

July 2009

Onondaga County Department of
Water Environment Protection



Onondaga Lake: Progress Report 2008

Joanne M. Mahoney, County Executive
Patricia M. Pastella, P.E., BCEE, Commissioner

Onondaga County Ambient Monitoring Program

Onondaga Lake is on the road to recovery.

After more than a century of pollution from municipal and industrial waste, Onondaga Lake is responding to the large investment of funds in wastewater treatment with cleaner water. Pollution levels are down, and the conditions for aquatic life, especially fish, have improved.

The Onondaga County Ambient Monitoring Program has been documenting conditions in the lake and its watershed for more than 30 years. The extensive monitoring program provides a scientific basis for answering important questions regarding the lake clean-up effort.

- How have the improvements to the wastewater collection and treatment system affected the lake?
- Is the lake suitable for recreational uses?
- Does the lake support a healthy aquatic community?

This progress report describes conditions measured in 2008 and compares recent data with historical data to track improvements to this valuable community resource.



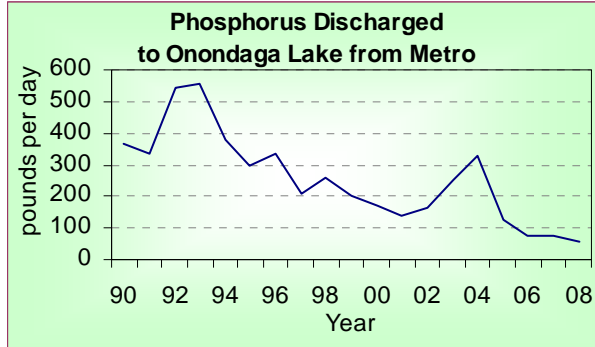
Measures of Progress

Recent improvements at the Metropolitan Syracuse Wastewater Treatment Plant (Metro) have brought about welcome changes in Onondaga Lake. Major projects are also underway throughout the 285-square mile watershed that will reduce runoff from urban areas and farmlands. Perhaps most importantly, the effects of past industrial discharges of mercury and other contaminants are being addressed by Honeywell and the DEC. Graphs on the following pages display the effectiveness of improved wastewater treatment on Onondaga Lake water quality.

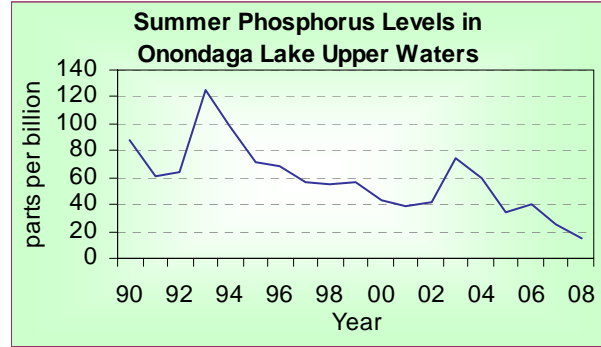


How have improvements in wastewater collection and treatment affected phosphorus, algal blooms, and dissolved oxygen levels in Onondaga Lake?

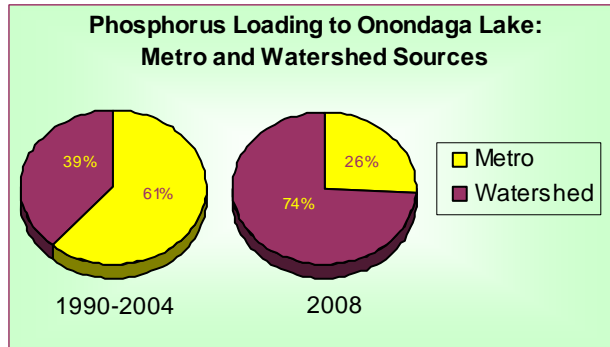
Phosphorus is the key nutrient supporting algal growth. Too much phosphorus causes excessive algal growth, which turns the lake water green and cloudy and contributes to low oxygen levels.



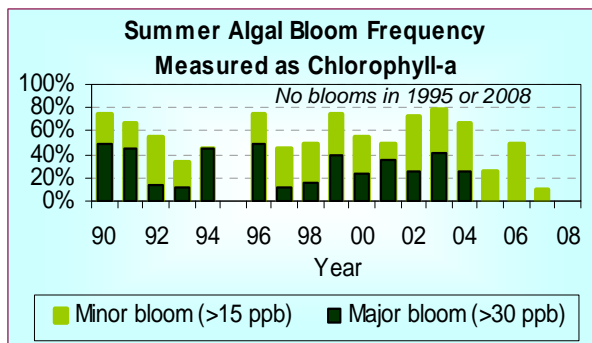
Improvements at the Metro plant have reduced phosphorus discharges to the lake from the treatment plant by more than 80%. Since the advanced treatment system was completed in 2005, loading has been less than 100 lbs per day.



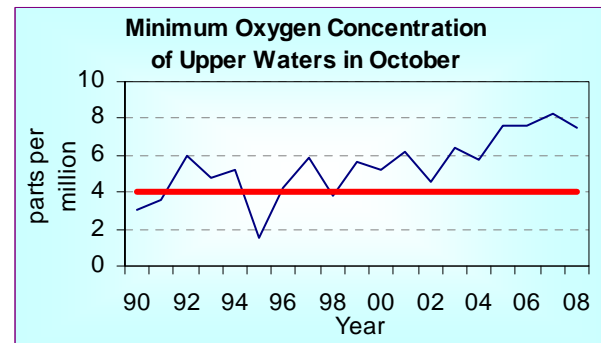
Reductions in phosphorus discharges from the Metro plant have resulted in substantially lower phosphorus concentrations in the lake water in recent years, down to 15 ppb in 2008, comparable to Oneida Lake.



With the recent improvements at the Metro plant, runoff from the watershed contributes the majority of phosphorus to Onondaga Lake. Prior to 2005, the Metro plant contributed approximately 60% of the yearly phosphorus load.



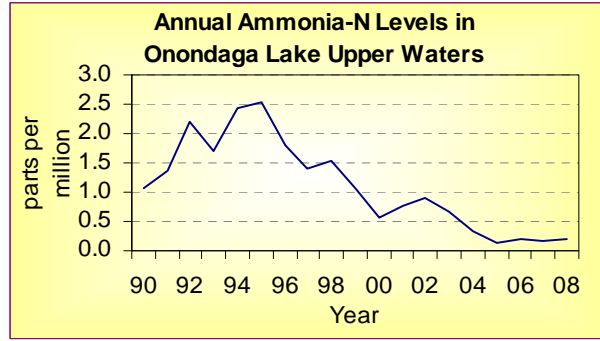
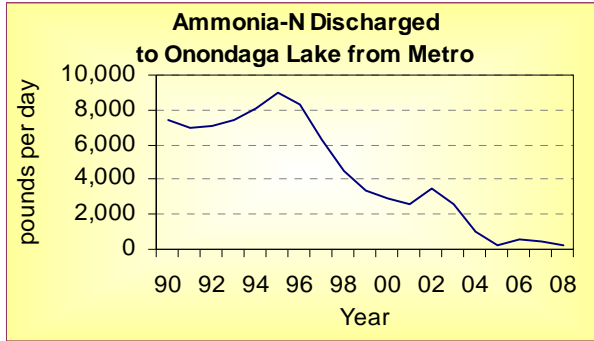
Less phosphorus in the lake has resulted in fewer and less severe algal blooms. Less algae also means clearer water and more oxygen for aquatic life.



Until recently, low oxygen in October was one of the most significant low water quality problems in Onondaga Lake. Recent improvements in oxygen mean better habitat for aquatic life. The NYSDEC Ambient Water Quality minimum standard is 4 ppm.

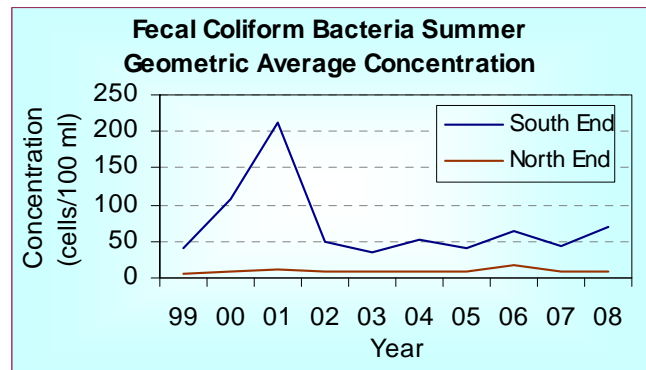
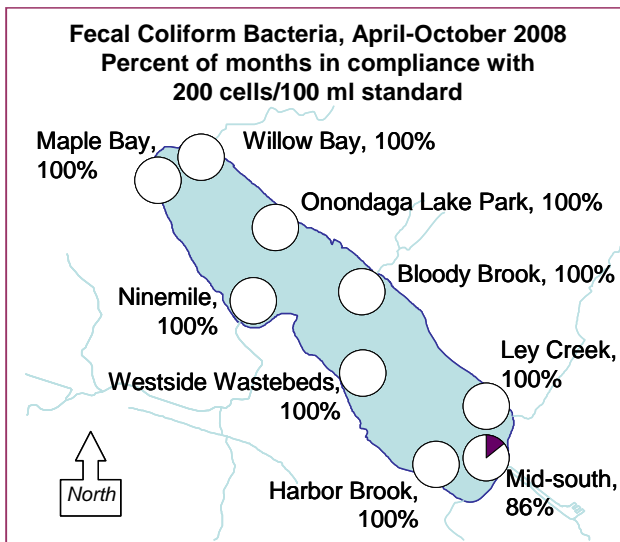
How have improvements in wastewater treatment affected ammonia levels in Onondaga Lake?

High concentrations of ammonia can be harmful to sensitive aquatic life, such as young fish. Onondaga County has completed major upgrades at the Metro plant that reduced the amount of ammonia-N discharged to the lake from the treatment plant. An advanced treatment system came on-line in 2004; as a result, ammonia-N concentrations in the lake have declined and meet state standards 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 (CSOs) which carry both sewage and storm runoff. These pipes can overflow during periods of heavy rain and snowmelt, allowing a mixture of stormwater and raw sewage to flow into creeks and ultimately reach Onondaga Lake. Monitoring data document elevated bacteria levels during wet weather. Onondaga County continues to implement projects, including treatment facilities, to control storm runoff and combined sewer overflows. County officials recently have begun evaluating the potential use of “green” infrastructure to help manage urban storm runoff. Green infrastructure encourages infiltration, capture, and reuse of storm runoff before it enters the sewer system. Monitoring data have also identified elevated bacteria levels in streams during dry weather in certain areas. A cooperative program, funded by the Onondaga Lake Partnership and Onondaga County, is underway to identify and remediate these dry weather sources of bacteria, which may include leaky pipes and/or illicit connections.



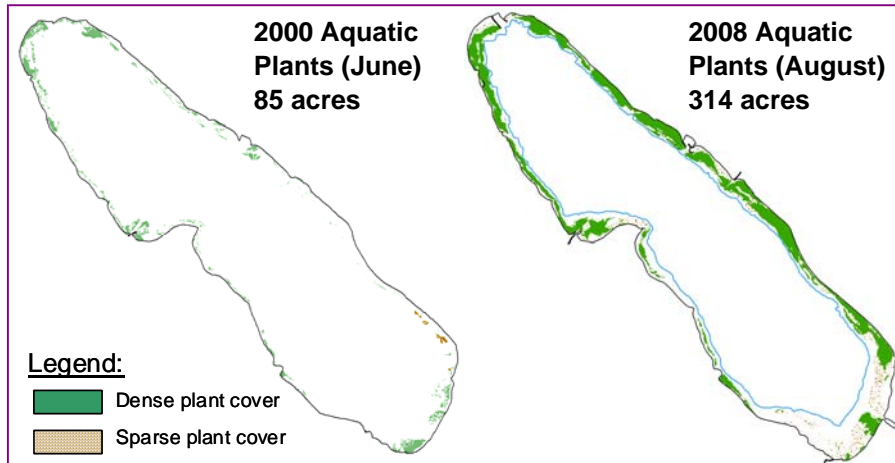
This figure displays the 2008 data in detail. The fecal coliform bacteria standard of 200 cells per 100 ml of lake water, calculated as a geometric average of at least five samples per month, is used by DEC to evaluate water quality and by DOH to evaluate suitability for swimming at designated beaches.

Bacteria levels are higher at the southern region of Onondaga Lake, close to the major inflows, as compared to the northern regions. The good news is that bacteria levels at the northern stations and the lake outlet are consistently very low. The previous ten years of summer measurements, the period of major recreational use, are displayed above.

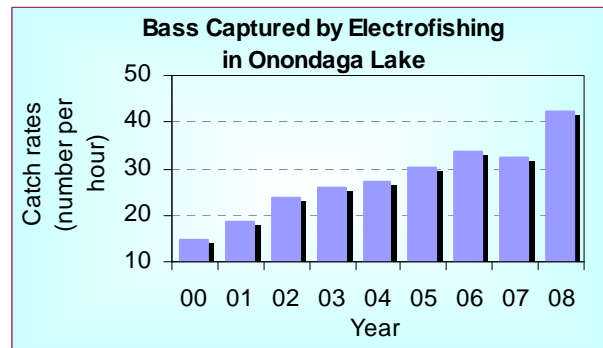
Bacteria levels in portions of the lake typically increase after significant storm events.

How has aquatic life in Onondaga Lake changed over time?

Aquatic plants provide vital spawning and nursery habitat for lake 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. A nearly four-fold increase in plant cover was documented from 2000—2008.



Onondaga Lake supports a diverse warm-water fish community; there are many species present, and game species such as bass are increasingly abundant. This is a result of improved habitat and better water quality.



Summary and a Look Ahead

Visit our Web site:
www.ongov.net

Onondaga County Department of
Water Environment Protection

650 Hiawatha Blvd West
Syracuse, NY 13204-1194
Phone: 315-435-2260
Fax: 315-435-5023

Real progress is being made in Onondaga Lake. The water is clearer, there is less algae, and water quality conditions support a thriving warm water aquatic community.

The Onondaga County Ambient Monitoring Program will continue to track key indicators in response to reductions in wastewater inputs, urban runoff, agricultural runoff, and industrial pollution.