# Honeoye Lake Watershed Task Force Newsletter

## Summer 2014

## Honeoye Lake Inlet Restoration Project

Concerns about beach closures, swimming conditions and the well-being of our children and pets that play in Honeoye Lake all stem from the historical excess of nutrients in our waters. Now, a new study completed by The Nature Conservancy and the Honeoye Lake Watershed Task Force provides critical data that will help prioritize management projects with the greatest benefit for the lake.



## THE PROBLEM

Honeoye Lake is a naturally nutrient-rich—or "eutrophic" —system due to its shallow depths. It has also experienced a number of water quality issues due in part to past land use and poor waste water treatment prior to the municipal sewer system. Nonetheless, there are steps we can take today to improve its water quality. These steps are targeted toward reducing the amount of sediment, nitrogen and phosphorus that reach the lake every year.

Nitrogen, phosphorus and other nutrients are required for plant and algal growth. Since phosphorus is the nutrient that is in short supply in natural systems, its availability generally limits the amount of plant and algal growth that occurs. When it increases by even a small amount, under the right conditions it can cause accelerated plant growth, algae blooms, low dissolved oxygen, and the death of certain fish, invertebrates, and other aquatic animals. For this reason, phosphorus, and sediment that carries it, have been and will continue to be the focus of water quality improvement efforts.

## THE STUDY

In 2013, The Nature Conservancy partnered with the Honeoye Lake Watershed Task Force to commission an independent study that would identify not only the parts of the watershed requiring the greatest attention because of their relatively high contributions of nutrients and sediment, but those areas where reducing sediment, nitrogen and phosphorus is technically feasible. This information will help the Watershed Task Force select and prioritize management projects with the greatest overall benefit.

The consulting firm we hired, Princeton Hydro, used land cover, soil, elevation, and precipitation data to come up with preliminary estimates of sediment and nutrient loadings. They then used water quality data collected in Honeoye Lake's watershed to calibrate the model and verify the results.

This study focused on the nutrients and sediment that tributaries are contributing – or sources of external loading – as a first step in improving water quality. The management of the lake's *internal* phosphorus load—that is, nutrients entering the water column via interaction with the existing sediment at the bottom of the lake—must also remain part of comprehensive efforts to control the lake's rate of eutrophication. This study did not address internal loading.

## MODEL RESULTS

The study identified the parts of the watershed that are the highest contributors of sediment and nutrients. While the most sediment and nutrients per unit area are contributed by subwatersheds Northwest, Affolter Gully and Cratsley Gully, the Honeoye Inlet was identified as the greatest contributor in total loadings due to its large size (it drains 43% of the lake's watershed). Annual loads from the Inlet account for approximately 50% of the total sediment, nitrogen and phosphorus entering the lake each year.

The study also found that major one-year storm events are responsible for up to 70% of the loading. This means that regardless of the size of the storm, the majority of the pollutant loading occurs during the first flush of the event. As such, from the perspective of pollutant load reduction, best management practices sized to manage the one-year event should have the greatest effectiveness. This is good news because it greatly reduces the size and cost of possible solutions.

## THE SOLUTION

For the small subwatersheds, the steep valley sides and geology present a challenge in designing management practices that can treat runoff before it reaches the lake. Consequently, the best solutions for these areas are community-based initiatives that everyone in the watershed can undertake to reduce sediment and nutrients reaching the lake. These solutions include fertilizer and pesticide management, restoration of lake-side and stream-side riparian buffers, and installation of vegetated swales, rain gardens and alternative landscaping.

To address the sediment and nutrients coming from Honeoye Inlet, Princeton Hydro developed a four part conceptual restoration plan for the portion of the Inlet that runs through state land – the Honeoye Inlet Wildlife Management Area—between Hwy 36 and the swamp. This area is the former Wild Rose Ranch property.

The plan utilizes services provided by nature to filter water before it enters the lake. Such a restoration project would meet many objectives, including a reduction in nutrient and sediment loading, the attenuation of peak flows, reduced flooding, restoration of previously damaged habitat, creation of new habitat and expanded recreational use of the Honeoye Inlet Wildlife Management Area.

## WHAT'S NEXT

The study included a conceptual plan that suggested four elements that will work together so that Inlet stream flows produced by storms can spread out, slow down, and drop the sediment and nutrients they carry before reaching the lake. Suggested elements are as follows but the exact design will be worked out in the first phase of the project:

- 1. First, we will consider reconnecting stream flows in the Inlet to the floodplain. The high banks of the channel would be lowered so that high flows can "jump" the banks and flow onto the adjacent floodplain.
- 2. Second, we will consider re-creating meanders in the stream channel just upstream of the silver maple-ash swamp to slow water down before it enters the swamp.
- 3. Third we will consider the construction of a backwater wetland that would be flooded during storm events and remain wet by its direct connection to the stream channel and water table.
- 4. Finally, we will consider strategically plugging ditches within the project area that run perpendicular to the Inlet's stream channel. This will reduce the amount of sediment and nutrient laden water that is shunted from the valley sides to the Inlet and then to the lake by forcing storm flows out of the ditches and into vernal pool depressions.

Princeton Hydro used two methods to calculate the reduction in sediment and nutrient loading from the proposed restoration work—one very conservative and one moderately conservative.

## They found that the project would remove 24-37% of the total amount of phosphorus entering Honeoye Lake from surface flows.<sup>1</sup>

Restoration of the Inlet will consist of two phases, a design and permitting phase then a construction phase.

On June 16, 2014 Ontario County Soil & Water Conservation District completed and submitted a New York State Green Innovation Grant Program (GIGP) proposal to fund the design and permitting phase for the Honeoye Lake Inlet Restoration Project. This particular grant program provided a unique opportunity to fund a design and permitting phase but only comes around once a year so we felt very compelled to take advantage of it. The grant request was for \$100,000 with \$11,000 of local match funding. The Nature Conservancy has committed to providing the required local match of \$11,000. An award announcement will be made by December 2014.

There are state and federal funding sources that can help with funding the construction project phase, but local and private funds will be needed as well.

More information on the Princeton Hydro study and the Honeoye Lake Inlet Restoration Project will be provided at the Honeoye Valley Association Annual meeting on July 19, 2014. If GIGP funds are received, public feedback opportunities on the restoration project design will provided during the Design and Permitting Phase.

<sup>1</sup>Please keep in mind that restoration of the Honeoye Inlet is only addressing 43% of Honeoye Lake's watershed and thus is just one step in what will need to be comprehensive management of the external loading from 100% of the watershed.

## Enhancement & Mitigation Strategies

#### Ditch Manipulation 😫

Plug or fill ditches to facilitate overbank flows, encourage opportunities for vernal pool and wetland habitats, and raise groundwater elevation

Broaden ditch width to increase flood storage



## Floodplain Reconnection

Lower bank elevation to enhance stormwater access to floodplain, increase flood storage, and foster sedimentation Create wetland to wet meadow gradient to diversify habitat opportunities

#### Stream Lengthening 🖌

Create natural sinuosity consistent with regional streams to slow flows and facilitate sedimentation

Create natural backwater wetland habitat

#### Vernal Pool Enhancement and Creation (

Manipulate site hydrology in support of amphibian, reptile and other species that rely on vernal habitats for reproduction

#### Streambed Alteration 808

Raise streambed using rock grade controls to enhance stormwater access to floodplain, increase flood storage, and foster sedimentation

## HONEOYE INLET RESTORATION CONCEPT

Habitat Enhancement : Stormwater Mitigation Hydrologic Uplift : Floodplain Enhancement



- Hydraulic modeling to identify
  appropriate location for each strategy

Reduce pollutant load to lake Reduce sediment load to lake "Best Results with the Lightest Touch"

Princeton Hydro

## **1** Pound of Phosphorus **Entering Honeoye Lake** Supports the Growth of

500 Pounds of Aquatic Vegetation.

#### Ditch Manipulation & Vernal Pool Creation

## Honeoye Lake Watershed Task Force Chairman's Letter: Terry Gronwall

Our Summer Newsletter covers all of our 2014 projects to help in improving the water quality in Honeoye Lake and its watershed. The common focus for most of these Honeoye Lake Watershed Management Plan based projects is to implement Best Management Practices (BMP's) to reduce external sources of nutrients and sediments from reaching Honeoye Lake:

NYSDEC WQIP Grant Projects – In December 2013 Ontario County Soil and Water Conservation District (OCSWCD) and HLWTF prepared and submitted a new NYSDEC Water Quality Improvement Program (WQIP) Round 11 Grant funding proposal for over \$200,000 including local match funding to address stream bank erosion issues in public road right of ways, build several detention basins, and vernal pools in the Honeoye Lake Watershed.

**Princeton Hydro Watershed Modeling and Inlet Restoration Project** – The study included a conceptual plan that suggested four elements that will work together so that inlet stream flows produced by storms can spread out, slow down, and drop the sediment and nutrients they carry before reaching the lake. Ontario County Soil & Water Conservation District submitted a Green Innovation Grant Program grant proposal to fund the design & permitting phase for the Inlet Restoration Project on June 16<sup>th</sup>, 2014. The grant request was for \$100,000 with \$11,000 of local matching funding. The Nature Conservancy has committed to providing the required local match of \$11,000.

**Local Law Project** – The Genesee Finger Lakes Regional Planning Council and Ontario County Planning Department worked with the five towns in the watershed to review and assess their local laws from a watershed protection vantage point. Specific assistance was provided by request in developing new draft town laws. Project completed on April 30, 2014.

**Blue-green algae monitoring project** - At the request of the NYSDEC blue-green algae samples are being collected from Honeoye Lake from June through early October 2013 for testing for toxin levels. Samples will be collected by OCSWCD and HLWTF staff. Toxin testing results are posted on the NYSDEC web site.

**Onsite Wastewater Treatment System (Septic System) Workshop** – HLWTF and Ontario County Soil and Water Conservation District held this workshop on June 12, 2014.

**10 Year Macrophyte (aquatic plant) Survey** – **Bruce Gilman, FLCC summer 2014** -this will give us very valuable information on how the macrophyte community has changed over the last 10 years.

**Zebra Mussel Survey – Bruce Gilman, FLCC summer 2014** - This will provide us with zebra mussel population trend information and he will be monitoring to see if we have any quagga mussels.

These efforts to improve the Honeoye Lake and watershed water quality are a true partnership between The Nature Conservancy, New York State Department of Conservation, Ontario County Planning Department, Ontario County Soil and Water Conservation District, Finger Lakes Community College, Finger Lakes Institute, Honeoye Valley Association, the Towns of Richmond, Canadice, Bristol, South Bristol, and Naples and all lake users and residents.

We appreciate everyone's support!

Terry Gronwall, HLWTF Chairman Please contact me at 585-367-3000 or tgronwall@taurusgrouplic.com

## Pilot Project to Help Manage Honeoye Lake: Aquatic Vegetation Harvesting Program

We have been managing dense beds of aquatic vegetation with a mechanical harvester for over 25 years. The objectives of the harvesting program are to provide relief for recreational lake users and to remove biomass containing phosphorus from the lake every summer. An average of between 400-800 wet tons of biomass are removed per season.

When we learned about ciBiobase, we saw this service as a way to make our aquatic vegetation harvesting operation more efficient by concentrating our efforts on areas in the lake that have aquatic vegetation growing through most of the water column. This is shown as the red zone on the aquatic vegetation maps included here. We plan to monitor our actual harvesting rates relative to our aquatic vegetation maps over the summer harvesting season to see if we can enhance plant biomass removal.

Later this year, Dr. Bruce Gilman, FLCC, will complete a comprehensive study of the lake's aquatic vegetation as part of a long-term ecological monitoring research program. Earlier studies were completed in 1984, 1994 and 2004. We plan to compare the ciBioBase electronically collected data with his field data to verify the accuracy of our ciBioBase aquatic vegetation maps.

Terry and Dorothy Gronwall have volunteered to collect the aquatic vegetation data several times this summer using a Lawrence GPS/Sonar/Downscan device and producing the aquatic vegetation maps using ciBiobase. Our 2014 pilot ciBioBase program service is being funded by an Ontario County Water Resources Council Grant.



Photograph: Terry Gronwall: Mechanical Harvesting, Honeoye Lake 2012



Honeoye Lake: Northern Basin



## Gloeotrichia echinulata

*Gloeotrichia echinulata,* a blue green algae, has been present in Honeoye Lake for over 40 years, but recently identified by Dr. Bruce Gilman, Finger Lakes Community College as the dominant species in early summer algal blooms. The presence of *Gloeotrichia* should be of concern to lake residents and lake users for a number of reasons: it may create foul odors; alter aquatic food web interactions; and on rare occasions, some strains of *Gloetrichia* can produce the toxin microcystin-LR and release it into the water when the algae dies.

*Gloeotrichia echinulata* is a large (1-3 mm diameter) colonial blue green algae usually found in high-nutrient (eutrophic) lakes. Today, blooms are also occurring in mesotrophic (those having an intermediate level of nutrients) and oligotrophic (nutrient poor) lakes. Many of the recent blooms have been attributed to warmer temperatures, higher springtime water clarity accompanied by less cloud cover, and ample nutrient concentrations in near-shore sediment. Conditions of climate change, including greater annual precipitation and more frequent intense storm events, are implicated in increasing nutrient-rich stormwater runoff.

The large spherical colonies of *Gloeotrichia* resemble tapioca on the lake surface. A colony has a yellow-green center, with hundreds of surrounding filaments radiating from its core. It has several life history stages in a year.

- <u>Spring</u>: As light and temperatures increase, akinetes (highly resistant, specialized resting cells lying dormant on the shallow near-shore sediment) begin to germinate and spend several weeks on the lake bottom absorbing high levels of nutrients (nitrogen and phosphorus) as they grow. Akinetes have a rapid rate of cell division and develop into colonies.
- <u>Summer</u>: Mature *Gloeotrichia* colonies float to the surface of a lake, buoyed by gas vesicles produced within the colony. A bloom is observed when millions of colonies migrate to the surface at the same time. They typically spend a few weeks at the lake's surface during a bloom and each colony can divide into new colonies until their internal nutrients are depleted. Then they begin to produce akinetes. One colony can form up to 500 akinetes.
- Fall: Akinetes remain within the parent colony after it dies and sinks to the lake bottom.
- <u>Winter:</u> Akinetes are protected within the dead parent colony on the shallow near-shore lake sediment and are dormant during this stage. Akinetes are able to withstand periods of extreme cold as well as desiccation.

The effects of a *Gloeotrichia* bloom on a lake's ecosystem are the subject of current scientific study. When *Gloeotrichia* colonies migrate from the near-shore sediments to the surface, they take stored phosphorus with them. *Gloeotrichia*, like many blue-green algae, has the ability to fix nitrogen gas from the atmosphere into the nutrient nitrate. As the colonies die, the nitrogen and phosphorus may be released in sufficient quantities to stimulate other algal blooms in the open waters of the lake.

The effects of *Gloeotrichia* on humans and pets are variable. Swimming in a *Gloeotrichia* bloom can irritate human skin and cause a rash, and drinking water containing large numbers of colonies may be harmful. Existing food webs in a lake may be disrupted as *Gloeotrichia* can potentially out-compete other algae for resources. Organisms that depend upon algae for food tend to reject *Gloeotrichia*.



Illustration Source: http://link.springer.com'article'10.1007%2Fs10453-012-0309-9 (source citation fulfills use requirements)

Websites that offer more information about harmful algae blooms: <u>http://oceanservice.noaa.gov/hazards/hab/</u> http://www.cdc.gov/nceh/hsb/hab/

## Lake Friendly Living

## Honeoye Lake is a fragile environment: many household items and actions can degrade its quality.

- Don't put any leaves, grass clippings, raked water weeds or garden waste in the lake. These are a source of nutrients for water weeds and algae. Plant waste can be deposited at the Town of Richmond brush pit located at 4947 East Lake Road or composted.
- Paints, solvents, and other hazardous wastes can be disposed of safely at an Ontario County Hazardous Waste Clean Up Day.
- Recycle used oil. Any New York business selling more than 5 gallons of oil in a year is required by law to accept used oil from the public, at no cost, for recycling. The location does not have to be the same as the place of purchase.
- Streams, storm drains and road ditches drain into the lake. Don't deposit anything that you wouldn't want to swim in.



- Pick up dog and cat waste and put it into the garbage. Don't wash pets in the lake.
- **Do not feed ducks and geese.** Feeding waterfowl leads to nutritional deficiencies, encourages overwintering instead of natural migration, spreads avian diseases quickly and encourages hybridization. Waterfowl waste contributes a large amount of nitrogen and phosphorus to the lake, which supports weed and algae growth.
- Burn firewood in a pit to contain the ashes (no trash or leaves) and be courteous to neighbors who may be affected by the smoke.

## If you use a boat or jet ski:

- Respect the 200ft. NO WAKE ZONE around the lake shoreline. Motorized craft exceeding the speed limit in this area not only create a safety hazard but significantly increase the amount of 'weed chop' that floats up on the shore. <u>Some weeds can reproduce from plant fragments.</u>
- Speed limits are: **Under 5 mph in No Wake zones**, no more than **10 mph after sunset** anywhere on the lake.
- No tubing or skiing after sunset. Children under 12 must wear an approved life jacket.
- Do not attempt to fuel or change watercraft oil while it is in the water. A marina is equipped to perform these tasks safely.



## Healthy Lawns: Healthy Lake

Protect the water quality of Honeoye Lake and your property values by practicing healthy lawn care. A healthy lawn can improve water quality by filtering, purifying and reducing stormwater runoff. Misuse or overuse of fertilizers and pesticides can harm Honeove Lake as chemicals are carried into	<ul> <li>Try non-chemical alternatives to pesticides first, such as manual removal, biocontrol with other organisms or Integrated Pest Management. For more information, call Cornell Cooperative Extension (585) 394-3977 ext. 436.</li> <li>If you use chemical pesticides, follow the directions printed on the label. Improper use of</li> </ul>
surface water and groundwater. Unhealthy conditions for your family and pets and more weeds in the lake may be the result.	pesticides can result in contamination of lakes and streams and environmental damage.
Clean up after pets. Animal feces contain	I natch is a layer of decomposing plant tissue made
nutrients, bacteria and parasites that will	up mostly of stems and roots, <u>not</u> grass
contaminate the lake. Discard pet waste in your	clippings. A thin layer of thatch (up to ½ lh.) above
garbage collection.	the soli is beneficial. A thick layer leads to
	increased disease and insect problems, drought
infiltration of rupoff water from your roof and	stress and winter injury. Thick thatch usually occurs
driveway. Direct down shouts to a rain garden or	watered for constant lush growth
infiltration point where vegetation will filter	watered for constant lush growth.
nutrients from the water	Compacted poorly drained and acidic (below 5.8
	nH) soil contributes to thatch problems
Drainage from your driveway or landscaping	Use of pesticides can reduce or eliminate
projects can carry pollutants to the lake. Make sure	microorganisms that break down thatch.
there's a buffer or erosion control practice in place to	Mechanical removal works temporarily. Core
eliminate adverse impacts.	aeration and topdressing are effective means of managing thatch.
Test Before You Treat	
A soil test can determine whether fertilizer is	Promote Dense, Healthy Growth.
needed. Cornell University surveys indicate	Plant disease-resistant seed.
that only 1 in 10 lawns actually needs fertilizing.	• Cut grass no less than 3 inches high.
If fertilizer is necessary, apply in late May to early	• Keep mower blades sharp, shredded grass blade
June or late August to early September.	tips invite disease.
Use only fortilizers with slow-release nitrogen	• Water early in the morning, not in the evening
and zero phosphate unless you are establishing	vvater early in the morning, not in the evening.
new turf Follow label	
directions. 1 lb of phosphorus in the lake spurs	Local Merchants Stocking
the growth of 500 lbs of aquatic plants. Look for	Low and No Phosphorus
this label:	Fertilizer Include:
22 - 0 - 7	Honeoye: The Greenery/Ward's
Nitrogen- Phosphorus - Potassium	Landscaping, 8969 Dugan Drive
Millogen- rhosphorus -rotassium	Bloomfield: Country Corners
Know The Pests	State Routes 5 & 20 at Route 64
Inspect regularly for pests to find problems early	
Decide which species you can live with and which	Canandaigua: Lowe's
you need to control. Not all bugs are bad.	
	Victor: CountryMax

## Honeoye Lake Watershed Task Force was formed in 1998

## By Town of Richmond Town of Canadice Town of Bristol Town of Naples Town of South Bristol Honeoye Valley Association

То

## Protect and improve the water quality of Honeoye Lake.

#### Voting members include:

Steve Barnhoorn, Councilmember, Town of Richmond Bill Hershey, Councilmember, Town of Canadice Barbara Welch, Supervisor, Town of South Bristol Al Favro, Councilmember, Town of Bristol Mark Adams, Representative, Town of Naples Terry Gronwall, Honeoye Valley Association (Chairman)

### Permanent professional support is provided by:

P J Emerick, Bill Hershey, Edith Davey, Ontario County Soil and Water Conservation District Dr. Bruce Gilman, Finger Lakes Community College Tom Harvey and Betsy Landre, Ontario County Planning Department

## Project Specific professional support is provided by:

NYS Department of Environmental Conservation The Nature Conservancy Finger Lakes Institute Cornell Cooperative Extension of Ontario County Ontario County Water Resources Council Princeton Hydro Consulting Services

## Further information may be obtained by contacting:

Chairman Terry Gronwall at (585) 367-3000 tgronwall@taurusgroupIIc.com or P J Emerick, Ontario County SWCD at (585) 396-1450 ontswcd1@rochester.rr.com



Photograph: Terry Gronwall