

# The Oswego River/Finger Lakes Basin

## Basin Description

The Oswego River/Finger Lakes Basin, located in Central New York State, encompasses the area drained by the Oswego, Oneida, Seneca and Clyde Rivers. The headwaters of these rivers originate along the northern edge of the Appalachian Plateau and the southwestern Adirondacks and flow across the central lowlands before emptying into Lake Ontario. The basin is one of the largest in the state, draining 5,070 square miles. Most of the largest of the New York Finger Lakes are also contained within the drainage basin; in fact lake surface area makes up about 300 square miles – or nearly 6% of the basin. The drainage area of the of the Oswego River/Finger Lakes Basin includes all of Seneca County; most of Onondaga, Cayuga, Tompkins, Schuyler, Yates and Ontario Counties; large parts of Oswego, Oneida, Madison and Wayne Counties; and smaller parts of Lewis, Cortland, Chemung, Steuben, and Livingston Counties.

The Oswego River/Finger Lakes Basin is largely rural, with considerable agricultural lands as well as tracts of forest and woodland. The Syracuse Metropolitan Area provides the basin with a highly urbanized and populated hub that dominates the economic landscape of the region. This urban area – the third largest in the state – generates considerable industrial, manufacturing, commercial and service sector activity in the area. The majority of the total basin population of 970,888 (2000) is located in and around the larger urban centers. In addition to the City of Syracuse (147,306) and surrounding towns, these population centers include Ithaca (29,287), Auburn (28,574), Oswego (17,954, portion), Geneva (13,617), Fulton (11,855), Canandaigua (11,264) and Oneida (10,987). The remaining population centers within the basin are smaller villages that largely support farming or suburban bedroom communities. The basin supports a wide variety of agricultural activities including dairy and row crops as well as a renowned wine industry in the Finger Lakes Region

There are about 8,896 miles of rivers and streams (and canals) in the basin and over 400 lakes and ponds. Many of the ponds are too small to be individually assessed, but 76 significant\* lake, pond and reservoir waterbody segments (covering 189,722 acres) are included in the Oswego River/Finger Lakes Basin Waterbody Inventory. The largest of the river watersheds in the basin include the Oneida River/Lake watershed with about 2,330 miles of streams or 26% of the basin total, the Clyde River/Canandaigua watershed (1,630 miles, 18%), the Cayuga Lake watershed (1,500 miles, 17%) and the Seneca Lake watershed (1,240 miles, 14%). Of the lakes/reservoirs, the largest are Oneida Lake (51,091 acres, or 27% of the basin lake acres), Cayuga Lake (42,812 acres, 23%), Seneca Lake (42,646 acres, 22%), Keuka Lake (11,712 acres, 6%) and Canandaigua Lake (10,605 acres, 6%). Together, these 5 lakes account for 85% of the lake acres in the basin.

## Water Quality Issues and Problems

The primary water quality impacts in the Oswego River/Finger Lakes Drainage Basin are typically the result of one of two sources. In the more populated urban centers – namely the Syracuse Metropolitan Area – municipal discharges and industrial activities (including the legacy of past industrial activities) are the primary source of impacts. These impacts restrict uses of Onondaga Lake and its urban tributary waters. Through considerable investments in wastewater treatment upgrades and hazardous waste remediation, water quality in Onondaga Lake has experienced notable improvement in recent years, though impacts remain.

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\* *Significant Lakes* are lakes of 6.4 acres (0.01 square miles) or larger and are included the New York State Lakes Gazetteer.

In other more rural areas of the drainage basin, elevated nutrient and sediment loads from heavy agricultural use and other nonpoint sources are the cause of less severe but frequently occurring impacts. Though less severe, these nonpoint sources pose a significant threat to maintaining and protecting the highly valued water resources of the basin. In particular, many of the Finger Lakes – which provide drinking water supplies and support a variety of recreation activities for both residents and tourists – have been identified as experiencing minor impacts and threats to uses.

### *Onondaga Lake*

As recently as the 1970s, Onondaga Lake was one of the most polluted lakes in the nation – a result of decades of industrial and municipal discharges. Onondaga Lake remains impaired by a variety of pollutants from municipal wastewater discharges, CSOs, urban runoff, and past industrial operations and uses. However water quality in the lake is improving. Ammonia levels now meet standards and municipal phosphorus discharges have been reduced by 80% or more. On a parallel track, industrial waste impacts are being addressed through various remediation efforts. Considerable additional actions – many of which are underway - are necessary to restore the multiple uses of the lake. These efforts – outlined in the Amended Consent Judgement (ACJ) and overseen by the multi-party Onondaga Lake Partnership – extend to addressing issues affecting many of the urban tributaries of Onondaga Lake as well.

### *Owasco Lake*

Various uses in Owasco Lake are limited by pathogen contamination that results in beach closures along the north shore and by excessive growth of aquatic vegetation and algae in other parts of the lake, particularly its southern end. The sources of pathogens and nutrients include agricultural runoff, municipal discharges in the watershed, on-site wastewater treatment systems, wildlife and waterfowl. Though nutrient levels are low in much of the lake, elevated levels in the southern end of the lake exacerbate the growth of aquatic vegetation. Water supply uses of the lake are also considered to be threatened due to the potential formation of disinfection by-products when the water is treated with chlorine for public water use.

### *Southern Cayuga Lake*

Recreational use in the southern end of Cayuga Lake is restricted by various pollutants including pathogens, nutrients and silt/sediment. The sources of these pollutant loadings are numerous and occur throughout the watershed. Multiple municipal wastewater discharges and urban/storm runoff from the City of Ithaca impact the lake. Agricultural activity in the Southern Cayuga Lake watershed includes significant levels of dairy farming, poultry operations and cropland. Nonpoint source loadings from increasing development, stream erosion and roadbank erosion are also identified as sources of pollutants to the tribs and lake.

### *Fish Consumption Advisories*

Fish consumption in a number of notable waters in the basin is impaired due to various toxic pollutants that result in NYS DOH fish consumption health advisories. An advisory for Onondaga Lake recommends eating no walleye and no more than one meal per month of other species due to mercury contamination. Dioxin and PCBs also restrict the consumption of other species. An advisory is also in place for Keuka Lake limiting the consumption of larger lake trout (over 25 inches) to no more than one meal per month due to elevated DDT levels. Consumption of some species taken from portions of two rivers in the basin – the Oswego River and Skaneateles Creek – are restricted to one meal per month due to PCB contamination. The source of contaminants for all these advisories are thought to be past historic discharges rather than the result of continuing discharges.

### *Oswego Harbor Delisted as Area of Concern*

A recent water quality success was noted in July of 2006 when Oswego Harbor was officially removed from the list of Great Lakes Areas of Concern, the first and only one of 31 Areas of Concern in the United States to be delisted. Pollution reduction activities in the Oswego Remedial Action Plan (RAP) that led to the delisting include remediation of State Superfund hazardous waste sites, upgrade of the Oswego WWTP and collection system, increased control of point and nonpoint water discharges, reduction of nutrients and stormwater runoff, implementation of river corridor enhancement projects and modification of the Oswego River power dam license during the recent Federal Energy Regulatory Commission's (FERC) re-licensing of the dam to increase and better support suitable fish habitat in the AOC. These actions have resulted in improved water quality, a more productive fishery, expanded recreational uses and a revitalized river shoreline and downtown area.

### *Protection of Finger Lakes Water Resources*

More than half of the lake acres in the basin – including most of the larger Finger Lakes – have uses that are considered to be threatened. However the designation of these waters on the DEC/DOW Priority Waterbodies List as threatened is largely due to the particular resource value reflected in their Class AA designation and the need to provide additional protection, rather than any specifically identified threats. Although there are no significant known water quality impacts in these waters and uses are fully supported, the segments are considered highly valued water resources due to their Class AA drinking water supply designation. This designation indicates that water quality is to be maintained such that the water can be used as a potable source with limited treatment.

### *Habitat Modifications and Invasive Species*

The impact of invasive species and other alterations of aquatic habitat have also been identified as causing impacts to recreation and aquatic life support. Such problems result in impacts to the largest lake in the basin, Oneida Lake. The appearance of zebra mussels and other invasive species such as water chestnut, the increase in cormorant predation and the decline of fish populations are seen as related and in need of addressing. The impact of zebra mussels is even more severe in the Seneca River where dense populations cause drastic reductions in dissolved oxygen in the river. Hydrologic stratification related to Onondaga Lake outflow exacerbate the dissolved oxygen impacts in the river.

### *Groundwater Resources*

Although groundwater resources are not specifically tracked through the WI/PWL, they are considered *Priority Waters* nonetheless. Groundwater provides drinking water for about one-third of the population of New York State and is the source of base flow for most rivers and streams in the state. Management and protection of both the quantity and quality of this resource is critical for protecting public health and is also a key element of surface water quality and wetland management efforts. In the Oswego River/Finger Lakes Basin, the more significant threats to groundwater resources include inactive hazardous waste sites, pesticide application, animal feeding operations, deep-well injection, on-site wastewater treatment systems and chemical spills.

## Oswego River/Finger Lakes Basin Water Quality Assessment

The series of charts presented on the following pages provides an overall assessment of water quality conditions in the entire Oswego River/Finger Lakes Basin. For each waterbody type (rivers/streams and lakes/reservoirs) the first chart shows the percentage of the miles/acres of waters in the basin that fall into the various *Water Quality Assessment Categories*. The **red** portion of the first pie indicates the percentage of waters characterized as *Impaired Segments* which do not support appropriate uses. The **purple** portion represents segments with *Minor Impacts* and *Threatened Waterbody Segments*. Taken **together**, waters in both of these categories (represented by the **red** and **purple** segments) comprise the **Priority Waterbodies** (for that waterbody type) within the basin. The percentage of miles/acres for the other Water Quality Assessment Categories – *Waterbodies Having No Known Impacts*, *UnAssessed Waterbodies*, and *Waterbodies with Impacts Needing Verification* – are shown in **blue**, **light blue**, and **green** respectively.

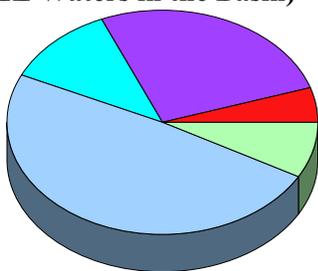
The second pie chart shows the severity of the most significant use impact or restriction for *Priority Waterbodies*. The levels of severity are:

- Precluded:* waters do not support appropriate uses
- Impaired:* waters frequently do not support appropriate uses
- Stressed:* waters support appropriate uses, but other water quality impacts are apparent
- Threatened:* waters support uses and have no impacts, but activities threaten future use support

More detailed descriptions of these levels of severity are outlined in Appendix A - Assessment Methodology. The bar charts indicate the pollutant sources that are most frequently cited as major contributors to the water quality impacts for *Priority Waterbodies* in the Oswego River/Finger Lakes Basin. The charts reflect the percentage of miles/acres of the total waterbody area on the Priority Waterbodies List where the source is listed as a major contributor to the water quality impact. For each source, the color shading of the bar indicates the severity (*Precluded, Impaired, Stressed, Threatened*) of the most significant water use impact to the waterbody.

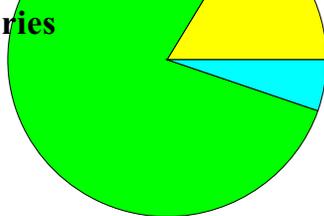
### Rivers/Streams

**Water Quality Assessment Categories**  
(for ALL Waters in the Basin)



- PWL - Not Supporting Uses
- PWL - Other Minor Impacts
- No Known Impacts
- UnAssessed Waters
- Impacts Needing Verification

**Severity of Problems**  
(PWL Segments Only)

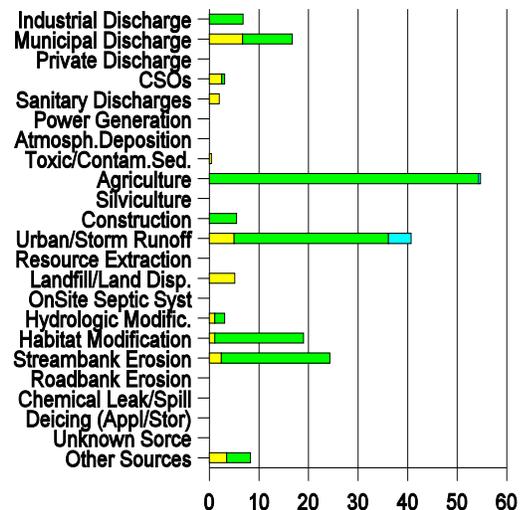


- Precluded
- Impaired
- Stressed
- Threatened

#### Oswego River Basin

Total River Miles: 8,896  
Total PWL Miles: 2,796

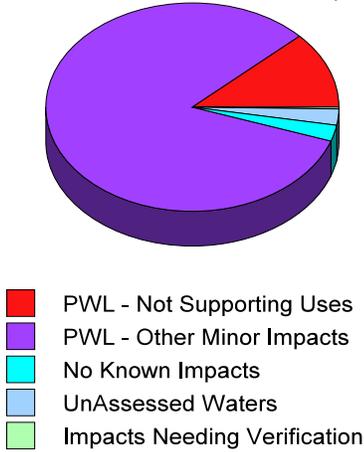
**Major Sources of Impact**  
(PWL Segments Only)



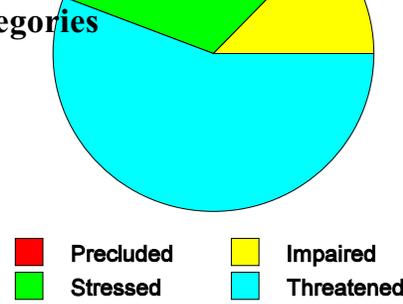
Percent of PWL Waters Affected

# Lakes/Reservoirs

## Water Quality Assessment Categories (for ALL Waters in the Basin)

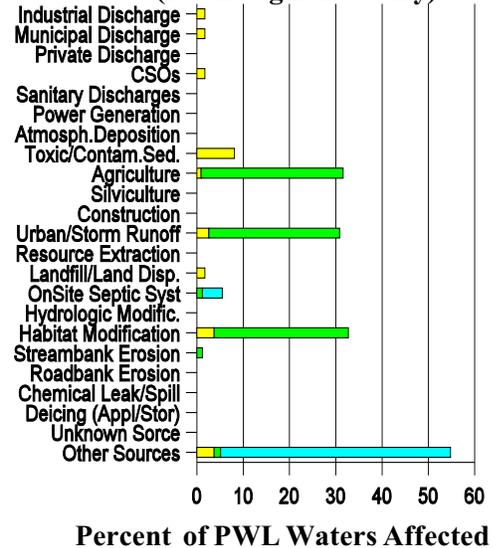


## Severity of Problems (PWL Segments Only)



**Oswego River Basin**  
 Total Lake Acres: 190,446  
 Total PWL Acres: 180,917

## Major Sources of Impact (PWL Segments Only)



## Basin Water Quality Summary

About one-third (31%) of the 8,896 river miles in the Oswego River/Finger Lakes Basin (2,796 miles) are included on the Priority Waterbodies List as either not supporting uses or having minor impacts or threats to water quality. The large majority (83%) of these Priority Waterbody Listed river miles are considered *Stressed* or *Threatened* waters that fully support appropriate uses, but that have minor impacts/threats to uses. Only about five percent (5%) of all basin river miles are *Impaired* and do not fully support appropriate uses.

Nineteen of the 76 separate lake segments in the basin are included on the PWL as having either impaired uses or minor impacts/threats to uses. However these 19 impaired/impacted lakes represent nearly all (95%) of the total lake acres in the basin. For six of these lakes (totaling 23,198 acres, or 12% of basin lake acres) the impacts are such that fish consumption, recreational uses and/or aquatic life support are not fully supported. Half of the impaired lake acres are the result of a fish consumption advisory for one lake (Keuka Lake). It is also worth noting that 56% of the Priority Waterbody listed lake acres do not presently exhibit signs of impact or stress, but are listed as *Threatened* due to their AA classification, reflecting the value of these water resources and the need to protect them.

The most frequently cited sources affecting water quality in the basin are agricultural activity and urban/stormwater runoff. Habitat modification and streambank erosion are also often noted as contributing sources. The sources of the more severe impairments to the waters of the basin include toxic/contaminated sediments from past/historical discharges, municipal point discharges, landfill disposal and urban/stormwater runoff. Combined sewer overflows and untreated or inadequately treated sanitary discharges have also been noted. Most of the lake acres listed as *Threatened* are listed as being the result of *Other Sources*. These listings can be interpreted as including a wide range of unspecified potential sources that may impact future water quality in the basin.

Figure 2 - Oswego River/Finger Lakes Basin Water Quality Assessment Map

# The Oswego River/Finger Lakes Basin Waterbody Inventory/Priority Waterbodies List

This inventory of water quality information includes individual waterbody *Data Sheets* describing the water quality conditions in the Oswego River/Finger Lakes Basin of New York State. Causes (pollutants) and sources of water quality problems for those waterbodies with known or suspected impacts are also outlined.

The data sheets on the following pages are compiled in hydrological order and grouped by US Geological Survey Hydrologic Unit Code (HUC) basin and smaller watersheds in the Oswego River/Finger Lakes Basin (see Figure 2). An outline of the specific waterbodies in each watershed is presented at the beginning of each Watershed Section. Data sheets are included for each waterbody that has been assessed; that is, waterbodies listed as *Impaired Waters*, *Waters with Minor Impacts*, *Threatened Waters*, waters with water quality impacts *Needing Verification*, or waterbodies with *No Known Impact*. *UnAssessed* waterbodies are listed in the hydrologic outline of waterbodies at the front of each Watershed Section; however, separate data sheets for these segments are not included because they have yet to be assessed.

The information outlined on the data sheets includes *Waterbody Location Information*, *Water Quality Problem/Issue Information*, *Resolution/Management Information* and *Further Details*. More detailed explanations of these data fields are outlined in Appendix B: *Waterbody Inventory Data Sheet Background Information*.

Note that this inventory and the assessments reflect the best available water quality information at the time of publication. Water quality information may be added or modified subsequent to the preparation of this edition of the Waterbody Inventory and Priority Waterbodies List. When water quality information is updated, the corresponding waterbody segment data sheet is issued with an appropriate revision date. The information on more recently revised data sheets supercedes the information in this listing.

In addition to the more detailed data sheets, a *Summary Listing of Priority Waters* provides a brief overview of all *Priority Waterbodies* (i.e., *Impaired Segments*, *Segments with Minor Impacts* and/or *Threatened Waters*). This listing follows the Data Sheet Section of the report.

Cross-referenced lists of the waterbody data sheets are included at the end of the report as Appendix C: County Index of Data Sheet Segments, and Appendix D: Alphabetic Index of Data Sheet Segments.

Figure 3 - Oswego River/Finger Lakes Watershed Map