

Onondaga Lake: Progress Report 2012

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www.savetherain.us
www.ongov.net/wep

Onondaga County Ambient Monitoring Program

Remarkable Improvements in Onondaga Lake

Multiple projects have been completed to restore water quality and habitat conditions in Onondaga Lake, and the lake has responded positively. Wastewater collection and treatment systems have received major upgrades and industrial wastes are being remediated. Since 2010, more than 120 green infrastructure projects have been completed as part of the "Save the Rain" initiative, reducing inputs of stormwater runoff and pollution to Onondaga Lake and its tributaries.

The County's Ambient Monitoring Program (AMP) provides a scientific basis for answering important questions about the lake.

- How have the remedial efforts affected the lake and its tributaries?
- Is the lake suitable for recreational uses?
- Does the lake support a healthy aquatic community?

The answers to these questions are now evident. Nutrient concentrations are dramatically reduced, nuisance algal blooms no longer occur, and oxygen levels are greatly improved. The lake supports a healthy balance of plants and animals, and interest in the lake as a recreational resource has surged.

This progress report describes 2012 conditions and compares recent data with historical data to track improvements.



Onondaga Lake



Wadsworth Park Rain Garden

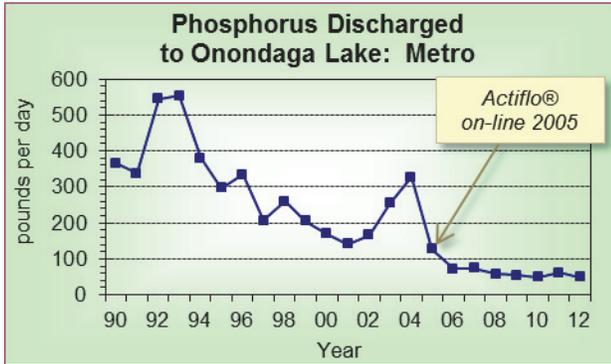
Measures of Progress

The 2012 results document the continued substantial improvements realized by improved treatment at the Metropolitan Syracuse Wastewater Treatment Plant (Metro), continued progress toward abatement of combined sewer overflows (CSOs), and reductions in nonpoint source pollution from the watershed's urban and agricultural areas. Onondaga Lake continues to exhibit the water quality improvements first noted in 2006. Phosphorus and ammonia concentrations are reduced, dissolved oxygen levels continue to rise, and water clarity has improved with the decline in algal abundance. Clearer water improves light penetration, allowing expansion of aquatic plants and improving fish habitat.

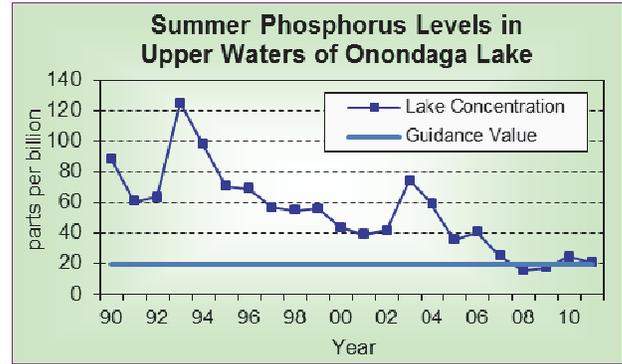


Porous Parking Lanes, N. State St.

How have improvements in wastewater treatment affected phosphorus, algal blooms, and dissolved oxygen levels? Phosphorus is the limiting nutrient for algal growth in Onondaga Lake. Too much phosphorus causes excessive algae, which in turn makes the water appear green and cloudy, and contributes to low oxygen levels in the deep water. During the summer of 2012, total phosphorus concentrations in the upper waters (0-3 meters) of the lake averaged 22 parts per billion (ppb). Since 2007, summer average total phosphorus has been close to 20 ppb, which New York State has established as a guidance value for determining a lake's suitability for recreational uses.

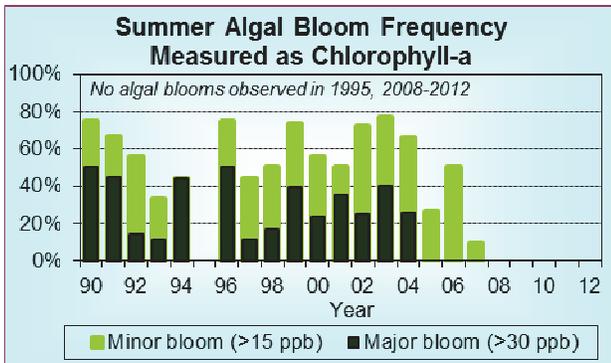
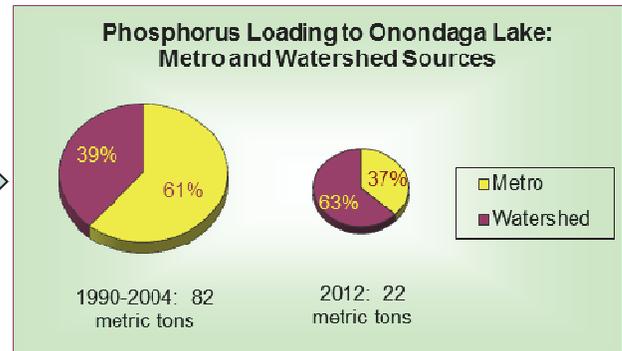


Phosphorus discharges to the lake from Metro have decreased by more than 80% since the advanced phosphorus treatment system (ActiFlo) was completed in 2005.

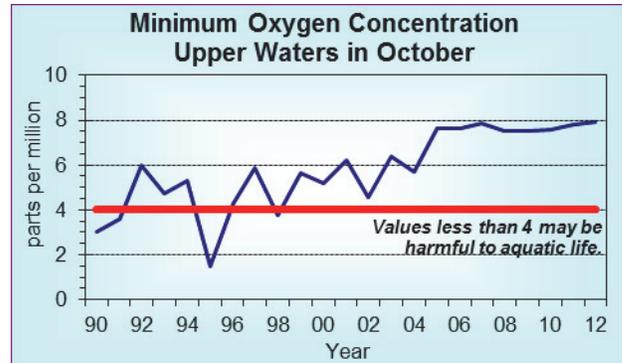


Reductions in phosphorus discharges from Metro have resulted in substantially lower phosphorus concentrations in the lake. Current phosphorus concentrations are comparable to levels measured in Oneida Lake.

With the upgrades to the Metro plant in 2005, runoff from the watershed is now the major source of phosphorus to Onondaga Lake. Prior to 2005, Metro contributed approximately 60% of the annual phosphorus load. Phosphorus loading from Metro has dropped substantially, while the watershed load has remained relatively unchanged. As a consequence, the watershed's contribution to the annual phosphorus load has increased from 39% to 63%.

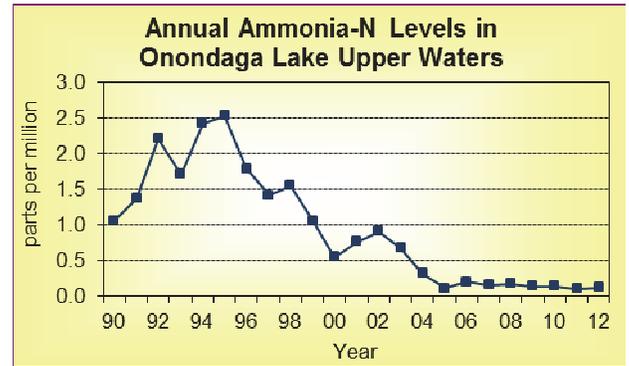
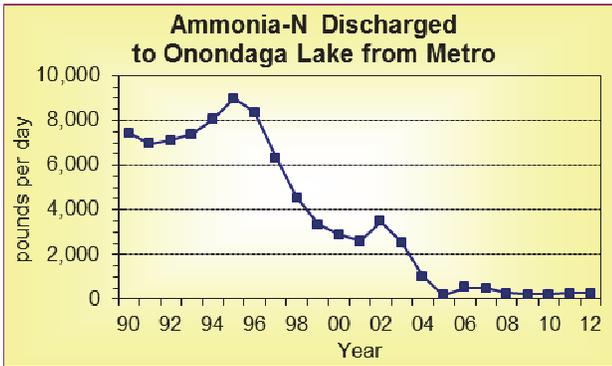


Less phosphorus in the lake has resulted in fewer and less severe algal blooms. No algal blooms have been measured in Onondaga Lake in the past five summers (June—September). Less algae also means clearer water and more oxygen for aquatic life.

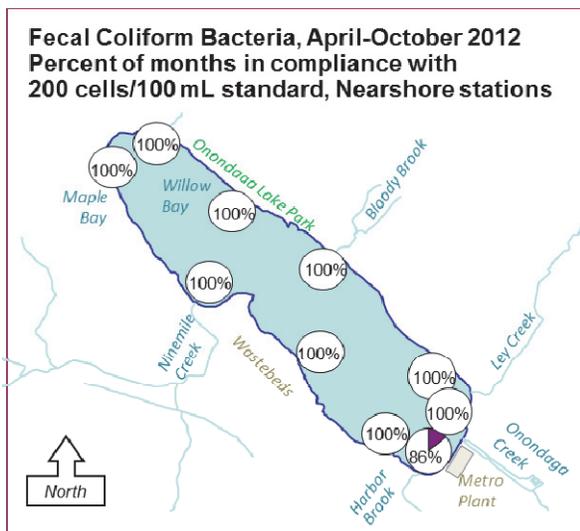


Low dissolved oxygen (DO) in the upper waters during October was one of the lake's most severe water quality impairments. DO in the upper waters has remained above the NYSDEC standard of 4 ppm since 1999, resulting in better habitat for aquatic life.

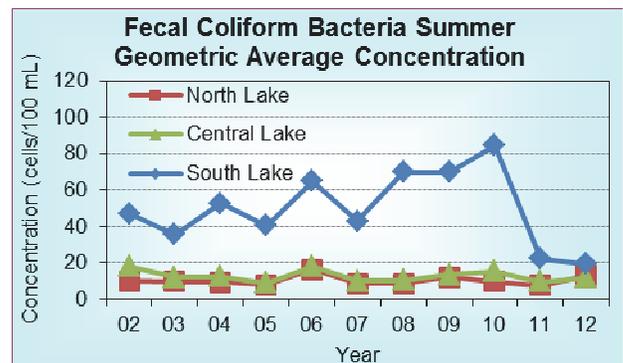
How have improvements in wastewater treatment affected ammonia levels in Onondaga Lake? High concentrations of ammonia-nitrogen can be harmful to sensitive aquatic life, such as young fish. Onondaga County completed major upgrades to the Metro plant that reduced the facility's discharge of ammonia-N by 98%. This advanced treatment system (Biological Aerated Filter, or BAF) came on-line in 2004; as a result, ammonia-N concentrations in the lake have declined. Since 2007, the lake's waters have met NYS water quality standards for ammonia developed for protection of aquatic life.



How have improvements in wastewater collection and treatment affected bacteria levels in the lake? Areas of Syracuse are served by combined sewer systems that carry both sewage and storm runoff. Combined sewer overflows (CSOs) occur during periods of heavy rain and snowmelt, allowing a mixture of stormwater and raw sewage to flow into creeks that feed Onondaga Lake. Reducing the amount of storm water entering the sewers will improve lake quality and has reduced the need to construct traditional facilities. During 2012, the County continued to separate sewers, implement new approaches to reduce CSOs, improve the capture of floatable materials, and maximize system storage capacity. These initiatives are reducing the risk of elevated bacteria counts in the lake. As illustrated below, bacteria counts are low except for a limited area of the southern shoreline following storms.



The lake waters met bacteria standards for contact recreation in 2012, except at one location along the southwestern shoreline. The fecal coliform bacteria standard is used by NYSDEC to evaluate water quality and by NYS Department of Health to evaluate suitability for swimming at designated beaches.



Summertime bacteria levels have been consistently highest in the southern region of Onondaga Lake, adjoining major inflows that drain urban areas. In 2011 and 2012, bacteria concentrations in the southern end dropped to the lowest levels on record. As in previous years, the 2012 data establish that bacteria levels increase along the southern portion of the lake shoreline following significant storm events. Bacteria levels have been consistently low in central and northern regions of the lake.

What is the “Save the Rain Program” and how does it support the County’s stormwater management efforts? Onondaga County’s [Save the Rain](#) (STR) Program was created in response to Fourth Stipulation of the Amended Consent Judgment (ACJ), entered into by Onondaga County, New York State and Atlantic States Legal Foundation (ASLF) on November 16, 2009. The ACJ specifically identified Green Infrastructure (GI) as an acceptable technology to significantly reduce or eliminate the discharge of untreated combined sewage into Onondaga Lake and its tributaries, and bring the County’s effluent discharges into compliance with the applicable water quality standards for the receiving waters.

The ACJ includes a phased schedule for Combined Sewer Overflow (CSO) compliance that uses an incremental approach to meeting the new goal of capture for treatment or elimination of, within the meaning of the Environmental Protection Agency’s (EPA) National CSO Policy, no less than 95 percent by volume of CSO by 2018. To meet this goal the County initiated the “Save the Rain” program which will implement a combination of green and gray infrastructure that focuses on the removal of stormwater from the combined sewer system through GI, CSO storage with conveyance to the Metropolitan Syracuse Wastewater Treatment Plant (Metro), and elimination of CSO discharge points. Building on the success of the 2011 “Project 50” campaign, the STR program experienced another impressive year in 2012 with over 50 GI projects completed.



Arbor Day—Bellevue Tree Planting



OnCenter Green Roof



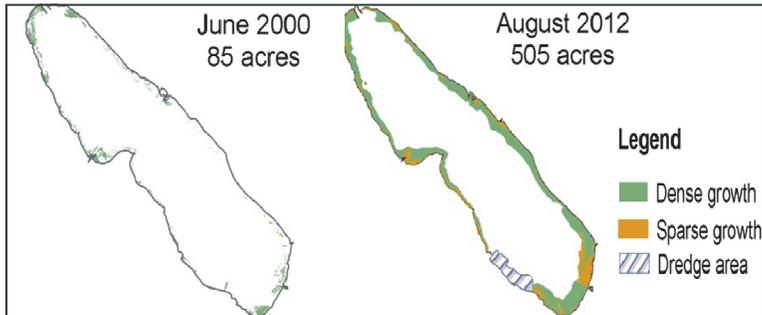
Rain Barrel Program

How are the environmental benefits of Save The Rain being communicated to the local community and beyond? County Executive Joanne Mahoney is championing a Save the Rain initiative to educate residents about stormwater management. The campaign raises awareness of effective ways to improve the environment by using rain barrels, rain gardens, porous pavement, green roofs, cisterns, and vegetated swales. STR continued its approach to rebuilding neighborhoods, developing strong community relationships, and advancing signature projects to solidify its place as a national leader in stormwater management. In addition, STR continued a comprehensive public education and outreach program to engage the local community and provide continued support for program activities. The STR program received numerous awards and recognition in 2012 including the United States Green Building Council (USGBC) 2012 Global Community Leadership award, a feature in *Water Environment and Technology* magazine, presenting at the White House for a conference hosted by the EPA and Council on Environmental Quality, and being featured as a “spotlight city” for the 2012 Urban Water Sustainability Leadership Conference, held by the U.S. Water Alliance in Cincinnati, Ohio.

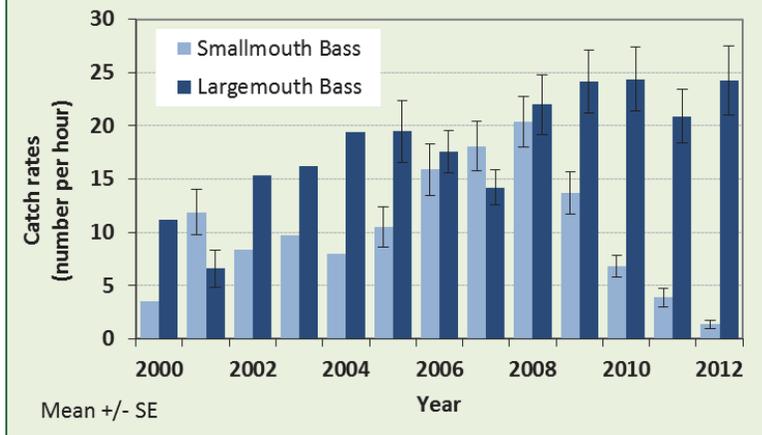
The 2012 STR Public Education and Outreach Team continued to engage the general public to raise awareness of the benefits of green infrastructure and the County’s efforts to implement the program. The outreach campaign included community presentations, demonstration projects, school outreach and the street tree planting program. In addition, STR either coordinated or participated in over 30 project-related public meetings.

How has aquatic life in Onondaga Lake changed? Aquatic plants provide spawning and nursery habitat for fish, as well as food and cover to a variety of other aquatic animals. The shallow areas of the lake are increasingly covered with aquatic plants as water quality improves, and a thriving warmwater fish community is one positive result. Based on annual surveys, the aquatic plant cover exhibited greater than a five-fold increase from 2000 to 2012.

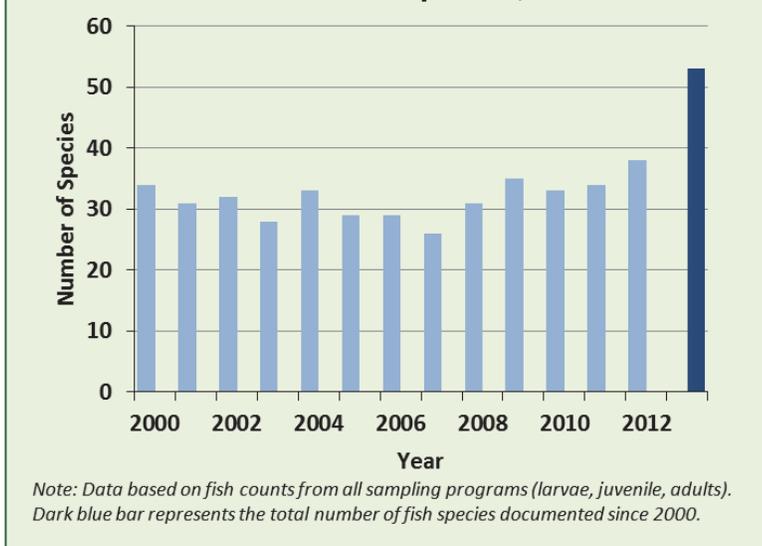
Expanding Macrophyte Coverage



Trends in Bass Catch Rates, 2000-2012



Number of Fish Species, 2000-2012



Aquatic plants have continued to expand within the Onondaga Lake littoral zone with over 500 acres observed in 2012. This increased coverage has notably improved largemouth bass habitat and has resulted in increasing trends in catch rates of largemouth bass in the County's sampling program. The number of fish species collected from the lake continues to increase, with 38 species documented in 2012. Since 2000, the County's program has documented over 50 species in the lake. It should be noted that several of these species including alewife and round gobies are invasive species. Alewife in particular are monitored annually. When occurring in large numbers, these opportunistic feeders have the capability to alter the lake food web and impact water quality. The warmwater and coolwater fishery continues to provide plenty of angling opportunities for our community.



As water clarity and macrophyte growth have improved, populations of several fish species including the longnose gar pictured above have increased in Onondaga Lake. Only eight species of gar are known worldwide, one of which, the longnose gar, is found in Onondaga Lake. Longnose gar are a common sight in the shallows of Onondaga Lake in late May or early June as they gather in the shallows to spawn.

How is Honeywell progressing with their Onondaga Lake cleanup initiatives? Dredging and capping of Onondaga Lake sediments began in summer 2012. About 2 million cubic yards of contaminated sediment will be removed from the lake by hydraulic dredging, which is expected to be about halfway complete by the end of 2013. About 450 acres of the lake bottom are being capped to provide a new habitat layer, prevent erosion, and isolate remaining contaminants. Additional work is under way to remediate and transform 17 acres at Geddes Brook and 30 acres at Nine Mile Creek into diverse new habitats for wildlife. Contaminated soil has been removed and 100,000 native shrubs, flowers, and trees are being planted.



The Onondaga Lake Visitors Center opened on the southwest shoreline of the lake in 2012 to provide the public with access to information on the lake cleanup. Additional information on Honeywell's remediation activities is available on their project website www.lakecleanup.com.



Summary and a Look Ahead

Visit Our Web Sites
www.ongov.net/wep
www.savetherain.us

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Real progress is being made in Onondaga Lake. The water is clearer, there is less algae, and water quality conditions support a thriving warmwater aquatic community. Phosphorus, water clarity and algal abundance are now comparable to other regional lakes, including Oneida Lake. Onondaga Lake is a recreational asset to the entire community. We will continue to evaluate Onondaga Lake's response to wastewater improvements, reductions in stormwater runoff, and the ongoing remediation of legacy industrial pollution.