

The Susquehanna River Basin

Basin Description

The Susquehanna River Basin is the second largest river basin – next to the Ohio River Basin – east of the Mississippi River and the largest on the Atlantic seaboard. The 444-mile Susquehanna River drains 27,500 square miles covering portions of New York, Pennsylvania and Maryland before emptying into the Chesapeake Bay. In New York State the Susquehanna Basin encompasses much of the south-central portion of the state. The western-most third of the New York State portion of the basin is drained by the Chemung River, which is a major tributary to the Susquehanna. (Within New York State, the Chemung River Basin is considered a separate drainage basin and is addressed in a separate WI/PWL Report.) Excluding the Chemung River drainage, the Susquehanna River drains approximately 4,520 square miles in central New York. This drainage area includes most of Broome, Chenango, Cortland, Otsego and Tioga Counties; parts of Delaware, Madison and Chemung Counties; and small portions of Schuyler, Tompkins, Onondaga, Oneida, Herkimer and Schoharie Counties.

The population of the entire Susquehanna River Basin totals over 4 million people: a number that includes about 438,938 (2000) New York State residents. The largest population centers within the New York State portion of the basin are the City of Binghamton (47,380), City of Cortland (18,740), Village of Johnson City (15,535), City of Oneonta (13,292) and Village of Endicott (13,038). The region is characterized by low rolling hills covered by hardwood forests and large wide valleys scattered with agricultural activity. Seventy percent (70%) of the basin is forested; agricultural land uses account for about 25% of the drainage area. Consequently most of the basin population is rural or located in smaller villages and hamlets.

There are about 7,597 miles of river and stream and over 400 lakes and ponds in the New York State portion of the Basin. Many of the ponds are too small to be individually assessed, but 129 significant* lake, pond and reservoir waterbody segments (covering 13,800 acres) are included in the Susquehanna River Basin Waterbody Inventory. The three main sub-basins of the Susquehanna Basin in New York are the Lower Susquehanna (below Binghamton to the state line), the Chenango River and the Upper Susquehanna (above Binghamton). The larger tributary watersheds in the Basin are the Tioughnioga River Watershed (1,293 miles of stream, or 17% of the basin total) which includes the Otselic River Watershed, the Unadilla River Watershed (936 miles, 12%), the Owego Creek Watershed (766 miles, 10%), and the Cayuta Creek Watershed (279 miles, 4%). Otsego Lake (4,100 acres) is the largest lake and accounts for 3% of basin lake acres. The next largest lakes are Canadargo Lake (1,882 acres, 1%), and Whitney Point Reservoir (1,235, 1%).

Water Quality Issues and Problems

Water quality in the Susquehanna River Basin generally ranges from satisfactory to very good. Over 85% of river miles and lake acres fully support uses with no more than minor impacts, and about two-thirds of river miles and lake acres were found to have no known impacts. Use impairments affect about 10% of basin waters. But these impairments are almost entirely a result of 1) a fish consumption advisory for mercury in specific waters that is largely attributed to atmospheric deposition, or 2) impacts to a single large lake from agricultural activities. Lesser impacts or threats affect another 10% of basin waters. The most significant sources of impacts include agricultural activities, inadequate on-site septic systems and streambank erosion.

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

Agricultural Activity

Considerable agricultural activity in the largely rural Susquehanna River Basin has an impact on aquatic life use support and recreational uses of the waters. Agricultural runoff contributes nutrient and silt/sediment loads to the streams and lakes. If not properly managed these pollutants result in algal and weed growth and reduced water clarity that limits recreational use. Agricultural activities are a frequently cited source of impacted waters in the basin. However numerous state and local (county) agencies and organizations are actively working with the farming community to continue to manage these sources.

Atmospheric Deposition of Mercury

Mercury is a toxin that bioaccumulates up the food chain, and can concentrate in large predatory fish. 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 walleye taken from the Susquehanna, Chenango and Unadilla Rivers. 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. Though sources other than atmospheric deposition could possibly be contributing, mercury has been largely removed from most wastewater and industrial effluents and no other sources in the basin have been identified.

Streambank Erosion

Silt and sedimentation from the erosion of stream banks is a source of impacts to stream habitat and resident fisheries. Steep gradient streams that cut through silty soils are highly susceptible to erosion. Though some erosion may be considered the natural result of topography and soil type, uncontrolled livestock access to streams and other practices can exacerbate the problem.

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.

Municipal Wastewater Treatment

A number of municipal wastewater treatment facilities along the Lower Susquehanna River have undergone upgrades and collection system improvements in recent years. The Binghamton-Johnson City Joint STP, for example, has been nearly completely rebuilt and went on line in 2009. Plant capacity was increased from 20 mgd to 60 mgd and now includes advanced ammonia and total nitrogen removal. Ammonia, nitrogen, BOD and TSS levels are typically reported to be close to the method detection levels. In-line screening and upgrades to both Binghamton and Johnson City CSO outfall structures were also completed in 2002 resulting in 85% capture of wet weather flows which are being treated to at least secondary standards at the plant (exceeding EPA CSO policy which requires only primary treatment for 85% of the wet weather flows). These and other improvements have or will address most of the water quality impacts identified in previous assessments of the Lower Susquehanna River.

Flood Control

Hydrologic and topographic characteristics make the Susquehanna River Basin highly vulnerable to flooding and dams, flood walls and levies are found throughout the basin. In some ways the flood control effort conflicts with other uses of the waters. Stream access limitations as well as the modification of hydrology and habitat in some basin waters can impact recreation and aquatic life and habitat. Efforts are made to limit the impacts to these other uses, but the need to protect the life and property of basin residents from flood waters is recognized as a priority.

Chesapeake Bay Loading Reductions

The Upper Susquehanna River and its watershed is tributary to and therefore part of the 64,000 square mile Chesapeake Bay Watershed. The Chesapeake Bay and its tidal tributaries are listed as Clean Water Act Section 303(d) Impaired/TMDL Waters due to low dissolved oxygen and reduced water clarity. To address these impairments the USEPA Chesapeake Bay Program has collected water quality monitoring data and conducted watershed computer modeling that documents that these impairments are the result of sediment and nutrient (phosphorus and nitrogen) loadings from sources throughout the Chesapeake Bay Watershed.

By 2002, all of the Chesapeake Bay states had adopted a Memorandum of Understanding regarding cooperative efforts for the protection of the Chesapeake Bay. The MOU cites that unless water quality standards are met by 2010, the impairments to the Bay will require the establishment of a TMDL by May 2011. In the MOU, the signatories agree to work cooperatively to achieve the nutrient and sediment load reductions that are necessary to meet water quality standards in the Bay by 2010.

The watershed modeling shows that New York State's current nutrient and sediment loads contribute to the impairment in the Bay. implementation of agricultural best management practices (BMPs) and wastewater treatment plant improvements throughout the basin that reduce pollutant loadings will contribute to the restoration of the Bay. Although the waters that are the focus of this restoration lie well outside the borders of New York State, these and other activities that reduce nutrient inputs to the waters of the Susquehanna River Basin should be viewed as high priority water quality restoration efforts deserving of increased support.

Due to the impact of nutrient loads from the Susquehanna River Basin on the Chesapeake Bay and a commitment by New York State to reduce these impacts, efforts to reduce nitrogen in any waterbody in the basin can be considered to be contributing to the restoration of "stressed" uses, albeit those impacted uses lie beyond the New York State border.

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

Susquehanna 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 Susquehanna River 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 *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:

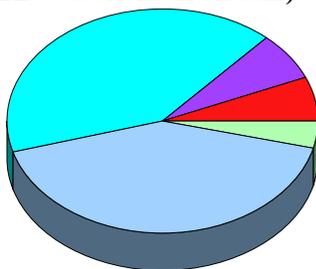
- Precluded:* waters do not support appropriate uses;
- Impaired:* waters frequently do not support appropriate uses;
- Stressed:* waters support appropriate uses, but other water quality impacts are apparent; and
- Threatened:* waters support uses and have no impacts, but activities threaten future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

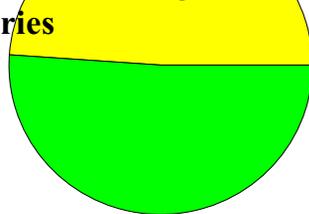
Rivers/Streams

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)

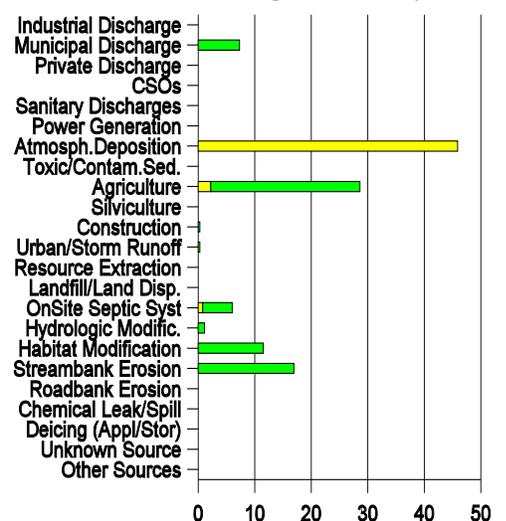


- Precluded
- Impaired
- Stressed
- Threatened

Susquehanna Basin

Total River Miles: 7,597
Total PWL Miles: 1,023

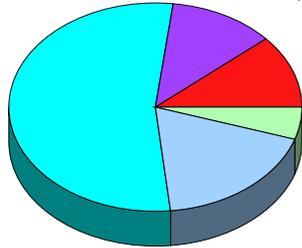
Major Sources of Impact
(PWL Segments Only)



Percent of PWL Waters Affected

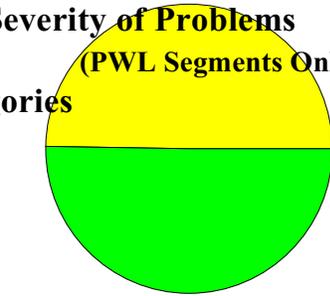
Lakes/Reservoirs

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

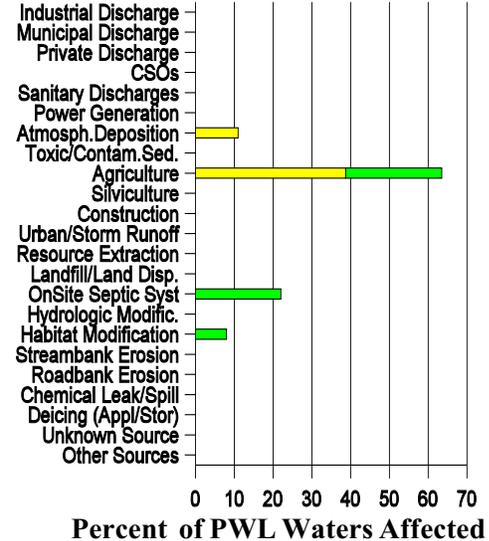
Severity of Problems (PWL Segments Only)



- Precluded
- Stressed
- Impaired
- Threatened

Susquehanna Basin	
Total Lake Acres:	85,723
Total PWL Acres:	46,449

Major Sources of Impact (PWL Segments Only)



Basin Water Quality Summary

About thirteen percent (13%, or 1,023 miles) of the 7,597 river miles in the New York State portion of the Susquehanna River Basin are included on the Priority Waterbodies List as either not supporting uses or having minor impacts or threats to water quality. Just over half (51%) 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.

Thirteen (13) of the 129 separate lake segments in the basin are included on the PWL as having either impaired uses or minor impacts/threats to uses. These impaired/impacted lakes represent about one-quarter (23%) of the total lake acres in the basin. For only two of these lakes (totaling 1,588 acres, or 12% of basin lake acres) the impacts are such that fish consumption, recreational uses and/or aquatic life are not fully supported.

The most frequently cited sources of impacts affecting water quality in the basin are atmospheric deposition and agricultural activities. These two sources are also the responsible for virtually all of the limited amount of water quality impairment that occurs in the basin. Stream erosion/habitat modification, inadequate on-site wastewater (septic) systems, and municipal wastewater impacts are also significant sources that contribute to lesser minor impacts and threats to water quality. 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.

Figure 2
Susquehanna River Basin
WI/PWL Water Quality Assessment

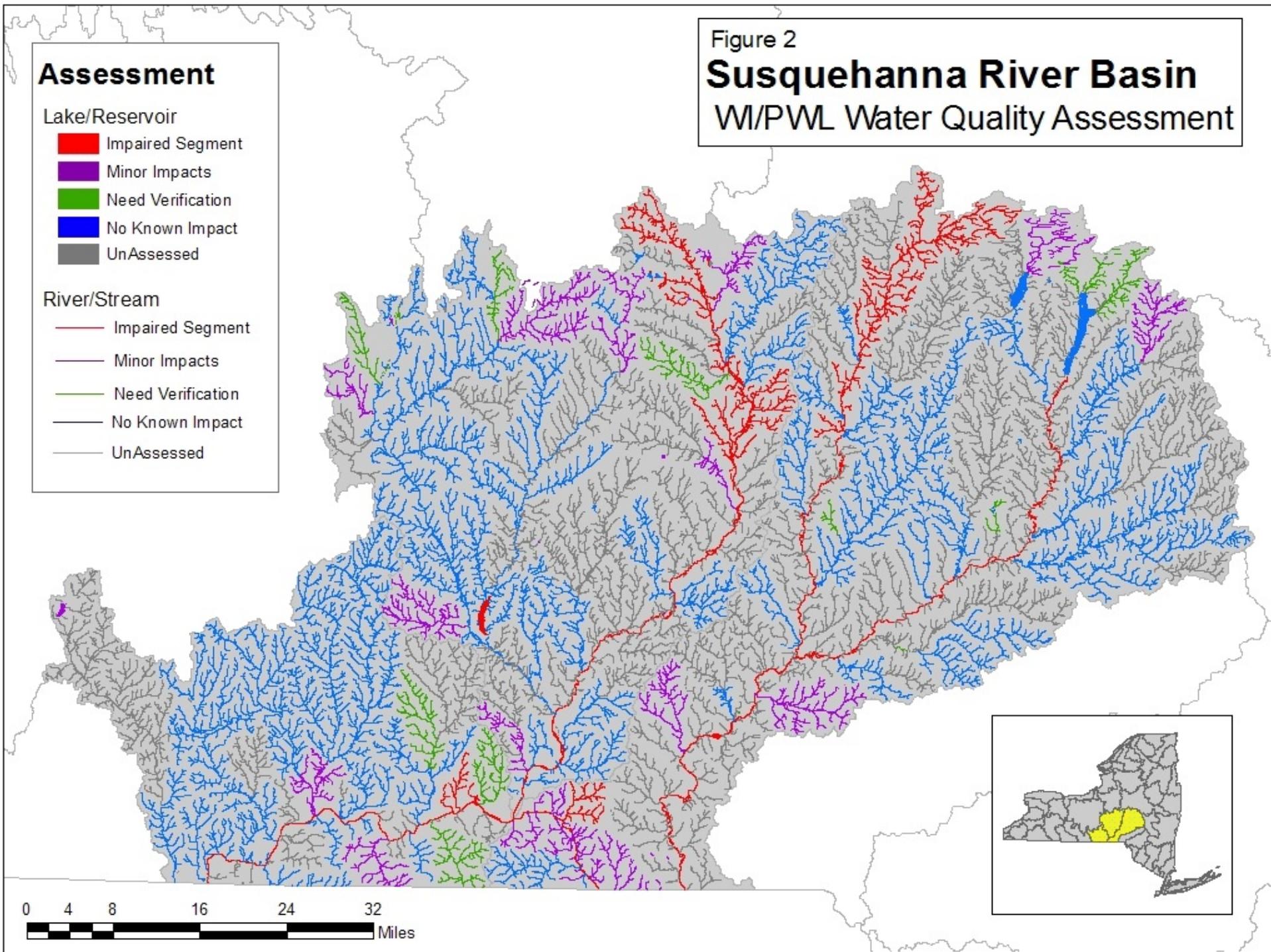
Assessment

Lake/Reservoir

- Impaired Segment
- Minor Impacts
- Need Verification
- No Known Impact
- UnAssessed

River/Stream

- Impaired Segment
- Minor Impacts
- Need Verification
- No Known Impact
- UnAssessed



The Susquehanna 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 Susquehanna 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*.

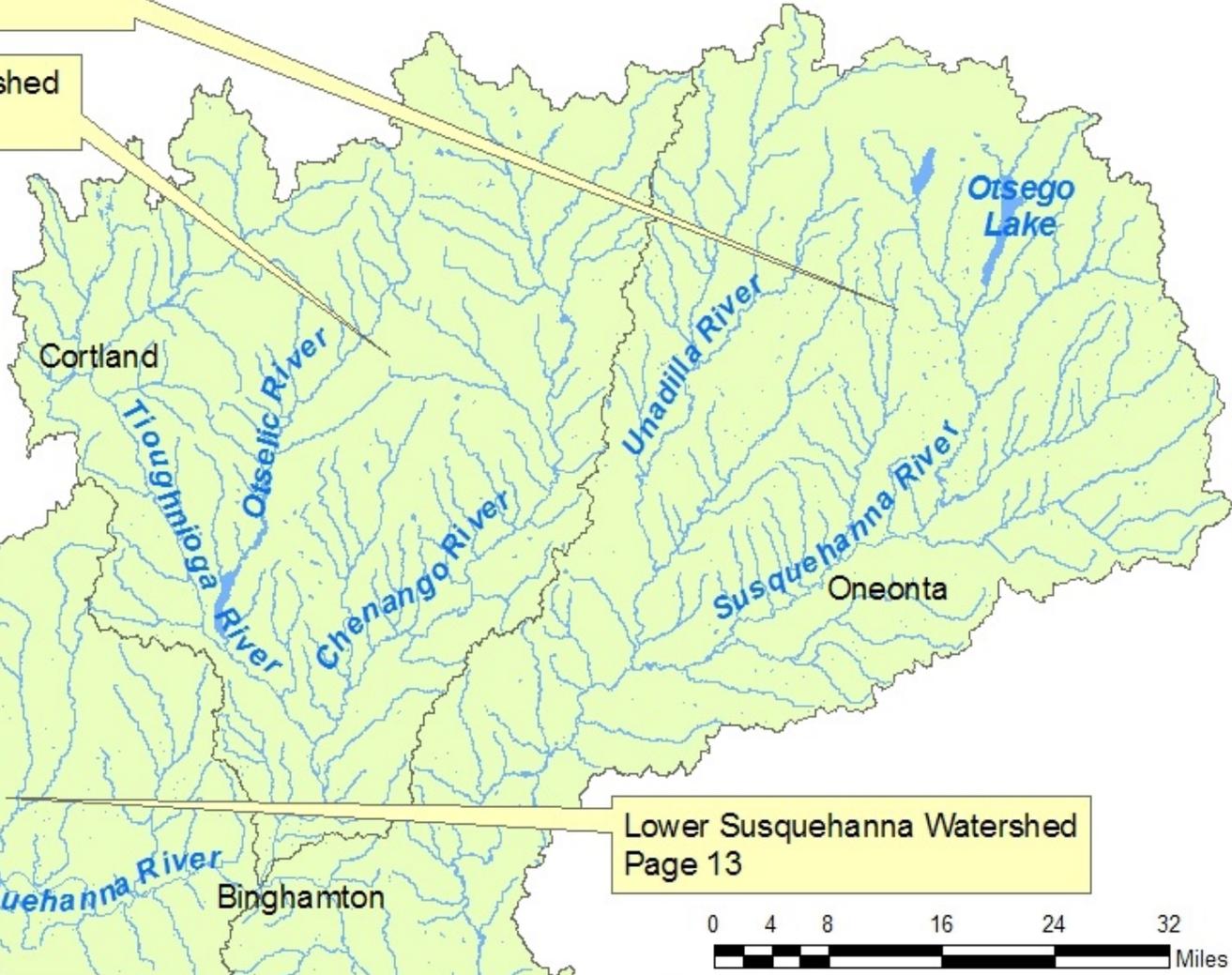
Indices of waterbody data sheets by both county and alphabetically by segment name are included as Appendix C and D, respectively.

Figure 3

Susquehanna River Basin Watershed Map

Upper Susquehanna Watershed
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Chenango River Watershed
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Lower Susquehanna Watershed
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