

The Saint Lawrence River Basin

Basin Description

As the gateway between the North Atlantic and the Great Lakes, the Saint Lawrence River is one of the most significant waterways in North America. At its most downstream point in the United States (near Massena) the Saint Lawrence drains an area of nearly 300,000 square miles. About 5,600 square miles in New York State are drained by tributaries that enter the Saint Lawrence between Lake Ontario and Montreal (excluding the area of the Lake Champlain Basin). This area includes all of Saint Lawrence County, most of Franklin County, large portions of northern Jefferson, Lewis, Herkimer and Hamilton Counties, and small parts of Essex and Clinton Counties.

The overall land use/character of the Saint Lawrence Basin in New York State is split between the densely forested woodlands covering the northern and western slopes of the Adirondack Mountains in the southern headwaters portion of the basin; and the flat, more agricultural lake plain region along the Saint Lawrence in the northern basin. The primary economic activities in the region include agriculture, logging, mining and recreation/tourism. A heavy industrial complex centering around aluminum production is located in Massena. Although it is the largest of the major drainage basins in the state, the Saint Lawrence Basin ranks eleventh out of seventeen in population with 194,869 (2000) residents. Nearly 60% of the population is rural/residential (town), 35% is urban/residential (village), and only 7% is urban (city). The largest urban center is Massena (11,931). The remainder of the basin population is mostly rural with small population centers such as Potsdam (15,957), Malone (14,981), Ogdensburg (12,364), Canton (10,334) and Gouverneur (7,418) located along the Saint Lawrence River and its larger tributaries.

There are about 11,371 miles of rivers and streams in the basin – more than in any other basin in the state – and nearly 1,100 lakes and ponds. Many of the ponds are too small to be individually assessed, but 376 significant* lake, pond and reservoir waterbody segments (covering 85,723 acres) are included in the Saint Lawrence River Basin Waterbody Inventory. In addition the Saint Lawrence River accounts for 185 miles of Great Lakes shoreline. The largest tributary to the Saint Lawrence is the Oswegatchie with 3,590 miles of stream, almost one-third of the basin total. This watershed includes 1,222 miles of stream in the Indian River drainage. Other large tributary watersheds in the basin include the Raquette River Watershed (2,016 miles of stream, 18%), the Saint Regis Watershed (1,734 miles, 15%), the Grass River Watershed (1,607 miles, 14%) and the Salmon River Watershed (857 miles, 8%). Of the lakes/reservoirs, the largest are Black Lake (7,754 acres, or 9% of the basin lake acres), Cranberry Lake (6,795 acres, 8%), Raquette Lake (5,194 acres, 6%), Tupper Lake (4,858 acres, 6%) and Long Lake (4,094 acres, 5%).

Water Quality Issues and Problems

The most significant sources of water quality impacts in the Saint Lawrence River reflect the rural and somewhat remote character of the basin. In fact, a number of the sources having the greatest impact on water quality actually originate from outside the basin. These include atmospheric deposition of mercury and acid rain and toxic contaminants from Lake Ontario. Impacts from agricultural activities are frequently cited; not surprising in that the basin includes some of the most significant farming areas in the state. Hazardous waste sites and other industrial impacts have resulted in impairments, most notably in the Massena area.

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

Some portions of the Saint Lawrence River Basin fall within the protection of the Adirondack Park. The Adirondack Park was created in 1892 by the State of New York to protect the water and timber resources of the region. Today the Park is the largest publicly protected area in the contiguous United States, greater in size than Yellowstone, Everglades, Glacier, and Grand Canyon National Park combined. The boundary of the Park encompasses approximately 6 million acres, nearly half of which belongs to all the people of New York State and is constitutionally protected to remain “forever wild” forest preserve. The remaining half of the Park is private land which includes settlements, farms, timber lands, businesses, homes, and camps.

Atmospheric Deposition of Mercury

Mercury is a toxin that rapidly bioaccumulates up the food chain, and can concentrate in large predatory fish. This is particularly true in acidic waters. While mercury has been largely removed from most wastewater and industrial effluents, air emissions and the resulting atmospheric deposition of mercury on the land and into the waters remain a significant source. New York State has issued health advisories limiting the consumption of various species of sportfish for about a dozen specific waterbodies in the Saint Lawrence Basin, including four of the five largest lakes: Cranberry, Raquette, Tupper and Long Lakes. A general advisory for limiting the consumption of sportfish from all waters of the state is in place due to the common occurrence of some chemicals (including mercury) in fish and the inability to test all waters. There are additional more restrictive advisories for women and children regarding the consumption of fish from waters of the Adirondacks and Catskills because of the likelihood of atmospheric deposition to acidic waters in these areas.

Acid Rain

Low pH attributed to atmospheric deposition/acid precipitation has been documented in many small lakes and ponds in the basin. Such conditions are known to have a significant impact on ecosystems, impairing fish and aquatic life support in some lakes and ponds. Efforts are underway on a national level to address problems caused by acid rain by reducing pollutant emissions, as required by the Clean Air Act. New York State (and other northeastern states) have taken legal action against USEPA to accelerate implementation of controls. Monitoring of these waters will continue, in order to assess changes in water quality resulting from implementation of the Clean Air Act. However, these changes are expected to occur only slowly over time.

Previous Priority Waterbodies Lists included a significant number of small lakes impacted by acid rain/atmospheric deposition. However, with the expansion of the WI/PWL database to accommodate all waterbodies, it was necessary to limit individual listing of smaller lakes. Although these lakes and ponds are no longer listed separately, and the sum total lake area affected is not that large a percentage of the total lake area in the basin, acid rain/atmospheric deposition remains a significant water quality issue affecting a large number of waterbodies in the Saint Lawrence Basin.

In 2006, NYSDEC established and USEPA approved a TMDL to address acid rain impairment to 143 Adirondack lakes that are located in NYS Forest Preserve lands, including some in the Saint Lawrence River Basin. Recognizing that the available pH data for many of these lakes is 20-30 years old, the TMDL outlines a phased/adaptive management approach, that initially relies heavily on monitoring and assessment to determine current conditions, modeling refinements to estimate future conditions, and the implementation of statewide, regional and national efforts to reduce atmospheric loadings causing the impairment.

Saint Lawrence River Fish Consumption Advisories

Fish consumption in the entire length of the Saint Lawrence River is impaired due to various toxic pollutants that result in NYS Department of Health fish consumption health advisories. These advisories recommend

limiting consumption of many species (and eating none of other species) because of elevated levels of PCBs and other contaminants. The contamination is largely the result of past industrial discharges to the waters of the Saint Lawrence River and the Lake Ontario/Great Lakes watershed. Remediation of industrial sites within the basin are ongoing (see *Saint Lawrence/Massena Remedial Action Plan*, below). These restrictions have severely affected recreational and commercial fishing in the River.

Saint Lawrence/Massena Remedial Action Plan

The St. Lawrence River at Massena Remedial Action Plan (RAP) Area of Concern (AoC) begins above the power dam facilities and seaway locks at the Massena Village drinking water intake and follows the river downstream for about fifteen miles to the international border. For New York State, the AoC includes portions of the Grass, Raquette and St. Regis Rivers. There are three governmental agency groupings that share jurisdictional responsibilities for the AoC. These are the United States, Canada, and the St. Regis Mohawk Tribe at Akwesasne.

Pollution from past local area industrial production and waste disposal practices created contaminated sediments and hazardous waste sites that to a large degree are being or have been remediated. The sources and causes include PCBs, mercury, DDE, Mirex, nutrients, metals and physical disturbance. Large area remedial projects at Alcoa and General Motors sites have contributed significantly to the restoration and protection of beneficial uses in the AoC. After the Grass River and limited land-based remedial measures are completed, a reassessment of the status of the beneficial use indicators is to be conducted. When the installation of water and air pollution discharge equipment is included, the total costs of the Massena area cleanup will likely exceed one billion dollars.

Remedial Action Plans

The Great Lakes Remedial Action Plan (RAP) program originated in 1985 with the International Joint Commission (IJC) Great Lakes Water Quality Board and was formalized in 1987 amendments to the United States-Canada Great Lakes Water Quality Agreement. The Agreement calls for the federal governments, in cooperation with state and provincial governments, to ensure that RAPs incorporate a systematic and comprehensive ecosystem approach in restoring beneficial uses, and that the public is consulted in all actions undertaken pursuant to RAPs. The ecosystem approach accounts for the interactions among land, air, water, and all living things, including humans.

RAPs are pollution identification and abatement action plans that outline the necessary remedial activities to correct use impairments and document progress towards restoration. The RAP process begins with the identification of use impairments, sources, and causes based on 14 IJC indicators. The plans further identify remedial and preventative actions to restore and to protect beneficial uses, and seek to document and confirm the restoration.

Agricultural Activity

Considerable agricultural activity in the Saint Lawrence River valley has measurable impacts on aquatic life use support and recreational uses of some basin waters. Agricultural runoff contributes nutrient and silt/sediment loads to the streams. Poor agricultural management practices, including permitting livestock unrestricted access to streams, improper manure application on fields, intensively cultivated crop lands with little riparian buffer and fertilizer, pesticide application to fields in the absence of approved nutrient/pesticide management plans and a lack of silage leachate control and manure or milkhouse wastewater treatment facilities can have significant impacts on nearby waters. Various state and local (county) agencies are working with the farming community to address these issues.

Failing and/or Inadequate On-site Septic Systems

Recreational uses and aesthetics of lakes and streams in a number of smaller rural communities are impacted by failing and/or inadequate on-site septic systems. In some cases, raw sewage discharges to the waters have

been observed. Such conditions raise obvious public health concerns as well. Efforts to address these problems are often hindered by fiscal considerations. Correcting individual systems and/or the sewerage of a larger neighborhood or community results in a significant (often insurmountable) financial burden. NYSDEC and the NYS Environmental Facilities Corporation works with local communities to identify funding opportunities to address the water quality impacts.

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 Saint Lawrence River Basin, the more significant threats to groundwater resources include inactive hazardous waste sites and industrial discharges, pesticide application, chemical spills, animal feeding operations and inadequate on-site wastewater treatment systems. The impact of increasing groundwater withdrawals in order to support development is an emerging issue that merits additional investigation.

Saint Lawrence River Basin Water Quality Assessment

The series of charts presented on the following pages provides an overall assessment of water quality conditions in the entire Saint Lawrence River Basin. For each waterbody type (rivers/streams, lakes/reservoirs and Great Lakes shoreline) 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 *Not Supporting Uses*. The **purple** portion represents segments with *Minor Impacts/Threats*. Taken together, these categories of waters comprise the *Priority Waterbodies* for that waterbody type. The percentage of miles/acres for the other water quality assessment categories – waterbodies having *No Known Impacts*, *UnAssessed Waters*, 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 waters in the two categories that comprise the Priority Waterbodies. The levels of severity are:

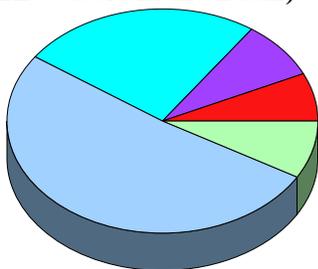
- Precluded:* waters do not support appropriate uses;
- Impaired:* waters frequently do not support appropriate uses;
- Stressed:* waters support appropriate uses, but other water quality impacts are apparent; and
- Threatened:* waters support uses and have no impacts, but activities threaten future 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 Saint Lawrence River Basin. The charts reflect the percentage of miles/acres of the total waterbody area on the Priority Waterbodies List where a particular source is listed as a major contributor to the water quality impact. For each source, the color shading of the bar indicates the severity level (*Precluded, Impaired, Stressed, Threatened*) of the most significant water use impact to the waterbody.

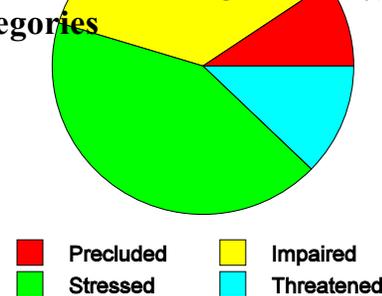
Rivers/Streams

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

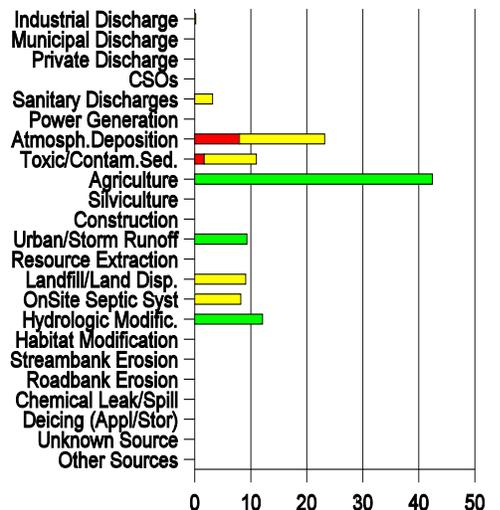
Severity of Problems
(PWL Segments Only)



Saint Lawrence Basin

Total River Miles: 11,371
Total PWL Miles: 1,658

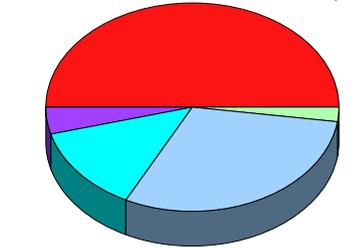
Major Sources of Impact
(PWL Segments Only)



Percent of PWL Waters Affected

Lakes/Reservoirs

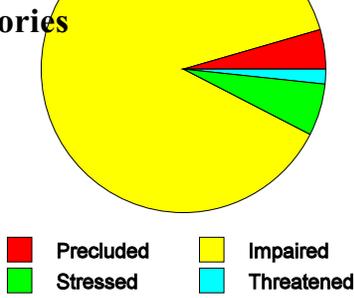
Water Quality Assessment Categories (for ALL Waters in the Basin)



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

Severity of Problems

(PWL Segments Only)

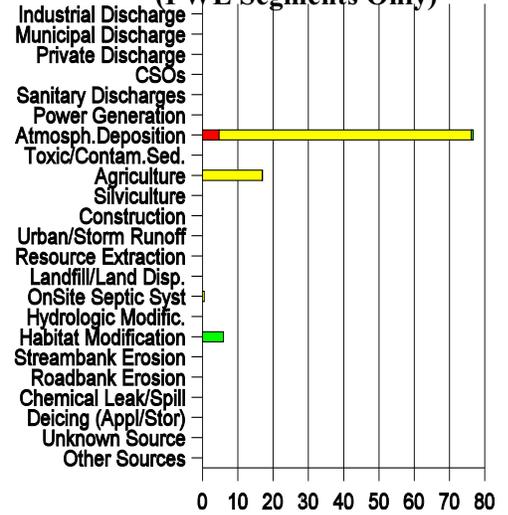


- Precluded
- Stressed
- Impaired
- Threatened

Saint Lawrence Basin
 Total Lake Acres: 85,723
 Total PWL Acres: 46,449

Major Sources of Impact

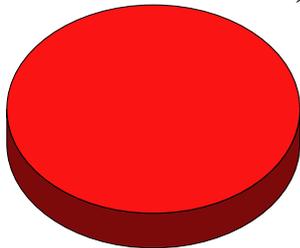
(PWL Segments Only)



Percent of PWL Waters Affected

Great Lakes Shore

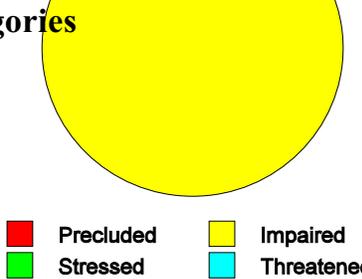
Water Quality Assessment Categories (for ALL Waters in the Basin)



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

Severity of Problems

(PWL Segments Only)

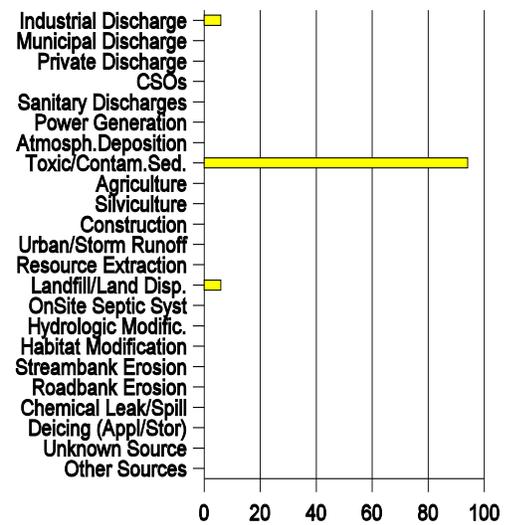


- Precluded
- Stressed
- Impaired
- Threatened

Saint Lawrence Basin
 Great Lakes Shore Miles: 185
 Total PWL Shore Miles: 185

Major Sources of Impact

(PWL Segments Only)



Percent of PWL Waters Affected

Basin Water Quality Summary

About fifteen percent (15%, or 1,746 miles) of the 11,371 river miles in the Saint Lawrence River Basin are included on the Priority Waterbodies List as either not supporting uses or having minor impacts or threats to water quality. More than half (54%) of these Priority Waterbody Listed river miles are considered *Stressed* or *Threatened* waters that fully support appropriate uses but have minor impacts/threats to uses. Only about seven percent (7%) of all basin river miles are *Impaired* and do not fully support appropriate uses.

Sixty-nine (69) of the 376 separate lake segments in the basin are included on the PWL as having either impaired uses or minor impacts/threats to uses. However these 69 impaired/impacted lakes include a number of larger lakes and represent about fifty-four percent (54%) of the total lake acres in the basin. For 63 of these lakes (totaling 43,035 acres, or 50% of basin lake acres) the impacts are such that fish consumption, recreational uses and/or aquatic life support are not fully supported. Nearly three-fourths (75%) of the impaired lake acres are the result of fish consumption advisories due to the atmospheric deposition of mercury. These advisories for mercury include eight of the twelve largest lakes in the basin.

All (100%) of the Great Lake Shoreline waters in the basin are impaired due to fish consumption advisories that extend along the entire length of the Saint Lawrence River. These advisories are the result of past industrial discharges to the waters of the Saint Lawrence River and Lake Ontario/Great Lakes watershed. Note that in previous WI/PWL assessment reports the Saint Lawrence River was counted among other river segments. However for this and future reports, the Saint Lawrence will be assessed as a portion of the Great Lakes Shoreline.

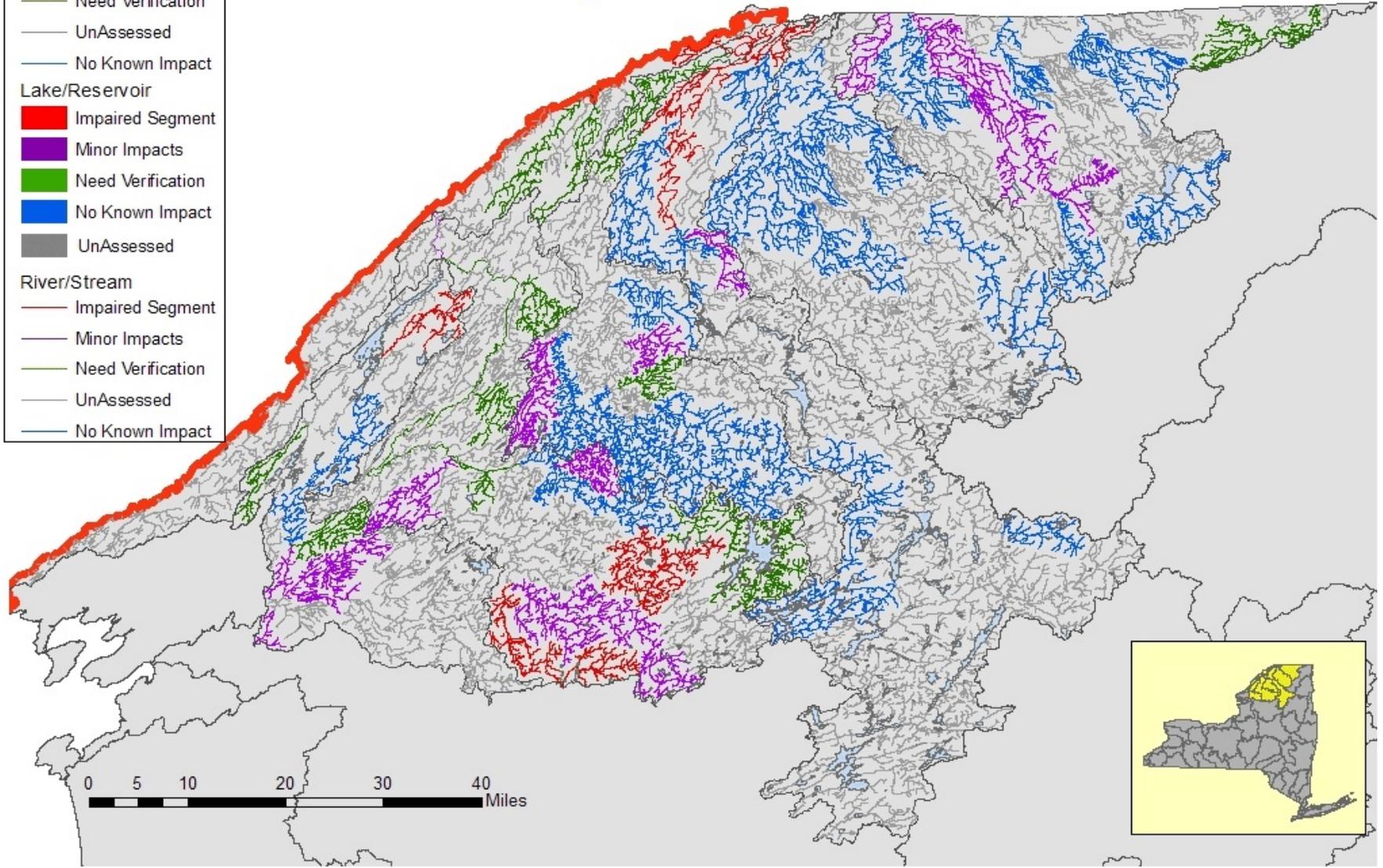
The most frequently cited sources of impacts affecting water quality in the basin are atmospheric deposition, toxic/contaminated sediments and agricultural activities. Atmospheric deposition of both mercury and constituents of acid rain is the source of the most significant impairments to the waters of the basin. Toxic/contaminated sediments – largely the result of historic legacy pollutant discharges – are responsible for the impairment to the entire length of the Saint Lawrence River. The occurrence of agricultural sources reflects the rural character of the basin which includes significant farming regions. However, for the most part, agricultural activities result in less severe stresses and threats to water quality rather than more significant use impairment caused by atmospheric deposition and contaminated sediments.

Figure 2

Saint Lawrence River Basin

W/PWL Water Quality Assessment

- Assessment**
- Great Lakes Shoreline
 - Impaired Segment
 - Minor Impacts
 - Need Verification
 - UnAssessed
 - No Known Impact
 - Lake/Reservoir
 - Impaired Segment
 - Minor Impacts
 - Need Verification
 - No Known Impact
 - UnAssessed
 - River/Stream
 - Impaired Segment
 - Minor Impacts
 - Need Verification
 - UnAssessed
 - No Known Impact



The Saint Lawrence River Basin

Waterbody Inventory/Priority Waterbodies List

This compilation of water quality information includes individual waterbody *Data Sheets* describing the water quality conditions in the Saint Lawrence River 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 are presented in hydrologic order, beginning with the most downstream waters and continuing upstream through the basin. Waterbody data sheets are grouped by US Geological Survey Hydrologic Unit Code (HUC) basin and presented as separate sections of this report (see Figure 3). A Waterbody Inventory of the specific waterbody segments in each watershed is included at the beginning of each watershed section.

Data sheets are included for each waterbody that has been assessed; i.e., waterbodies listed as *Impaired Waters* (Not Supporting Uses), Waters with *Minor Impacts*, *Threatened Waters*, waters with water quality impacts *Need Verification*, or waterbodies with *No Known Impact*. *UnAssessed* waterbodies are included in the Waterbody Inventory for each watershed, but because they have not been assessed data sheets for these waters have not been included.

The information outlined on the data sheets includes *Waterbody Location Information*, *Water Quality Problem/Issue Information*, *Resolution/Management Information* and *Further Details*. See *Appendix B – Waterbody Inventory Data Sheet Background Information* for more details about the data sheets.

Note that the assessments in this report 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 information is updated, the data sheet for the corresponding waterbody segment is issued with the date of revision. More recently revised data sheets supercede the corresponding waterbody information in this listing.

Following the individual waterbody data sheets in the watershed sections, a *Summary Listing of Priority Waters* provides a brief overview of all *Priority Waterbodies*, i.e., waterbodies listed as *Impaired Waters* (Not Supporting Uses), Waters with *Minor Impacts* and *Threatened Waters*.

Indices of waterbody data sheets by both county and alphabetically by segment name are included as Appendix C and D, respectively.

Figure 3
Saint Lawrence River Drainage Basin Watershed



Upper Saint Lawrence River Watershed
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English/Salmon Rivers Watershed
Page 15

Saint Regis River Watershed
Page 61

Raquette River Watershed
Page 115

Oswegatchie River Watershed
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Grass River Watershed
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Black Lake/Indian River Watershed
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