The Genesee River Basin

Basin Description

The Genesee River Basin originates in the Allegheny Plateau highlands of northern Pennsylvania, about 15 south of the New York State-Pennsylvania border. From there the Genesee River flows generally north across western New York State to Lake Ontario. The upper (southern) portion of the basin drains generally lightly populated agricultural and forested lands. Farther downstream (north) the basin becomes more populated and developed. At its mouth the river flows through the urban center of Rochester. About midway along its path to Lake Ontario, the Genesee River cuts through the Genesee River Gorge (sometimes referred to as the "Grand Canyon of the East") in Lecthworth State Park. The entire basin drains 2,480 square miles, most of which is in New York State. Within New York State the basin drainage area includes most of Livingston and Allegany Counties, large parts of Monroe, Genesee and Wyoming Counties, and portions of Orleans, Ontario, Steuben and Cattaraugus Counties.

The population of the entire Genesee River Basin within New York State totals about 401,100 people (2000). The largest population center in the basin is Rochester with a city population of 230,356 (not all of whom live within the basin boundaries), and a considerable suburban population surrounding the city. Outside the Rochester Metropolitan Area, the basin is largely rural and forested or agricultural. The size of the next largest centers of population in the basin are only a few thousand. Wyoming, Livingston and Allegany Counties in particular are significant agricultural areas.

There are about 5,048 miles of rivers and streams and 31 significant* lakes, ponds and reservoirs (covering 13,288 acres) in the basin. Of these lakes, the four largest (Mount Morris Reservoir, Conesus, Hemlock and Honeoye Lake) represent over 80% of the total amount of lake acres in the basin. Within New York State, these Genesee River itself extends to a total of about 140 miles.

Water Quality Issues and Problems

The Genesee River Basin drains a diverse area that encompasses highly urbanized Rochester, surrounding commercial strips and suburban residential communities, heavy agricultural areas and lightly populated tracts of forested land. Not surprisingly, water quality issues in the basin are also quite diverse. But while minor water quality impacts are fairly widespread in the basin, the more significant use impairments are limited to a smaller number of river and streams, and a few larger lakes that comprise nearly half the lake acres in the basin. The more significant water quality issues in the basin are discussed below.

Urban/Industrial Impacts

Various recreational uses, aquatic life support and aesthetics in urban waterways of the Lower Genesee River are significantly restricted by pollutants from various industrial, municipal, commercial and other sources in the highly-urbanized metropolitan Rochester area and surrounding suburban communities. Nonpoint urban runoff flushes a variety of pollutants and debris into the river. Contaminated sediments, inactive hazardous waste sites and other impacts attributed to past/historic discharges also limit uses.

Silt/Sediment Loadings

The Genesee River also carries a significant silt and sediment load. Much of this silt/sediment loading is

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

considered to be largely naturally occurring, as the river flows through an alluvial plain with highly erodible soils, and in some areas steep stream and lake banks. However, extensive agricultural activity and continuing land development throughout the basin also contribute to the loading.

Nonpoint Source Nutrient Loadings

In addition to silt and sediment loads, nutrient loadings from various nonpoint sources impact water quality in the basin. Elevated nutrient concentrations contribute to excessive aquatic weed and algal growth. Such conditions restrict and discourage recreational activities (swimming, fishing, boating) and can impact drinking water supplies. Agricultural activity is considered the primary source of much of the nutrient load. Failing and/or inadequate on-site septic systems serving a number of smaller villages and hamlets have also been identified as likely or possible sources.

Fish Consumption Advisories

Fish consumption in Canadice Lake is impaired due to a NYS DOH health advisory. The advisory recommends eating no more than one meal per month of lake and brown trout due to PCB contamination. The most probable source of PCBs, an electrical component dump, was identified in 1985 and was remediated under the State Superfund program. Analysis of fish from the lake show a continuing downward trend in PCB concentration. PCB concentrations are now less than allowable FDA level for human consumption, but still exceed DEC guideline for consumption by piscivorous animals.

Fish consumption in the Lower Genesee is impaired due to a NYS DOH health advisory for Lake Ontario that applies to the first impassable fish barrier (Lower Falls). The advisory recommends eating no American eel, channel catfish, carp, chinook salmon, and larger lake trout (> 25 inches) and brown trout (>20 inches). Consumption of white sucker, rainbow trout, smaller lake and brown trout, and larger coho salmon (>25 inches) should be limited to no more than one meal per month. These advisories are a result of elevated PCBs, mirex and dioxin in Lake Ontario sediments.

Recreational and Water Supply Uses of Lakes

Various recreational uses and/or drinking water supply use in some of the larger lakes in the basin are restricted or otherwise affected by elevated nutrient loads, reduced dissolved oxygen, poor clarity and aquatic vegetation and weed growth. Agricultural nonpoint sources, failing/inadequate on-site septic systems and/or nutrient recycling are considered likely sources of nutrients. Dense rooted aquatic vegetation significantly restricts recreational uses of Honeoye and Conesus Lakes. Mechanical harvesting or other measures are necessary to maintain recreational uses. Nutrients (phosphorus) and algal growth that reduce clarity in Silver Lake have impacts on the water supply use of the lake.

Hemlock Lake/Rochester Drinking Water Supply

The City of Rochester uses Hemlock Lake for its drinking water supply. The city has constructed a water filtration plant to meet legal requirement that treatment of all surface water supplies include filtration. Additionally, the city owns most of the land immediately surrounding the lake and enforces watershed rules and regulations that significantly restrict other uses. Swimming is not allowed, boating is severely restricted and fishing requires a permit. These watershed rules and regulations contribute significantly to the reduction of threats due to silt, sediment, turbidity and nutrient loadings and the protection of the overall lake condition. Although there are no known water quality impacts in the lake, this segment is included on the Priority Waterbodies List as a "special use" water due to its drinking water supply classification.

Groundwater Resources

Although groundwater resources are not specifically tracked through the WI/PWL, they are considered *Priority Waters* nonetheless. Ground water 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.

Groundwater is not incorporated into the WI/PWL because of the difficulties with regard to monitoring, assessing and even defining "waterbody segments." In addition, the emphasis on *protection* of groundwater now (rather than *restoration* later) also makes the WI/PWL an inadequate tool to manage this resource. While the WI/PWL discusses water quality threats to some degree, the more typical WI/PWL approach tracks the need for periodic assessment, the determination of impacts and impairments, and the progress toward restoration of uses. While this approach is adequate for surface waters, the use of groundwater for drinking water supplies, the corresponding impact on public health, and the considerable difficulty in restoring groundwater resources once degraded, requires a different approach. The proper management of groundwater resources requires a greater emphasis on threats (both known and potential) than the WI/PWL provides, and less focus on restoration. In the Genesee River Basin, the more significant of these threats include agricultural sources, inadequately maintained and/or failing on-site septic systems and salt storage and application for road deicing.

Genesee River Basin Water Quality Assessment

The series of charts presented on the following page provide an overall assessment of water quality conditions in the entire Genesee River Basin. For each waterbody type (rivers/streams and lakes/reservoirs) the first pie chart reveals the percentage of the miles/acres of waters in the basin that fall into the various *Water Quality Assessment Categories*. The red slice of the first pie indicates the percentage of waters characterized as *Impaired Segments* which do not support appropriate uses. The purple slice represents segments with *Minor Impacts* and *Threatened Waterbody Segments*. Taken together, waters in all these categories (represented by the red and purple slices) 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:

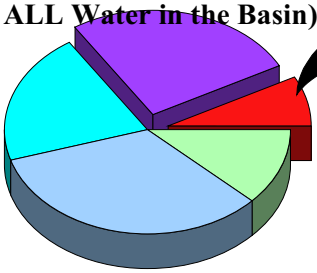
Precluded:	waters do not support appropriate uses,
Impaired:	waters frequently do not support appropriate uses,
Stressed:	waters support appropriate uses, but other water quality impacts are apparent, and
Threatened:	waters support uses and have no impacts, but activities threaten future use support.

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 Genesee River 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.

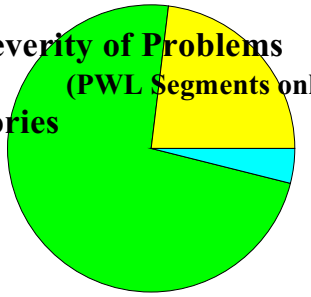
Rivers/Streams

Water Quality Assessment Categories
(for ALL Water 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)

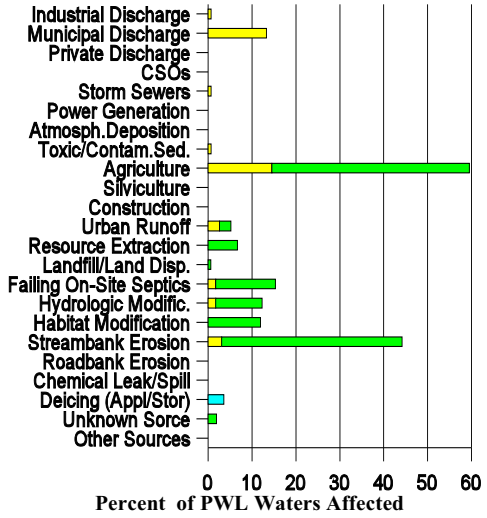


Precluded
Impaired
Stressed
Threatened

Genesee River Basin

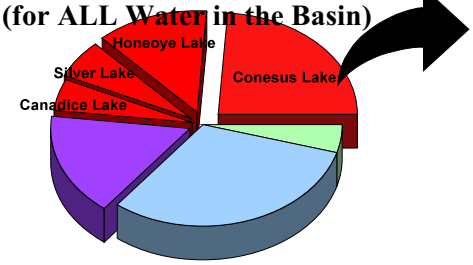
Total River Miles:	5,048
Total PWL Miles:	1,733

Major Sources - Priority Waterbodies



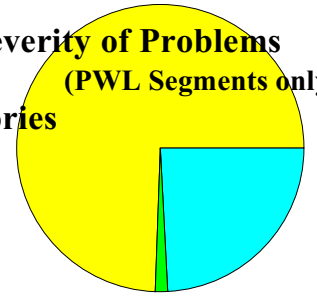
Lakes/Reservoirs

Water Quality Assessment Categories
(for ALL Water 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)

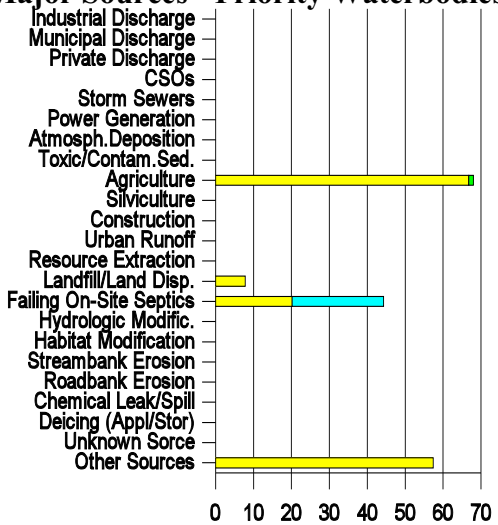


Precluded
Impaired
Stressed
Threatened

Genesee River Basin

Total Lake Acres:	13,288
Total PWL Acres:	8,569

Major Sources - Priority Waterbodies



Basin Water Quality Summary

About one-third of the river (and canal) miles in the Genesee River Basin (1,733 miles) are listed on the Priority Waterbodies List as either not supporting uses or having minor impacts or threats to water quality. Over three-quarters of these miles are listed as *Stressed* or *Threatened* waters that fully support appropriate uses, but with minor impacts/threats. Only about eight percent of basin river miles are *Precluded* or *Impaired* and do not support appropriate uses.

A larger percentage (about 64%) of lake acres in the basin are included on the PWL. Impacts to five of the six largest lakes in the basin represent nearly all of the PWL lake waters. All of the lake acres not supporting uses are a result of impairments to four lakes: Conesus, Honeoye, Silver and Canadice Lakes. These impairments are the result of nonpoint nutrient runoff, resulting aquatic weed and algal growth and/or fish consumption advisories. About 95% of the lake acres listed as having *Other Minor Impacts* is attributable to the listing of a single large lake -- Hemlock Lake -- as *Threatened* due to its use as a significant public drinking water source.

The 2001 Genesee River Basin Waterbody Inventory/Priority Waterbodies List

This inventory of water quality information includes individual waterbody *Data Sheets* describing the water quality conditions in the New York State portion of the Genesee River Basin. 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 Genesee River 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 Segments, Segments 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.

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

Note also that the inventory reflects 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.