September, 2008

Onondaga County Department of Water Environment Protection

Onondaga Lake Fishery: 2007-2008 Fact Sheet

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Onondaga County Ambient Monitoring Program

Each year, Onondaga County Department of Water Environment Protection (OCDWEP) monitors Onondaga Lake to measure how the lake is changing as pollution levels decline. The 2008 OCDWEP Ambient Monitoring Program (AMP) represents the 39th consecutive year of Onondaga County's lake monitoring effort. The County monitoring program measures physical, chemical, and biological conditions and compares the results to state and federal standards. By law, all waters are to support recreational use and a balanced biological community. This national requirement is often referred to as ensuring that all waters are "fishable and swimmable".

In 1998, the County's historical water quality monitoring program was modified and expanded to include biological components. Results of the monitoring program are used to evaluate how the lake is changing in response to clean-up efforts.

Onondaga County's monitoring program is designed to help answer two important questions:

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

This progress report describes recent findings of the County's comprehensive fish community monitoring program. A detailed report of the entire annual monitoring program is available on the County's web site *http://www.ongov.net/WEP/we1510.html*.

Largemouth bass from 2007 Bassmasters tournament held on Onondaga Lake

Alewives caught during gill net survey

Measures of Progress

The County's biological monitoring program tracks a number of plant and animal communities in the lake ecosystem. The monitoring program measures the number and types of fish, aquatic plants, macroinvertebrates, phytoplankton (algae), zooplankton, and zebra mussels. Results of the biological monitoring program are very encouraging; the lake now supports a diverse and productive biological community. Fish are quite abundant, and angling is becoming increasingly popular. Onondaga Lake now resembles other lakes of its size in the region with respect to the number of fish species, plant abundance, and summertime water clarity.

Walleye caught during Spring 2008 electrofishing

How many and what kinds of fish are in Onondaga Lake?

Popular belief is that Onondaga Lake's legacy of pollution has left the lake a biological wasteland. This couldn't be further from the truth. In fact, the County's monitoring program has captured 46 different fish species since 2000. When combining the County's species list with that of other recent studies, there have been 66 fish species identified in the lake, in recent years. Fish species and their relative abundance are summarized in Table 1.

Table 1. Fish species documented in Onondaga Lake, grouped by relative abundance (2000—2008). Source: OCDWEP database.

Abundant Species			Common Species			Uncommon Species		
Alewife	Banded Killifish	Bluegill	Black Crappie	Bluntnose Minnow	Bowfin	Black Bullhead	Brown Trout	Goldfish
Brown Bullhead	Carp	Channel Catfish	Brook Silverside	Brook Stickleback	Emerald Shiner	Greater Redhorse	Green Sunfish	Johnny Darter
Gizzard Shad	Golden Shiner	Largemouth Bass	Fathead Minnow	Freshwater Drum	Longnose Gar	Lake Sturgeon	Longnose Dace	Northern Hogsucker
Pumpkinseed	Shorthead Redhorse	Smallmouth Bass	Logperch	Northern Pike	Rock Bass	Quillback	Rainbow Trout	Rudd
White Perch	White Sucker	Yellow Perch	Tessellated Darter	Tiger Musky	Walleye	Spotfin Shiner and Trout Perch	White Bass	Yellow Bullhead

What are the new species you're finding and where are they coming from?

Quillback caught in Onondaga Lake as part of the OCDWEP fish monitoring program.

In recent years several new species have been caught in Onondaga Lake including: lake sturgeon, quillback, green sunfish and black bullhead. In some cases these fish can be tracked directly to stocking efforts. For example, because of identification tags on the fish, the lake sturgeon are known to have made their way to Onondaga Lake from Oneida Lake where they had been stocked as part of an effort to re-establish this endangered species. It appears that other species may be naturally extending their range in New York. Quillback (they resemble small carp but have a longer dorsal fin tip, see photo to the left) are usually found in Lakes Ontario and Erie, not inland waters. Several have now been captured in Onondaga Lake indicating that there is now an established population here. Other species, such as the green sunfish and black bullhead, are uncommon in most areas of New York and may have simply avoided detection in the past. In all cases it is likely that new species are moving into Onondaga Lake via the extensive Seneca River system.

How does the number and kinds of fish in Onondaga Lake compare to other regional lakes?

The number and kinds of fish found in any lake is dependent on several factors including: quality of the water and physical habitat, lake size, and how intensive the lake is studied. Not many lakes are as well studied as Onondaga, so comparable information is difficult to come by. We do know that Oneida Lake has a very diverse fish community and that sampling conducted by Cornell University has found over 60 species of fish, which is comparable to what has been found in Onondaga Lake.

Smallmouth bass are common in Onondaga Lake (note the OCD-WEP tag the angler is holding)

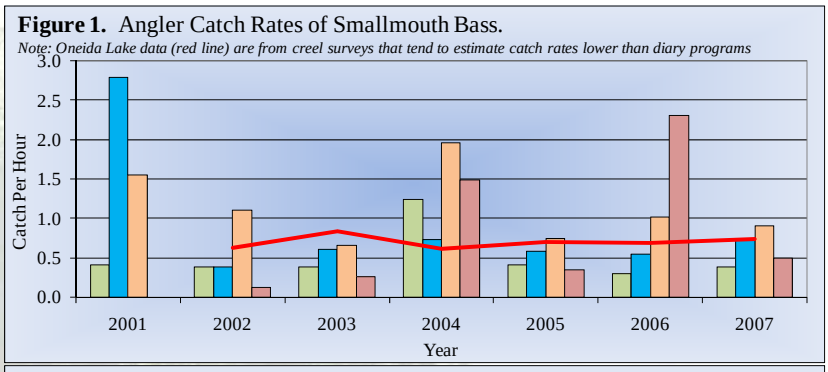
Like most other nearby lakes, Onondaga Lake supports a very productive warm water fishery. Anglers from across the region, both recreational and professional, enjoy the lake's excellent largemouth and smallmouth bass fishery. Numerous bass tournaments are held on the lake every year.

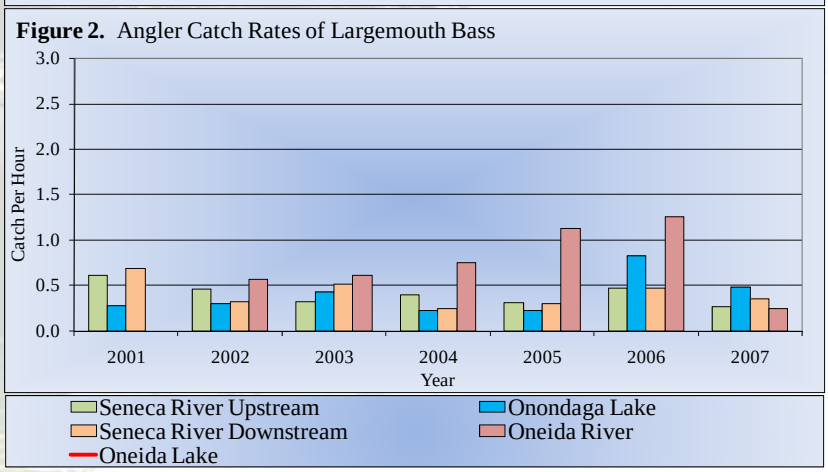
Reasons for the abundance of fish in Onondaga Lake are the connections between the lake and other regional waterways. Onondaga Lake is an open system, meaning that it is connected to other streams, rivers, and lakes with no barriers to fish passage. Ninemile Creek connects

Otisco Lake to Onondaga Lake. The lake outlet flows north into the Seneca River that in turn is connected to the Finger Lakes, Oneida Lake, and Lake Ontario. Many fish likely enter the lake from the river and tributaries. For example, tiger musky stocked in Otisco Lake, and brown trout stocked in streams connected to Onondaga Lake have moved downstream and been caught in Onondaga Lake.

Are the fish safe to eat?

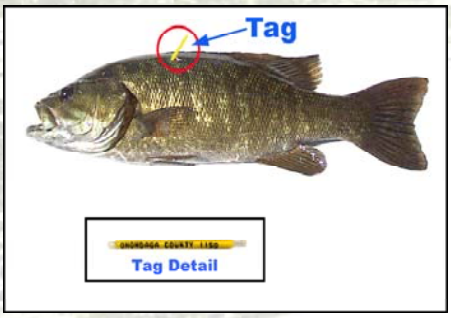
Fish in Onondaga Lake have had elevated levels of mercury for many years. There is currently a health advisory issued by the NYS Department of Health to eat no more than one meal per month of any species caught in Onondaga Lake, to eat no largemouth or smallmouth bass over 15 inches, and to eat no walleye of any size. For additional information on fish consumption advisories in New York waters, see the State's health advisory report at: *http://www.health.state.ny.us/environmental/outdoors/ fish/docs/fish.PDF*.





Has fishing success improved?

OCDWEP surveys anglers fishing on Onondaga Lake, the Seneca River (upstream and downstream of the lake), and Oneida River through the use of an Angler Diary Program. Fishing success in Onondaga Lake is typically comparable to, or slightly better than, fishing success in other local waters, including Oneida Lake (Figures 1 and 2). In general smallmouth bass are more commonly caught in Onondaga Lake than largemouth bass. To participate in the angler diary program, please contact OCDWEP (315-435-2260 ext. 360), or visit *http://www.ongov.net/WEP/we1506.html* for more information.

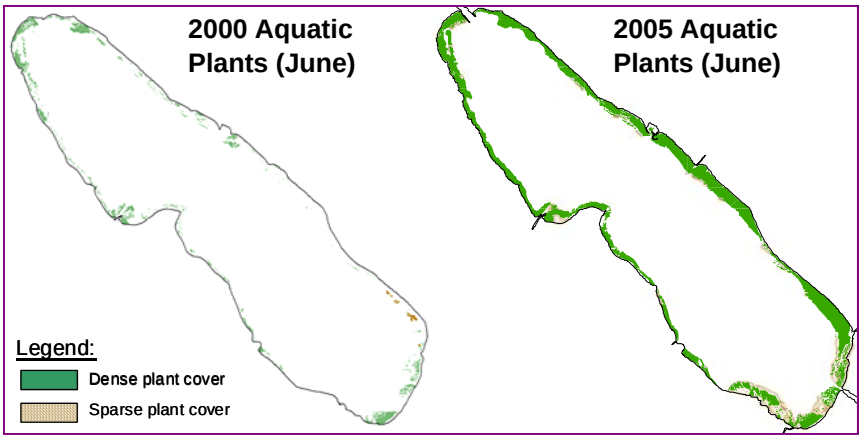


If I catch a fish with a tag, what should I do?

As part of its ongoing monitoring, OCDWEP tags fish in Onondaga Lake with a yellow "spaghetti tag" below the dorsal fin (fin on the fish's back). The information gathered from these tags, such as how far the fish moved and how much it has grown since it was tagged, is important in helping managers understand the fish community. Anyone catching a tagged fish should record the tag number, the length, weight, and location caught, and report this information to OCDWEP (315-435-2260 ext. 360).

I've noticed a lot of aquatic plant growth in the Lake lately. Is this good for the Lake?

You're right, the amount of aquatic plants in the lake has increased dramatically in recent years (from 85 acres in 2000 to 378 acres of plant cover in 2005). Aquatic plants act as essential rearing and nursery habitat for fish, they help stabilize the bottom, and also help clear the water.

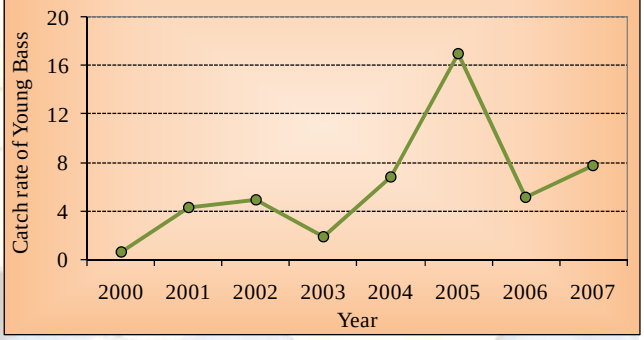


As long as plant growth doesn't get out of control, this is a very good thing for the lake. It appears that largemouth bass have benefited the most from

the increase in plants. Reproductive success for this very important species has increased greatly in recent years (Figure 3), probably a direct result of the increase in plant growth.

If the wrong kinds of plants get into the lake, and they become abundant enough, they can pose problems for lake users. For this reason, OCDWEP is closely monitoring the plant community.

Figure 3. The catch rates of largemouth bass young in Onondaga Lake has increased in recent years due to increased amounts of plants.



It seems things that happen in the lake can dramatically affect the fish, but can the fish affect the lake?

Absolutely. This became all too clear in 2003 when a small fish called the alewife (see photo on front page) suddenly became very abundant in Onondaga Lake. This species feeds heavily on small lake animals called zooplankton and also on larvae of other fish. An important type of zooplankton was eradicated by the alewives. Since those zooplankton help clear the lake's water by feeding on algae, the result was that water clarity actually declined. All because of one type of fish! If that wasn't bad enough, it appears that the alewives have also negatively affected reproduction of some fish species such as yellow perch and sunfish by feeding on their larvae. OCDWEP in cooperation with Cornell University will continue to monitor the impact of alewives on the Onondaga Lake food web.

With all the recent upgrades to the Metro Wastewater Treatment Plant (located on the southern shore of the lake) has the fish community shown an improvement?

Yes, the fish community is improving, and more quickly than anticipated. The overall number of fish species caught in the lake has increased since comprehensive monitoring began in 2000. The abundance of many types of fish is increasing, including important gamefish species such as largemouth and smallmouth bass (Figure 4).

Figure 4. The abundance of largemouth and smallmouth bass is increasing in Onondaga Lake.

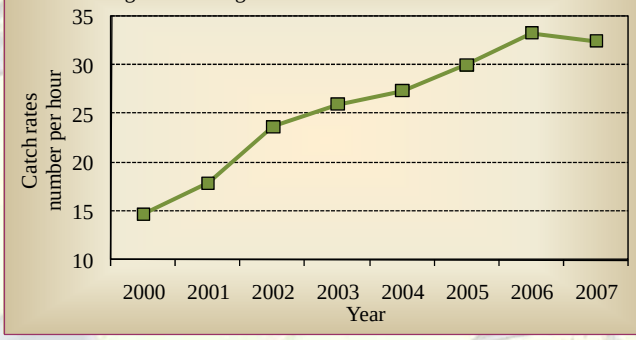
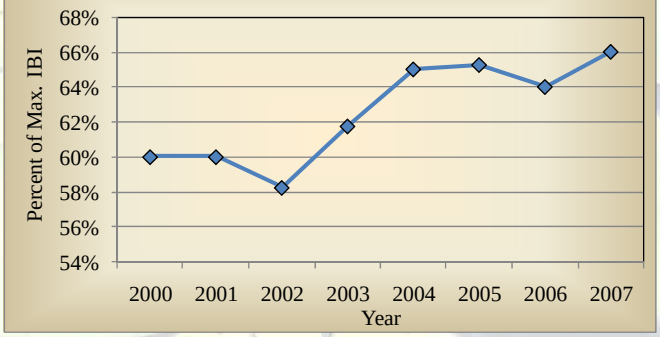


Figure 5. Overall improvments in fish community quality have been documented in recent years.



OCDWEP uses data collected from the entire fish community to calculate what is called an Index of Biotic Integrity (or IBI for short) which measures the relative quality of the fish community over time. Figure 5 shows the results of this calculation, as a percent of the maximum possible value, since the year 2000. You can see that there have been subtle but steady improvements in the quality of the fish community since 2002.

Visit our Web site:

www.ongov.net/WEP

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Summary and a Look Ahead

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

Sound management decisions regarding the fishery are needed to ensure that improvements continue. A Strategic Fishery Management Plan for the lake is needed to help insure that the fish community continues to improve.