

Conesus Lake Annual Report Card



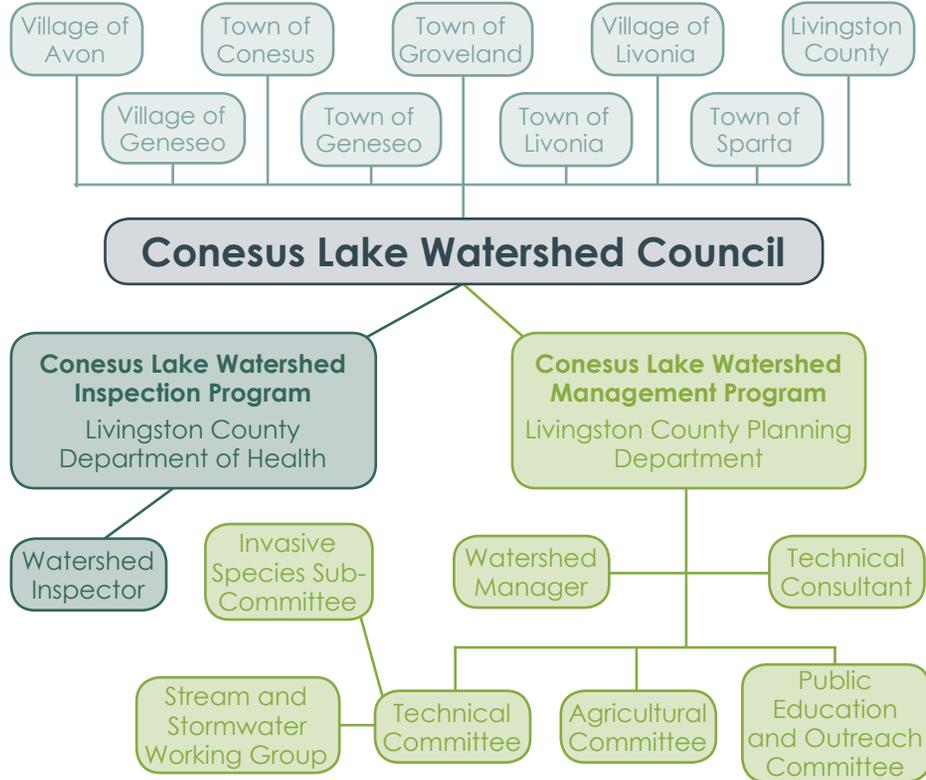
Conesus Lake Watershed Council

2017



About the Conesus Lake Watershed Council

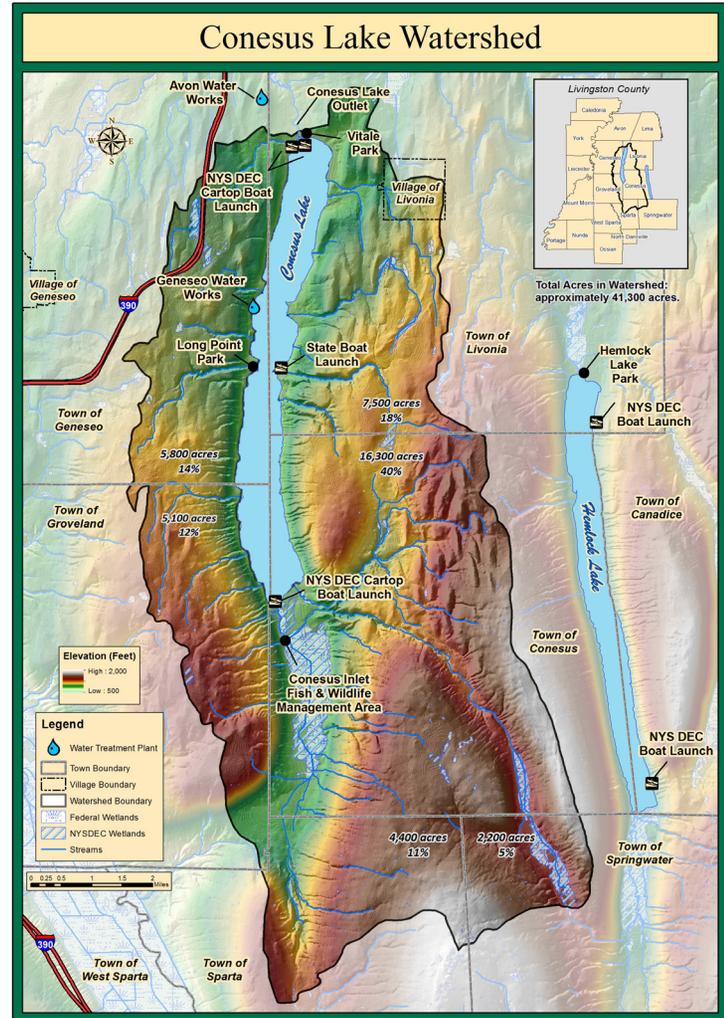
The Conesus Lake Watershed Council is an inter-municipal organization established in 2003 to govern the implementation of the Conesus Lake Watershed Management Plan. Council membership is composed of towns and villages with land within the watershed boundaries and water purveyors who use Conesus Lake as a public water supply. The Council oversees the Conesus Lake Watershed Management Program and the Conesus Lake Watershed Inspection Program. Important partners include, but are not limited to, the Conesus Lake Association, SUNY Brockport & Geneseo, Livingston County SWCD and WSA, CCE Livingston, Finger Lakes Institute, NRCS, and NYSDEC.



Conesus Lake Watershed Council governing structure

Purpose of this Document

Recommendation H-2 in the Conesus Lake Watershed Management Plan (2004) is to prepare an annual update summarizing the status of activities in the watershed, particularly the ongoing efforts to reduce nonpoint source pollution. The Annual Report Card provides a forum for tracking water quality conditions in Conesus Lake and highlighting implementation projects and new developments.



Summary of Major Accomplishments

Since its formation in 2003, the Conesus Lake Watershed Council has coordinated implementation of the recommendations of the Conesus Lake Watershed Management Plan. Restoring the health of the lake and its watershed requires a sustained effort across multiple partnerships and a focus on many deeply interconnected issues. Progress in implementation of the Conesus Lake Watershed Management Plan continued in 2017. Highlights include:

Water Quality Monitoring

- SUNY Geneseo investigated how water column mixing affects nutrient supply, phytoplankton abundance and species composition in Conesus Lake.
- In 2017, the Citizen Statewide Lake Assessment Program (CSLAP), a volunteer monitoring effort of lakes across the state, returned to Conesus Lake. The NYS Department of Environmental Conservation (NYSDEC) Finger Lakes Water Hub established at least two monitoring sites on all 11 Finger lakes.
- The 2017 CSLAP results are consistent with existing data on the lake, which have been gathered for years by professors and students from the SUNY Colleges at Geneseo and Brockport. Conesus Lake is a mesotrophic lake, meaning it exhibits moderate levels of productivity.
- Water quality conditions continue to support human uses for recreation and drinking water supply (after treatment),



CSLAP volunteers during training

and sustain a healthy aquatic ecosystem.

Invasive Species

- Continued implementation of the Conesus Lake Watershed Council's Invasive Species Prevention and Response Plan (adopted 2013). No new, high priority aquatic invasive species were discovered in 2017.
- Governor Cuomo's Initiative to Address Harmful Algal Blooms (HABs) was released in December 2017. The Conesus Lake HABs Steering Committee will be formed to begin working on the Initiative in early 2018.
- The Watercraft Steward Program inspected 8,439 boats and added additional coverage hours. The boat decontamination station was operational for its first full season in 2017.
- Mile-a-Minute is a highly invasive terrestrial plant. NYSDEC coordinated several eradication/vine pulling activities in 2017.



NYSDEC team at Mile-a-Minute pull.

Watershed Inspection Program

- The Watershed Inspector responded to 24 complaints, monitored 33 construction sites and issued 10 violations to help improve environmental protection.
- The Department of Health continued its public bathing beach program at Long Point Park, Camp Stella Maris, and Southern Shores Beach through 2017.

Harmful Algal Blooms

- Blooms were identified in July and September. Surfacing HABs were absent for the majority of the recreational season.

Education

- Groundbreaking for the new Town of Livonia Watershed Education Center (WEC) in Vitale Park occurred in 2017. A partnership was formed to develop a year-round series of public presentations on important topics for watershed residents and lake users.



First WEC Program, on FEMA floodplains was held.

Stream Restoration and Stormwater Management

- The Planning Department contracted with Barton and Loguidice to provide code review for watershed municipalities and develop a regulatory toolkit that addresses stormwater management needs. The toolkit is nearing completion.
- The Town of Livonia's grant for the Wilkins Creek Stormwater Management Feasibility Study was received, and the contract with NYS Department of State (DOS) was executed.
- Vitale Park Green Infrastructure & Shoreline Habitat Restoration Project was funded, and a search for consultants was initiated.



Lake looking south from Vitale Park

Agricultural Best Management Practices

- The Natural Resources Conservation Service supported the installation of cover crops on 620 acres of watershed farms.
- The Livingston County Soil and Water Conservation District installed 1,700 feet of underground outlet and 1,100 feet of earthen terraces to address sheet, rill, and gully erosion on nearly 50 acres of cropland in the Sand Point subwatershed.

Partnerships Protect Water Quality

Water Quality Monitoring

Researchers from SUNY Brockport, SUNY Geneseo, and NYSDEC regularly monitor Conesus Lake to assess long-term trends in water quality and trophic status, evaluate the food web and plankton community, survey the species diversity and relative abundance, and study other emerging issues.

2017 'State of the Lake' Snapshot

With the formation of the Finger Lakes Water Hub in 2017, NYSDEC was able to expand the Citizens Statewide Lake Assessment Program (CSLAP) across all 11 Finger Lakes. CSLAP is a cooperative program of NYSDEC and the NYS Federation of Lake Associations. Since 1985, CSLAP has enlisted and trained volunteers to monitor lake quality using standard methods and NYS-certified laboratories. These data are used to evaluate the status and trends in water quality and assess whether conditions support the designated uses—water supply, recreational use, and aquatic life support. The enhanced CSLAP program on the 11 Finger Lakes is slated to continue.

Conesus Lake (south basin) was included in CSLAP from 1986 through 1991. Subsequently, the lake's water quality and plant community have been monitored regularly by faculty and students associated with the SUNY Colleges at Brockport and Geneseo. This long-term data set illustrates the year-to-year changes in water quality and enables the Watershed Council and others to track the lake's status and trends.

The NYSDEC has established at least two monitoring stations on each Finger Lake. A second site on Conesus Lake has been added and is located in the deepest part of the north basin and will expand our collective understanding of lake dynamics and spatial variability. Currently, Conesus Lake has four extensively trained CSLAP volunteers from the CLA.

In addition to the CSLAP program, the CLA also provides water quality data with recently installed, custom designed and fabricated thermal sensor arrays and related communication systems that will provide real time, year round lake data.

Conesus Lake is classified as mesotrophic (moderately productive) based on the three classic Trophic State Indicator parameters (TP Total Phosphorus, Secchi disk transparency, and chlorophyll-a). The 2017 data are consistent with long-term average results (Table 1). Overall, water quality of the lake has been stable for decades. Year-to-year fluctuations are primarily reflective of changing weather patterns; wet years tend to have higher TP and chlorophyll-a concentrations than dry years. This pattern is typical across the Finger Lakes where nonpoint source runoff from the watershed is the major source of external loading. The timing of runoff events is also a key factor in summer conditions.

Data from the north station are summarized in Table 2. Similar to the deeper south station, the trophic state parameters are consistent with a mesotrophic lake. The similarity in water quality conditions at the two basins reflects the wind-induced mixing of the lake; despite differences in locations of tributary inflows, the upper waters are typically well mixed.



Students from SUNY Geneseo's Aquatic Ecology study water quality in Conesus Lake during the fall semester, 2017.

Table 1. 2017 CSLAP results, South Basin, compared to long-term average data

Trophic State Indicator	Oligotrophic	Mesotrophic	Eutrophic	Conesus - South Average (St. Dev.) 1972-2016	Conesus - South 2017
Summer average total phosphorus, TP (ug/L)	<10	10 - 35	35 - 100	22.4 (3.8)	20
Summer average chlorophyll-a (ug/L)	<2.5	2.5 - 8	8 - 25	6.3 (1.95)	6.3
Peak chlorophyll-a (ug/L)	<8	8 - 25	25 - 75	10 (3.3)	9
Summer average Secchi disk (meters)	>6	6 - 3	3 - 1.5	3.1 (0.9)	3.2
Minimum Secchi disk (meters)	>3	3 - 1.5	1.5 - 0.7	1.5 (0.2)	1.7
Minimum Dissolved Oxygen in lower waters (% saturation)	80 - 100	10 - 80	Less than 10	Less than 10	Less than 10

Table 2. 2017 CSLAP results, North Basin

Trophic State Indicator	Oligotrophic	Mesotrophic	Eutrophic	Conesus - North 2017
Summer average total phosphorus, TP (ug/L)	<10	10 - 35	35 - 100	20
Summer average chlorophyll-a (ug/L)	<2.5	2.5 - 8	8 - 25	5.4
Peak chlorophyll-a (ug/L)	<8	8 - 25	25 - 75	8.4
Summer average Secchi disk (meters)	>6	6 - 3	3 - 1.5	3.1
Minimum Secchi disk (meters)	>3	3 - 1.5	1.5 - 0.7	2.2
Minimum Dissolved Oxygen in lower waters (% saturation)	80 - 100	10 - 80	Less than 10	Less than 10

The nitrogen (N): phosphorus (P) ratio in the upper waters was also measured and reported as part of the 2017 CSLAP. The ratio and biological availability of these two key nutrients plays a role in the composition of the phytoplankton (algae and cyanobacteria) community. In general, higher ratios (above about 30) indicate phosphorus limitation of primary productivity and lower ratios indicate that the supply of nitrogen may be limiting. The N:P ratio varies seasonally, spatially, and with depth. When the supply of biologically available N is low, some species of cyanobacteria are able to utilize atmospheric N and thus enjoy a competitive advantage over other species in the assemblage. The 2017 CSLAP data indicate that both the north and south monitoring sites on Conesus Lake exhibit a relatively low N:P ratio (Figure 1), indicating that N supply may be an important factor affecting the phytoplankton community.

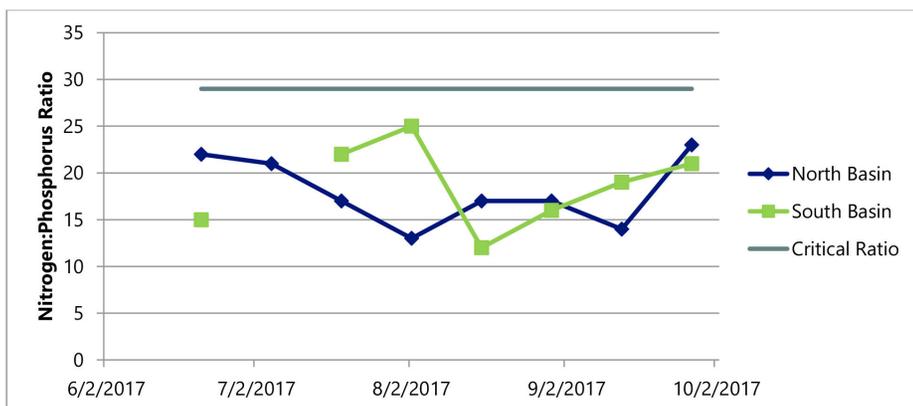


Figure 1. 2017 N:P ratio, Conesus Lake upper waters

Summary of Key Points:

- Conesus Lake continues to be classified as mesotrophic (moderately productive)
- Water quality conditions have remained stable for decades
- NYSDEC has expanded the Citizen Statewide Lake Assessment Program (CSLAP) to include annual

monitoring of at least two locations on all 11 Finger Lakes

- The nitrogen: phosphorus ratio of the lake's upper waters is relatively low. Nitrogen supply may affect the species mix of the phytoplankton community and increase the lake's susceptibility to cyanobacterial blooms.



Karl Hanafin of the CLA demonstrates the deployment of a temperature sensor array he designed and constructed. These sensors allow researchers to detect water column mixing that may trigger HABs in Conesus Lake.

Focus on Cyanobacteria

In 2017, Professor Isidro Bosch, SUNY Geneseo, led an investigation of how water column mixing waters affects nutrient supply, phytoplankton abundance and species composition in Conesus Lake. This special project focused on the relationship between nutrient supply and cyanobacteria. Previous studies have documented that phosphorus is released from Conesus Lake sediments during summer

stratification, when dissolved oxygen (DO) concentrations are depleted by decomposition of organic matter settling from the upper waters. Once DO is depleted, chemical changes occur at the sediment surface that release phosphorus to the overlying water.

While phosphorus accumulation in the deep waters is well-documented, the extent to which the deep layer mixes into the upper sun-lit waters and affects summer phytoplankton is an important question with implications for lake management. Dr. Bosch and his team installed thermistor arrays in the southern, central, and northern basins of the lake to record water temperature at 1-m depth intervals. These data are essential to understanding the lake's hydrodynamics. Nutrient and phytoplankton samples were collected to characterize the linkages among the physical, chemical, and biological conditions.

Conesus Lake is comprised of three distinct basins that differ in depth and volume. These physical parameters were used to calculate the Schmitt index of water column stability (that is, the amount of wind energy needed to mix the water column) in units of J/m^2 . The calculated Schmidt index of the south basin was nearly 7.5 times greater than that of the north basin and 4 times greater than in the central basin station by July.

The 2017 monitoring program documented several wind and rain events that affected water column stability and entrained (mixed) phosphorus-rich water into the sun-lit upper waters. The water quality impacts of these events are clear. The investigators documented contemporaneous increases in turbidity, chlorophyll-a concentration, and cyanobacterial counts following entrainment of water from below the thermocline into the photosynthetic zone. The 2017 water quality data measured as part of this investigation were comparable to those reported by CSLAP.

Another significant finding of the 2017 investigation was

a change in the dominant species of cyanobacteria from 2015 results. In 2015, the cyanobacterial assemblage was dominated by *Microcystis aeruginosa*, a species that can release the toxic microcystin; this species was not detected in abundance in 2017. In contrast, species of *Anabaena* were dominant in 2017. This genus can also produce the microcystin toxin and is capable of utilizing atmospheric nitrogen.

Summary of Key Points:

- The 2017 investigations document the interactions of internal mixing processes on the physical, chemical, and biological conditions of Conesus Lake.
- Internal (sediment) loading of phosphorus has the potential to reach the upper waters during summer and stimulate growth of algae and cyanobacteria.
- In 2015, *Microcystis aeruginosa* dominated the cyanobacterial assemblage. In 2017, the dominant genus was *Anabaena*, which is capable of utilizing atmospheric nitrogen which may have helped overcome the low ambient N concentrations in the lake.



Emily Reiter, Krista Rounds, Sebastian Bosch and Michael Roncone conduct FLOWPA funded research on Conesus Lake during summer 2017.

Invasive Species

Invasive species, by definition, are non-native, introduced species that cause harm to the environment, human health, and/or economy. Humans have dramatically increased the rate of spread of new species through international trade and travel. Invasives out compete and displace native species in their new environment. In the absence of natural predators, invasive species can grow relatively unchecked and disrupt the native ecosystem. In response to the discovery of highly invasive *Hydrilla verticillata* in nearby Cayuga Lake Inlet in 2011, the Conesus Lake Watershed Council established an Invasive Species Sub-Committee tasked with drafting and implementing the Invasive Species Prevention and Response Plan (2013). Implementation efforts continued in 2017.

Volunteer Monitoring

The Conesus Lake Association (CLA) provided education and outreach promoting lake friendly best practices to watershed residents and lake users. Reaching students, general public and landowners, the CLA offered aquatic and terrestrial/upland invasive species programming at schools, public events and extension sponsored programs. The CLA continues to act as a resource for ongoing identification of suspect watershed invasive species.

To aid in the detection and monitoring of aquatic invasive species, the CLA initiated training on and use of an autonomous/remotely operated underwater vehicle (AUV/ROV). Additionally, the CLA participated in the Finger Lakes PRISM Macrophyte Survey Pilot Program (PRISM - Partnership for Regional Invasive Species Management).

Partnerships Protect Water Quality

Hemlock Woolly Adelgid

Hemlock woolly adelgid (*Adelges tsugae*) was positively identified in the southwestern Conesus Lake watershed by the CCE Invasive Species Program. Hemlock woolly adelgid (HWA) is a small aphid-like insect originating from Asia that feeds on hemlock trees. The Eastern Hemlock (*Tsuga canadensis*) species found in the forests in New York State has not built up a natural resistance to this new invader. Hemlock woolly adelgid causes extensive tree decline and mortality within 4-10 years of initial infestation.



Hemlock Woolly Adelgid

Eastern Hemlock trees are found along creeks and in steep ravines in the southern portion of the Conesus Lake watershed. They serve an important role in stabilizing streambanks and preventing erosion. Their shade also cools stream water therefore moderating the temperature of the lake. Without this important species in the watershed, streambanks would erode sending sediment and nutrients into the lake. Water temperature would increase, fouling fish and wildlife habitat and increasing algae bloom frequency and duration and aquatic vegetation growth.



Hemlock Ravine

In 2017, Cornell University launched a biocontrol lab to rear HWA biocontrol *Laricobius* beetles, and a few locations within NYS now have identified *Laricobius* established populations. The Conesus Lake Invasive Species Subcommittee is looking into partnering with Cornell University to determine feasibility of releasing HWA biocontrol beetles once available in sufficient quantities.



Mile-a-minute vine

Mile-a-Minute Vine

Mile-a-minute vine (*Persicaria perfoliata*) was confirmed in the Conesus Lake watershed in the Town of Geneseo by the Finger Lakes PRISM in 2016. The invasive annual vine grows along hedgerows, roadsides, and other disturbed areas with ample sunlight. Mile-a-minute (MAM) vine smothers and often kills other vegetation. It can grow up to 6 inches a day forming dense mats. The occurrence in the Town of Geneseo is the first instance of Mile-a-minute vine north of the lower Hudson River Valley.



Hill covered in mile-a-minute vine

The Finger Lakes PRISM and NYSDEC have taken the lead on the coordinated

response, with support from Livingston County, Watershed Council, CLA and local partners. Extensive work included surveying 90 acres and holding five vine pulling events. Seeds from past years can survive in the soil for up to seven years, so further seed and plant harvesting will need to take place in following years. Additional surveying and landowner notification will take place during the 2018 growing season. Public education on MAM is anticipated at the Watershed Education Center in 2018.

Boat Wash Station

The Conesus Lake Association received a New York State Department of Environmental Conservation grant through State Senator Cathy Young's office for a boat wash decontamination station at the East Lake Road Boat Launch. CLA volunteers worked with NYSDEC to administer this grant and construct and install the wash station. The decontamination station was in operation for the full 2017 boating season.



Conesus Lake watercraft stewards at the Conesus Lake boat launch.

Watercraft Steward Program

The primary pathway by which hydrilla and other aquatic invasive species reach inland waterways is by “hitchhiking” on recreational boats and trailers or in the live wells of fishing boats. Hydrilla (*Hydrilla verticillata*) is an invasive aquatic plant that roots in the sediment and forms dense mats at the surface of the water that block sunlight to native plants below, crowd out native fish habitat, and impede swimming and boating.

Watercraft Steward Programs educate the community on the risk of spreading invasive species via recreational boating and assist boaters in performing inspections and invasive species decontamination. The Conesus Lake Watercraft Steward Program was continued in 2017 through an effective collaboration among the Livingston County Cornell

Cooperative Extension (CCE), SUNY Geneseo, the Conesus Lake Association (CLA), the Finger Lakes Institute, and the Livingston County Planning Department.

Livingston County CCE provided in-kind services to house and supervise three stewards whose salaries were funded by the CLA and NYSDEC grant funds.

In 2017, the Watercraft Stewards staffed the boat launch from Memorial Day through Labor Day. A total of 8,439 boats were inspected, and over 18,400 boaters were reached with information about invasive species prevention.

Livingston County CCE and the Livingston County Planning Department applied for and secured additional funding for the Watercraft Steward Program through the 2018 boating season. The NYSDEC Aquatic Invasive Species Spread Prevention grant will leverage in-kind staff and volunteer time and cash contribution from the CLA to provide \$64,025 for watercraft stewards. The grant will expand steward coverage and wooden invasive species disposal stations at nearby Hemlock and Canadice Lakes in partnership with NYSDEC Lands and Forests. Livingston County’s application was ranked first out of 24 applications and was funded in full.

Total traffic significantly increased at all three boat launches in 2017. Some of this increase may be due to boaters redirecting due to access issues from Lake Ontario to Conesus Lake. More likely the recorded increase in traffic is due to an increase in watercraft steward coverage. The New York State Parks parking ticket collection numbers at the East Lake Road Boat Launch also reflected this trend. Only 0.7% of risk launches (12 boats) were found to be transporting organisms as opposed to 10% in 2015. This more than ten fold reduction could partially be explained by increased

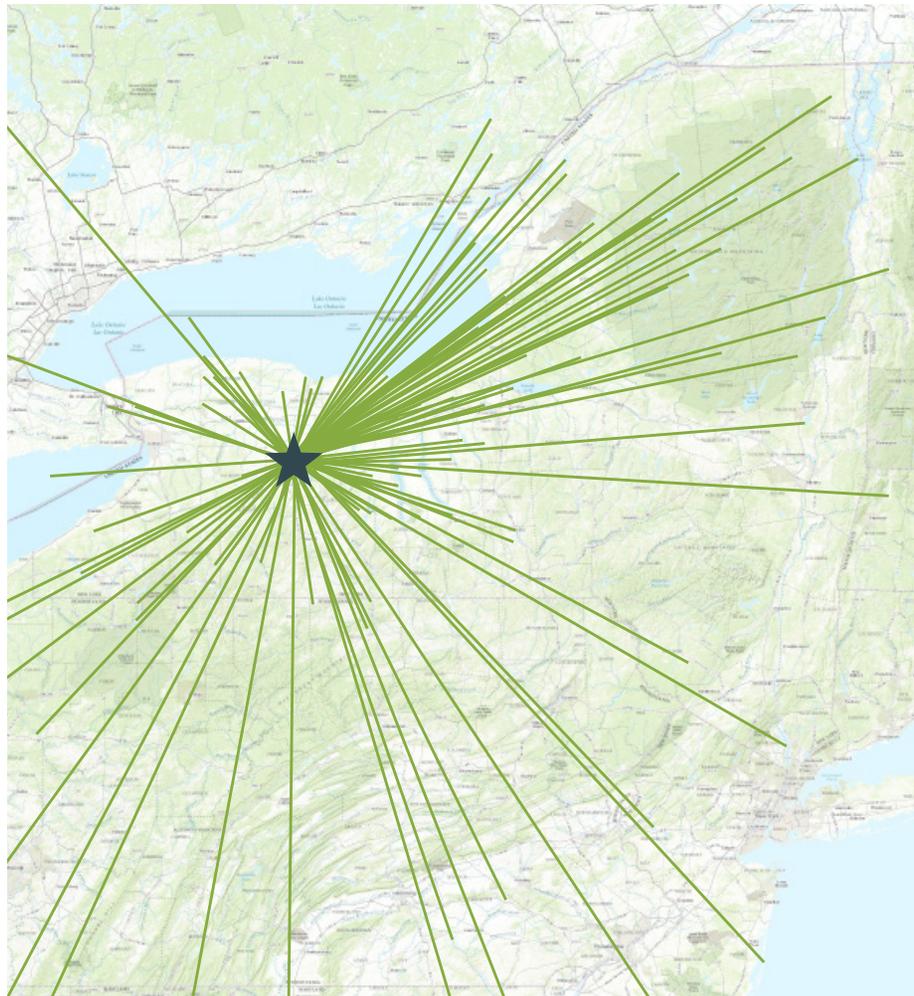
Watercraft Steward Program Data

	2015	2016	2017
Days at launch	83	93	123
Boats recorded	5131	4491	8439
Non risk boats (last launch Conesus)	3560	2176	6715
Risk boats (last launch other)	1671	1445	1724
% of boats non risk	67%	68%	80%
% of boats risk	33%	32%	21%
Boats found with organisms attached	121	13	12
Percent of total boats	2.4%	0.29%	0.14%
Percent of risk launches	10%	0.90%	0.70%
Prior contact with a Steward	89%	93%	96
Prevention steps taken prior to launch	21%	25%	90%
Total Steward hours	890	1172	1255

awareness of NYS regulations and clean boat best practices conveyed by the Conesus Lake stewards and other similar programs across the State.

By the end of 2017, 96% of boaters entering Conesus Lake launch had previously spoken with a watercraft steward, as opposed to 80% of boaters at the start of the 2015 season.

Last Waterbody Visited



Boats travel to Conesus Lake from across the continent, emphasizing the need for the Watercraft Steward Program. In 2017, boats came as far as Canada and the Gulf of Mexico.

Boaters taking prevention steps prior to launch continues to increase, reaching 96% in 2017.

Fish Stocking Program

The Conesus Lake Association and New York State Department of Environmental Conservation stock young walleye into the Lake each year to increase the walleye population that was decimated by the introduction of the invasive alewife. In turn, adult walleye prey on alewives which helps lower the alewife population. The NYSDEC stocked 22,750 walleye fingerlings and 32,500 smaller fingerlings in June. In September, NYSDEC stocked 9,500 10-inch tiger muskellunge. The CLA stocked 2,200 8 to 10-inch walleye fingerlings in late fall.



CLA stocking of walleye fingerlings in Conesus Lake

Watershed Inspection Program

The objective of the Conesus Lake Watershed Inspection Program is to help protect and enhance Conesus Lake as a potable water source. Conesus Lake is a valuable resource for Livingston County; protection of the water supply is important for health of the community. With the cooperation and contributions of the two purveyors of public water (Villages of Avon and Geneseo), the Village of Livonia, Livingston County, and five surrounding towns, the inspection program became a reality on August 31, 1998. The Livingston County Department of Health provides the Conesus Lake Watershed Inspector who responds to concerns regarding water quality and non-point sources of pollution in the watershed.

Watershed Inspections

The Conesus Lake Watershed Inspector responds to water quality complaints made by watershed residents and other members of the public. The Inspector also conducts routine watershed surveillance, monitoring construction sites, erosion, sewage overflows, harmful algal blooms, flooding, bathing beaches, and other activities including public education.

2017 Inspection Activities

Complaints	24
Construction Projects	33
Violations	10
New Septic Systems	6
Repaired Septic Systems	5
Sewage Overflows	0
Bacteriological Bathing Beach Water Samples	44
Beach Closures	0
Educational Events	3
Special Water Samples	0
Damaging Flooding Events	1

2017 Complaint Breakdown

Sediment and Erosion	14
Drainage	1
Sewage Discharge	3
Agricultural Related	2
Nuisance	3
Weeds/Algae/Odor	2
Petroleum & Chemical	2

Drinking Water

The New York State Department of Environmental Conservation classifies Conesus Lake as a Class AA waterbody, designating its best use as a public drinking water supply. One of the goals of both the Watershed Inspection and Management Programs is to ensure this best use. The Villages of Avon and Geneseo both use Conesus Lake as the source for their public water supply. Through these two purveyors, Conesus Lake water supplies 20,000 users and 10 water districts, including the Villages of Avon and Geneseo, and portions of the Towns of Avon, Geneseo, Leicester, and York.

Conesus Lake Drinking Water Facts and Figures

	Village of Avon	Village of Geneseo
NYSDEC Allocation	3.5 MGD	3 MGD
Plant Rating	1 MGD	2 MGD
2017 Annual Usage (gallons)	270,000,000	327,000,000

MGD: (million gallons per day)



Bathing Beach Monitoring

The Livingston County Department of Health (LCDOH) collects nearshore water samples at designated bathing beaches each summer and tests for the presence of fecal coliform bacteria. Fecal coliform bacteria are used as an indicator of recent contamination of water by fecal material. While the coliform bacteria may not be pathogenic (disease-causing), their presence means that other harmful microbes may be in the water. Three bathing beaches: Long Point Beach, Southern Shores Beach, and Camp Stella Maris were routinely monitored throughout the recreational season.

Results are compared to the state ambient water quality standards for bacteria, which are used by the New York State Department of Environmental Conservation (NYSDEC) to evaluate whether a waterbody supports its designated best uses and by the New York State Department of Health (NYSDOH) to evaluate suitability for swimming at designated beaches.

The NYSDEC ambient water quality standard for fecal coliform bacteria is 200 colony forming units per 100 mL of lake water (cfu/100 mL), calculated as the geometric mean of at least five samples per month. A single sample maximum count (1000 cfu/100 mL) is also enforced by the



Water Sampling

NYSDOH for public beaches. The current bathing beach monitoring program collects weekly samples during the summer recreational season.

The summer-averaged results for all beach locations ranged between non-detect (<5 cfu/100mL) and 120 cfu/100mL. There were 44 samples in total. No result exceeded the single sample limit of 1000 cfu/100 mL. The highest bacterial count at a designated bathing beach during the summer of 2017 was collected at Camp Stella Maris after a rain event. The Department of Health is able to report full compliance with fecal coliform bacteria standards at the three monitored bathing beaches.

Beach Closure Days

	2017			2016			2015			2014			2013		
	HAB	Bact.	Turb.												
Long Point	0	0	0	0	0	0	0	0	1	2	0	0	1	0	0
Stella Maris	0	0	0	3	0	0	0	0	0	8	0	0	1	0	0
Southern Shores	0	0	0	8	0	0	0	0	0	3	0	0	0	0	0

HAB: Harmful Algal Blooms Bact: Bacteria Turb: Turbidity

Harmful Algal Blooms

Harmful algal blooms, or HABs, are algal blooms that have the potential to cause illness or harm in humans and animals. Often HABs are composed of blue-green algae, also known as cyanobacteria. These harmful forms of algae are naturally present in very low concentrations in lakes and streams, but can form concentrated blooms or surface scums following certain key environmental and weather conditions that encourage algal growth. During the summer and fall the Watershed Inspector conducts routine surveillance for HABs and responds to reports of blooms from the Sheriff's Marine Patrol and citizens on the Lake.

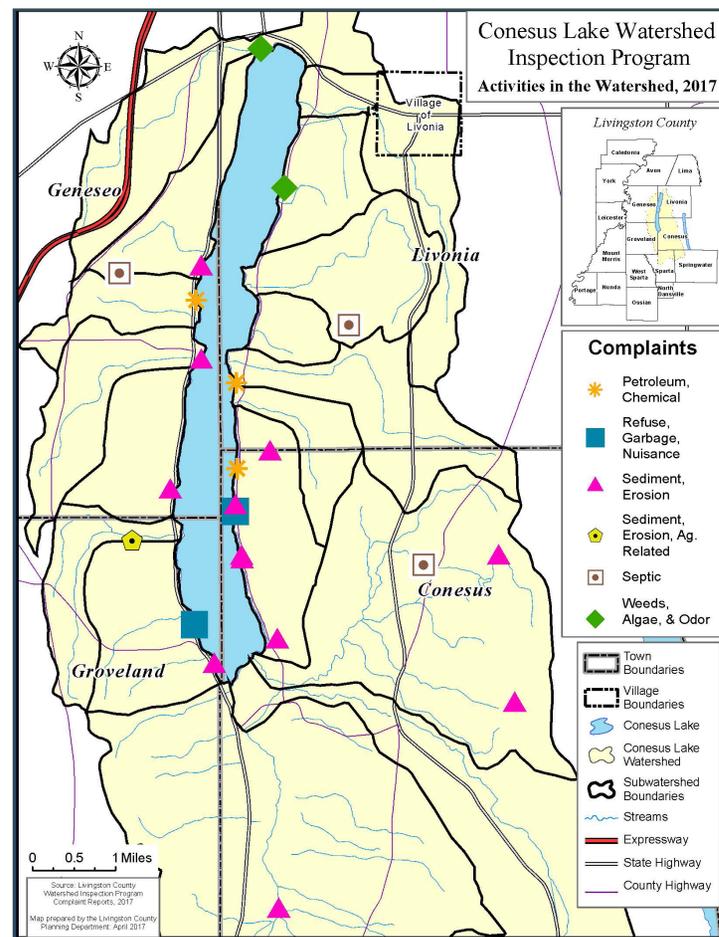
2017 Bloom Season

Similar to 2016, the 2017 Harmful Algal Bloom (HAB) season was again mild in comparison to previous years. The first HAB bloom in 2017 was reported on July 13th in areas on the North and North East shoreline including Vitale Park and the Grayshores Road area on the North West shoreline. The blooms were small localized blooms, and they dissipated quickly. Surfacing HABs were absent for the majority of the recreational season. On September 15th, a bloom was reported in various locations along the North and East shorelines.



Harmful Algal Bloom, Old Outlet

combat HABs by funding water quality improvement projects in 12 priority lakes in New York State. Conesus Lake was identified as one of the priority lakes. As part of the Initiative, the Governor directed the New York State Department of Environmental Conservation (NYSDEC) to identify and implement solutions. Each of the 12 priority lakes will have an Action Plan that will be tailored to reflect the best available science regarding the root causes of the HABs. The Action Plans are tentatively scheduled to be completed in spring of 2018. Funds to implement the recommended actions will be awarded by the State on a competitive basis after completion of the Plans. It is anticipated that a Conesus Lake HABs Initiative Implementation Planning Committee will be formed in early 2018 to assist NYSDEC with developing the Conesus Lake Action Plan.



Education

A NEW Education Center is coming to Vitale Park, in the Town of Livonia. The Town of Livonia has joined with many partners, including the Town of Conesus, Geneseo & Groveland, the Conesus Lake Association (CLA) and numerous community businesses and volunteers to bring this state-of-the-art facility to life. In preparation for the Watershed Education Center (WEC), the Town demolished the aging Vitale Park building in early January 2017. Construction commenced, and the Town anticipates the completion of the building in 2018. The new building will house the Sheriff Substation, Vitale Park Office, and the CLA office. In addition, a well-outfitted community room and science and research areas will be included.

The Education Center, one of a kind in this region, will serve as an educational hub providing information about watershed protection and best management practices. The Town is working with the CLA, Livingston County Planning Department, Livingston County Department of Health, Cornell Cooperative Extension of Livingston, and the Chip Holt Nature Center to develop and implement year-round programming. The Watershed Education Center education series was kicked off in December 2017 with a program on FEMA Floodplains.



First WEC program held in December 2017 in the Chip Holt Nature Center while the WEC was under construction.



Demolition of the existing Vitale Park building



Construction of the new WEC building



Construction of the new WEC building

Stream Restoration and Stormwater Management

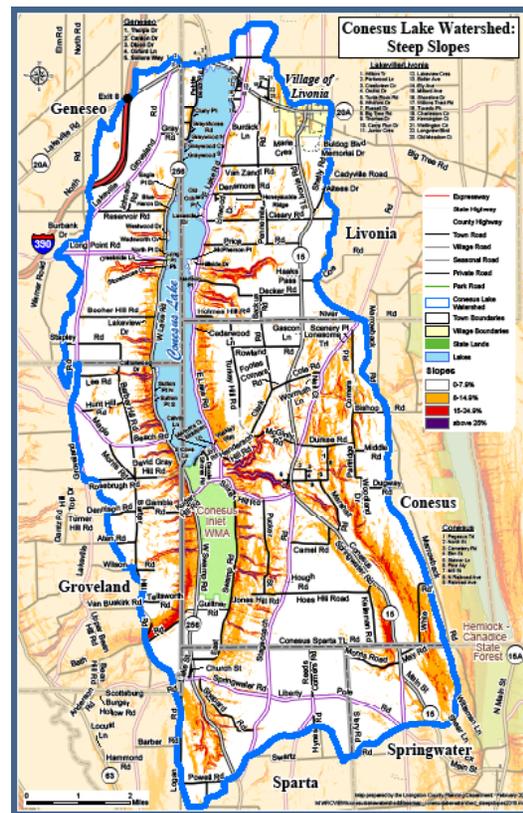
Climate Change predictions for the Finger Lakes Region forecast an increase in the frequency and intensity of heavy rain events and corresponding streambank erosion and localized flash flooding. In light of increased development pressures in the watershed compounding these issues, focus has rightly turned toward stream system restoration and stormwater management to help alleviate effects on water quality and public and private property.

Wilkins Creek Sub-Watershed Stormwater Study

The Town of Livonia received grant funding on behalf of the Town and Village of Livonia through New York State Department of State (NYS DOS) for a stormwater study for the Wilkins Creek sub-watershed. Wilkins Creek is the most developed sub-watershed leading into Conesus Lake. The study will examine and identify stormwater management practices for Wilkins Creek, and zoning and land use regulations will be analyzed to assess potential impact of development on the stormwater system. The study will offer recommendations on projects, and updates to municipal regulations to improve water quality. In 2017, the contract with the NYSDOS was executed. The project will begin in 2018.

Stormwater and Erosion Control Regulatory Toolkit

The Planning Department contracted with Barton and Loguidice and CC Environment & Planning to develop a new stormwater and erosion control regulatory toolkit. The toolkit will provide local agencies and code enforcement officers with a comprehensive overview of jurisdiction and regulations pertaining to water quality, floodplains, stormwater management, and soil and erosion control.



In 2017, Barton and Loguidice initiated work on the toolkit. The project includes a review of local stormwater management regulations and provides development review flowcharts to assist municipalities when reviewing development applications relative to stormwater and flooding concerns. Next steps include the creation of individual fact sheets for the general public as a companion to the stormwater toolkit reference document.

Vitale Park Shoreline Restoration and

Green Infrastructure Demonstration Project

The Planning Department applied for and received a NYSDEC/New York Sea Grant Great Lakes Small Grant for projects in Vitale Park. The grant award provides funding for a rain garden and rain barrels to capture and treat stormwater runoff from the new building under construction at Vitale Park. The grant also provides funds for engineering and construction of a shoreline restoration project on the east shore of the Park. Public education kiosks will be designed and installed at each of the three projects, and a shorescaping and green infrastructure booklet will be created and available for landowners interested in implementing similar water quality practices on their own properties.

Agricultural Best Management Practices

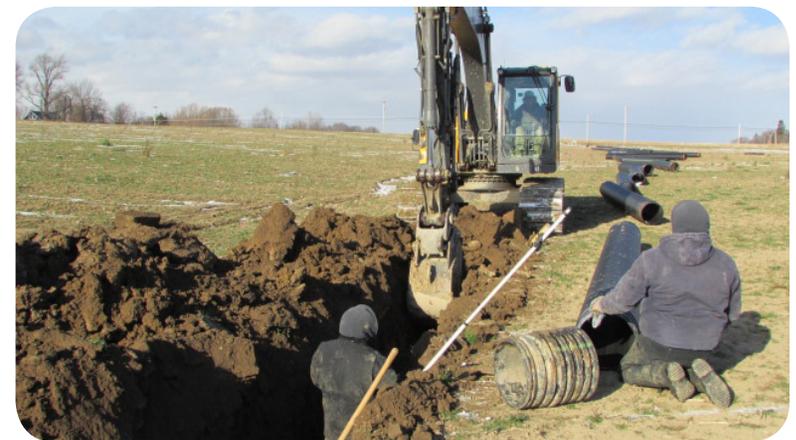
Agricultural Best Management Practices (BMPs) help protect water quality by reducing nonpoint sources of pollution on farms. Nonpoint source pollution occurs when rainfall moves over and through the ground picking up loose soil, nutrients, and other pollutants. BMPs function to keep soil and nutrients on the farm and out of ditches, gullies, and streams that flow into lakes and other waterbodies. The same nutrients that help plants grow in the field can contribute to plant growth in a lake in the form of weeds and algae.

The Livingston County Soil and Water Conservation District and the USDA Natural Resources Conservation Service conduct an upland watershed protection program for agricultural land uses to reduce nonpoint sources of pollution from entering waterbodies throughout the watershed.

The Livingston County Soil and Water Conservation District installed 1,700 feet of underground outlet and 1,100 feet of earthen terraces to address sheet, rill, and gully erosion on nearly 50 acres of cropland in the Sand Point subwatershed. Terraces provide temporary water/runoff storage capacity of 500,000 gallons. The Natural Resources Conservation Service supported the installation of 620 acres of cover crops on farms within the watershed.



Installation of underground outlet and water and sediment control basin



Trends and Recommendations

Identifying emerging trends and issues and establishing recommendations helps guide the Conesus Lake Watershed Council's yearly Work Plan.

Emerging Trends and Issues

- Invasive forest pests including, but not limited to, Hemlock Woolly Adelgid and Emerald Ash Borer affecting forest cover and riparian habitat.
- Changes in weather patterns (National Climate Assessment):
 - Increase in the frequency and duration of droughts leading to low water levels and intermittent streams.
 - Increase in the intensity of heavy rain events and overall precipitation leading to increases in natural and stormwater related high flow events contributing to property and infrastructure damage.
 - Less reliable snowpack and Spring groundwater recharge.
 - More frequent freeze thaw cycles during winter leading to increased instances of ice jamming and localized flooding.
- Increases in sodium and chloride levels in treated water at both the Village of Avon and Village of Geneseo water treatment plants. Sodium levels exceed the recommended levels for consumption by individuals on severely restricted sodium diets.
- HABs observations were more consistently reported in Conesus Lake since 2014, with 13 observed HABs since 2013. Higher temperatures, increased precipitation

and invasive species may contribute to increasing HAB occurrences in the future.

Recommendations

- Increase public education initiatives related to stream and shoreline restoration.
- Educate municipalities regarding land use practices effect on stormwater, soil erosion, and water quality.
- Continuation of invasive species prevention projects at all boat launches, including the watercraft steward program at the East Lake Road Boat Launch.
- Explore Watershed Management Plan update.
- Continue water quality parameter monitoring program.
- Conduct further investigation into potential causes and solutions to help mitigate increases in sodium levels.
- Revisit Invasive Species, Harmful Algal Blooms, and Fish Kill Response Plans.
- Pursue additional funding for watershed restoration projects and educational/science equipment for the Watershed Education Center.
- Further explore relationship between thermocline and wind mixing as a possible tool to predict Harmful Algal Blooms.
- Increase education on awareness of Harmful Algal Blooms and investigate potential mitigation measures.
- Begin implementation of Governor's HAB Initiative action plans.

#	Recommendation	Priority	Actions
All	Secure funding Outside of the EPF funding source to implement CLWMP activities. Investigate and apply for funds from grants opportunities as they arise.	High	<p>Planning Department and Soil and Water Conservation District assisted the Town of Geneseo on a USDA Forest Service GLRI application for post EAB reforestation and stormwater management at Long Point Park.</p> <p>The Watershed Manager submitted a grant proposal to the Finger Lakes Institute for equipment for an aquatic invasive species education and citizen monitoring program which was funded in full.</p> <p>The Planning Department assisted with a funding application for a County-wide Water Supply Study.</p>
A-1	Review and amend zoning regulations to improve consistency in near-lake areas.	High	<p>Planning Staff is working with the Town of Sparta on the creation of a new Agriculture and Farmland Protection Plan.</p> <p>A roundtable was held to discuss the stormwater regulatory toolkit. State and Federal regulatory officials, and county and municipal agency staff were in attendance.</p>
A-3	Develop public education campaigns on BMPs for lake and watershed residents.	High	<p>The Planning Department is working with the Town of Livonia, Conesus Lake Association, Livingston County Department of Health, Cornell Cooperative Extension of Livingston County, and the Chip Holt Nature Center on educational programming and equipment at the new Watershed Education Center.</p> <p>A Watershed Education Center presentation was hosted in December 2017 on FEMA Floodplains.</p> <p>The Planning Department contracted with Barton and Loguidice to develop a stream and stormwater regulatory toolkit for local agencies. Barton and Loguidice and CC Environment & Planning have provided the Planning Department with a rough draft of the toolkit outline, and Parts A-E for review. A meeting was held with agency stakeholders to discuss and provide feedback on the toolkit. Regulatory review will be continued into 2018.</p> <p>Water quality monitoring and Conesus Lake Annual reports were made available on the Planning Department's Conesus Lake webpage.</p> <p>The Watershed Inspector presented on watershed issues to youth audiences at the Way-Co Health Fair, Cuylerville Rod and Gun Club, and the Chip Holt Nature Center.</p>

#	Recommendation	Priority	Actions
B-1	Secure funding to help mitigate the financial impacts of changes in agricultural practices on the producers.	High	Agencies will continue these activities annually as part of their existing programs.
B-2	Implement practices that will reduce nonpoint source pollution from farms.	High	<p>The Natural Resources Conservation District supported the installation of 620 acres of cover crop throughout the watershed.</p> <p>The Soil and Water Conservation District (SWCD) installed 1,700 feet of underground outlet and 1,100 feet of earthen terraces to address sheet, rill, and gully erosion on nearly 50 acres of cropland in the watershed. Terraces provide temporary water/runoff storage capacity of 500,000 gallons.</p>
C-1	Develop and implement program to restore and stabilize streambanks in the watershed.	High	<p>Contracting for the NYS Sea Grant/NYSDEC Small Grants Program grant for green infrastructure and shoreline restoration at Vitale Park was completed. Planning Department worked with EcoLogic LLC for review & development of request for proposals for engineering services. Aerial images from Livingston County Sheriff's Department for RFP document were obtained.</p> <p>Wilkins Creek Subwatershed Stormwater Study draft RFP for consultant services was drafted & posted to the NYS Contract Reporter. Three submissions were received by the Planning Department and consultant selection process was initiated. Barton & Loguidice and CC Environment & Planning were selected as consultants.</p>
C-3	Develop public education campaigns on the impact of human activities on the health of the Lake.	Med.	The CLA distributed sixty-four Welcome to the Lake kits to new watershed residents this year. The Conesus campaign staffed an informational booth at the CLA's Arts and Craft Fair and the Livonia Autumn in the Village promoting lake friendly best practices.
E-2	Develop a public education campaign promoting invasive species awareness	High	<p>The CLA staffed an Aquatic Invasive Species education table at the NY Bass Nation Youth Fund Raising Fishing Tournament on Conesus Lake.</p> <p>The Planning Department is working with the CLA, LCDOH, CCE Livingston, Town of Livonia, and the Chip Holt Nature Center on educational programming and equipment at the new Watershed Education Center.</p>

#	Recommendation	Priority	Actions
G-1	Investigate and implement effective methods to control the spread of non-native (exotic) organisms	High	<p>2017 Stewards were hired through the Finger Lakes Institute. Stewards were trained through Finger Lakes Institute in May and started at the launch Memorial Day weekend. CCE Livingston coordinated a special training session for the wash station. The Watercraft Steward program finished for the season in early September with 8,439 boats inspected.</p> <p>The Watershed Manager and CLA volunteers participated in Finger Lakes Partnership for Regional Invasive Species Management Steering Committee meetings on 2/7/2017 and 4/11/2017. CLA Volunteer Mike Parker attended the Aquatic Working Group meeting on 4/20 and Full Partnership meeting on 5/16 and 8/17.</p> <p>Researched invasive species legislative support was conducted. Continue into 2018.</p> <p>The Planning Department submitted a grant proposal to Finger Lakes Institute for volunteer monitoring equipment. Grant proposal has been approved, and equipment has been purchased and received. Equipment is being stored for future use.</p>
G-2	Develop and implement a program for cleaning accumulated aquatic plants and algae along the shoreline of Conesus Lake	High	<p>The Livingston County Department of Health has created an updated Harmful Algal Bloom brochure.</p>
G-4	Initiate effort to determine if increased stocking of walleye fingerlings, or other species, would be an effective biological control in Conesus Lake.	High	<p>New York State Department of Environmental Conservation stocked 32,500 walleye pond fingerlings and 32,500 smaller fingerlings in June. DEC stocked 9,500 tiger muskellunge. All stocked fish came from DEC Fish Hatchery system.</p> <p>The CLA stocked 2,200 8 to 10-inch fingerlings in late fall.</p>

#	Recommendation	Priority	Actions
H-1	Conduct an annual monitoring program of Conesus Lake and its watershed. An annual monitoring meeting should be held to coordinate the monitoring program.	High	<p>The Livingston County Department of Health continued the public bathing beach monitoring and Harmful Algal Blooms programs during 2017.</p> <p>SUNY Geneseo will be monitoring in-lake water quality parameters and continuing its investigation into thermocline, mixing, and harmful algal bloom dynamics.</p> <p>The CLA installed custom designed and fabricated thermal sensor arrays and related communication systems that will provide real time, year round lake data.</p> <p>The Watershed Manager initiated contact with new limnology contact, Michael Chislock, at SUNY Brockport.</p> <p>SUNY Geneseo 2017 monitoring season has wrapped up & data is being analyzed by SUNY Geneseo.</p>
H-2	Prepare and distribute an annual Conesus Lake and Watershed Report Card.	High	<p>The 2016 Annual Report Card was approved by the Watershed Council and provided to NYSDEC/Finger Lakes Hub.</p> <p>Collaboration with Planning Department, CLWC Technical Committee and NYSDEC on the TMDL implementation plan continues. The Planning Department compiled implementation input from Technical Committee partners and submitted to DEC for consideration in the TMDL. Received DEC notification that TMDL release has been delayed.</p> <p>Programming/funding opportunities for an update to the Watershed Management Plan will continue to be explored in 2018.</p>

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Document prepared by the
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Cover photos provided by Conesus Lake Association, Livingston County Sheriff's Office, Livingston County Department of Health, and Livingston County Planning Department.