the WRC.
- Provide a venue for water organizations to communicate with each other and the public.

- Take a role in tracking and participating in DEC regulatory, permitting, and enforcement actions, including 303(d) list updates.
- Participate in opportunities to provide letters of support for grant funding and to comment on projects.
- Identify emerging contaminants and issues and identify appropriate action (research, education, etc.).
- Track changes in state and federal regulations on waterbodies, including wetlands, and disseminate information to local municipalities.
- Track status of implementing water resource activities based on duties outlined in water resource coordinator description approved by WRC in August 2020.
- Utilize new GovDelivery system to share information on water quality, training, funding, and other resources with municipal officials, farmers, and residents.
- Refresh WRC website.
- Update, as needed, brochures on paddling, watercraft regulations, watershed agencies, and arsenic in wells.
- Annually review "Action Items for Consideration by Others" list and reach out to one or more agencies to provide or receive updates on recent developments and opportunities for collaboration and support.

Action Items for Consideration by Others

In preparing this and previous Water Quality Strategy updates, the WRC identified a number of actions that are important for the water quality and quantity in Tompkins County but are more appropriately addressed by other organizations:

TCDPS, TCHD, water purveyors	Investigate the availability of water supply in public water systems during potential drought conditions. Identify existing data and gaps, including impacts for simultaneous drought and HABs outbreak.
SWCD, TCDPS, others	Seek funding for WQS actions
TCHD	Revise Tompkins County Sanitary Code to consider onsite wastewater treatment system inspection requirement, minimally at the time of a property sale.
TCHD	Provide oversight of operation of existing individual septic tanks.
TCHD	Map location of all on-site wastewater treatment systems and individual water supplies using GIS.
TCDPS	Promote stream corridor protection efforts, including the stream buffer planting guide, riparian protection agreements with landowners, and model stream buffer ordinances.
TCDPS	Promote the Stream Corridor Protection Program.
TCDPS	Promote the WRC wetlands map.
SWCD	Promote the use of BMPs and buffers on agricultural lands to control erosion and runoff from farm fields and farmsteads.
SWCD	Promote participation of agricultural operations in voluntary environmental risk evaluation (AEM process) and voluntary state and federal cost-share programs to protect and enhance water quality.
SWCD	Educate agricultural operations about the voluntary state environmental risk evaluation (AEM process) and cost-share programs to implement practices to protect and enhance water quality.
TC Highway Division	Promote intermunicipal cooperation and establish a schedule for the use of the County Street Sweeper/Vacuum truck.
All municipalities	Implement policies to reduce the use of road salt, or other chemicals that may impact water quality, by road maintenance organizations.

Owasco Lake Watershed Inspector	Promote monitoring efforts in the Owasco Lake watershed within Tompkins County.
Owasco Lake Watershed Inspector	Report to WRC on the Tompkins County Legislature's and constituent municipalities' work in support of the Owasco Lake Watershed Management Plan.
USC	Report to WRC on the Tompkins County Legislature's, constituent municipalities', and the USC's work in support of the Susquehanna Tributary Strategy.
Multiple agencies	Determine status of stream biota health.
CWIO	Implement the 2017 update of the Cayuga Lake Watershed Restoration and Protection Plan.
CWIO	Report to WRC on the Tompkins County Legislature's and constituent municipalities' work to support the Cayuga Lake Intermunicipal Organization agreement and implementation of the Restoration and Protection Plan.
CWIO	Promote the Cayuga Lake Intermunicipal Organization.
Stormwater Coalition of Tompkins County (SCTC)	Support coordinated stormwater management practices.
SCTC	Provide education to contractors, developers, municipal highway employees, municipal officials, and code enforcement officers on erosion control, stormwater regulations, and protection.
SCTC	Promote intermunicipal cooperation for compliance with EPA/DEC Phase II Stormwater Regulations. Foster public awareness, participation, and education on this issue.
SCTC	Prepare annual report on stormwater permit implementation and compliance.
SCTC	Inventory roadside erosion potential.
City of Ithaca	Undertake channel maintenance in the City of Ithaca.
CCETC	Educate the public, municipal officials, and others on issues related to invasive aquatic species.
FEMA/DEC	Update floodplain maps.
Natural Resources Conservation Service	Promote the voluntary U.S. Department of Agriculture Conservation Reserve Enhancement Program for livestock exclusion from streams.
USGS	Promote continued operation of existing stream gages on Cayuga Lake tributaries and assist in identifying funding sources for that purpose.
USGS	Complete Lower Fall Creek aquifer study under Tompkins County's Aquifer Study Capital Program.

Action Items Suggested, but not Included

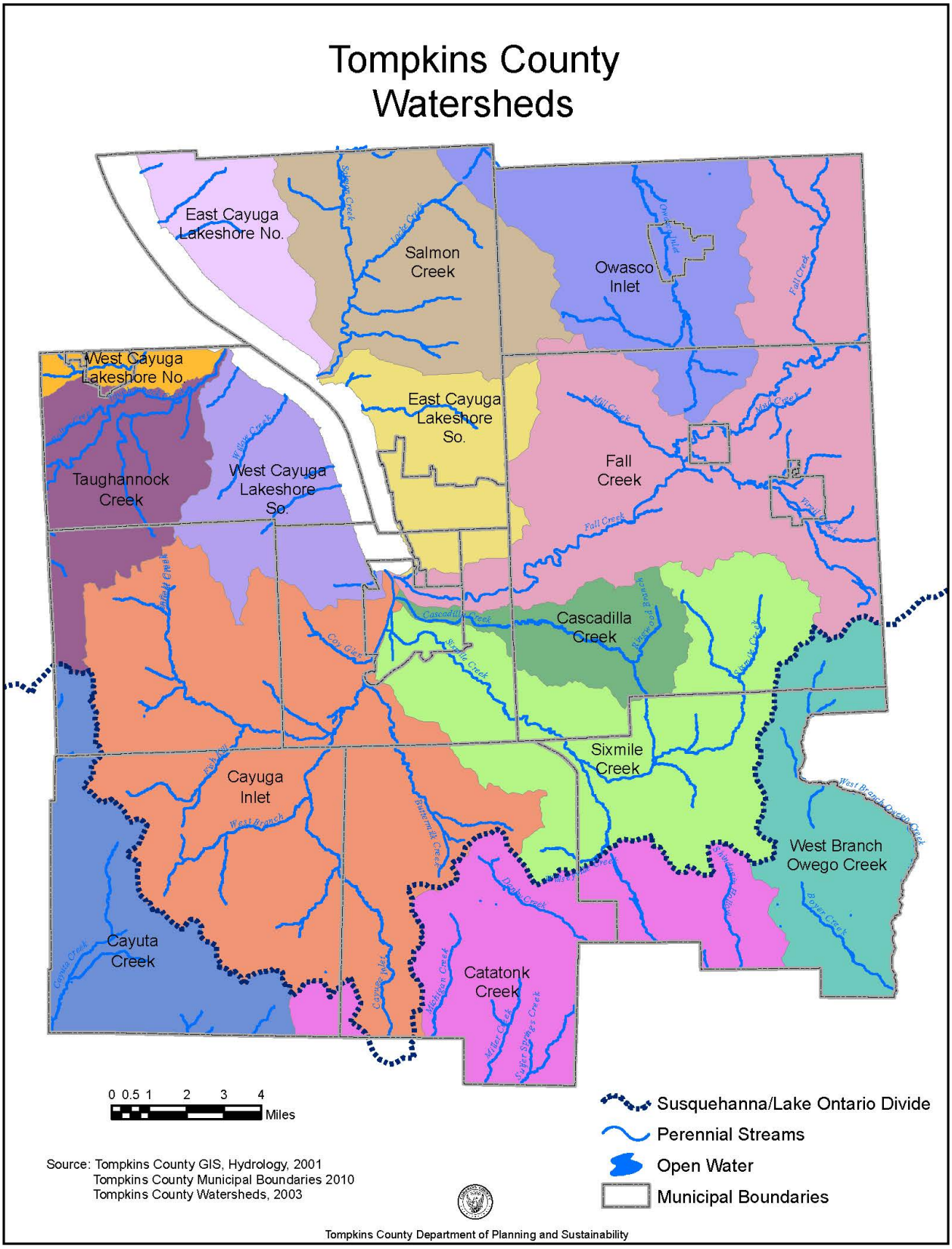
In preparing this and previous WQS, a number of potential action items were identified. Some are action items from the most recent WQS, some were identified during brainstorming sessions, and others were action items suggested in other water resources plans. These are listed here for reference.

- Monitor existing potential sources of water pollutants, e.g. the old coal ash landfill associated with the power plant in Lansing, wind-borne coal ash from the same source, salt mining.
- Promote stenciling of all storm drains.
- Provide public education on discharge of wastewater from boats.
- Determine the carrying capacity of Cayuga Lake for boating activity.
- Provide buoys within 500 feet of water intakes in Cayuga Lake.
- In concert with landowners and lessees, support regulations and programs that encourage riparian corridor protection and restoration.
- Promote non-polluting recreational uses of Cayuga Lake, such as non-motorized boats and photography.

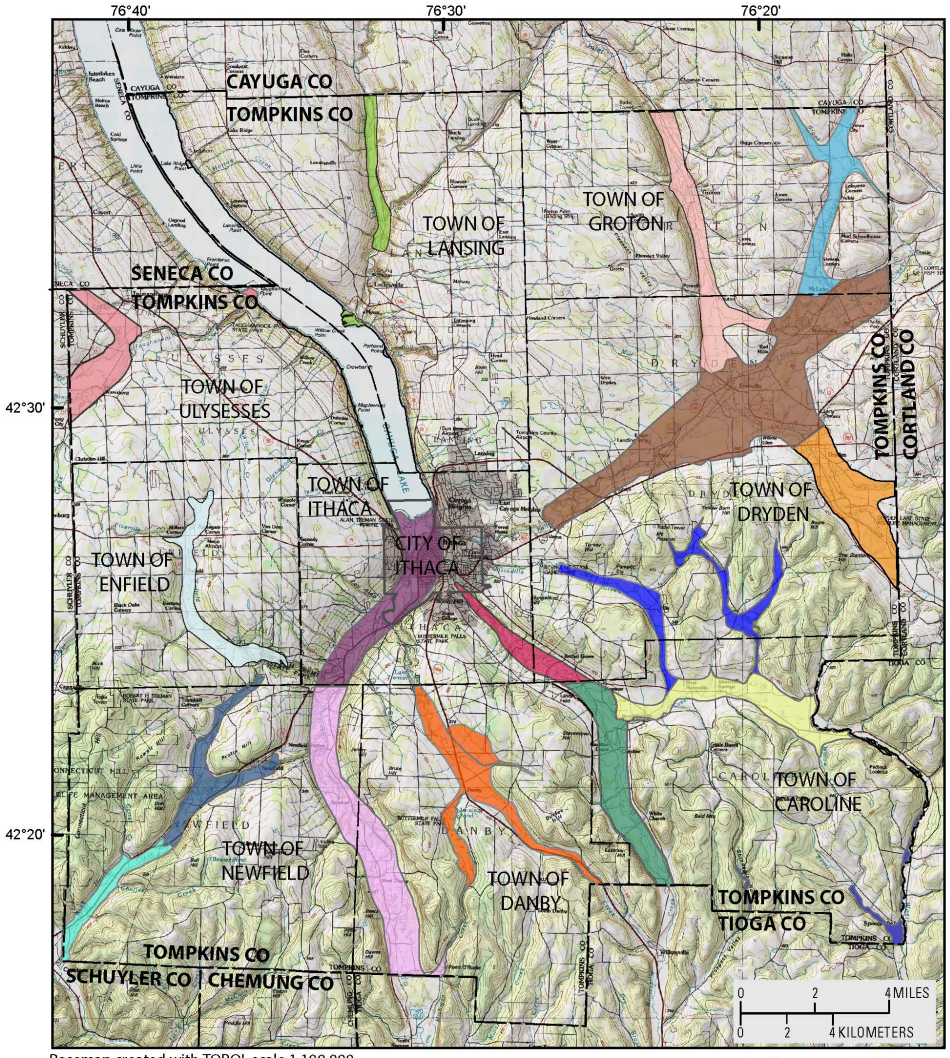
- Promote training opportunities for local municipal staff (Code Enforcement Officers) for enforcement of existing individual water supply regulations.
- Conduct Water Week activities.
- Complete and update annually a brochure of local water/watershed agencies and organizations for distribution at public events, such as Water Week.
- Raise awareness of watershed issues with youth groups and schools.
- Educate public on the public/private responsibility for water quality.
- Identify practices of pharmacies that accept unused drugs for disposal.
- Expand WRC membership to include watershed representatives from each municipality.
- Develop incentives for stream buffer protection.
- Evaluate existing educational and planning materials for use in promoting the protection of wetlands.
- Investigate possibilities for web-based dissemination of information on wetlands.
- Educate landowners on erosion control.
- Educate residents about how everyday activities (lawn care, use and disposal of pharmaceuticals, etc.) impact water quality.
- Collaborate with other organizations (e.g., CLWN, CWIO, Discover Cayuga/Floating Classroom, TCHD) on educational activities that further WQS goals.
- Provide public education on the byproducts of Stage II disinfectants used by water purveyors.
- Provide public education on aquatic plants.
- Identify and educate the public on new regulations affecting water purveyors.
- Re-establish a Lake-Friendly Farm program to recognize individual efforts to reduce water quality impacts of agricultural operations.
- Provide public education on pollution by microbeads and microplastics.
- Track SPDES Permit violations at the power plant in Lansing.
- Provide assistance to municipalities that wish to protect groundwater sources through local programs.
- Promote intermunicipal cooperation for the protection of riparian corridors.
- Develop long-term strategy to assist the County and municipalities with easement stewardship responsibilities.
- Acquire and collate wetland delineation data from major projects and municipal reviews.
- Develop a framework that uses municipal and community goals (e.g., protection of groundwater and surface water quality, flood storage, and habitat conservation) and activities (e.g., land development projects and community-based stewardship) to promote the protection of functions provided by wetlands.
- Identify the status of local wetland regulations and provide assistance to municipalities, on request.
- Delineate wetlands in the County.
- Provide information for the next US EPA Clean Watersheds Needs Survey
- Establish a coordinated response team for managing newly identified invasive aquatic species infestations.
- Work with municipalities/IO/agencies to secure funding for erosion control.
- Work to secure Finger Lakes-Lake Ontario Watershed Protection Alliance funding for erosion control.
- Create a surface water data-sharing structure.
- Encourage development of a stream sediment-monitoring program.
- Promote monitoring efforts in the Upper Susquehanna watershed within Tompkins County.
- Characterize nutrient loading in small watersheds.
- Investigate types and sources of groundwater data currently being collected.
- Evaluate the impact of pollution from pesticides.
- Evaluate bio-solids spreading potential for water contamination and identify appropriate actions.
- Identify circulation patterns in Cayuga Lake.

ACRONYMS USED

AEM	Agricultural Environmental Management
BMP	Best Management Practices
CAFO	Concentrated Animal Feeding Operations
CCE	Cornell Cooperative Extension – Tompkins County
CLWN	Cayuga Lake Watershed Network
CSI	Community Science Institute
CWIO	Cayuga Lake Watershed Intermunicipal Organization
DEC	New York State Department of Environmental Conservation
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
GWUDI	Groundwater Under the Direct Influence of Surface Water
HABs	Harmful Algal Blooms
IAWWTF	Ithaca Area Wastewater Treatment Facility
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
PWL	Priority Waterbodies List
RPP	Cayuga Lake Watershed Restoration and Protection Plan
SPDES	State Pollutant Discharge Elimination System
SCTC	Stormwater Coalition of Tompkins County
SWCD	Soil and Water Conservation District
TCHD	Tompkins County Health Department
TCDPS	Tompkins County Department Planning and Sustainability
TMDL	Total Maximum Daily Load
USACE	United States Army Corps of Engineers
USC	Upper Susquehanna Coalition
USGS	United States Geological Survey
WI/PWL	Waterbody Inventory/Priority Waterbodies List
WQS	Water Quality Strategy
WRC	Tompkins County Water Resources Council
WRI	New York State Water Resources Institute


Tompkins County
Watersheds
East Cayuga
Lakeshore No.
Salmon
Creek
Owasco
Inlet
West Cayuga
Lakeshore No.
East Cayuga
Lakeshore
So.
Taughannock
Creek
West Cayuga
Lakeshore
So.
Fall
Creek
Cascadilla
Creek
Sixmile
Creek
Cayuga
Inlet
West Branch
Owego Creek
Cayuta
Creek
Catatonk
Creek
0 0.5 1 2 3 4
Miles
Susquehanna/Lake Ontario Divide
Perennial Streams
Open Water
Municipal Boundaries
Source: Tompkins County GIS, Hydrology, 2001
Tompkins County Municipal Boundaries 2010
Tompkins County Watersheds, 2003
Tompkins County Department of Planning and Sustainability

Aquifers in Tompkins County



Basemap created with TOPO!, scale 1:100,000
2003 National Geographic (www.nationalgeographic.com/topo

Aquifers mapped Miller (2000)

EXPLANATION
Aquifer reach names

Completed (published)

- Enfield Creek Valley
- Upper Sixmile Creek and W Br Owego Creek valleys
- Lower Six Mile Creek and Willseyville Creek valleys Lower
- Six Mile Creek valley (Towns of Dryden and Ithaca)
- Virgil Creek valley
- Buttermilk Creek and Danby Creek valleys
- Pony Hollow valley

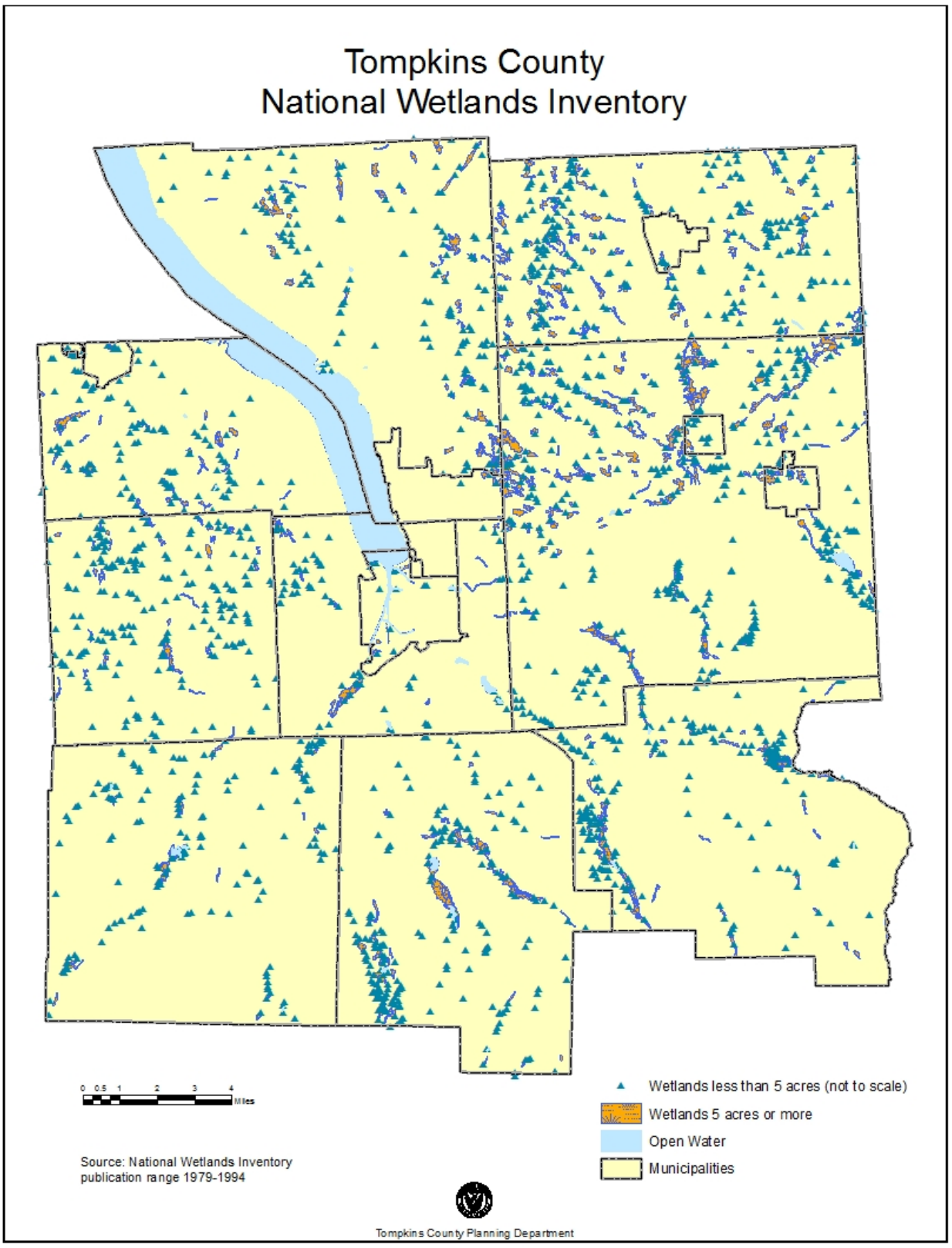
Completed (in progress, review or layout)

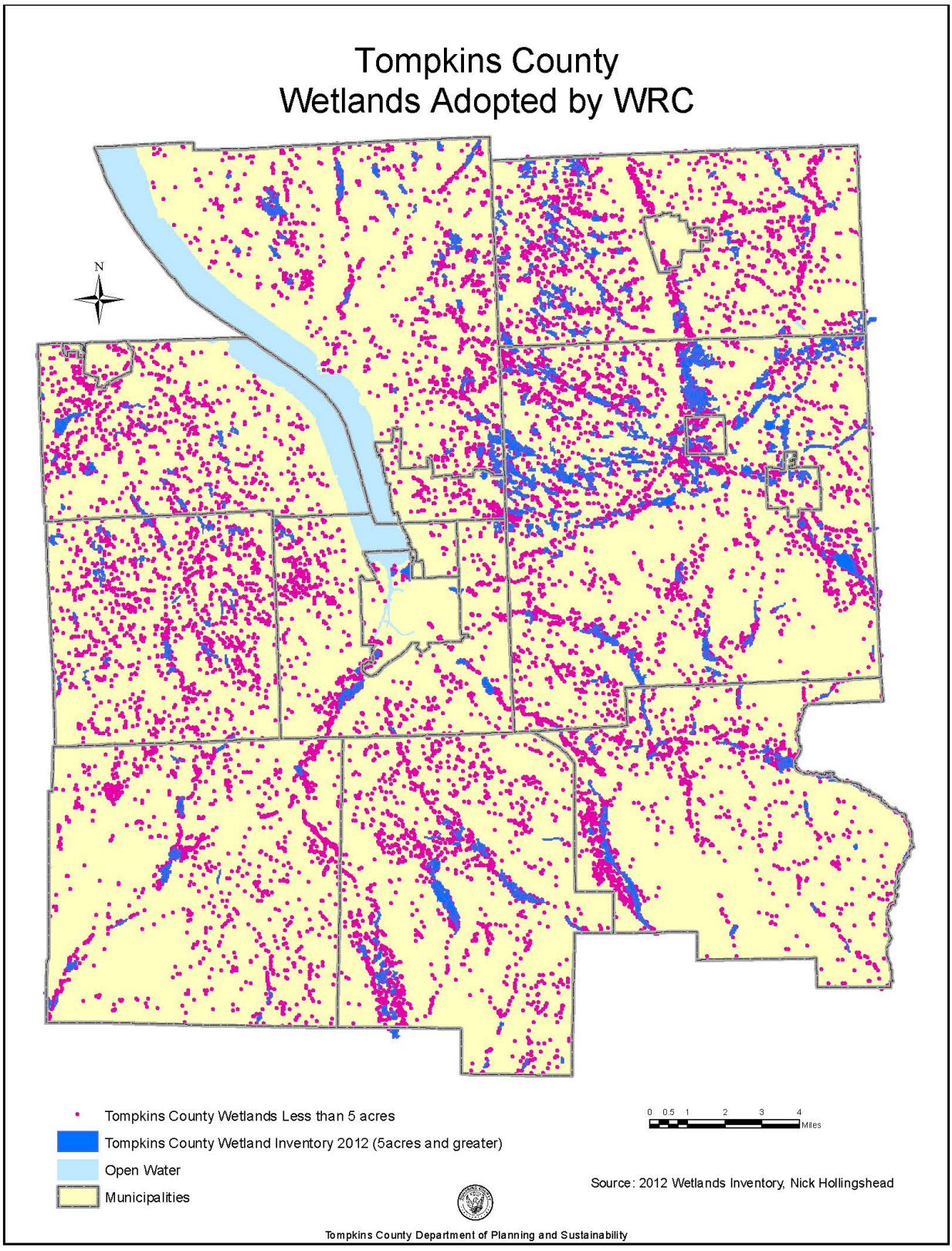
- Lower Fall Creek valley
- Owasco Inlet valley
- West Br. Cayuga Inlet and Fish Kill valleys

Proposed

- Salmon Creek/Myers Point/Locke Creek
- Lower Cayuga Inlet valley
- Cascadilla Creek valley and upland Six Mile Creek valley
- Taughannock Creek valley and delta
- Upper Cayuga Inlet valley
- Upper Fall Creek valley
- West Br. Owego Creek valley and tributaries

Status of aquifer mapping as of October 2021, Tompkins County, New York.


Tompkins County
National Wetlands Inventory
0 0.5 1 2 3 4
Miles
Source: National Wetlands Inventory
publication range 1979-1994
Wetlands less than 5 acres (not to scale)
Wetlands 5 acres or more
Open Water
Municipalities
Tompkins County Planning Department


Tompkins County
Wetlands Adopted by WRC
N
Tompkins County Wetlands Less than 5 acres
Tompkins County Wetland Inventory 2012 (5acres and greater)
Open Water
Municipalities
0 0.5 1 2 3 4
Miles
Source: 2012 Wetlands Inventory, Nick Hollingshead
Tompkins County Department of Planning and Sustainability