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Onondaga County Department of  
Water Environment Protection

# Onondaga Lake: Progress Report 2006

Nicholas J. Pirro, County Executive

Richard L. Elander, P.E., Commissioner

## Onondaga County Ambient Monitoring Program

Each year, Onondaga County monitors the quality of Onondaga Lake to measure how the lake is changing as pollution levels decline. While the lake is subjected to multiple sources of pollution, Onondaga County's wastewater discharge has historically been an important factor affecting water quality. Improvements to the County's wastewater collection and treatment system are helping to bring about welcome changes in the lake. This progress report describes recent findings of the County's comprehensive monitoring program. A detailed report of the annual monitoring program is available on the County's web site [www.ongov.net](http://www.ongov.net)

Onondaga County's monitoring program is designed to help address two important questions regarding the lake clean-up:

- Does Onondaga Lake support recreational uses?
- Does Onondaga Lake support a balanced community of plants and animals?

The County monitoring program measures physical, chemical, and biological conditions and compares the results to state and federal standards. Results are tracked over time to evaluate how the lake is changing in response to the clean-up efforts. The monitoring program is designed to evaluate progress from two perspectives: suitability for recreational uses and suitability for aquatic life. The shorthand "fishable, swimmable" is used to describe this federal Clean Water Act requirement for all waters.



## Measures of Progress

This progress report summarizes recent improvements at the Metropolitan Syracuse Wastewater Treatment Plant (Metro) and changes in Onondaga Lake. Metro is just one source of pollutants to Onondaga Lake. Major projects are also underway throughout the 285-square mile watershed that will reduce runoff from urban areas and farm-lands. Perhaps most importantly, the effects of past industrial discharges of mercury and other contaminants are being addressed by Honeywell. Graphs on the following pages display recent changes in wastewater treatment and Onondaga Lake water quality.

Figure 9. Number of Fish Species Found During Spring Sampling Annually (2000-2006)

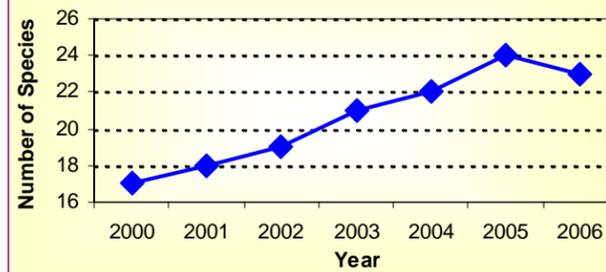
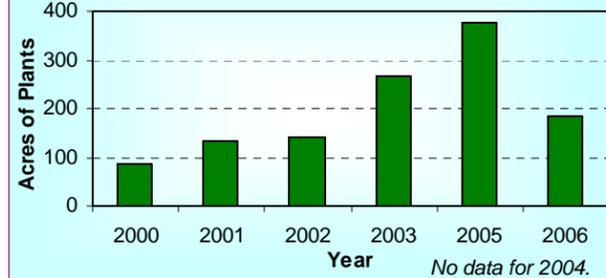


Figure 10. Acres of Aquatic Plants in Onondaga Lake, 2000-2006.



encouraging. The lake supports an abundant fish community; the number of fish species in the lake has increased since comprehensive monitoring began in 2000 (Figure 9). This graph displays annual data, the cumulative data are even more encouraging. Since the program began, the County has identified 43 different fish species in the lake. When combining the County species list with that of other recent studies, there have been 64 fish species identified in the lake. Aquatic plants are also expanding as water quality improves, although there substantial variability from year to year as is common in regional lakes (Figure 10). Onondaga Lake is beginning to resemble other lakes of its size with respect to plant abundance, number of fish species, and summertime water clarity.

### Who oversees the Lake Cleanup effort?

New York State Department of Environmental Conservation (NYSDEC) oversees the lake cleanup effort with input from the Environmental Protection Agency. The Onondaga Lake Partnership (OLP), comprised of federal, state, city and county officials, also plays a crucial role in assuring that projects are effective in restoring this valuable resource.

### Who oversees the Ambient Monitoring Program?

DWEP has brought together a group of technical experts to guide program design and help interpret results. This group, the Onondaga Lake Technical Advisory Committee, includes scientists and engineers with years of experience with Onondaga Lake. The NYSDEC reviews both the annual AMP work plan and the annual technical report.

### Are additional measures needed?

Onondaga County and its state and federal partners will determine what other measures, if any, may be warranted once all the planned improvements to the wastewater collection and treatment system are complete. The success of other non-County initiatives in managing stormwater runoff from urban areas and farm fields will affect the lake's progress, as will the Honeywell remediation. Final answers may not be known until after 2012.

## Summary and a Look Ahead

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Onondaga County Department of  
Water Environment Protection

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

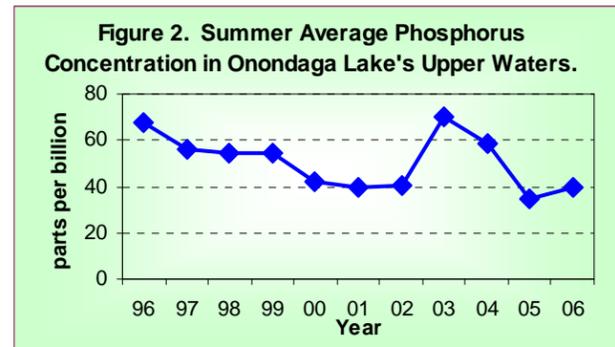
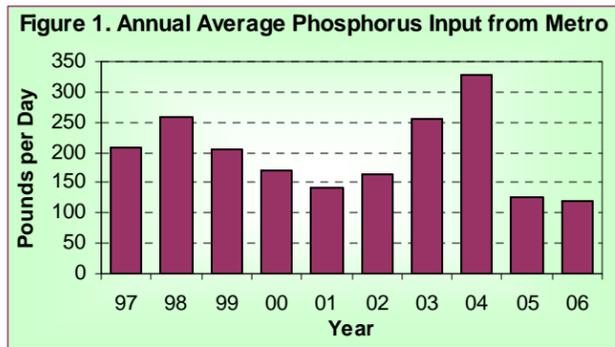
Real progress is being made in Onondaga Lake. The water is clearer, there is less algae, and water quality conditions support a thriving warm water aquatic community.

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

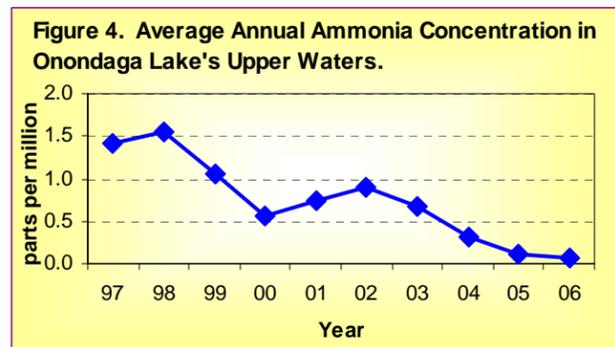
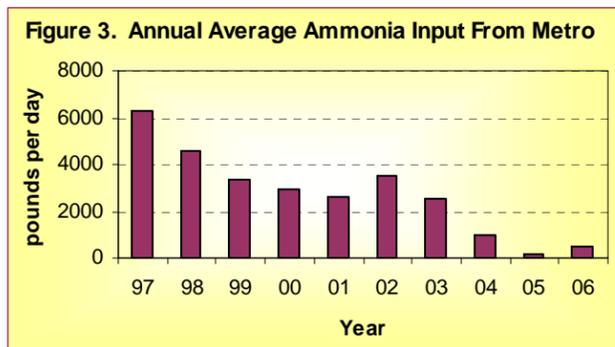
**How have improvements in wastewater collection and treatment affected Onondaga Lake?**

The County's wastewater treatment plant (Metro) was upgraded with an ACTIFLO system in February 2005 to remove additional phosphorus. Operation of this system was modified over a one-year period in a continuing effort to enhance phosphorus removal. Phosphorus is a key nutrient supporting algal growth. Too much algae will turn the lake water green and cloudy. Controlling phosphorus is an important component of making Onondaga Lake more attractive for recreational use.

Improved phosphorus removal at Metro (Figure 1) has helped reduce summertime phosphorus levels in Onondaga Lake (Figure 2). In 2006 the annual average phosphorus input from Metro was the lowest ever measured. The phosphorus concentrations in the lake water, which respond to inputs from the entire watershed, are also in decline.



In January 2004, Onondaga County modified the Metro treatment plant with a biological aerated filter to remove additional ammonia from the wastewater (Figure 3). High concentrations of ammonia can be harmful to sensitive forms of aquatic life, such as young fish. Ammonia concentrations in the lake have declined as a direct result of the treatment plant improvements (Figure 4).



**How does the lake compare to state standards and guidance values?**

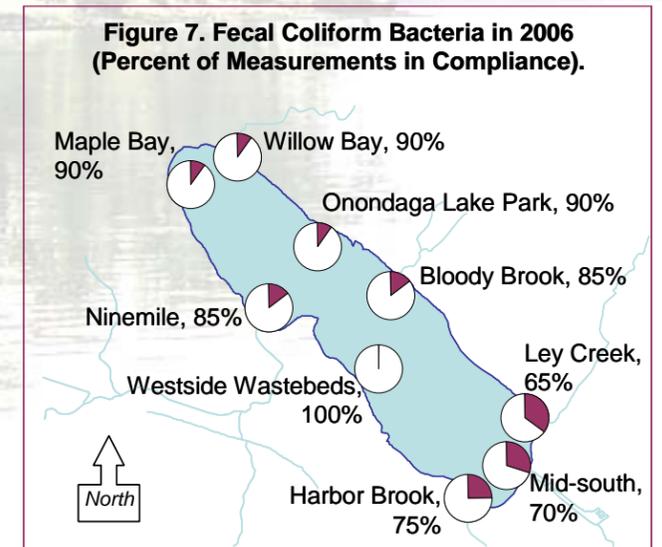
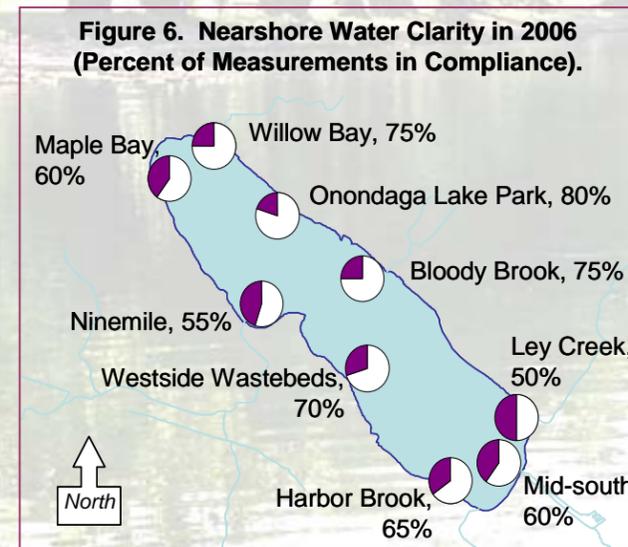
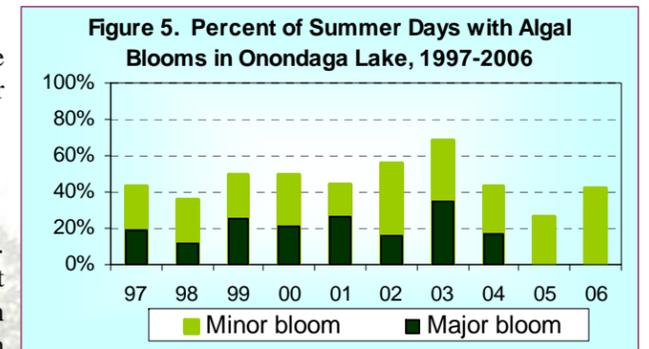
Water quality standards and guidance values are limits on the amount of certain harmful substances that can be present in water. These limits are meant to protect aquatic life and human health. In the past, levels of ammonia and bacteria were too high in Onondaga Lake. Dissolved oxygen levels were too low, especially in the fall. Significant progress has been made. Ammonia levels are now well within standards, as are oxygen levels in the fall.

**Is the lake visually appealing?**

Less phosphorus in the lake has generally resulted in less algae (Figure 5). Reductions in algae also mean improved water clarity. The lake is visually more appealing with clearer water.

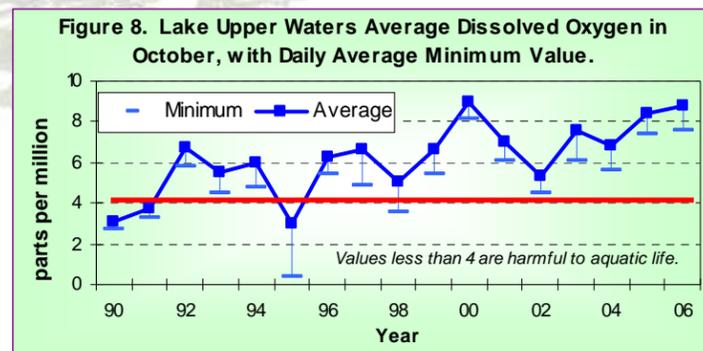
**Can the lake be used for contact recreation?**

The answer to this question is greatly affected by the weather. Water clarity is an important consideration for contact recreation. For official bathing beaches, the NY State Health Department requires a water clarity of four feet. As shown in Figure 6, this is not consistently met. Rainfall in 2006 was more than 7 inches above normal, and this affected water quality conditions. Suitability for swimming also means water free of disease-causing bacteria and viruses. Microbiological purity is measured by fecal coliform bacteria levels. The 2006 results are displayed in Figure 7. Again, wet years have more runoff and CSOs, which tends to result in more bacteria in the lake.



**Does the lake support a balanced community of plants and animals?**

The answer to this question is "yes". There are many different types of fish and other forms of aquatic life in the lake. Onondaga County's trained biologists track aquatic life throughout the year.



In addition, the field teams measure many factors affecting habitat. Oxygen is the most important factor affecting the type and distribution of animals living in the lake. Until recently, oxygen levels in the fall were quite low and potentially harmful to aquatic life. Figure 8 shows that the oxygen levels in the fall have been higher in recent years. This means better habitat for aquatic life.

The County monitoring program tracks the number and types of fish, aquatic plants, zebra mussels, and other life forms in the lake. The 2006 results are very