Owasco Lake Watershed Nine Element Plan Project Coordination Committee Progress

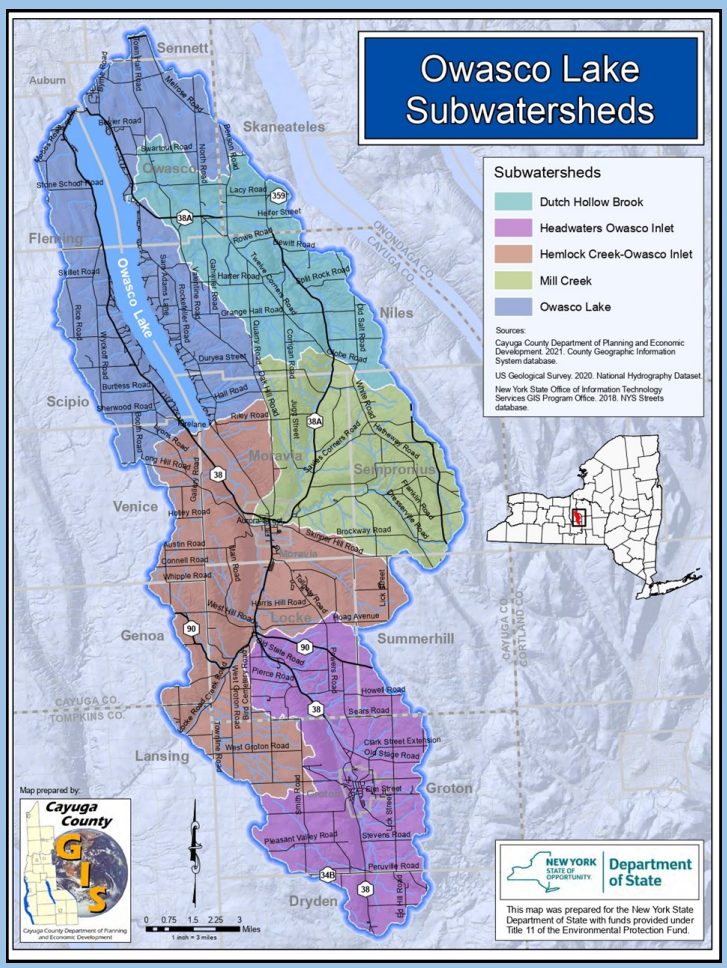
2022-2025

Owasco Lake Watershed Nine Element Plan for Phosphorus Reduction

Cayuga County received a New York State Department of State grant to implement a high-priority recommendation from the 2016 Owasco Lake Watershed Management and Waterfront Revitalization Plan, which was to incorporate the EPA's Nine Key Elements into the Plan. This project was led by the Cayuga County Department of Planning and Economic Development and the consultant on the project was Ecologic LLC.

The Owasco Lake Watershed Nine Element Plan for Phosphorus Reduction (9E Plan) was approved by the New York State Department of State and the New York State Department of Environmental Conservation in September 2022. This Clean Water Plan advances efforts to restore and protect the water quality of Owasco Lake and its watershed. This collaborative effort identified focused strategies to ensure the lake's water supply, aquatic habitat, and recreational uses are protected.

A recommended practice in the 9E Plan was supporting the Owasco Lake Watershed Management Council's (OLWMC) central role in lake and watershed management. On November 15, 2022 the OLWMC Board of Directors approved of the creation of the 9E Plan Project Coordination Committee that prioritizes, coordinates, and facilitates project and programming implementation based on the recommendations of the 9E Plan. This document is an overview of the various programs and projects that have been implemented since the adoption of the 9E Plan.



Map of HUC12 Subwatersheds

9E Plan Project Coordination Committee

The Owasco Lake Watershed Management Council's Board of Directors approved the creation of the 9E Plan Project Coordination Committee on November 15, 2022. The role of this committee is to:

- Facilitate the cooperation and coordination of local governments, state agencies and other stake-holders essential to the preparation and implementation of the plan;
- Focus on the planning process;
- Assist in reviewing consultant proposals;
- Review work products; and
- Be representative of project stakeholders.

This Committee meets monthly to advance the goals in the 9E Plan. Reports of this Committee can be found in the OLWMC's Director's Reports at https://www.olwmc.org/director-s-reports.

Partnerships and Collaboration

- Owasco Lake Watershed Management Council
- City of Auburn and Town of Owasco
- Cayuga County, Tompkins County and Onondaga County Soil and Water Conservation Districts (SWCD)
- Cayuga County Environmental Health Division
- Cayuga County Department of Planning and Economic Development
- Cornell Cooperative Extension of Cayuga County
- New York State Departments of Health, Ag and Markets and Environmental Conservation
- New York State Department of Environmental Conservation Finger Lakes Watershed Program
- Central New York Regional Planning and Development Board
- Owasco Watershed Lake Association (OWLA)
- The Nature Conservancy
- Finger Lakes Land Trust
- Ducks Unlimited
- Partners for Healthy Watersheds
- Finger Lakes—Lake Ontario Watershed Protection Alliance (FLLOWPA)
- Finger Lakes Institute/Finger Lakes Partnership for Regional Invasive Species Management (FLI/FLPRISM)
- SUNY Environmental Science and Forestry

For questions or comments on this report, please contact Michele Wunderlich at 315-253-1107 or by email at mwunderlich@cayugacounty.gov.

Implementation of the 9E Plan

Both quantitative and qualitative metrics will be used to track implementation of the recommended actions of the Owasco Lake 9E Plan, and the extent to which Owasco Lake supports its best uses for water supply, aquatic habitat, salmonid fishery, and contact recreation.

A primary metric is the annual monitoring reports of Owasco Lake from the Citizens Statewide Lake Assessment Program (CSLAP) to evaluate the trophic state indicator parameters and other ambient water quality standards related to aquatic habitat. Chlorophyll a concentration is considered a response variable related to in-lake concentrations of the limiting nutrient phosphorus, for which lake loading reductions are the target of the 9E Plan.

CSLAP seasonal trend analyses for individual sampling years and long term trend analyses show changes in chlorophyll a over a consistent index period (mid-June thru mid-September).

CSLAP Data from 2017-2024

Year	Summer Average Chlorophyll a (µg/L)	Summer Average Total Phosphorus (µg/L)
2017	5.4	13.5
2018	3.4	8.0
2019	5.1	6.5
2020	4.3	8.6
2021	4.2	10.6
2022	3.2	7.4
2023	3.8	7.4
2024	3.2	8.3

Summer average chlorophyll a concentration at or below 4 µg/L as documented through the CSLAP will be evidence of successful implementation of the 9E Plan. As shown in the graph above, the summer average chlorophyll a since the plan was passed in 2022 has been under 4 µg/L. The total phosphorus levels have been in the oligotrophic range during the same time period.

Secondary metrics include the percentage increase of 9E Plan recommended best management practices (BMPs) within the watershed. The outcomes of implementing recommendations within the plan are also being directly measured through leveraging on-going partnerships to monitor tributary nutrient concentrations directly.

The Owasco Lake Watershed Management Council and the Owasco Lake Watershed Inspection and Protection Division

Owasco Lake Watershed Management Council (OLWMC): The mission of the OLWMC is to coordinate actions for protecting and restoring the health of Owasco Lake and its watershed to ensure that Owasco Lake will serve as a source of public drinking water, a recreational asset, an economic driver, and an important natural resource for the well-being of watershed residents and those who benefit from its protection now and for future generations. One high-priority recommended practice in the 9E Plan is supporting the OLWMC's central role in lake and watershed management. On November 15, 2022 the OLWMC Board of Directors approved of the creation of the 9E Plan Project Coordination Committee that prioritizes, coordinates, and facilitates project and programming implementation based on the recommendations of the 9E Plan. This committee which is organized by the Director of the OLWMC usually meets monthly and has developed an annual work plan, which is a high-priority recommended practice in the 9E Plan. This report is a product of this committee.

Owasco Lake Watershed Inspection and Protection Division (OLWIPD): The OLWMC oversees the OLWIPD. The OLWIPD's mission is to make regular, thorough inspections of Owasco Lake, its water-courses, and its watershed, to identify compliance with the Rules and Regulations set forth for the Owasco Lake Watershed, and to provide educational outreach within the watershed community that supports environmental awareness and stewardship. One high-priority recommended practice in the 9E Plan is increased funding for the OLWIPD. From 2022 through 2024, revenue to the OLWMC increased by approximately 27%. This increase in funding was generated by enhanced government and third-party grant income.

Agricultural Environmental Management (AEM) Program

Agricultural Environmental Management (AEM) Program: is a voluntary, watershed based, locally-led effort to protect and enhance the environment while maintaining the viability of agriculture.

The AEM Program uses a five-tier voluntary approach to (1) gauge interest, (2) assess existing stewardship and environmental concerns, (3) develop farm-specific conservation plans, (4) implement the best management practices (BMPs) identified in the plan, and (5) update plans and conservation practices over time.

Farmers work with local AEM resource professionals to develop comprehensive farm plans using a tiered process:

Tier 1 - Inventory current activities, future plans and potential environmental concerns.
Tier 2 - Document current land stewardship; assess and prioritize areas of concern.
Tier 3 - Develop conservation plans addressing concerns and opportunities tailored to farm goals.
Tier 4 - Implement plans utilizing available financial, educational and technical assistance.
Tier 5 - Evaluate to ensure the protection of the environment and farm viability.

BMPs have been implemented on farms all over the Owasco Lake Watershed through the AEM Program. Examples include manure and agricultural waste treatment systems, silage leachate management, prescribed grazing systems and soil erosion control systems including cover crops, water and sediment control basins and grassed/lined waterways. These AEM BMPs implemented through SWCDs are in addition to all of the BMP installations farmers have voluntarily implemented.

Cover Crops


Residue and Reduced Tillage Management


Lined Waterway

The Cayuga County SWCD has developed the Cayuga County AEM Strategic Plan (2021-2025). This plan includes the status of agriculture in Cayuga County, general resource information, natural resource concerns, the AEM program, team capacities and capabilities, watershed inventory and prioritization, objectives for specific watersheds and opportunities. From 1998-2024, the Cayuga County SWCD cost-share programs have implemented over 100 AEM BMPs in the Owasco Lake Watershed at a cost of over $14 million.

AEM Cover Crops

One of the alternatives modeled in the Owasco Lake 9E Plan involved increasing the use of cover crops on agricultural lands, with the targeted acreage based on the 5-year goals outlined in the Cayuga County AEM Strategic Plan (2021-2025) for each specified HUC12 subwatershed. Keeping cover on the landscape for longer periods of time each year not only stabilizes soils and improves infiltration, but also incorporates nutrients from the soil profile to plant biomass. The net result is phosphorus reduction and improved hydrologic resiliency.

In the Owasco Lake 9E Plan a reduction of 30% external phosphorus load was selected as the target reduction to guide long term efforts in managing Owasco Lake and its watershed. Model projections indicate that expansion of cover crops and other agricultural BMPs, coupled with efforts to increase infiltration can meet the Owasco Lake 9E target reduction. In fact, model projections indicate that expanded adoption of cover crops has the potential to lead to a 30% reduction in current phosphorus load from the Owasco Lake Watershed, meeting the target reduction.

Expanded Cover Crops

HUC12 Subwatershed	Land Area (Acres)					
	Total HUC12 Subwatershed	Cultivated Crops	Previous Conditions	Current Conditions (2025)	9E Plan 5 Year Goal (2027)	9E Plan 5 Year Goal Met
Dutch Hollow Brook	18,825	7,914	247	3,007	2,900	Yes
Headwaters - Owasco Inlet*	24,305	5,364	1,046	4,629	1,800	Yes
Hemlock Creek - Owasco Inlet*	31,110	8,893	369	957	2,300	No
Mill Creek*	19,861	5,994	636	1,376	1,150	Yes
Owasco Lake	28,349	14,229	289	11,306	4,650	Yes
Sum For Watershed	**122,450**	**42,394**	**2,587**	**21,275**	**12,800**	

Note: The reported acreages under current conditions are only from grants and farm plans completed through the AEM program, and therefore underestimates the actual total number of acres in cover crops.
**** HUC12 subwatersheds where crop acreage has been lost in the subwatershed since the 9E Plan was developed.***

In the 9E Plan, HUC12 subwatersheds were prioritized based on their relative phosphorus export levels. The Owasco Lake and Dutch Hollow Brook HUC12 subwatersheds were designated as high-priority and have both exceeded their five-year goals for expanded cover crops implementation in the 9E Plan. The moderate-priority Headwaters-Owasco Inlet and the low-priority Mill Creek HUC12 subwatersheds have also achieved their five-year goals, while the moderate-priority Hemlock Creek - Owasco Inlet HUC12 subwatershed is the only one that has not.

AEM Expanded Nutrient Management Planning (NMP) Tier 3 or Equivalent

Expansion of nutrient management planning to farms regardless of size is projected to reduce nutrient export from the landscape to nearby waterways. The actual reduction of phosphorus loading will vary based on the site-specific configuration of farm fields and structures, soil types and infiltration capacity, herd sizes, existing manure handling practices, crop rotations, opportunities to capture and infiltrate runoff, and many other factors. SWAT modeling estimates that achieving the expanded Nutrient Management Planning (NMP) 10-year goals would result in a 27% reduction in current phosphorus loading within the Owasco Lake Watershed. A reduction of 30% in external phosphorus load is the target selected to guide long term efforts in managing the lake and watershed in the Owasco Lake 9E Plan.

An Agricultural Environmental Management (AEM) Tier 3 NMP is a comprehensive plan developed to address specific environmental concerns and opportunities on a farm. It builds upon the information gathered and prioritized in Tier 1 and Tier 2 assessments, tailoring conservation practices to the farm's unique characteristics and goals in regards to nutrients. These may include strategies like optimizing fertilizer application rates, implementing cover cropping, or improving manure management practices.

Expanded Nutrient Management Planning (NMP) Tier 3 or Equivalent

HUC 12 Subwatershed	Land Area (Acres)				
	Total HUC 12 Subwatershed	**Previous Conditions**	**Current Conditions (2025)**	**9E Plan 10 Year Goal (2032)**	**9E Plan 10 Year Goal Met (2032)**
Dutch Hollow-Brook	18,825	6,025	11,379	9,000	Yes
Headwaters - Owasco Inlet*	24,305	2,628	12,519	4,000	Yes
Hemlock Creek - Owasco Inlet*	31,110	757	5,134	5,000	Yes
Mill Creek*	19,861	0	2,154	3,300	No
Owasco Lake	28,349	3,550	5,975	7,500	No
Sum For Watershed	**122,450**	**12,960**	**37,161**	**28,800**	

Note: The reported acreages under current conditions are only from grants and farm plans completed through the AEM program, and therefore underestimates the actual total number of acres under an NMP.
**** HUC12 subwatersheds where crop acreage has been lost in the subwatershed since the 9E Plan was developed.***

The high-priority Dutch Hollow Brook HUC12 subwatershed, along with the moderate-priority Hemlock Creek-Owasco Inlet and Headwaters-Owasco Inlet HUC12 subwatersheds, have achieved the ten-year goals outlined in the 9E Plan. The high-priority Owasco Lake HUC12 subwatershed and the low-priority Mill Creek HUC12 subwatershed are well on their way to meeting their goals.

Increased Participation in Tier 3 AEM Program or Equivalent (Facility and Grazing)

The Agricultural Environmental Management (AEM) Tier 3 Program focuses on developing comprehensive conservation plans customized to a farm's specific needs, addressing the environmental concerns identified in Tiers 1 and 2. This chart shows Tier 3 participation in facility and grazing plans. Facility plans address issues related to farm buildings, waste storage, and water runoff. Grazing plans optimize grazing practices to protect water quality, reduce erosion, and enhance forage production.

Increase Participation in Tier 3 AEM Program or Equivalent (Facility and Grazing)				
HUC12 Subwatershed	**Number of Plans**			
	Previous	**Current Conditions (2025)**	**9E Plan 10 Year Goal (2032)**	**9E Plan 10 Year Goal Met (2032)**
Dutch Hollow Brook	4	11	15	No
Headwaters - Owasco Inlet*	4	13	9	Yes
Hemlock Creek - Owasco Inlet*	11	16	22	No
Mill Creek*	6	13	23	No
Owasco Lake	7	17	28	No
Sum For Watershed	**32**	**70**	**97**	

Note: The reported number of plans under current conditions are only from grants and farm plans completed through the AEM program, and therefore underestimates the actual total number of facility/grazing plans on farms.
**** HUC12 subwatersheds where crop acreage has been lost in the subwatershed since the 9E Plan was developed.***

The moderate-priority Headwaters - Owasco Inlet HUC12 subwatershed has already achieved its ten-year goal for facility and grazing plans outlined in the 9E Plan. Work is ongoing in the remaining HUC12 subwatersheds to meet their ten-year goals.

Install Soil Erosion Control Systems

Soil erosion control systems help prevent soil degradation and improve soil health by employing various conservation practices to reduce sediment and nutrient loss. Reducing sediment and nutrient loss from the landscape, reducing runoff velocities and encouraging water infiltration in agricultural fields through the use of best management practices is a high-priority recommended practice in the 9E Plan. Some structural examples include water and sediment control basins, sediment retention ponds, grassed waterways and diversions.

Install Soil Erosion Control Systems			
HUC12 Subwatershed	**Number of Systems**		
	9E Plan 5 Year Goal (2027)	**Current Conditions (2025)**	**9E Plan 5 Year Goal met (2027)**
Dutch Hollow Brook	Install 6 New Systems	2 New Systems Installed	No
Headwaters - Owasco Inlet *	Install 2 New Systems	1 New Systems Installed	No
Hemlock Creek - Owasco Inlet *	Install 3 New Systems	0 New Systems Installed	No
Mill Creek *	Install 4 New Systems	0 New Systems Installed	No
Owasco Lake	Install 2 New Systems	4 New Systems Installed	Yes
Sum For Watershed	**Goal of 17 Systems Installed**	**7 New Systems Installed**	

Note: The reported number of soil erosion systems under current conditions are only from grants and farm plans completed through the AEM program, and therefore underestimates the actual total number of soil erosion systems installed.
**** HUC12 subwatersheds where crop acreage has been lost in the subwatershed since the 9E Plan was developed.***

The Owasco Lake HUC12 subwatershed has exceeded its five-year goal for soil erosion systems outlined in the 9E Plan. The Headwaters-Owasco Inlet HUC12 subwatershed is halfway to meeting its goal, and the Dutch Hollow Brook HUC12 subwatershed now has one-third of the systems required to meet its target.

Agricultural Best Management Practices (BMPs)

Partnerships: Agricultural BMPs are implemented through partnerships between Cayuga County, Tompkins County and Onondaga County Soil and Water Conservation Districts (SWCDs), USDA Natural Resource Conservation Service, NYS Department of Agriculture and Markets, Cornell Cooperative Extension and farmers.

Great Lakes Sediment and Nutrient Reduction Program Grant: Two Water and Sediment Control Basins (WASCOBs) were installed in the Owasco Lake Watershed with funding from the Great Lakes Sediment and Nutrient Reduction Program. These WASCOBs were constructed across small drainageways to intercept runoff. The basins detain runoff and slowly release it while allowing sediment to settle. WASCOBs generally use an underground outlet to control the release and carry the runoff in a pipe to a receiving stream or ditch. Cayuga County SWCD partnered with the landowner to complete this project in the Fall of 2024. The "after" photos show the basins shortly after hydroseeding, before full vegetation has established.

Before

After

After

Agricultural Best Management Practices (BMPs)

Cover Crops in Tompkins County: Cover cropping was implemented on four farms within the Owasco Lake Watershed in Tompkins County from 2022-2025, covering a total of 936 acres. Varieties of winter wheat and cereal rye were planted to reduce erosion, improve soil structure, reduce nutrient runoff and improve soil health. These farmers are already seeing the benefits of planting cover crops, as these practices help retain valuable topsoil and nutrients for the following year's cropping systems.

Farm Improvements: A beef farm situated on hilly terrain in the Owasco Inlet Watershed in Tompkins County faced challenges moving cattle to pasture along a deteriorated laneway. The holding area just off the covered barnyard was also being impacted by large volumes of flowing surface water runoff. To address these concerns, the farm worked with the Tompkins County Soil and Water Conservation District (SWCD) to install an upgraded lane-way with water diversion controls. A concrete holding area was also installed to keep cattle-related nutrients from entering nearby surface and groundwater.

Tompkins County Grants Awarded: In September 2025, $2,469,440 was awarded from the Environmental Protection Fund (EPF) and the Clean Air and Green Jobs Bond Act of 2022 to the Tompkins County SWCD to work with two farms in the Owasco Lake Watershed.

$812,520 of EPF funding is targeted to capture and contain nutrient-rich silage leachate flows from bunk silos; implement practices to effectively manage silage leachate and reduce nutrient loading; and reuse collected silage leachate for irrigation on pasture fields and establish riparian forest buffers.

$1,656,920 of Bond Act funding will be used to construct a manure collection channel, pumping station, and transfer line to the farm's new manure storage facility; upgrade and relocate manure storage to consolidate waste management, reduce runoff and reduce greenhouse gas emissions and truck traffic associated with manure hauling.

Monitoring

A high-priority recommended practice in the 9E Plan is to develop and implement annual lake and tributary monitoring programs consistent with an approved Quality Assurance Project Plan (QAPP) with all laboratory analyses completed by a lab certified by the State's Environmental Laboratory Approval Program (ELAP). The main monitoring programs in 2023-2025 consisted of the Citizens Statewide Lake Assessment Program (CSLAP), the Owasco Watershed Lake Association (OWLA) Owasco Lake Tributary Monitoring Program and the Owasco Lake Buoy.

CSLAP: A primary metric to track successful implementation of the 9E Plan is the annual monitoring reports of Owasco Lake through the CSLAP to evaluate the trophic state indicator parameters and other ambient water quality standards related to aquatic habitat. CSLAP is a volunteer lake monitoring program operated by the NYS Department of Environmental Conservation (NYSDEC) and the NYS Federation of Lake Associations, Inc. OWLA volunteers conduct CSLAP sampling at one site in Owasco Lake. This program was partially funded by Finger Lakes-Lake Ontario Watershed Protection Alliance (FLLOWPA) grant funds from 2022-2024. The data from this program is available here: https://extapps.dec.ny.gov/data/IF/CSLAP/0706OWA0212/.

OWLA Owasco Lake Tributary Monitoring Program: This program is funded by Cayuga County using FLLOWPA grant funds and County resources. Volunteers from OWLA, with support from Owasco Lake Watershed Management Council (OLWMC) and Owasco Lake Watershed Inspection and Protection Division staff, conduct tributary sampling under an approved QAPP and deliver samples to Upstate Freshwater Institute Inc., which is an ELAP certified lab. The QAPP, Data Usability Report and data is available upon request from Michele Wunderlich at mwunderlich@cayugacounty.gov. Total phosphorus data from the 2023 and 2024 sampling programs was submitted to the NYSDEC as part of their 2025 data solicitation.

Owasco Lake Buoy: The Finger Lakes Institute at Hobart and William Smith Colleges deploys and operates a robotic water quality monitoring buoy on Owasco Lake under a short form QAPP. The data from the buoy as well as other water quality data from Owasco Lake is digitized for public access at https://flihws.shinyapps.io/Owasco2509/. The buoy is funded by Cayuga County and the data portal is funded by Cayuga County FLLOWPA grant funds.

Additional Monitoring and Research

A high-priority recommended practice in the 9E Plan was to continue partnerships on research, monitoring, management and outreach. The following are some of the research and monitoring partnerships in the Owasco Lake Watershed.

United States Geological Survey (USGS) Gage Station: Cayuga County uses their Finger Lakes-Lake Ontario Watershed Protection Alliance (FLLOWPA) grant funds for the operation and maintenance costs of the USGS gaging station on the Owasco Inlet below Aurora Street in Moravia. The Owasco Inlet is the major tributary to Owasco Lake. This gage underwent modernization in 2025 which included adding cameras. Data from this gage can be found at https://waterdata.usgs.gov/ny/nwis/uv?site_no=04235299.

Owasco Lake Watershed Inspection and Protection Division (OLWIPD): In 2025 Jesse Lloyd, Lead Watershed Inspector, operated a YSI sonde for real-time measurements of various water quality parameters. Data was collected at the same time and locations as the Owasco Watershed Lake Association (OWLA) Owasco Lake Tributary Sampling Program as able. These water samples were analyzed for temperature, conductivity, dissolved oxygen and turbidity. Data was also collected by the OLWIPD for inspection purposes as needed.

SUNY ESF Owasco Lake and Tributary Data Analysis and Research: A partnership was established in 2024 with SUNY-ESF Assistant Professors Dr. Jennifer Goff, Dr. Aaron Ninokawa and Dr. Christine Georgakakos. They analyzed data from the OWLA Owasco Lake Tributary Program and other certified sources, and presented their findings and trends at the December 17, 2024, meeting of the Owasco Lake Watershed Management Council. A video of that presentation is available at https://www.olwmc.org/news. In 2025, the team expanded their support for the OWLA Owasco Lake Tributary Monitoring Program by collecting and analyzing alkalinity samples and estimating instantaneous discharges at sampling locations. They also organized a one day sampling event on October 1, 2025 in which volunteers collected samples on the same day in the Central New York region, including within the Owasco Lake Watershed.

Global Aquatic Research (GAR): GAR received a grant from the Water Resources Institute to sample Owasco Lake foam in 2025 and perform specialized laboratory analysis for emerging lake contaminants, per- and polyfluoroalkyl substances (PFAS). They also operated the Finger Lakes Foam Reporting Tool in 2025.

NYS Department of Environmental Conservation (NYSDEC) Monitoring: The NYSDEC provides current and historical Owasco Lake and tributary monitoring data on their website at https://on.ny.gov/3WHi0Cj.

NYSDEC HABs Monitoring: The NYSDEC provides information and data on Harmful Algal Bloom on their website at https://dec.ny.gov/environmental-protection/water/water-quality/harmful-algal-blooms.

Harmful Algal Bloom

Soil and Water Assessment Tool (SWAT) Model

The recommendations in the 9E Plan were informed by a quantitative model known as the SWAT model, which simulates watershed processes and predicts the environmental impacts of land use changes and land management practices. The SWAT model characterizes the nature of the Owasco Lake Watershed and estimates sources and geographical areas that contribute phosphorus from the landscape. The SWAT model provides a quantitative framework for the Owasco Lake Watershed planning process and guides the prioritization of projects for implementation. The model created by Cornell University and utilized in the 9E Plan is based on observed data collected no later than 2018.

The lake and its watershed are not static and it is necessary to update the model and recalibrate to its current conditions. Therefore, a high-priority recommended practice in the 9E Plan is update the Owasco Lake Watershed's SWAT model with new data and information, including hydrologic data files. Cayuga County utilized their Finger Lakes-Lake Ontario Watershed Protection Alliance (FLLOWPA) grant funds in 2023 and 2024 to enhance and update the SWAT nutrient loading model. This work was conducted in accordance with NYS Department of Environmental Conservation Quality Assurance Project Plans (QAPPs). The updated models were used to simulate the implementation of best management practices (BMPs) and assess their potential in reducing sediment and nutrient loading and identify priority sub-basins for targeted implementation of BMPs.

First Owasco Lake Watershed SWAT Model Update Project: The SWAT model was updated with data through 2022. The BMPs simulated in this project were grassed waterways, grade stabilization structures, and streambank stabilization. The results of simulating BMPs using the updated SWAT model confirm the initial assumption that more widespread implementation of BMPS will result in reduced accumulation of sediment in Owasco Lake and its tributaries.

The Owasco Lake Watershed SWAT Model Update Project Report dated January 4, 2024 is available at https://www.cayugacounty.us/DocumentCenter/View/25652/Owasco-SWAT-Model-Update-Report.

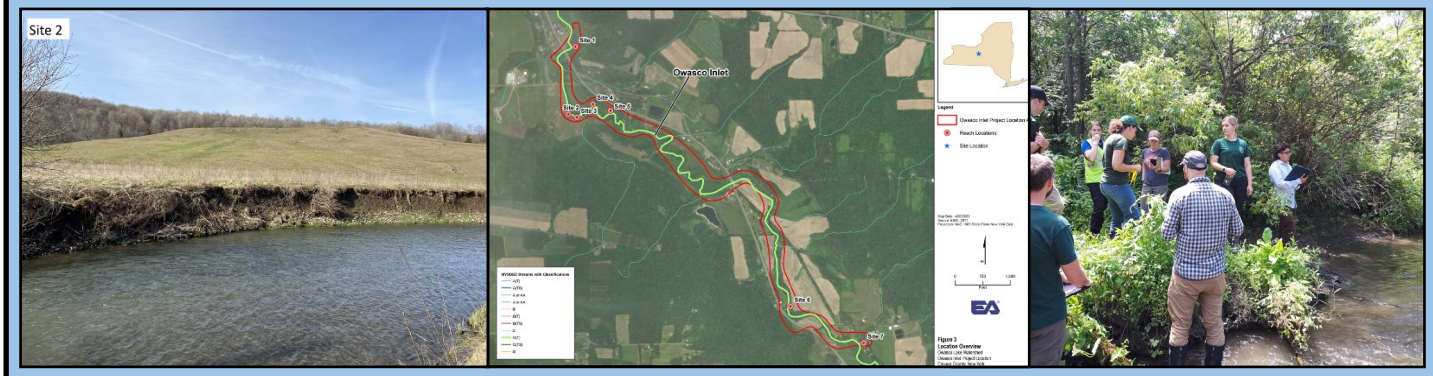
Second Owasco Lake Watershed SWAT Model Update Project: The previous model update was only allowed to use data from one approved stream discharge site. This update incorporated a newly approved method of estimating stream discharge at ungauged locations, thus allowing the use of multiple calibration sites. The BMPs simulated in this project were edge of field filter strips, sedimentation ponds and no-till farming.

The second Owasco Lake Watershed SWAT Model Update Project Report is available at https://www.cayugacounty.us/DocumentCenter/View/28694/Owasco-Lake-Watershed-SWAT-Model-Update-Project-Report-2025.

Streambank Stabilization

A high-priority recommended practice in the 9E Plan is to identify, prioritize and implement shoreline and streambank stabilization projects (including Owasco Lake shoreline).

Sustain Our Great Lakes (SOGL) program: The Owasco Lake Watershed Management Council was awarded $457,839.92 from the National Fish and Wildlife Foundation (NFWF) SOGL Grant Program in 2023 for the *Owasco Lake Watershed Critical Streams Restoration Project*. This project targets Owasco Inlet streambank restoration project sites between Booth Hill Road and Cat Path Road in the Town of Locke. Landowners who reside along the targeted reaches have expressed concern about severe streambank erosion in those areas.



NYS Non-Point Source Non-Agricultural Planning Grant: In 2023, the City of Auburn was awarded a $75,000 NYS Non-Point Source Non-Agricultural Planning grant to assess stream corridors including Sucker and Veness Brooks, as well as other small tributaries, within the prioritized Owasco Lake HUC12 subwatershed at the northern end of the lake.

Finger Lakes-Lake Ontario Watershed Protection Alliance (FLLOWPA): Cayuga County SWCD used Cayuga County's FLLOWPA grant funds for streambank stabilization. In 2024 they worked with a local contractor and the Indian Cove Association to stabilize 250 feet of an unnamed tributary to Owasco Lake by installing heavy stone fill along the bank to protect the banks from erosive forces and provide a reduction in stormwater velocities.

Unnamed Tributary before

Unnamed Tributary after

Road and Ditch Projects

Two high-priority recommended actions in the 9E Plan are stabilize and hydroseed road ditches; and work with county and municipal highway and public works departments and the Owasco Lake Watershed Inspection and Protection Division to identify, map and prioritize roadways, ditches, and culverts and implement remedial actions.

Owasco Watershed Lake Association (OWLA) Ditch Remediation Program: OWLA provides funds earmarked for ditch stabilization work in the Owasco Lake Watershed. This work can include hydroseeding ditches after they have been cleaned by highway departments, stabilizing ditches with riprap and constructing check dams to slow water velocity. Funding for the program comes from various sources, including local charitable foundations, private business contributions and individual donations. These funds are often used to provide the cost share required by grants.

Hydroseeding: Soil and Water Conservation Districts (SWCDs) work annually with local municipalities to hydroseed roadside ditches and construction sites. Hydroseeding is an effective tool to decrease erosion after roadside maintenance and construction projects. A seed/mulch mix accelerates the rate of germination by maintaining moisture around the seeds and helps prevent the establishment of invasive plant species. For example, Tompkins County SWCD hydroseeded 0.90 miles in the Owasco Inlet HUC12 subwatershed in the Town of Groton in 2022 and 1.96 miles in 2024.

Hydroseeding

Stream Crossing Assessments: Cayuga County SWCD used grant funds from the NYS Department of Environmental Conservation's Water Quality Improvement Project (WQIP) program to finish inputting stream crossing assessments in the Owasco Lake Watershed in Cayuga County into the North Atlantic Aquatic Connectivity Collaborative (NAACC) compliant database in 2022. Some of culverts in Tompkins County in the watershed have also been assessed, but not all of them. The NAACC provides protocols for assessing road-stream crossings (culverts and bridges), scoring them for fish and wildlife passability, culvert condition, and other factors useful for evaluating risk of failure.

Finger Lakes-Lake Ontario Watershed Protection Alliance (FLLOWPA): Cayuga County FLLOWPA grant funds were utilized in 2024 by the Cayuga County SWCD to stabilize over four miles of road ditches utilizing a hydroseeder with conservation seed mix and wood fiber mulch to reestablish vegetation after ditch cleanouts. The SWCD also utilized FLLOWPA funds to stabilize 90 feet of highly erodible road ditch along Indian Cove in the Town of Moravia using medium stone fill, and to stabilize 250 feet of an unnamed tributary to Owasco Lake. This project helps protect the banks from erosive forces and provides a reduction in stormwater velocities.

Before

After

Road and Ditch Projects

Owasco Lake Firelane Drainage Improvement Project: The Cayuga County Soil and Water Conservation District (SWCD) received a $600,000 grant in 2021 through the NYS Department of Environmental Conservation's Water Quality Improvement Project (WQIP) program to survey firelanes and private roads around Owasco Lake and install stormwater and erosion control practices where needed. Cayuga County SWCD staff assessed over 60 firelanes and ranked them as having the worst to best conditions. The top ten "worst" firelanes, along with their points of contact, worked with the Cayuga County SWCD to develop workplans for implementation in 2024.

In 2024, Cayuga County SWCD staff completed the stabilization of 80 feet of road ditch on Firelane 18E in the Town of Niles, including the installation of hard armoring and a culvert replacement.

Cayuga County SWCD staff also completed stabilization work on Firelane 19W in the Town of Scipio in 2024. This included the replacement of five cross culverts to improve the drainage system that was undersized. The project provided stable outlet controls utilizing angular limestone. Over 800 feet of road side ditches were improved by installing gabion rock along steep sections of ditches and hydroseeding areas that were flatter to help keep the soil on the land and reduce runoff velocities.

Firelane 19W before

Firelane 19W after

Firelane 19W after

Cayuga County SWCD staff also completed a road ditch stabilization along Firelane 20E in the Town of Niles.

Firelane 20E before

Firelane 20E after

Cayuga SWCD staff completed a drainage project on Firelane 21E in the Town of Niles. The project included the rock lining of 700 feet of roadside ditch, extending a culvert to allow safer travel along with better outlet protection and the re-routing of a ditch to improve drainage.

Road and Ditch Projects

Ensenore Road Ditch Stabilization Project: Cayuga County Soil and Water Conservation District (SWCD) worked with the Town of Scipio to install over 1,200 feet of rock-lined ditch stabilization to protect Owasco Lake from sedimentation and nutrient inputs. The project was funded through a NYS Department of Environmental Conservation Water Quality Improvement Project (WQIP) program grant, with in-kind services provided by the Town of Scipio Highway Department and an additional 25% of funding contributed by the Owasco Watershed Lake Association (OWLA) Ditch Remediation Program.

Before

After

Additional Road and Ditch Work conducted by Cayuga County SWCD:

- Assisted the Cayuga County Highway Department in stabilizing Tollgate Hill Road in the Town of Locke in December 2022.
- Assisted the Town of Scipio with the stabilization of over 1,600 feet of eroding road ditch in the Owasco Lake Watershed in 2023.
- Completed 800 feet of road ditch stabilization on Richardson Road in the Town of Niles, to reduce erosion and sediment movement in the Dutch Hollow Brook HUC12 subwatershed in 2024.
- Completed the cleanout of 100 feet of ditch, including a small basin, in the Town of Moravia in 2024 to facilitate the movement and increase the retention time of stormwater runoff.
- Completed the installation of a new culvert with outlet protection on a property along Dresserville Creek in the Town of Sempronius in 2025.
- Assisted the Town of Niles in stabilizing 600 feet of road ditch on Cream Hollow Road in response to a significant rain event that hit the area in 2025.
- Assisted the Town of Moravia with cleaning out a sediment basin, removing sediment deposits from a road surface and repairing culverts damaged by a significant rain event in 2025.

Invasive Species Management

Aquatic Vegetation Harvesting: Finger Lakes-Lake Ontario Watershed Protection Alliance (FLLOWPA) grant funds and County funds were utilized for the Cayuga County Soil and Water Conservation District (SWCD) to use their equipment and staff to harvest aquatic vegetation in Owasco Lake. The Cayuga County SWCD was able to remove 378 cubic yards of material from the waterbody in 2023 and 165 cubic yards in 2024. It is estimated that approximately 1,482 pounds of nitrogen, 126 pounds of phosphorous and 787 pounds of potassium were removed from the waterbody in the process.

CD3 Boat Cleaning Station: A waterless CD3 boat cleaning station is located in Emerson Park near the boat launch. Cayuga County and FLLOWPA provide the funds needed for the operations and maintenance of this station. Flyers have been created to encourage use by boaters as recommended in the 9E Plan.

Finger Lakes Institute/Finger Lakes Partnership for Regional Invasive Species Management (FLI/FL-PRISM): The FLI/FL-PRISM provides a boat launch steward at the Emerson Park Boat launch. Their staff also surveyed Owasco Lake for priority species such as hydrilla and other aquatic invasive species in 2023, 2024 and 2025.

Hemlock Woolly Adelgid (HWA): A high-priority recommended practice in the 9E Plan is continued surveillance and treatment for HWA, a tiny aphid-like insect that attacks North American hemlocks. In October 2021, the Owasco Watershed Lake Association (OWLA) received a $138,750 grant from the Great Lakes Restoration Initiative Forestry Restoration Program for the *Owasco Lake Watershed 2022-2023 Hemlock Woolly Adelgid Suppression Project*. OWLA treated over 10,000 HWA-infested hemlock trees during 2022 and 2023. Surveys conducted in 2025 shows that treatment is promising. However, these watershed critical hemlocks will require re-treatment starting in 2026. This treatment cycle will need to continue every three to five years until adelgid predator insects become widely established in the infected hemlock groves. Additionally, the New York State Hemlock Initiative has released biocontrol insects that prey on HWA in Cayuga County.

"Clean, Drain, Dry" Billboard: The Owasco Lake Watershed Management Council's aquatic invasive species "Clean, Drain, Dry" billboard was placed at the Emerson Park boat launch during the boating seasons in 2023, 2024 and 2025.

Watershed Protection and Preservation

Two highly recommended practices in the 9E Plan are identify priority areas and continue to use easements, acquisition, and other conservation tools; and encourage land conservation efforts for both forested “upslope” areas (headwaters) including gullies, as well as natural floodplains and wetlands to enhance storage and filtration of high flows.

Fillmore Nature Preserve: The Nature Conservancy (TNC) transferred the Fillmore Nature Preserve property in the Town of Sempronius to the Owasco Lake Watershed Management Council (OLWMC) in 2023. TNC ranked the 161-acre property as one of the 10 most impactful parcels in the Owasco Lake Watershed with the greatest effect on water quality if left in their natural states. The land includes diverse forests and approximately 40 acres of freshwater wetlands. The preserve includes trails, an educational kiosk, boot brush station and a perennial pollinator wildflower garden.

Fillmore Glen State Park: TNC donated a 203-acre property to Fillmore Glen State Park in Moravia in 2024. Ranking at the very top of the TNC’s prioritization process, the property consists of vacant woodland and approximately 50 acres of freshwater forested/shrub wetlands with two seasonal streams. Both streams flow north into Dry Creek within Fillmore Glen State Park, where they feed the park’s natural swimming pool, then flow into the Owasco Inlet.

Venice Nature Preserve: TNC protected 72 acres of forested wetlands in Venice in 2024. It was transferred to the OLWMC in 2025. The newly protected land is home to a diverse forest of hemlocks, white pines, birch and beech trees. It includes several streams and provides habitat for many species including grouse, coyote, and deer. Extensive wetlands on the property also function as a natural filter, cleaning the runoff from neighboring properties before the water ultimately reaches Owasco Lake. TNC ranked the property within the top 20 parcels in the watershed for its ability to preserve water quality.

Watershed Protection and Preservation

Parmley Property: In 2020, 92 acres of former farmland in the Owasco Flats was donated to The Nature Conservancy (TNC) from the Dale C. Parmley Trust. This property features 5,000 feet of Owasco Inlet shoreline. In 2023, TNC, Owasco Watershed Lake Association (OWLA), and Owasco Lake Watershed Management Council (OLWMC) teamed up to plant 2,000 trees on the riparian and upland portions of the site. The property has since been donated to NYS Department of Environmental Conservation (NYSDEC) as part of the Owasco Flats Wildlife Management Area.

Drone image of planting on Parmley property. Photo credit Mat Levine.

TNC staff and Ken Kudla.

Venice Property: TNC permanently protected several intermittent streams on a Venice agricultural property by purchasing a conservation easement on 95 acres of the property, which includes meadows and diverse native forest.

Locke Property: TNC is under contract to purchase one final property in the Town of Locke, which will protect 99 acres of forest, headwater streams, and farmland. The former hayfields on the property may be a site for monitoring future reforestation or natural forest regeneration.

Post Property: The Finger Lakes Land Trust (FLLT) accepted a donation of a conservation easement on 160 acres of farmland in the Town of Scipio from the Post family in 2023. The conservation easement ensures the farm is not developed and will also protect Owasco Lake's water quality. It is predominantly a mix of agricultural fields, and a stream winds its way along the southern and eastern borders of the property and flows into the lake 4,000 feet downstream. The easement also expands vegetated buffers along the stream which will reduce runoff to the lake. In the fall of 2023, FLLT staff and volunteers planted nearly 400 trees and shrubs along 5,000 feet of a tributary that flows into Owasco Lake. Funds for the project came from a grant from NYS Environmental Protection Fund and the NYS Conservation Partnership Program, as administered by the Land Trust Alliance.

FLLT Water Quality Improvement Project (WQIP) Program Grant: The FLLT was awarded a $1,240,000 NYSDEC WQIP grant in 2024. FLLT is working with landowners and partners in the Owasco Lake Watershed to permanently protect approximately 500 acres through direct acquisition and the use of perpetual conservation easements. The program focuses on conservation and stewardship efforts to protect Owasco Lake, a drinking water source.

Ducks Unlimited Inc. WQIP Program Grant: In 2024, Ducks Unlimited Inc. was awarded a $252,436 NYSDEC WQIP grant to restore a wetland in the Owasco Flats Wildlife Management Area near the Town of Moravia. The project will provide habitat for migratory birds and other wildlife, help mitigate flood impacts downstream and improve water quality.

Septic System Programs

A high-priority recommended practice in the 9E Plan is for municipalities and homeowners to invest in wastewater collection and treatment infrastructure. Another high-priority recommended practice is to encourage residents to utilize the NYS septic system replacement program.

Cayuga County Septic System Inspection Program: The majority of residences and commercial properties within the Owasco Lake Watershed rely on individual onsite wastewater disposal systems (septic systems) to dispose of wastewater. In recognition of the potential environmental impact of this common practice, the Cayuga County Sanitary Code was revised in 1994 to require periodic routine inspections of septic systems. Pump-out and inspections are also required when properties are transferred. The inspection schedule varies based on the property's proximity to the lake.

Location within Owasco Lake Watershed	Inspection Cycle
Adjacent to Owasco Lake shoreline	Every 2 years
Within 500 ft. of Owasco Lake shoreline	Every 3 years
Greater than 500 ft. from Owasco Lake shoreline (Towns of Owasco, Niles, Moravia, Scipio & Fleming)	Every 5 years
Greater than 500 ft. from Owasco Lake shoreline (other watershed towns in Cayuga County)	Every 7 years

NYS Septic System Replacement Program: The Cayuga County Health Department encouraged residents to utilize the NYS Septic System Replacement Program. This program has been created to assist property owners who choose to pursue septic system replacements and upgrades by granting up to 50% or up to $10,000 of the eligible costs per project.

Year	# of failures fixed in the watershed	# of grant projects completed	# of routine inspections completed in the watershed
2022	4	9	620
2023	3	24	0
2024	10	18	719

Water and Wastewater Infrastructure

Village of Moravia Wastewater Treatment Plant (WWTP): A high-priority recommended practice in the 9E Plan is for municipalities and homeowners to invest in wastewater collection and treatment infrastructure. In 2025, construction began on a major upgrade to the Village of Moravia WWTP that discharges directly into the Owasco Inlet. The Village of Moravia bonded for $25.5 million for this project which is expected to be completed in November 2026. Funds are coming from the Village of Moravia ($5.8 million), NYS Department of Corrections and Community Supervision ($14.2 million), and $5.3 million in grants through the Federal Workforce Innovation and Opportunity Act, the Development Innovation Lab and the NYS Department of Environmental Conservation's (NYSDEC) Water Quality Improvement Project (WQIP) Program. The project includes replacing the facility's outfall structure, adding a new grit removal system, installing aerobic sludge digesters, expanding the existing aeration process, replacing the influent pump station and replacing the ultraviolet disinfection system. These improvements will reduce nutrient loading into the Owasco Inlet.

City of Auburn Drinking Water Source Protection Plan (DWSP2): A low-priority recommended practice in the 9E Plan is support recommended actions from the 2022 City of Auburn DWSP2. The DWSP2 draft plan is currently under review by the NYS Department of Health and NYSDEC.

Cyanotoxins: A medium-priority recommendation in the 9E Plan is continue efforts to detect and respond to cyanotoxins. Harmful algal blooms (HABs), also known as cyanobacteria, are of concern as they can produce toxins known as cyanotoxins that could pose a health risk to people and animals when they are exposed to them in large enough quantities. The City of Auburn and Town of Owasco treat their drinking water to remove cyanotoxins and test for microcystin (a cyanotoxin) during the HABs season. Results from this testing are placed on the Health Department website at https://www.cayugacounty.us/742/Harmful-Algal-Blooms. The Owasco Watershed Lake Association has a HABs Surveillance Program where their volunteers walk the shoreline looking for HABs. If found, they submit photos and other information to the NYSDEC HABs Notification Page.

HAB in Owasco Lake at Emerson Park

Green Infrastructure

A medium-priority recommended practice in the 9E Plan is expand use and funding of green infrastructure on private and public lands. Green infrastructure is an interconnected network of natural and engineered elements, such as parks, wetlands, rain gardens, green roofs, and permeable pavements, designed to mimic natural processes and deliver multiple environmental, social, and economic benefits. These systems can help manage stormwater, improve air and water quality, provide habitat for wildlife, reduce urban heat, offer recreational opportunities, and enhance community well-being.

Green Infrastructure Projects at Emerson Park: In 2024, the Cayuga County Soil and Water Conservation District (SWCD) worked with Cayuga County Parks and Trails to install 4,800 square feet of permeable parking at the Agricultural Museum with some funding coming from the Friends of the Agricultural Museum. This allows for stable parking areas at the Agricultural Museum while promoting infiltration of stormwater.

Before

During

After

The Owasco Watershed Lake Association (OWLA), Owasco Lake Watershed Management Council (OLWMC) and Cayuga County Parks and Trails installed a rain garden in Emerson Park in 2021. This rain garden was expanded and improved in 2023 and 2024 as part of the Lake Friendly Living Awareness Month Program.

In 2024, Cayuga County Parks and Trails restored lawn at Emerson Park as well as established and expanded the buffer zones around the channel that goes around Deauville Island.

Other Rain and Pollinator Garden Projects: The OLWMC and OWLA participated in the Lake Friendly Living public event "Owasco Lake: Fillmore Nature Preserve Pollinator Wildflower Garden" in 2024. They covered approximately 480 feet of the preserve's public access lot perimeter with 12 cubic yards of compost and then seeded it with wildflowers.

OWLA also joined the Friends of Fillmore Glen State Park, other community volunteers and park staff to establish a new native plant garden in Fillmore Glen State Park. This event was part of the 2024 "I Love My Park Day."

Education and Outreach

"Residential Guidelines to Protect Water Quality in Cayuga County": A high priority recommended practice in the 9E Plan is promoting the adoption and implementation of "Residential Guidelines to Protect Water Quality in Cayuga County." The Owasco Lake Watershed Management Council (OLWMC) distributed copies to its directors to make it available on their websites. This document is available on the OLWMC, Cayuga County Water Quality Management Agency, and Town of Genoa websites.

Lake Friendly Living: A medium-priority recommended practice is to continue to participate in the Lake Friendly Living Program. The OLWMC website has information on the program and how to join. Lake Friendly Living signs are provided to those who sign the Lake Friendly Living pledge.

The OLWMC, Owasco Watershed Lake Association (OWLA) and Cayuga County Parks and Trails held the program "Emerson Park Rain Garden Expansion Project" in May 2023 as part of the Lake Friendly Living May Awareness Month. In 2024, the OLWMC and OWLA hosted the Lake Friendly Living public event "Owasco Lake: Fillmore Nature Preserve Pollinator Wildflower Garden." In 2025, "Lake Friendly Living Awareness Day" was held at Emerson Park where volunteers and members of the public helped grow a rain garden, experienced a water monitoring demonstration and observed the taking of a water sample.

Youth Education: Owasco Lake Watershed Inspection and Protection Division (OLWIPD) and Cayuga County Planning Department staff hosted an invasive species station at Conservation Field Days at Emerson Park in 2024 and 2025. In 2024, Union Springs Middle School students wrote essays about invasive species and their impacts after attending this station. In May 2025, OLWMC staff partnered with the Cayuga County Planning Department staff to host Moravia High School students for "Moravia Gives Back Day," during which students learned about terrestrial invasive species and assisted with trail maintenance activities and invasive species removal at the Fillmore Nature Preserve.

Tributary Signage: The Tributary Adoption and Identification Pilot Project (TAIPP) "pilot" project involved the installation of tributary signage in the watershed. The purpose of this collaborative project is to increase public awareness of watershed watercourses and provide easily accessible contact information for members of the public to engage with the OLWIPD to communicate watershed concerns. Over the course of 2024, with the help of municipal and project partners, the TAIPP and associated signage expanded.

Newspaper Articles: The OLWMC staff have published multiple articles in the Auburn newspaper, *The Citizen*. In 2025, these articles included "Fighting road salt pollution in the Finger Lakes;" "Protecting Owasco Lake through construction site stabilization;" "Reflections on managing the Owasco Lake Watershed;" "Being Owasco Lake Watershed Friendly during the winter;" and "Three invasive species in the Finger Lakes and how you can help stop them."

Education, Outreach and Recognition

Shop Meetings: Every winter, Cornell Cooperative Extension (CCE) of Cayuga County hosts a series of free educational workshops called “Shop Meetings.” The topics of these meetings range from agricultural transportation rules to emerging weeds and their control. A shop meeting that should be highlighted is the one on “Using Soil and Manure Analyses to Create Fertilizer Plans.” During this meeting, participants learned the proper way to collect a manure sample and where to submit it. Pairing manure and soil analyses, participants went through an exercise calculating how much manure needs to be applied without exceeding phosphorus requirements. Different methods of manure incorporation and their impacts on nutrient availability were discussed.

2024 North American Manure Expo: This Expo was a two-day event (July 17, 2025 and July 18, 2025) in Auburn, NY, attended by over 1200 people. This was the first time the event was hosted in New York. CCE of Cayuga County led the on-site education planning committee. The on-site education portion of the expo included four tents (Safety, Climate & Greenhouse Gas Mitigation, Agronomy & Soil Health, and Water Quality) with four thirty-minute presentations in each. Presentations were given by experts from around the United States on topics that are pertinent to agriculture in the Northeast. All presentations were well attended, with participants engaging in questions with the presenters.

Farmer Recognition: OLWMC staff are working with a Cornell University graduate student and Senior Media Relations Specialist on a farmer recognition initiative, which will act as their capstone. Sunnyside Farms hosted a farm tour of their facilities on October 22, 2025 as part of this work.

Cayuga County AEM Farm Awards: Two farms in Cayuga County in the Owasco Lake Watershed were honored for their commitment to environmentally friendly agriculture by Cayuga County Soil and Water Conservation District at the 2025 AEM Farm Awards held in August 2025. One of the recipients was Sierzenga Farms, which grows a variety of cash crops and has been a consistent participant in the Cayuga County AEM Program, actively implementing BMPs such as cover cropping and soil health systems since the mid-1990’s. The other was Finger Lake Nut Farm, which spans about 15 acres and features a variety of trees, including 1,200 chestnut trees, 600 hazelnut bushes, and several heartnut trees, all planted within a fenced enclosure. Building on the success of its initial small planting, the farm has expanded its chestnut production while adopting best management practices such as planting cover crops to prevent erosion, improve water infiltration, and enhance carbon sequestration.