NYS DEC

Division of Water

New York State Water Quality 2000

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Section 305(b)
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Federal Clean Water Act
Amendments of 1977 (PL 95-217)

New York State Department of Environmental Conservation

George E. Pataki, Governor John P.Cahill, Commissioner

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* The water quality assessments for these Drainage Basins have been updated since the publication of the previous New York State 305(b) Report in 1998.

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Acknowledgments

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Forward

In addition to the continued routine monitoring and assessment of the waters of the state – conducted according to the program's rotating basin schedule – NYS DEC staff have also been involved in a number of other water quality monitoring and assessment initiatives since the 1998 Section 305(b) Report was submitted. The most significant of these initiatives involve:

- **Section 305(b) Reporting Consistency,**
- **Achieving *Comprehensive Assessment* of New York State Waters, and**
- **Modifications to Section 303(d) Listing and TMDL Program.**

Section 305(b) Reporting Consistency
Section 305(b) of the Clean Water Act requires each state to report on water quality and the degree to which waters support specific uses designated in state standards. These individual state reports are then compiled by USEPA in a Report to Congress. But because each state has different water quality standards, different water resources, different priorities and different levels of monitoring resources, the compilation of this information can be quite difficult; and the resulting information confusing, perhaps even misleading. Because of the many variables between state monitoring programs and the different approaches to water quality assessment, true "consistency" in 305(b) reporting among the states has long been an elusive goal.

To address this issue, 305(b) Coordinators from a number of Northeastern states joined with New England Interstate Water Pollution Control Commission (NEIWPCC) staff and EPA Region I and II representatives to share information about each state's approach to water quality monitoring and assessment, and consider the idea of "consistency" in 305(b) reporting and whether it could be achieved. The workgroup began with a belief that although each state monitors and assesses its waters differently, by understanding the individual approaches taken by each state it may be possible to find common ground that allows for the reasonable comparison of water quality assessments between the states. Identifying this level of "comparability" of results, rather than "consistency" was the goal of the workgroup.

The workgroup then reviewed specific definitions, direction and recommendations in the EPA 305(b) Reporting guidance and evaluated the impact of these items on the comparability of the final assessments. While some items were deemed inconsequential with regard to their impact on the final assessment results, the workgroup identified a number of areas in the guidance where the interpretation and application of the guidance was critical to achieving comparability. The workgroup further categorized these items as:

- areas where the majority of the states interpret these items similarly (or similarly enough) that the final assessments can be fairly compared against each other;
- areas where the majority of the states interpret these items somewhat similarly, but where the different approaches should be taken into account when comparing the final assessments of each state, and;
- areas where the majority of the states interpret these items differently, and the resulting final assessments are not easily comparable from state to state.

In addition to producing a summary of the various approaches – entitled *An Overview of Section 305(b) Reporting Practices and Protocols in the Northeast* – the effort allowed the states to share thoughts and ideas; some of which were incorporated into New York State's program.

Achieving *Comprehensive Assessment* of New York State Waters
USEPA has established for 305(b) Reporting a long-term goal of the comprehensive assessment of ALL surface and ground waters in each state. New York State supports that goal, and with the implementation

of its *Comprehensive Assessment Strategy*, in conjunction with a rotating basin approach, it has a program in place that will allow for the assessment of a much higher percentage of waters than previously assessed. However, reconciling a goal of 100% assessment with limited and diminishing resources will take time. New York State has begun implementation of its Comprehensive Assessment Strategy according to its rotating basin schedule. As basin studies are completed, the enhanced monitoring and assessment work will be reflected in the Section 305(b) and other water quality reports. Enhanced assessments are included in this report (see <u>Appendix A</u> - *Watershed/Basin Water Quality Summaries*) for those basins where the Comprehensive Assessment Strategy was first implemented. Over the next few years, the watershed/basin assessments will be further enhanced and expanded to the remaining basins of the state.

Modifications to Section 303(d) Listing and TMDL Program

The USEPA recently issued a final rule to significantly revise the Section 303(d) Water Quality Planning and Management Regulation and Total Maximum Daily Load (TMDL) Regulations. The new rule expands the scope of previous 303(d) Lists to include waters impaired by nonpoint as well as point sources, and requires more detailed implementation plans for the restoration of these waters.

NYS DEC has followed the development of the new rule very closely, paying particular attention to the likely impacts of the changes on current monitoring, assessment and management programs. Because of its call to provide a comprehensive listing of polluted and impaired waters, the new rule will have several impacts on future Section 305(b) reporting; a fact recognized by USEPA in their recent call for the development of a Consolidated Assessment and Listing Methodology. The development of this methodology is designed to integrate, enhance and streamline the water quality reporting requirements in both Sections 305(b) and 303(d).

As the implementation of these modifications to the 303(d) and TMDL process move forward, and their impacts on 305(b) reporting become more clear, NYS DEC will work with USEPA to identify and secure the additional resources needed to successfully implement this program expansion and see that the new rules achieve, in practice, their intended goals.

Part I

Executive Summary/Overview

The 49,576 square mile surface area of New York State is rich in water resources. Freshwater resources include over 52,000 miles of rivers and streams, nearly 7,900 lakes and ponds totaling over 790,000 acres (not including Great Lakes), and almost 600 miles of Great Lakes coastline. The marine waters of the state include over 1,530 square miles of estuaries, as well as 120 linear miles of Atlantic Ocean coastline. Additionally, about six million residents draw drinking water from abundant groundwater resources in the state. Water quality in a significant majority of these waters supports all intended uses. However some waterbodies suffer some level of water quality impact, use impairment, or are otherwise threatened by various human activities.

The New York State Department of Environmental Conservation (NYS DEC) Division of Water maintains an extensive inventory of these waters. This inventory – the *Waterbody Inventory/Priority Waterbodies List* – also provides summaries of general water quality conditions, tracks the degree to which the waterbodies support (or do not support) a range of uses, and monitors progress toward the identification and resolution of water quality problems, pollutants and sources. It is the information from the Waterbody Inventory/Priority Waterbodies List (WI/PWL) that is used to compile this *Clean Water Act Section 305(b) Water Quality Report*. **(See pages 31-33 for more detailed discussion of WI/PWL.)**

An overview of current water quality conditions in New York State – drawn from the WI/PWL – is represented in Figure 1 on page 3. For each of five categories of waterbodies, the figure shows the percentage of waters in New York State that are listed as Priority Waterbodies (waters with documented water quality impacts, use impairments or threats), waters needing verification of a suspected water quality impact/use impairment, and waters with no known impact/use impairment or that are Unassessed. In addition, for Priority Waterbodies the level of severity of water quality problems (*precluded, impaired, stressed* or *threatened*) is also indicated[1]. More complete descriptions of these severity levels are outlined in the *Assessment Methodology* section in Part III of the report.

Overall Use Support

When reporting on water quality in the 305(b) Report, states are to use the USEPA Designated Use Support categories (fully supporting, partially supporting, not supporting). The corresponding USEPA Designated Use Support category for a waterbody is a function of the WI/PWL problem severity and the level of documentation (*known, suspected* or *possible*) for the waterbody. The relationship between the WI/PWL information and the USEPA designated use categories is discussed in detail in Part III, Chapter 3 - *Assessment Methodology*.

The overall use support for the various types of waterbodies in New York State are as follows:

- Ninety-eight percent of New York State river and stream miles are considered to support all designated uses. About 94 percent *Fully Support* uses, while 4 percent of the waters have uses currently *Supported but Threatened*. Only 2 percent of river/stream miles have designated uses that are *Partially Supported* or *Not Supported*.

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[1] Note that Figure 1 reflects the severity of water problem based on the ***primary*** use impairment for each waterbody. For instance, if a waterbody has a primary use which is *precluded*, and several ***secondary*** uses which are *impaired*, it is counted only once and designated as a *precluded* segment.

- Sixty-one percent of New York State lakes and reservoirs are considered to support all designated uses. About 49 percent of lake waters *Fully Support* uses, while an additional 12 percent have uses currently *Supported but Threatened*. Thirty-nine percent of lake acres have designated uses that are *Partially Supported* (38%) or *Not Supported* (>2%). However, much of the lake impairment in the state is due to a few large waterbodies that support many uses but have lakewide restrictions for a specific use. For example, while Lake Champlain supports drinking water use and a variety of recreational activities, a limited fish consumption advisory for the entire lake accounts for nearly one-third of the impaired lake acres in the state.

- Seventy-four percent of New York State bays and estuaries are considered to *Fully Support* designated uses. Nearly 26 percent have designated uses that are only *Partially Supported* (15%) or *Not Supported* (11%). Over 71 percent of the *Partial/Not Supporting* waters are a result of fish consumption or shellfishing restrictions.

- Only 28 percent of New York State Great Lakes shoreline is considered to support all designated uses. Twenty-one percent of the shoreline waters *Fully Support* designated uses; an additional 7 percent of the shoreline uses are *Supported but Threatened*. About 72 percent of Shoreline waters have designated uses that are only *Partially Supported*. An advisory limiting consumption of some fish species in all of Lake Ontario accounts for most (90%) of the impaired shoreline in the state.

- **Ninety-eight percent of New York State ocean coastal waters are considered to *Fully Support* all designated uses. About 2 percent have designated uses that are *Not Supported*.**

Causes and Sources of Use Impairment

Information regarding the pollutants causing use impairments to specific waterbodies and the sources of those pollutants/causes are tracked by the WI/PWL database. Both primary (major) and secondary (moderate/minor) causes and sources are noted. An assessment of pollutant sources and their relationship to the frequency and severity of use impairment is presented in Figure 2 on page 5. More detailed tables outlining sources and pollutants/causes of water quality problems in New York State are presented in the *Water Quality Assessment* section (Part III, Chapter 4) of this report. This information provides an overall assessment of what water quality problems and issues are of greatest significance in New York State. The results of this assessment show that:

> *Primary* pollutants/sources are identified as the principal contributor to a primary use impairment.
>
> *Secondary* pollutants/sources either 1) relate to a secondary impairment, or 2) are a lesser contributor to a primary impairment.

- **Industrial and municipal point sources are relatively minor sources of water use impairment, and their impact on water quality has diminished significantly in the past 20 years. In 1972, approximately 2,000 miles of rivers and streams were estimated to have been impaired by point sources. Today, that figure is less than 200 miles.**

- **Nonpoint sources of both toxic and conventional pollutants are much more significant contributors to water quality impairment than point sources. Nonpoint sources represent the primary source for 91 percent of water quality impacted/impaired rivers, 90 percent for lakes and reservoirs, 68 percent for estuary waters and 95 percent for Great Lakes shoreline.**

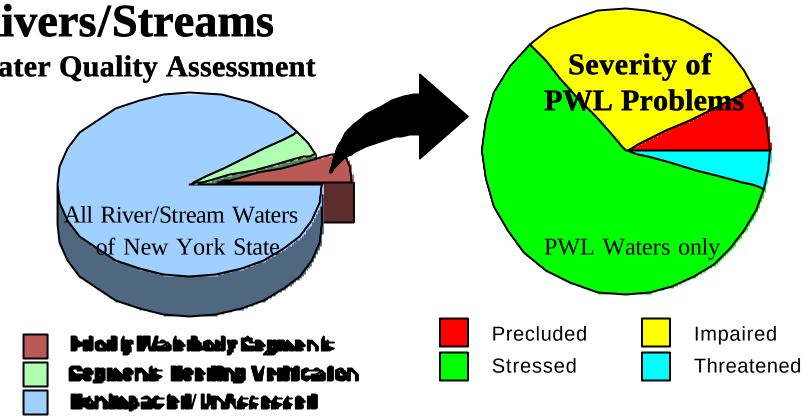
Figure 1

Assessment of New York State Waters

The series of pie charts on this page provide an overall assessment of waterbody impairment in New York State. For each of the five waterbody types, the first chart shows the relative percentage of all waters (of that type) that are: 1) on the Priority Waterbodies List, 2) Need Verification of a water quality impact, or 3) considered NonImpacted/UnAssessed. The other chart illustrates the severity of the use impairment (i.e., **Precluded**, **Impaired**, **Stressed**, **Threatened**) for those waters on the Priority Waterbodies List.

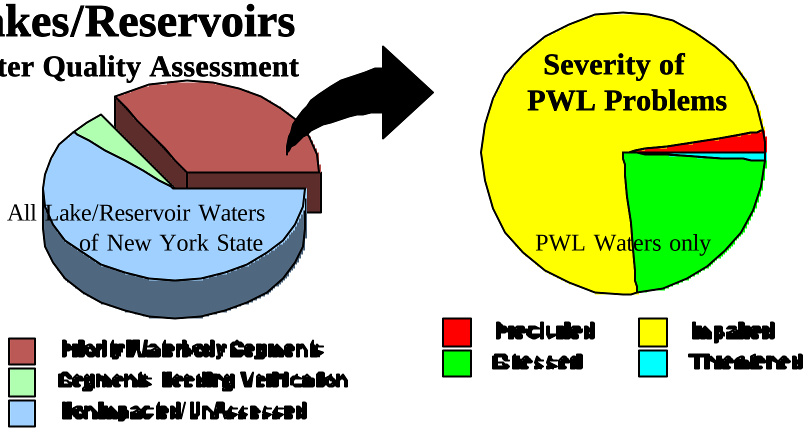
Rivers/Streams

Water Quality Assessment



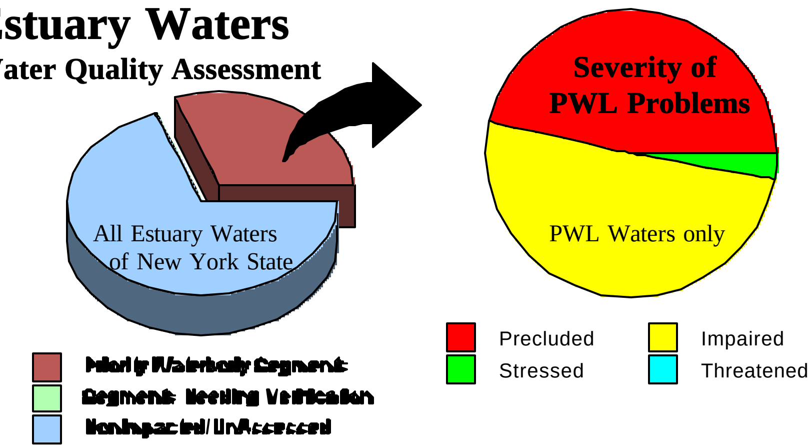
Lakes/Reservoirs

Water Quality Assessment



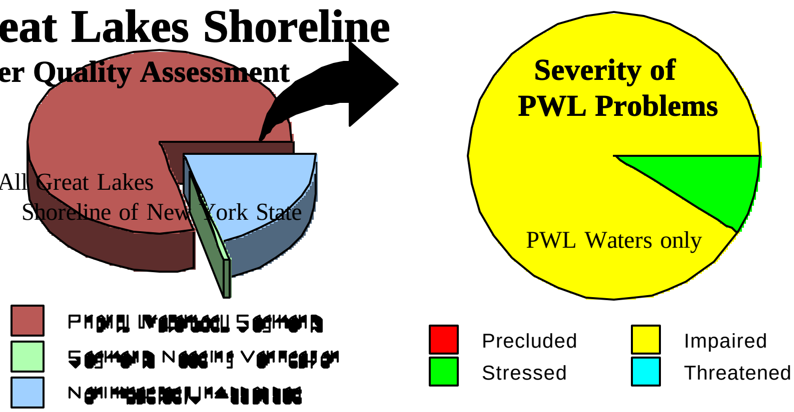
Estuary Waters

Water Quality Assessment



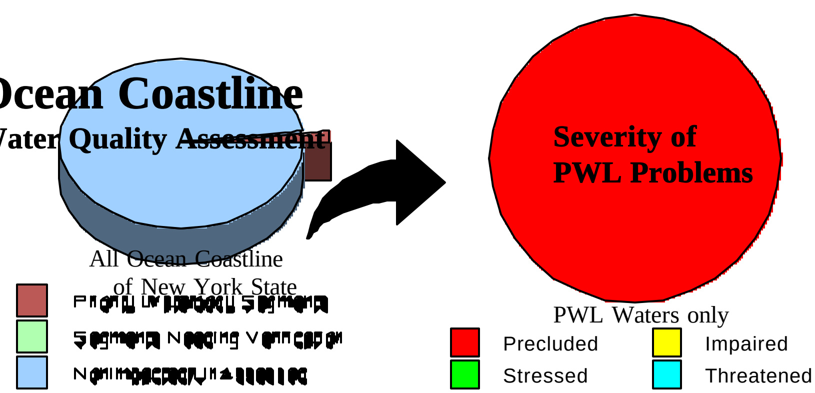
Great Lakes Shoreline

Water Quality Assessment



Ocean Coastline

Water Quality Assessment



- **Approximately 550 river miles, 151,600 lake acres, 130 square miles of estuary waters and 370 miles of Great Lakes shoreline are significantly affected by toxic pollutants. Priority organics (PCBs), pesticides and heavy metals in bottom sediments are responsible for virtually all of this impairment. Across the state several local dredging projects have been undertaken to remove contaminated sediments. Several others are in the planning process or being held up pending resolution of disposal issues.**

- **Toxic organic contamination has affected 312 wells or springs with a combined total capacity of 417 million gallons per day. Many of these wells have been reopened or operate under restriction, but 121 on Long Island and 39 upstate remain closed or have been permanently abandoned. These represent about 3 percent of the state's 5,500 public water supply wells.**

- **Atmospheric deposition is known to impact/impair water uses in nearly 400 lakes and ponds with an aggregate area of over 15,000 acres, or about 2 percent of the total lake area in New York State. However, it is assumed that many other small lakes and ponds in the Adirondack and Catskill Mountains – where monitoring is difficult due to limited access – are similarly affected. The ultimate resolution of the atmospheric deposition issue will require federal involvement, since the source of much of this problem originates outside of New York State.**

- **Agricultural activity is the most frequently cited nonpoint source of water quality impact/use impairment and threat to New York State rivers, lakes, and reservoirs. Agricultural sources contribute excess nutrients and silt to waterbodies. The nutrients cause excessive weed and algae growth which can impair recreational uses of the waters. Silt and sediment loads result in excessive turbidity which can impair recreation, aquatic life support and water supply uses.**

- **Hydrologic/habitat modification (and streambank erosion) are also frequently cited sources of water quality impact/impairment in rivers and lakes. This category includes a variety of activities that alter the nature of a stream corridor or wetland area such as changes to the bed and banks of a stream, dredging or filling of wetlands, and removal of riparian vegetation from stream banks. Flow regulation is the most common subcategory. Surface impoundments can cause detrimental effects both upstream and downstream of a dam. Water level fluctuations within the impoundment disturb fish habitat. Changes in downstream flow conditions also affect aquatic life, fish survival and spawning.**

- **Urban runoff, stormwater runoff and combined sewer overflows (CSOs) are cited as primary nonpoint sources of water quality impairment in the estuary waters of New York State. These sources contribute pathogen/bacteria, petroleum products, heavy metals, silt, floatables, and oxygen demanding substances. Pathogens from urban runoff and other sources including boats, point sources, waterfowl and on-site disposal systems have caused the closing of nearly 104,000 acres (11%) of the potential shellfishing beds in the New York City-Long Island region.**

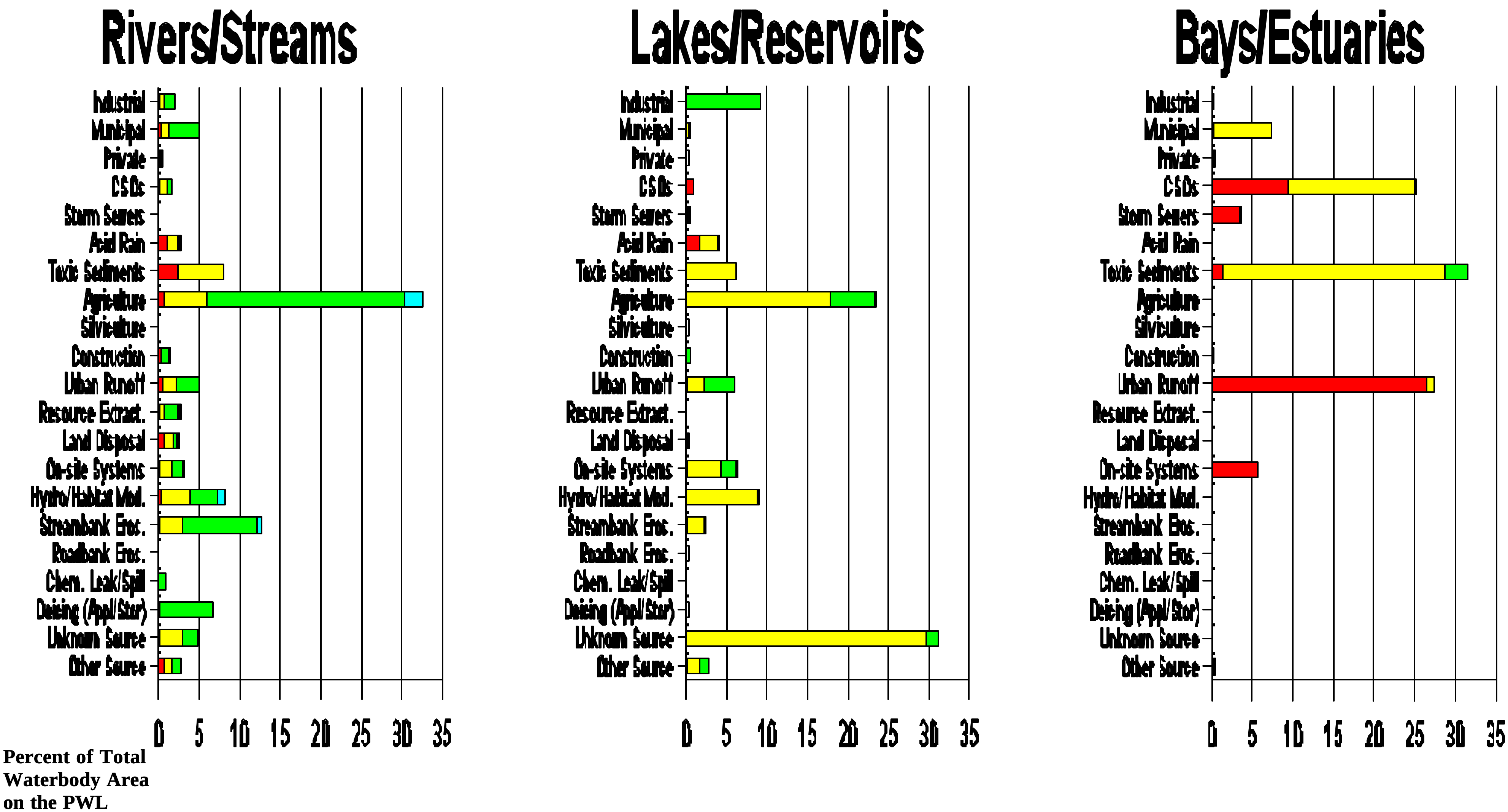
- **Failing on-site septic systems are also frequently cited as significant sources of water quality impairment and threat. Failing systems contribute nutrients, pathogens and other pollutants which restrict recreational uses.**

- **Nutrients from municipal point sources (in New York State and Connecticut) have been determined to be a major cause of hypoxia in Long Island Sound. Various control measures have been recommended through the Long Island Sound Comprehensive Conservation and Management Plan (CCMP) and are being implemented.**

Figure 2 **May 2000**

Primary Sources/Causes of Water Quality Impairment (by severity)

The series of bar charts on this page illustrate what sources are most frequently cited as the *primary* cause of water quality impairments in New York State (as a percentage of the total waterbody area on the PWL). For each source, the frequency data is further segregated by the *severity* of water quality problem (precluded, impaired, stressed, threatened). Separate charts are presented for three of the five waterbody types. Not shown are Great Lakes Shoreline segments, dominated by the Lake Ontario shoreline segment (impaired by contaminated/toxic sediments resulting in a fish consumption advisory); and Ocean Coastline segments, not presented since there is only one PWL segment of this waterbody type.



Water Quality Trends

Since its inception, the Priority Waterbodies List (PWL) has proved to be a useful tool for assessing water use impairments, and causes and sources of those impairments. However, because it was designed to track problems and did not originally include good or unassessed waterbodies, it is misleading to use PWL information to evaluate overall trends in water quality. For virtually every successive reporting period, the number of waterbody segments in the database and the corresponding total size of these segments has increased. But this increase in the number of segments does not necessarily represent a decline in the water quality, but rather reflects the incorporation of additional information about previously unassessed waters.

Recent enhancements to the PWL include a *Waterbody Inventory* of all waters in the state. The Waterbody Inventory will accommodate *Waters with No Known Impairment, Waters Needing Verification of Impairment,* and *UnAssessed Waters* to allow for more accurate tracking of overall water quality trends. These enhancements will also aid in the establishment of a year 2000 baseline and enable the monitoring of progress toward recently identified nonpoint source water quality management goals. Attainment of these goals, contained in the NYS DEC Nonpoint Source Management Plan, and which focus on water restoration, water quality improvement, source reduction and the development and implementation of corrective management strategies will be evaluated in 2005.

While the enhanced Waterbody Inventory/Priority Waterbodies List will enable monitoring of future trends, other NYS DEC Division of Water efforts provide an assessment of overall water quality trends to date. These recent assessments include two reports comparing twenty-plus years of water quality monitoring data; one focusing on biological monitoring and the other on chemical parameters in the water column.

- **The biological study, <u>Twenty Year Trends in Water Quality of Rivers and Streams in New York State Based on Macroinvertebrate Data</u>[2] (1993), compared the macroinvertebrate (aquatic insect) communities at 216 sites across the state during the period 1972-1992 and found evidence of a water quality improvement at 38 percent of the sites, no change at 58 percent, and a decline at 4 percent (eight sites). Eighty-seven percent of the sites which showed improvement were attributed to improved treatment of municipal and/or industrial waste. Of these, the ten most significantly improved sites were all attributed to improved point source treatment. There were no obvious reasons for the change in water quality at the eight sites which had an apparent decline, although several may have been due to natural fluctuations in flow. Further investigation is needed.**
- **The second report on chemical water quality, <u>Trends in Water Quality of Rivers and Streams in New York State Based on Long-Term Routine Network Data</u>[3]** (1995), documented trends in water quality at nineteen sites on major rivers throughout New York State. Conventional pollutant parameter data, such as nutrient and dissolved oxygen data, revealed some notable improvements in water quality at some Routine Network sites over the past thirty years. The most dramatic results were those for ammonia and, at some sites, dissolved oxygen.

Plans to update both of these trends reports to incorporate the most recent ten years of biological and chemical monitoring are currently being considered.

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2 R.W. Bode, M.A. Novak, L.E. Abele, 1993. <u>Twenty Year Trends in Water Quality of Rivers and Streams in New York State Based on Macroinvertebrate Data 1972-1992</u>. NYS DEC, Division of Water. Albany, New York.

3 J.A. Myers, 1995. <u>Trends in Water Quality of Rivers and Streams in New York State Based on Long-Term Routine Network Data</u>. NYS DEC, Division of Water. Albany, New York.

Comprehensive Assessment Strategy

In addition to the Waterbody Inventory/Priority Waterbodies List (WI/PWL) changes outlined previously, the NYS DEC Division of Water has recently implemented a number of other enhancements to its water quality monitoring, assessment and management programs. These enhancements are designed to integrate a variety of division activities into a more coordinated and comprehensive water quality program. The objectives of this *Comprehensive Assessment Strategy* are to provide:

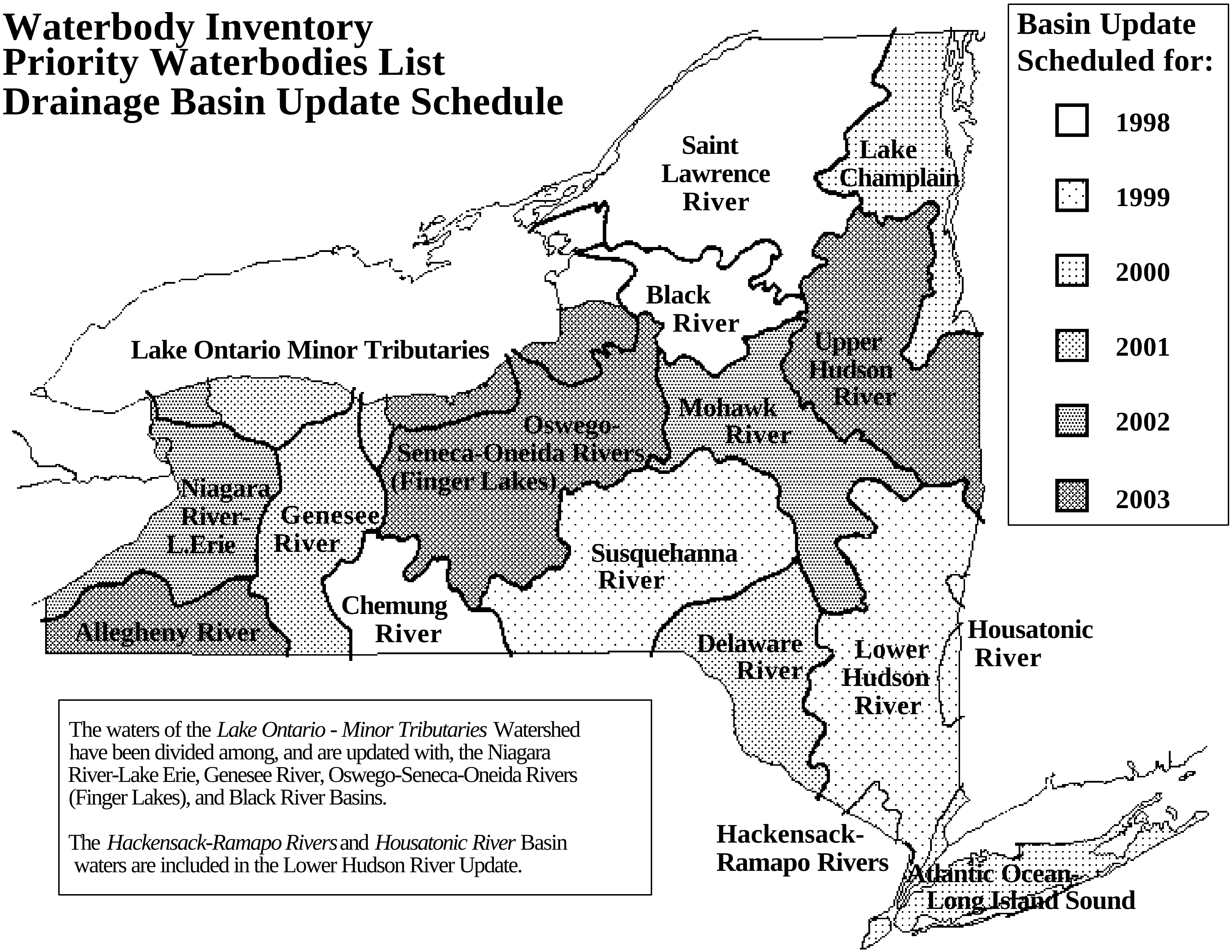
- **a complete and thorough evaluation of all available monitoring data,**
- **a comprehensive assessment of water quality throughout the state, and**
- **a coordinated approach to the restoration, protection and management of water resources.**

The key component of the *Comprehensive Assessment Strategy* is use of a rotating drainage basin approach. A rotating drainage basin approach focuses monitoring, assessment and management activities on a portion of the state for a period of time and then turns attention to other parts of the state. The New York State strategy enables multiple programs to conduct coordinated efforts in two or three targeted basins each year, resulting in a comprehensive assessment of the entire state over a five-year cycle. The rotating basin schedule for updating of the WI/PWL water quality assessment information is presented in Figure 3. The adoption of a common basin rotation schedule to drive most division programs further facilitates integration of component programs and moves the division toward a more coordinated and unified monitoring, assessment and management strategy.

Further details about the *Comprehensive Assessment Strategy* are outlined in Part III, Chapter 2 of this report.

Figure 3

Waterbody Inventory
Priority Waterbodies List
Drainage Basin Update Schedule



The waters of the *Lake Ontario - Minor Tributaries* Watershed have been divided among, and are updated with, the Niagara River-Lake Erie, Genesee River, Oswego-Seneca-Oneida Rivers (Finger Lakes), and Black River Basins.

The *Hackensack-Ramapo Rivers* and *Housatonic River* Basin waters are included in the Lower Hudson River Update.

Part II

Water Resources Background

Snapshot of New York State Waters

The 49,576 square mile surface area of New York State includes over 52,000 miles of rivers and streams, and nearly 7,900 lakes and ponds with a total area of almost 800,000 acres (not including the Great Lakes). In addition, there are 979,200 acres (1,530 square miles) of bays and estuaries, 577 miles of Great Lakes coastline, and 120 linear miles of Atlantic Ocean coastline. Although watershed boundaries can be drawn in any number of ways, for NYS DEC Division of Water management purposes the surface waters of New York State are considered to drain seventeen major drainage basins (see figure 3).

The water resources of New York State are fed by an average precipitation of 40 inches per year (or 90 billion gallons per day). About half of this is lost to evapotranspiration from either land or water. Approximately one-third (27-31 bgd) run off into surface waters and, eventually, into the Atlantic Ocean. The remainder (14-18 bgd) seep into and recharge the groundwater supply.

Table 1

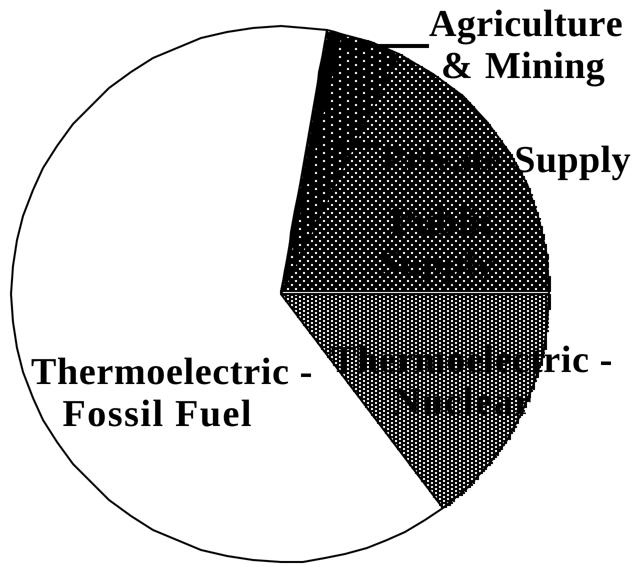
New York State Water Resources Information

State Population, 2000 (estimate)	18,196,600 persons
State Surface Area	49,576 square miles
Surface Water Information	
Rivers and Streams, total miles	52,337 miles
Perennial Rivers/Streams	46,266
Intermittent River/Streams	5,075
Canals/Ditches	547
Rivers Bordering Other States/Canada	448
Lakes/Reservoirs/Ponds, total number	7,849
Lakes/Reservoirs/Ponds, acres	790,782 acres
Bays/Estuaries/Harbors, square miles	1,530 square miles
Great Lakes Shoreline, shore miles	577 miles
Ocean Coastline, shore miles	120 miles
Freshwater Wetlands, acres	2,400,000 acres
Tidal Wetlands, acres	25,000 acres
Groundwater Resources Information	
Long Island Aquifers - underlie about 3% of New York State land area and serve over 3 million people.	
Primary Aquifers (Upstate) - eighteen (18) aquifers underlie about 4% of state and serve 800,000 people.	
Principal Aquifers - highly productive aquifers, but not presently intensively used, underlie 11.2% of state.	

Total Water Withdrawals [4]

in Million Gallons Per Day (mgd)

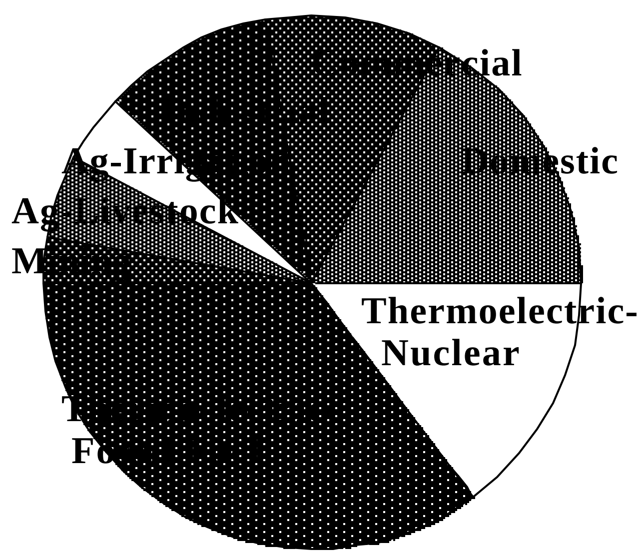
Water Use Categories		
Public Supply		
Domestic	1,810	
Commercial	409	
Industrial	356	
Public Use/Loss	424	
Private Supply		
Domestic	144	
Commercial	200	
Industrial	259	
Agriculture		
Irrigation	30	
Livestock	34	
Mining	62	
Thermoelectric Power		
Fossil Fuel	10,600	
Nuclear	2,440	
TOTAL	**16,800**	**mgd**



Consumptive Water Use [4,5]

in Million Gallons Per Day (mgd)

Water Use Categories		
Domestic	107	
Commercial	61	
Industrial	62	
Agriculture		
Irrigation	26	
Livestock	30	
Mining	17	
Thermoelectric Power		
Fossil Fuel	212	
Nuclear Power	88	
TOTAL	**603**	**mgd**



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4 Water Use Estimates from *Estimated Use of Water in the United State in 1995,* U.S. Geological Survey Circular 1200, 1998.

5 Water not returned due to evapotranspiration, incorporation in products or other processes.

Water Resource Uses

Nearly 17 billion gallons each day are withdrawn from the surface and groundwaters of New York State for various uses. Over 60 percent of that total is fresh water. (Almost all of the 6.5 billion gallons of saline water are used primarily for thermoelectric power generation.) Surface water withdrawals account for nearly 90 percent of all freshwater withdrawals in New York State, while groundwater withdrawals account for the remaining 10 percent.

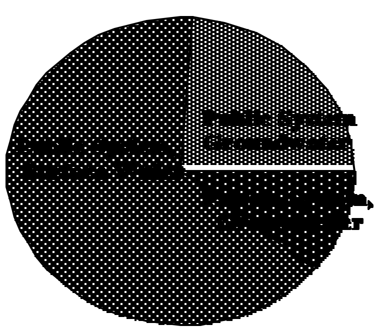
Domestic water uses (including normal household uses such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets and watering lawns and gardens) represents about 20 percent of all freshwater withdrawals in the state. Seventy-eight percent of the domestic water supply in the state is taken from surface waters, while groundwater provides the rest.

Community supply systems throughout the state withdraw, treat and distribute water for domestic, municipal, commercial and some industrial uses. In New York, over 3,200 community water supply systems serve almost 90 percent of the state population. The largest 10 percent of these systems supply water to over 95 percent of New York State residents in the larger urban and suburban areas. This includes the majority of New York City residents, whose 1.5 billion gallon per day water supply is drawn from a series of reservoirs upstate in Delaware, Sullivan, Schoharie, Greene and Ulster counties. The vast majority of the community systems in the state, however, are rather small with each serving on average only a few hundred people. People not served by community systems are self-supplied; virtually all withdraw water from their own wells. In all, approximately one third of New York State's population depends on groundwater, including much of the population of Long Island.

Public Water Supplies

State Population (1995):	18,136,000
Public Water Supply Systems	over 3,200
People Served by Systems:	16,200,000
New York State Population Supplied by:	
Surface Water:	11,900,000
Groundwater:	4,350,000

Percent of NYS Population Served by:



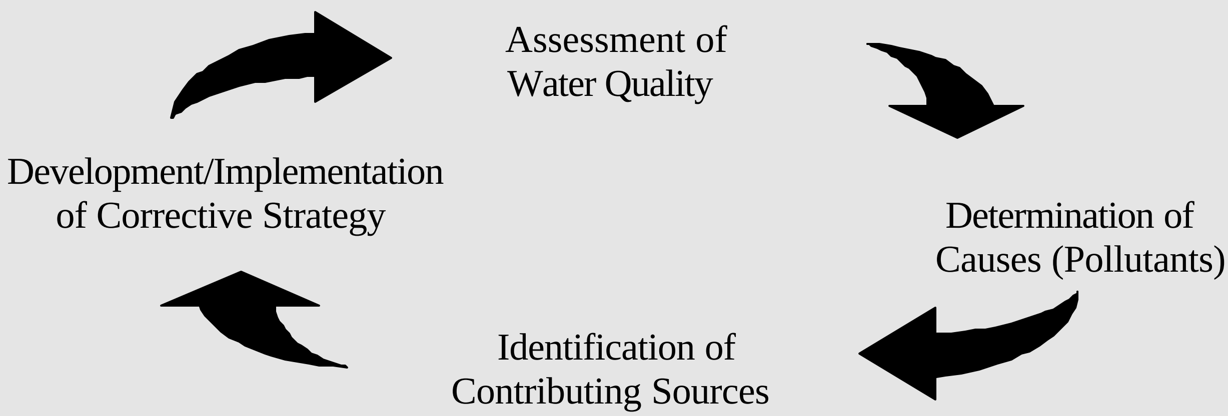
In addition to these consumptive uses, the water resources of New York State also support numerous and exceptional recreational activities for state residents and tourists alike. Swimming, fishing and boating opportunities abound throughout the state. Over 100 state parks and forests – including the six-million acre Adirondack Park and 650,000 acre Catskill Park and Forest Preserves – feature some form of water recreation. The state offers a variety of public beaches, from the sandy shores of the Atlantic Ocean and Long Island Sound to the clear, cool lakes of the Adirondacks, scenic beauty of the Finger Lakes area, or majesty of the Great Lakes. Boating on the extensive Erie Barge Canal System and canoeing or rafting outings through forested wilderness areas are also popular outdoor pastimes.

The NYS DEC Water Quality Monitoring and Management Program

In order to protect these valuable water resources, the NYS DEC Division of Water (DOW) has initiated a monitoring and management strategy for water resources and water quality that integrates many activities into a coordinated and comprehensive program. The goals of this initiative are to provide:

Figure 4

Cycle of Water Quality Monitoring and Management



- a complete and thorough evaluation of monitoring data,
- a comprehensive assessment of water quality throughout the state, and
- a coordinated approach to improving and protecting water resources.

This strategy requires each unit in the division to look beyond individual program objectives and consider what contributions the program can make to the comprehensive monitoring and management efforts of the entire division.

Establishing Common Objectives
Such a comprehensive plan requires a unifying framework or approach – a brief statement outlining how various DOW component programs fit together and contribute to the achievement of the division's larger vision of protected and enhanced water resources. Such a framework, which represents how water quality problems and issues are addressed in the division, is represented by the *Cycle of Water Quality Monitoring and Management.*

The *Cycle of Water Quality Monitoring and Management* (Figure 4) represents an iterative cycle where division efforts are focused on the distinct stages common to most water quality issues/problems. Specifically, these stages include:

1) the **Assessment of Water Quality** and impact on resources (i.e., *Is there a water quality problem/use impairment or threat to a water resource?*);
2) the **Determination of Causes/Pollutants** (i.e., *Why is there a problem/use impairment or threat?*);
3) the **Identification of Sources** contributing to the problem (i.e., *What is causing the problem/use impairment or threat?*),
4) the **Development/Implementation of Corrective Strategy** to address the causes/sources and

correct a verified problem (i.e., *How is the problem/use impairment to be fixed or threat to be avoided?*), and;

5) the **Re-Assessment of Water Quality** and impact on resources (i.e., *Was the strategy to address the problem/use impairment or threat effective?*).

Every core program in the division can define its primary goals and objectives in terms of its contributions to the activities outlined in the *Cycle of Water Quality Monitoring and Management.* By defining the goals of various monitoring and management efforts in terms of this common framework (rather than by individual program functions), relationships between the various separate component programs and the possible integration and coordination of these programs becomes clearer.

Water Classification and Standards System

The basis for water quality management is the Water Classification System. All surface waters (fresh and saline) and groundwaters are classified based on their best uses, such as drinking, bathing, fish propagation and/or fish survival. Waters are classified through a regulatory process that allows anyone, from NYS DEC program staff to members of the public, to propose a classification change. After studying the uses (actual and potential) of the specific waterbody, assessing its physical, chemical and biological characteristics, and evaluating economic and social considerations, the DOW – with input from NYS DEC Division of Fish, Wildlife and Marine Resources (fishery/natural resource uses) and NYS Department of Health (water supply and public bathing uses) – recommends an appropriate classification. This recommendation undergoes public review and hearing before it is made final. Classifications are reviewed and updated periodically to reflect new information and/or changing conditions. An outline of the New York State Water Quality Classifications is included as Appendix C. Water Quality Classifications for specific waters of the state are contained in New York State Water Quality Regulations (Title 6 NYCRR, Parts 800-941).

Once a water is classified as to its best use, corresponding water quality standards are applied to protect its best use. Water quality standards are descriptive limits, generally expressed in numeric concentration, for quantities of certain chemical, biological and physical constituents in the water. They identify the amounts of substances that can be present in a water without impairing best uses. After reviewing studies on the nature and effects of the substance, DOW proposes specific standards to protect aquatic life, wildlife and human health. The standards are then evaluated through the regulatory process, which includes a public review component. If approved, the standards are promulgated and become law.

Reclassification

NYS is required to document progress toward the Clean Water Act goal of fishable/swimmable waters. When the classification system was first instituted, the assigned classification of many waters did not support aquatic life, fish propagation/survival or swimming uses. It is the Division's goal to make all waters in the state meet the federal fishable/swimmable standards - except where natural conditions make it impossible for fish to reproduce. In its current round of reclassification, DOW is nearing that goal. Currently, waters in thirteen out of seventeen drainage basins have been reclassified and meet the fishable/swimmable goal.

Water quality standards for various specific substances are issued for each use classification. As discussed above, the standards for many substances take the form of numeric concentrations which cannot be exceeded. For others, the standard is expressed in a more narrative or qualitative description (e.g., no increase in turbidity that will cause a substantial visible contrast to natural conditions.) Taken together, the standards and classifications form the legal basis which drives the NYS DEC water program.

Water Quality Monitoring and Assessment
Monitoring can be seen as both the beginning and the end point of the management cycle. Data are collected on present conditions to compare with those in the past and in the future. These measurements mark the progress of division efforts as well as help to identify future goals for water quality programs.

The DOW monitoring efforts rely on a variety of approaches to monitoring and assessment. The most commonly recognized is measurement of chemical and physical constituents in the water itself. The concentrations of these constituents are compared to appropriate standards to determine if designated best uses of the waterbody are supported. Chemical/physical sampling has also been extended to the bottom sediment and to biological tissue (macroinvertebrate and fish). While water sampling provides a *snapshot* of conditions at the time of the sample collection, sediment and tissue results provide a view of conditions over a somewhat longer time period.

In addition to the measurement of chemical and physical constituents in the waters, recent water quality assessments have focused on biological monitoring as well. While biological data (benthic macroinvertebrate and fish community assessments) present a greater challenge to interpret, this information provides a good indication of the viability of aquatic populations and of the ecosystem's overall health. In short, biological monitoring reflects the true impact of water quality on living organisms. Along with this evaluation of *in situ* organisms, biological monitoring also includes toxicity testing, where toxicity is gauged by exposing aquatic species (primarily *Ceriodaphnia dubia*) to water column or diluted effluent samples.

The division incorporates all of these (and other) monitoring tools in its routine monitoring and assessment of the environmental health of the state's waters. Further discussion of NYS DEC monitoring efforts is included in Part III, Chapter 1 - *Water Quality Monitoring Program.*

Water Quality Management
Armed with adequate and reliable monitoring and assessment information, the focus of division programs turns toward the management of water quality to assure that standards are not violated and that appropriate water resource uses are protected. These efforts are designed to address both *point source* discharges and *nonpoint sources* of pollution.

Point Source Regulation
Control of pollution from point source discharges (i.e., discharges that come through a pipe or other conveyance to a receiving water) are accomplished through the State Pollution Discharge Elimination System (SPDES) permit program. Any individual wishing to discharge a wastewater effluent to the surface or ground waters of New York State must have a permit for that discharge. Currently, just under 10,000 SPDES permits have been issued.

A SPDES permit lists parameter-specific limits

Whole Effluent Toxicity Testing (WETT)
WETT requires dischargers to evaluate the toxicity of the effluent upon test organisms. Such testing is required of permittees when:
- # the discharge contains numerous compounds, and additive effects are possible;
- # the limits for one or more compounds toxic to aquatic life cannot be established; and/or
- # toxicity to aquatic life in the waterbody persists after the discharge.

WETT requires permittees to perform both Tier I tests, which measure acute responses of aquatic organisms to the effluent, and Tier II tests, to measure chronic effects. Toxicity reduction evaluations (TREs) identify the source and nature of the toxicity indicated by the acute or chronic effects. This evaluation determines the appropriate long-term monitoring parameter for toxicity control, sets a permit limit, and suggests a plan to reduce the toxicity permanently.

(for concentration and flow/loadings) for facility discharges. When developing initial permit limits, DOW staff first consider technology-based effluent limits. These limits reflect wastewater treatment technology standards that require:

- Secondary treatment of municipal waste;
- Best Conventional Control Technology (BCT) for conventional pollutants; and
- Best Available-economically-achievable Technology (BAT) or Best Professional Judgement (BPJ) for toxics.

These standards have been set by USEPA based on a national average for effectiveness *and* affordability. The term "best" as used above refers to that average rather than a definitive, unqualified best possible treatment.

After establishing technology-based limits, staff then conduct water quality assessments for substances proposed to be discharged to determine if the limits are sufficient to protect the receiving water quality. This assessment includes a review of the classification and associated water quality standards of the receiving stream and the waste assimilative capacity of the water for biodegradable pollutants (how much of a particular substance a water can receive and self-cleanse without lasting adverse effects). The cumulative effect on the waterbody of all other discharges within the watershed are also evaluated.

The technology-based limits are compared with the water quality limits. For each substance, the more stringent of the two limits are reflected in the *draft* permit. The water quality limits are reviewed for reasonableness. Factors considered in determining reasonableness include level of detection, background levels, stream assimilative capacity and waste treatment options. Permits may also require *Whole Effluent Toxicity Testing* (WETT) of treated effluent be conducted to determine its toxicity to sensitive aquatic organisms (see box). WETT requirements are useful when numerous compounds are discharged and their additive effects are of concern and/or when limits for specific compounds cannot be established. Once developed, draft permits are announced publicly in the *Environmental Notice Bulletin* for public review and input before NYS DEC makes them final and issues them.

Permits must be renewed every five years. Until recently, when SPDES permits were renewed, each had to go through the same technical review as a new permit, regardless of whether it had any deficiencies or if those deficiencies were environmentally significant. This lengthy process resulted in backlogs of permits waiting for renewal, facilities operating under expired permits, and major permits in the same queue as minor permits, waiting for review.

To make management of SPDES permits more responsive to environmental benefit, an Environmental Benefit Permit Strategy (EBPS) was designed. The EBPS is a means of prioritizing permit review to focus staff time and attention where they will do the most good. Under EBPS, each permit is administratively renewed before it expires, every five years. At the time of this renewal, a permit goes through technical review to identify potential permit deficiencies and the priority of the permit. A permit might need to be modified due to changes in regulation, problems with compliance, or requests from the discharger or the public. A priority ranking of each permit is then developed according to a numerical score based on various considerations (15 environmental program factors and three environmental benefit multipliers). The permits with the highest scores get priority attention for detailed technical review and prompt modification to correct deficiencies.

In addition to facility-specific SPDES permits, NYS DEC also issues *general* permits for four specific activities. These are: Construction Stormwater Runoff, Stormwater Runoff associated with Industrial Activity, Sanitary Discharges to Groundwater (1,000 to 10,000 gallons/day), and Concentrated Animal Feeding Operations (CAFOs). In each of these instances, discharges must meet requirements in the appropriate general permit rather than in individual discharge-specific permits.

Concentrated Animal Feeding Operations

Agricultural activities in New York State include a large number of concentrated animal feeding operations (CAFOs). To address nonpoint agricultural runoff from such operations, NYS DEC recently developed a general (statewide) discharge permit for CAFOs. The general permit requires the development and implementation of a site-specific agricultural waste management plan. In exchange, the permit provides CAFOs with some legal protection regarding runoff that may impact water quality.

Another component of the division's point source control effort is the Pretreatment Program. Many industries discharge their wastewater to municipal wastewater treatment plants, rather than directly to a receiving water. These industries are called *indirect dischargers* and those industries that receive the most regulatory attention are *significant industrial users*. USEPA regulations require larger municipal treatment authorities that receive industrial waste from significant industrial users to have pretreatment programs to control indirect discharges.

Fifty-seven municipal treatment authorities in New York State have developed and are implementing local pretreatment programs, in accordance with USEPA pretreatment regulations. These local authorities manage significant indirect discharges through permit programs similar to the state SPDES permit program. The objectives of these programs are to prevent pollutants that are incompatible with municipal sewage treatment plants from:

- interfering with municipal treatment plant operation, including the use/disposal of sludge;
- passing through municipal treatment plants; and
- limiting municipal sludge recycling and reclamation.

Local pretreatment programs have been very successful in reducing incompatible pollutants in municipal sewage treatment plants in New York State. NYS DEC presently shares oversight of local pretreatment programs with the USEPA. However, the lack of combined USEPA/NYS DEC resources for oversight has kept local pretreatment programs in New York State from reaching their full potential. NYS DEC hopes someday to provide adequate resources to assume primary oversight authority.

Nonpoint Source Control

The NYS *Waterbody Inventory/Priority Waterbodies List* of water quality assessment and impairment reveals that the primary source of pollution in over 90 percent of New York's impaired waterbodies comes from nonpoint sources. This fact attests to the success of NYS DEC's point source SPDES program. That is, because the department's point source program has dramatically reduced direct discharges of pollutants to our waterways, the vast majority of the remaining impairments are due to nonpoint sources.

In contrast to the departments's point source program, which is primarily a state-level regulatory program, the NYS DEC Nonpoint Source Management Program focuses on integrating federal, state, local and individual landowner activities in a comprehensive program with both regulatory and non-regulatory elements. The principal focus of the nonpoint source program is on non-regulatory approaches, particularly outreach, education and special assistance projects for implementing best management practices for a wide range of activities. Regulatory elements include coordination with state-level programs such as concentrated animal feeding operation (CAFO), stormwater and onsite wastewater treatment system controls, and with other regulatory programs that may address nonpoint sources (watershed rules, pesticides, spills).

The NYS DEC Nonpoint Source Management Program originated from Section 319 of the federal Water Quality Act of 1987 which called for states to prepare two documents to address nonpoint sources of pollution: *The Nonpoint Source Assessment Report* (February 1989) and *The Nonpoint Source Management Program* (January 1990). The Assessment Report identified waters that are impacted or threatened by nonpoint sources of pollution and categories of nonpoint sources that pollute certain waters. The Management Program identified Best Management Practices (BMPs) to be used to reduce nonpoint sources of pollution and identified programs to implement the BMPs.

The Nonpoint Source Management Program was updated in June 2000. A companion document, *New York's Nine Key Elements for Implementing the Nonpoint Source Management Plan* was concurrently developed to ensure proper program implementation. The program update identified over 200 nonpoint source implementation projects conducted since 1990 – totaling over $18 million from funding sources that include Section 319, Environmental Protection Fund, Natural Resources Conservation Service, and Clean Water/Clean Air Bond Act. The program update also highlighted the continuing enhancement of partnerships with other federal, state and local government agencies since 1990. Another key development since 1990 has been the growing emphasis on watershed planning and addressing nonpoint sources and point sources in an integrated approach across entire watersheds. Finally, the program update outlined a detailed implementation schedule and analyzed funding sources for nonpoint source pollution control activities.

The management and control of nonpoint source pollution can be viewed as four components, each involving different partners in the public and private sectors. First, categories of nonpoint source pollution such as contaminated sediments, atmospheric deposition, bulk storage and inactive hazardous waste sites are addressed by federal and state governments. Second, county and municipal governments have responsibility for regulating on-site septic systems, stormwater management and watershed protection. Third, business and agricultural communities are responsible for using best management practices in their operations to reduce nonpoint source pollution. Finally, property owners are responsible for residential sources such as on-site septic systems maintenance, lawn care practices and disposal of household hazardous materials.

Stormwater Permitting

The SPDES permit program for stormwater discharges associated with industrial and construction activities is a regulatory program addressing what has traditionally been considered a nonpoint source of pollution. However, when discharged to waterways via a conveyance system, discharge regulations require that these point sources of pollution obtain permit authorization.

The major component of the general SPDES permits for stormwater discharges is the requirement to implement pollution prevention plans which utilize management practices and measures aimed at controlling pollutant sources at their source. Another component of the general permits is the provision that the State Director can require activities covered under a general permit to apply for an individual permit, thus "elevating" the level of regulatory attention afforded the discharge which may result in effluent limitations and self-monitoring requirements.

The coordination of activities by the numerous partners in the NYS DEC Nonpoint Source Management Program has been achieved by two principal communication approaches. First, the Nonpoint Source Coordinating Committee (NPSCC) has been established to coordinate the activities of state and federal agencies and institutions as they relate to local and regional agencies (primarily counties and regional agencies). The principal state agency partners, aside from NYS DEC, include the NYS Soil and Water Conservation Committee, Cornell's Cooperative Extension Service and Water Resources Institute, and the NYS Departments of Agriculture and Markets, Health, State and Transportation. The NPSCC also includes representative of numerous federal, state and local agencies that meet at least quarterly to communicate and assist in administering New York's nonpoint source program.

Secondly, each of New York's counties has established a County Water Quality Coordinating Committee (WQCC) to address communication and coordination between county agencies, municipal and town governments, and citizen groups or associations. The WQCCs typically include significant involvement from local Soil and Water Conservation Districts, Cornell Cooperative Extension, county health agencies, citizen or lake associations, farm groups, and local representatives of federal agencies such as the NRCS. They generally meet monthly or bimonthly with nonpoint source issues typically the primary concern.

The NYS DEC Division of Water provides overall leadership for this important program. This includes responsibility for state and federal government interactions, administration of the Nonpoint Source Coordinating Committee, and a principal role in funding local nonpoint source control projects and other projects to assist local governments. The NYS DEC Bureau of Watershed Management, Nonpoint Source Section has prepared the Nonpoint Source Management Program Update that outlines and provides further detail on seven key long-term goals for nonpoint source management. These are:

- Establish a five-year planning cycle for updating the NYS Nonpoint Source Management Plan.
- Coordinate statewide federal, state and industry programs that address aspects of nonpoint source pollution.
- Establish and foster partnerships to coordinate county and local activities to address nonpoint source pollution.
- Identify and evaluate nonpoint source water quality problems.
- Encourage and assist all landowners with guidance documents, incentives, and funding to implement management practices to control nonpoint source pollution.
- Where regulatory programs exist, identify management practices approved for use in New York State and track progress of their implementation/installation for the control of nonpoint source pollution.
- Address nonpoint source pollution from all categories geographically by watershed.

Other key additions to the Nonpoint Source Management Plan Update document are explicit short-term and long-term goals and objectives to protect surface and ground water. New York State is working to implement these goals and objectives through two initiatives that will address priority source categories statewide and restoration needs on a watershed basis:

- The New York State Nonpoint Source Coordinating Committee established four interagency workgroups and two subcommittees to develop additional policy direction for correcting problems from the highest priority source categories causing water quality problems statewide. They are: (a) Urban Runoff Workgroup; (b) Onsite Wastewater Treatment Systems Workgroup; (c) Hydrologic and Habitat Modification Workgroup; (d) Agricultural Workgroup; (e) Information and Education Subcommittee, and (f) Community-based Environmental Management Subcommittee. Long and short-term goals were developed for each.
- Unified Watershed Restoration and Protection Action Strategies will be prepared for Category I

watersheds in each basin in the state. Through the compilation of available information at the local watershed level, this process will highlight regional variations in the four priority nonpoint source categories, and will be a framework for funding implementation activities to restore and protect New York's waters.

Watershed Restoration Action Strategies

Water quality management requires both the preservation and the restoration of water quality resources. To address these needs, NYS DEC has recently embarked on a program to develop Watershed Restoration and Protection Action Strategies (strategies) for all New York State watersheds. These strategies are concise, action-oriented documents that:

- *compile* currently available information about the state of the watershed and ongoing assessment, outreach and implementation activities, and
- *propose* environmental and natural resource priorities or goals and measurable objectives for achieving those goals.

The purpose of the strategies is to develop and document management plans for watersheds that bring together all appropriate agencies and stakeholders to focus support – in the form of grant dollars, technical assistance and other resources – to address priority water and natural resource needs in specific watersheds.

The strategies create an opportunity to strike an appropriate balance between control of point discharges and polluted nonpoint runoff. The strategies also consider other water-related problems in the watershed, including wetland loss, sediment contamination, erosion and sedimentation, aquatic species habitat degradation, drinking water protection, and health of riparian areas. As a result, strategies serve as a source of information for setting priorities for state and federal funds, guiding development of NYS DEC work plans and better integrating various components of the department's water quality management program.

The strategies will also help the Natural Resource Conservation Service, Farm Services Agency, and other Nonpoint Source Program partners identify priority areas on which to focus federal funds available through Farm Bill programs to more effectively address state and local watershed restoration and protection needs. The strategies should be considered by agencies including the USEPA, NOAA, US Fish and Wildlife Service, US Forest Service, USGS, Coast Guard and Army Corps of Engineers as part of their determination of priorities. They will also serve as a tool for other stakeholders, such as County Water Quality Coordinating Committees, to guide their decision-making.

To date, NYS DEC has submitted to USEPA Watershed Restoration Action Strategies for four watersheds: Long Island Sound, Northern Long Island, Bronx, and Sandy Hook-Staten Island. These watersheds are covered by the Comprehensive Conservation Management Plans for Long Island Sound and the New York/New Jersey Harbor Estuary.

Additionally, NYS DEC has involved a wide range of stakeholders in developing a framework to guide the collaborative development of strategies for the rest of New York State. These stakeholders include federal, state and local or tribal government and local entities such as county officials and agencies, municipal (city, town or village) officials and agencies, regional planning boards, Soil and Water Conservation Districts, Environmental Management Committees and Cooperative Extension. The framework builds on existing partnerships with these groups and watershed initiatives currently underway, while also establishing consistent key statewide elements. Also, by involving key stakeholders in developing the framework, NYS DEC ensures that the New York State tradition of teamwork and partnership in watershed management extends through this new initiative, strengthening community-based environmental management and enhancing the restoration of watersheds.

In creating the framework, it became clear that the details of developing a strategy should be worked out in the context of an actual strategy. Therefore, the next (and current) step in this effort is the piloting of the strategy development in a portion of the state. The five sub-basins (8-digit HUCs) of the Chemung and Susquehanna River Basins were selected for the pilot because of a variety of factors, including active local interest and synchronization with other components of the Division of Water's Comprehensive Assessment Strategy. At the same time, NYS DEC will participate with the development of the Peconic Comprehensive Conservation Management Plan and the South Shore Conservation Management Plan to add any elements necessary to constitute a Watershed Restoration and Protection Action Strategy.

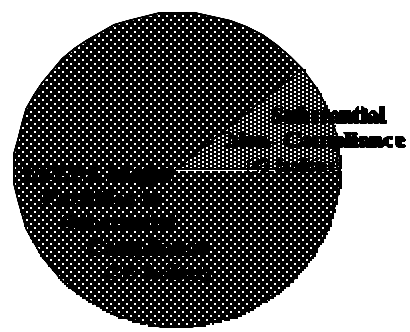
Compliance Activities

Once water quality goals and strategies are developed, the role of NYS DEC shifts to the ensuring of compliance. The water quality compliance activities of the Division of Water consist of three key elements: *surveillance*, *assistance* and *enforcement*, which assure that water quality and quantity standards are met. Because the final objective is compliance, not punishment, department functions combine to form a regulatory presence to assure this goal is achieved.

Compliance works best through partnership between NYS DEC and permitted municipalities or industries. Working together, NYS DEC and each facility take timely and appropriate action to correct pollution problems that arise. Cooperation is crucial to success.

SPDES Permit Compliance

For Year Ending June 30, 1999



Surveillance consists of monitoring, inspecting and sampling, with the focus on specific permitted activities. For example, effluents are tested to see if they are within the limits set to maintain the intended best uses for a water body. Most of these data are gathered through the self-monitoring programs of regulated facilities; but DOW's compliance monitoring program, along with evidence obtained through on-site inspections and sampling by DOW technicians, provides verification of performance.

Wastewater facilities are evaluated according to their discharge limits and their compliance with remediation schedules. When an actual or potential problem or violation is identified, actions are taken to correct or prevent it. DOW staff track the facility's progress toward compliance. Industries that discharge into public treatment facilities are overseen to ensure pretreatment.

Assistance includes support provided through training, education, as well as through direct technical assistance. Since the termination of relevant state and federal grant programs, there are no longer any direct funds for the operation of wastewater treatment plants. To repair or to improve their plants, NYS DEC encourages municipalities to apply for low interest loans through the State Revolving Fund. DOW trains facility personnel in the operation and regulation of treatment plants. Technical assistance includes trouble-shooting operations and structures. DOW staff also distributes information to facility owners, operators, customers, and neighbors to increase awareness of problems and goals. Public participation is encouraged through outreach programs, which make residents and workers aware of the part they must play in protecting our waters.

Enforcement begins when DOW surveillance activities find that a facility is in violation of its State Pollutant Discharge Elimination System (SPDES) permit or other program requirements. The division notifies the facility of the violation and puts it on a compliance schedule. Discharge reports, reconnaissance, annual inspections, and regulatory compliance samples provide a meaningful basis for evaluating corrective strategies. Priorities for NYS DEC action are based upon the environmental impact of noncompliance.

If the violation continues, DOW may take more formal actions, such as hearings, penalties and consent orders. DEC may seek federal enforcement or criminal prosecution for severe, willful or prolonged violations. Such legal actions formally define violations and specify their resolution. USEPA can be a source of formal action when funds and personnel are in short supply at the state level.

Water Integrated Compliance Strategy System

Previous division compliance assurance efforts focused on permitted point-sources of pollution, such as municipal wastewater treatment plants and industrial facilities. The Water Integrated Compliance Strategy System (WICSS) represents an expansion of these activities to include nonpoint sources and other DOW programs needing compliance assurance in one overall process.

WICSS applies to all problems or violations which may occur in any DOW program. The system drives and monitors priority enforcement activities. WICSS balances legal action with technical assistance, operator training, field inspections, permit reevaluations, and facility self-help. It employs all available mechanisms in an orderly, step-by-step manner to achieve compliance with SPDES permit conditions, effluent limits and other requirements.

Problems or violations are defined in terms of water quality or quantity criteria, which reflect public policy decisions concerning safety, health, and the economy. When a priority violation is detected at any regulated facility, the WICSS process involves appropriate Regional Office and Central Office staff to identify sources and causes of pollution and assess their impact. All appropriate parties then work together to develop the best strategy to achieve compliance. Implementation of the strategy is tracked through DOW monitoring and surveillance programs.

WICSS is a primary responsibility of NYS DEC regional DOW and legal staff, who work directly with regulated facilities toward mutual solutions. DOW's compliance program encourages economic development consistent with sound water quality and quantity management. The success of WICSS is measured by improved compliance and, ultimately, the enhanced quality of the state's waters.

A Watershed Approach

The previous section of this report presented an outline on specific NYS DEC water quality programs. However, the effectiveness of these programs depends upon how well they work together. In order to achieve a more comprehensive and integrated assessment and better management of water resources in New York

State, the Division of Water has adopted a *watershed approach* toward assessment and management. The watershed approach involves focusing the activities of multiple DOW programs on the water resources within the entire area of a watershed, rather than having those programs act independently on various water quality issues around the state. Such an approach will improve the management and protection of surface and ground water resources by better integrating existing water resource monitoring and management programs within the DOW. Furthermore the watershed approach provides an opportunity to incorporate the efforts of other governmental agencies, as well as non-government agencies and the public and private sectors into water resource monitoring and management.

The watershed approach does not represent a new program; rather it is a strategy to integrate a number of existing monitoring and management programs. The approach provides a framework to focus existing program efforts and coordinate their activities geographically, by watershed. Key components of the watershed approach include:

<u>Geographic Scope of Study:</u> Watersheds are defined by surface water hydrology; they are nature's boundaries. In addition to rivers and streams, lakes, estuaries, and wetlands, watersheds also include the surrounding landscape. The watershed approach should also recognize associated groundwater resources, the delineation of which may be less well-defined than surface waters. Likewise, air deposition, hazardous waste and landfill facilities, and other possible impacts on water quality in the watershed not normally addressed by DOW programs could be included as well.

<u>Specific Goals/Objectives:</u> Again, the division's water quality monitoring and management efforts must remain focused on specific, well-defined and attainable results (one being moving waterbodies from *Not Supporting* or *Partially Supporting* designations to *Fully Supporting*). A framework illustrating the focus of Division of Water activities was discussed previously in this report (see *Establishing Common Objectives*, page 12).

<u>Cooperative Partnerships:</u> Because watersheds transcend political/governmental boundaries, the watershed approach encourages the involvement of a variety of interested parties in the study and implementation of water quality management strategies. Watershed advisory groups should include representatives from various levels of government, public interest groups, business and industry, college, university and other academic institutions, private citizens and landowners, and others.

The division has for some time applied such a watershed approach to a number of specific *priority* watersheds identified in the state. In these areas watershed teams composed of a cross-section of program staff have been established to address water quality issues. Activities in these watersheds which are currently the focus of division efforts are outlined on the following pages.

In addition to efforts in these Priority Watersheds, the division has been expanding the application of a watershed approach to other, more routine program activities throughout the state. Details of this approach are outlined in Part III, Chapter 2 - *Comprehensive Assessment Strategy*.

Priority Watersheds

Great Lakes Programs

Goal: Restore, protect and maintain physical, biological and chemical integrity of the Great Lakes system.

Authority: The Great Lakes Water Quality Agreement Amendments of 1987, Section 118 Clean Water Act.

Remedial Action Plans (RAPs) for Areas of Concern

- Six in New York State: Buffalo River, Niagara River, Eighteenmile Creek, Rochester Embayment, Oswego River, St. Lawrence River at Massena.
- Stage 1 and Stage 2 Plans written by DEC (by Monroe County for Rochester Embayment) and Citizen Advisory Committees to identify problems (beneficial uses that are impaired) and the pollutants that cause them, locate the source of the pollutants, recommend remedial actions, and monitor implementation.

Status

- Buffalo River: Plans completed 1989, implementation in progress, status report completed June 1999.
- Niagara River: Plans completed 1993, implementation in progress, status report completed June 2000.
- Eighteenmile Mile Creek: Plans completed 1997, implementation in progress.
- Rochester Embayment: Plans completed 1997, implementation in progress, Addendum completed June 1999.
- Oswego River: Plans completed 1991, implementation in progress, workshop summary and update May 1999.
- St. Lawrence River at Massena: Plans completed 1991, implementation in progress; status report May 2000.

Lakewide Management Plan (LaMP) for Lake Ontario and Lake Erie

- Binational development of plans to identify problems/causes, identify and track sources, and identify remedial actions. Commitment to load reductions and ecosystem approach.
- Program involves significant public participation and many jurisdictions and agencies.

Status

- Lake Ontario Lamp: Problem definition document completed in May 1998. Progress, load reduction and remedial action identification report planned to be completed in 2000.
- Lake Erie Lamp: Status Report summarizing information on use impairments, ecosystem objectives and sources and loads completed in 1999. Comprehensive Lamp 2000 Report released April 2000.

Niagara River Toxic Management Plan (NRTMP)

- Four Parties (Environment Canada, United States EPA, Ontario Ministry of Environment and NYS DEC) develop and implement plans to reduce toxic inputs to these waters.

Status

- Plan completed in 1987; implementation and reporting on progress ongoing.
- Annual Public Information meeting conducted in conjunction with Lake Ontario Lamp Update in June 2000.

Priority Watersheds

NY/NJ Harbor Estuary Program (HEP)

Goal: Establish and maintain a healthy, productive ecosystem and full beneficial uses of the Estuary.

Authority: Designated "Estuary of National Significance" under the USEPA National Estuary Program in 1987.

Objectives

- Cooperative development and implementation of Comprehensive Conservation and Management Plan by the HEP Management Conference whose members represent NYS and NJ, USEPA and NYC, other state, federal and local entities, and the public.

Status

- Comprehensive Conservation and Management Plan completed/adopted in 1996; approved by USEPA in 1997.
- Implementation of CCMP is in progress.

Priority Watersheds

Long Island Sound Study

Goals:

1. Protect and improve waters of Long Island Sound to ensure healthy/diverse living resources.
2. Minimize health risks associated with consumption of shellfish and finfish.
3. Maximize opportunities for water recreation without conflict with ecosystem management.
4. Realize full social and economic benefits associated with use of the Sound.
5. Preserve and enhance the biological, physical and chemical integrity of the Sound.
6. Establish a water quality policy that supports both the health and habitats of the living resources and the recreational and commercial activities of people.

Authority: Designated an "Estuary of National Significance" under the Harbor Estuary Program in 1987.

Objectives

- LISS focuses on seven (7) priority areas of concern:
  low dissolved oxygen;
  toxic contamination;
  pathogen contamination;
  floatable debris;
  impacts on living resources;
  public involvement and education; and
  land use.

Status

- A Management Conference for the LISS was convened in 1988. It involves the cooperative efforts of federal, state, and local agencies, universities, environmental groups, industry and the public. It consists of a Policy Committee, a Management Committee, a Technical Advisory Committee, and a Citizen Advisory Committee.
- In 1990, implemented a policy of no net increase of nitrogen.
- In 1992, began reductions of nitrogen discharges from selected sewage treatment plants to achieve 25% reduction by the year 2000.
- Final Comprehensive Conservation and Management Plan adopted in 1994.
- Phase III Actions for Hypoxia Management adopted in February 1998.
- Draft TMDL based on Phase II actions proposed for public comment in October 1999.

Priority Watersheds

New York City Watershed

Goal: To protect and enhance the drinking water quality of the NYC Water Supply.

Authority: Since 1905, NYS Law has allowed the city to use upstate lands for water supply and to regulate land use in the watershed. NYC's Watershed Rules and Regulations were last revised in 1997. Memorandum of Agreement between New York City, USEPA, watershed communities, environmental groups and New York State signed in 1997.

Objectives

The Memorandum of Agreement between New York City, USEPA, New York State, watershed communities and environmental groups contains numerous provisions to protect and enhance the quality and quantity of the NYC source of water supply.

Status

! January 1997, MOA signed by parties (NYC, USEPA, watershed communities, environmental groups and NYS) to work cooperatively to protect and enhance the quality and quantity of NYC's source of water supply.
! May 1997, USEPA issues Filtration Avoidance Determination for Catskill and Delaware Watersheds.
! May 1997, New York City updated Watershed Rules and Regulations become effective.
! July 1997, NYS DEC establishes enhanced monitoring program for New York City Watershed.
! NYS DEC awarded Safe Drinking Water Act grants in 1997, 1998 and 1999 for NYC Watershed Program
! July 1998, NYC, USEPA and NYS sign Croton Consent Decree requiring NYC to filter the Croton supply by March 2007.
! February 1999, NYS DEC certifies $5.1 million in funded projects under Water Resources Development Act to protect and enhance NYC source water quality and quantity.

Priority Watersheds

Peconic Estuary System

Goals:

1. Ensure integrity of marine resources, habitat and terrestrial ecosystems while supporting human activities.
2. Ensure effective technical, regulatory and administrative framework for monitoring and managing study area.
3. Broaden and generalize policy developed in this program for use in other estuaries with similar problems.

Authority: Comprehensive Assessment and Management Program initiated by Suffolk County Health Services in 1988. Designated an "Estuary of National Significance" under USEPA National Estuary Program.

Objectives

! Protect and improve Peconic Estuary system to ensure healthy and diverse marine community.
! Preserve and enhance the ecosystem to ensure optimal habitat and diversity of species and to promote conservation and wise management of consumable renewable resources of the bay.
! Optimize opportunities for water-dependent recreation.
! Promote the social and economic benefits of the Peconic Estuary system.
! Minimize health risks from human consumption of shellfish and finfish.
! Promote public awareness and involvement in estuarine management issues.

Status

! Draft Comprehensive Conservation and Management Plan released for public comment in September 1999.
! Final Comprehensive Conservation and Management Plan expected in Fall 2000.

Priority Watersheds

Lake Champlain Basin Program

Goal: Ensure the lake and its drainage basin will be protected, restored and maintained for future generations.

Authority: Funding for Lake Champlain implementation activities is authorized by special Lake Champlain language in the Federal Clean Water Act.

Objective/Other Aspects

- The program involves cooperative decision making and planning for the Lake Champlain Basin through a New York - Vermont - Quebec Steering Committee, created by the 1988 Memorandum of Understanding on Environmental Cooperation of Lake Champlain as a mechanism for information exchange and joint management, and the Lake Champlain Research Consortium, a group of seven in-basin academic institutions.
- Committees and subcommittees of the Steering Committee and Executive Committee include: Technical Advisory Committee, Education and Outreach Committee and Citizen's Advisory Committees of New York, Vermont and Quebec.

Status

- 1991 workshop held by the research consortium to identify research, monitoring and data management needs.
- During 1992, public opinion surveys about the lake were conducted in both New York and Vermont.
- A series of public workshops to discuss issues and propose solutions was held in spring of 1993.
- Ongoing projects are funded in part by the Special Designation Act. Numerous research & demonstrative projects address the four major areas on which the management plan focuses: water quality; living resources; human component; and support studies, data and monitoring.
- A comprehensive management plan was completed in October 1996, entitled "Opportunities for Action: An Evolving Plan for the Future of the Lake Champlain Basin." The three highest priorities for action in the Plan are: 1) to reduce the phosphorus load to the lake, 2) to reduce toxic inputs to the lake through pollution prevention programs, and 3) to develop and implement a strategy for managing nuisance aquatic plants and animals, including zebra mussels.
- A research workshop was co-sponsored by the Lake Champlain Basin Program in 1997 and again in 1999. The workshop reviewed recent research on Lake Champlain and set a research agenda for future research on the Lake. Research topics included: hydrodynamics/sediment resuspension, nutrients, toxics, ecosystem health, fisheries, cultural/social, economics and land use and atmospherics.
- A special Lake Champlain section was held at the International Association of Great Lakes Managers at their conference in Cornwall, Ontario in May, 2000.
- The 1996 New York Clean Water/Clean Air Bond Act has provided $15 million for point source, non point source and habitat restoration projects.
- An interstate workplan for the management of invasive nuisance aquatic species was approved by New York and Vermont and the Federal Nuisance Aquatics Taskforce in 1999. Ongoing prospects include water chestnut harvesting in the South Lake portion of Lake Champlain.
- U.S. Fish & Wildlife Service is preparing a supplemental draft EIS for long-term control of lamprey in Lake Champlain.
- A joint NY/VT Lake Champlain Byways plan was completed in 1999. An underwater shipwreck preserve has also been established by both states.
- A 5-year plan update is scheduled for 2001.

Priority Watersheds

Onondaga Lake Partnership

(Formerly the Onondaga Lake Management Conference)

Goal: Restore Onondaga Lake and resources.

Authority: Established by Great Lakes Critical Programs Act of 1990.

Objectives/Other Aspects

- Provide a framework for the City of Syracuse, Onondaga County, and federal, state and local governments to cooperate in cleaning up Onondaga Lake.
- Funded through a line item in the federal budget.

Status

- State of the Lake study document completed, 1993.
- Draft Management Plan completed, 1993
- Public Meeting held, June 1993.
- The Management Conference has endorsed an Amended Consent Judgment (ACJ) signed by the involved parties and accepted by Federal Court in Jan 1998. The ACJ addresses the build-out at the Syracuse Metro STP, ammonia and phosphorus treatment, sewer separation and controls on CSOs.
- The Onondaga Lake Partnership led by the US Army Corps of Engineers, replaced the Onondaga Lake Management Conference in August 2000.

Part III

Water Quality Monitoring and Assessment

Chapter 1 - Water Quality Monitoring Program

There are a number of programs within NYS DEC and the Division of Water that contribute information to the evaluation and assessment of water quality in New York State. Other government agencies and public groups are involved in the monitoring of water quality and participate in the periodic assessment activities as well. But the foundation of NYS DEC's ambient water quality monitoring effort is the Division of Water Rotating Intensive Basin Studies (RIBS) Program.

Rotating Intensive Basin Studies (RIBS)

The RIBS Program represents the latest iteration of a state water quality monitoring program that was established in the 1960s. The objectives of the RIBS Sampling Program are numerous and varied. They include: overall assessment of water quality, including the documentation of *good* quality waters; long-term trends analysis of water quality; comprehensive, multi-media sampling; characterization of background conditions; and the establishment of baseline conditions for other site-specific water quality investigations.

RIBS Networks

In order to address the number and variety of monitoring objectives, the RIBS Sampling Program is actually comprised of three (3) separate monitoring networks. Each of these networks operates concurrently, yet somewhat independently, and focuses on distinctly different objectives.

The Routine Network provides continuous sampling (6 samples annually) of water column chemistry at nineteen (19) selected sites across the state in order to monitor basin stream characteristics and determine long-term trends in water quality.

The Intensive Network employs more frequent water column sampling along with comprehensive, multi-media sampling (macroinvertebrates, fish, toxicity testing, bottom sediment chemistry) to provide more detailed assessments of water quality in selected drainage basins.

The Biological Screening Network relies on biological indicators (macroinvertebrates) to provide a *qualitative* assessment of water quality at a large number of sampling sites in selected basins with minimal analytic expense.

The water quality data and assessments generated by the RIBS Sampling Program are used to support various water quality management functions within the NYS DEC Division of Water. Specifically, RIBS information is used in the compiling of the Waterbody Inventory/Priority Waterbody List (WI/PWL), the writing of the New York State 305(b) Water Quality Report, the identification of 303(d) listed waters, support of Total Maximum Daily Load (TMDL) development, the selection of locations for intensive toxics surveys and other special water quality monitoring projects, and the development of water quality based SPDES permit limits.

A Plan for the Assessment of 100 Percent of Waters

Historically, limited resources forced the RIBS monitoring effort to focus on waterbodies with known or suspected water quality problems and issues. Correspondingly, there was not much emphasis on the monitoring and documentation of waters with good (*fully supporting*) water quality. However, modifications to the RIBS Sampling Program to correct this bias were piloted in 1996 and began in earnest in 1998. The new RIBS

Figure 5
RIBS Sampling Program Schedule

Year One: Planning/Recon and Biological Monitoring

In the winter/spring prior to the first sampling year in the target basin, RIBS Program staff plan to meet with regional staff, other monitoring units and WQCCs to discuss water quality issues/problems in the target basin, and where specific monitoring efforts should be directed. Based on this information, staff will develop a Biological Sampling Plan that will use on-site rapid biological assessments to determine the qualitative health of as many basin waters/watersheds as possible. The majority of basin waters are anticipated to have no significant water quality impairment. In the past, water thought to have no problems were generally ignored. This biological sampling effort will provide some qualitative documentation of water quality in these waters.

Biological sampling will be conducted during the summer of Year One. Other monitoring conducted during Year One in conjunction with the biological effort may include fish community assessments and ambient toxicity testing screening. The results will be used to develop a Intensive (chemical) Monitoring Plan (as well as *follow-up* biological monitoring plans) for Year Two.

Year Two: Chemical/Intensive Monitoring

Results from the Year One biological effort will be used to identify sites where more intensive chemical monitoring and more thorough biological monitoring would be most useful. This will likely lead to some multiple sampling at specific sites (intensive sites); it may also involve multiple samples taken along a specific problem reach (intensive surveys). Sampling work may also be coordinated with the efforts of others both within and outside the division/department. The Intensive Monitoring Plan will be conducted throughout Year Two.

Year Three: Evaluation and Assessment

Sampling results from the first two years will be evaluated and Basin Assessment Reports will be completed. The information gathered will also be used to update the WI/PWL database. (Additionally, a goal of this assessment effort is that the resulting report will become the basis for the 305(b) report for this basin.)

Year Four/Year Five

RIBS monitoring efforts in the target basin (except Routine Network sampling) will be suspended and the program will turn its attention to other drainage basins in the state. In the sixth year the RIBS Program will return to this basin.

strategy employs a tiered approach where rapid biological screening methods are applied at a large number of sites during the first year of a two-year basin study. This Biological Screening Network enables the program to document water quality in a greater percentage of all waters, not just those with known or potential problems. More intensive chemical monitoring is used in the second year to follow-up problems and issues identified by the biological screening effort. While resources are not currently available for a full-blown *probabilistic* monitoring network in the state, the wide coverage provided by the biological screening allows the RIBS Program to incorporate some of the main ideas behind the probabilistic approach and document good, as well as poor, water quality. However, until the biological screening is employed in a larger percentage of the state, waterbodies with no known use impairments will continue to be characterized as *nonimpacted/unassessed*.

Other changes recently incorporated into the RIBS monitoring strategy focus on other objectives, also designed to expand monitoring and assessment efforts to 100 percent of the state's waters. These objectives include:

- a greater flexibility to address specific water quality problems that may, in some cases, be unique to a given basin;
- improved coordination of RIBS monitoring efforts with the work of other monitoring units (both within and outside NYS DEC) to provide more complete assessments of water quality;
- the better incorporation other monitoring program data, as well as RIBS data, into annual 305(b) updates to USEPA.

Analytical Resources

The most limiting factor in defining the scope of the RIBS Sampling Program is the availability of analytical resources. By legislative agreement, the NYS Department of Health (NYS DOH) provides a specific amount of analytical services annually to NYS DEC. The DOW has, in recent years, allocated most of these laboratory service hours to support the RIBS Sampling Program. However, diminishing resource budgets and lab capabilities (due to staff shortages) have resulted in reductions in RIBS chemical monitoring in terms of the number of sites, the frequency of sampling at those sites, and the number of parameters analyzed.

The issue of analytical resource limitations at NYS DOH reached a critical point in 1998 when DOH informed DEC that their lab would no longer be able to provide regular water quality analyses. Recognizing the value of the program, DOW made limited contract laboratory monies available to maintain the RIBS Program's chemical monitoring component. Further, the division began an evaluation of the analytical resource needs of the entire division and an exploration of long-term solutions to this problem (see discussion under *Special State Concerns and Recommendations*, page 33).

Quality Assurance/Quality Control

The following of consistent and proper sampling, analytic, and reporting procedures is critical to ensuring that the water quality data obtained from the program is of known and satisfactory quality and integrity. A detailed outline of the proper procedures for the conduct of the RIBS Sampling Program is included in *The Program Plan for Rotating Intensive Basin Studies*. This Quality Assurance Plan (QAP) was most recently updated in March 2000.

Consistency of sample collection procedures becomes an even greater issue when more than one sampling team is responsible for the collection of samples, as is the case with the RIBS Sampling Program. In order to achieve consistent and effective sampling throughout the program, all RIBS sampling personnel have been provided and made familiar with the sampling protocol information contained in this program plan. Adherence to the plan is emphasized in order to ensure uniformity in sample collection techniques, sample handling, preservation methods, and shipping procedures.

Quality assurance is also maintained and enhanced by frequent and clear communication between the Central Office and regional sampling staff. Prior to the beginning of each sampling season, Central Office personnel visit the regional sampling staff to deliver supplies, and review and discuss the sampling for the upcoming season. These face-to-face meetings allow for the review of procedures and explanations of any changes to the program. The meetings also provide regional staff with an opportunity to express their thoughts and comment on any and all aspects of the program. During the sampling season, telephone and written communication between the Central Office and regional sampling staff are used to address various issues as they arise.

The objective of the quality control component of the RIBS Sampling Program is to establish and maintain standards that will insure the validity of the collected data. An integral part of sample quality is the collection of representative samples. The usefulness of the data obtained from any monitoring program depends upon how accurately that data actually describes the characteristics of the waterbody being investigated. The samples that are collected for analysis must accurately represent the stream. Additionally, the samples must also be unaffected by the collection procedure, sample preservation, and sample handling methods.

In order to monitor the integrity of the sampling effort, the RIBS Sampling Program includes quality control sampling. The quality control effort for water column samples includes the use of field blank samples, matrix duplicate samples, matrix spike samples, and laboratory control samples. Duplicates, spikes and laboratory control samples are also used to evaluated bottom sediment, and macroinvertebrate and fish tissue analyses.

The quality control results are evaluated using an evaluation criteria appropriate for the type of sample collected and the objective for collecting it. These various calculations are used to determine the precision, accuracy, and overall quality of the data results. Water quality reports generated from the RIBS Sampling Program data contain detailed evaluations of the various quality control results. Whereas the quality control results may differ significantly for different analytic methods, each group of parameters (e.g., solid, nutrients, metals, etc.) are evaluated independently. This evaluation provides some insight regarding the level of confidence to assign to the data and the conclusions drawn from the data. The quality control results may also serve to indicate areas where possible enhancements and improvements to the data collection and analytic procedures of the RIBS Sampling Program would be the most beneficial.

Data Management and Storage

To assist in the management of the RIBS water quality data, the staff has developed the Water Quality Network Management System (WQNMS). WQNMS is a collection of menu-driven software (FoxBase) programs for a personal computer. The system can perform data management tasks much faster and with greater accuracy and precision than can be achieved by hand. Specific functions include loading of water quality data received from multiple laboratories and other sources in a variety of formats to a common dBase/Foxbase format, conversion of parameter and station codes and comparison of reported values with expected data ranges. The system eases the editing of data sets, and the compilation of reviewed data into STORET storage files.

The RIBS Program has long used the USEPA STORET (STOrage and RETrieval) national water quality database to store its raw data, and make it available to others. Traditionally, monitoring data was received from the analytic labs, evaluated and appended to the STORET database monthly. USEPA has recently developed and released a completely reconfigured and enhanced STORET system. But while the new system is operational, it is taking RIBS Program staff considerable time to familiarize themselves with many of the features of the new system, and incorporate its use into the program. RIBS data is currently being processed and warehoused for eventual uploading to STORET.

Additionally, with the development of a new enhanced version of STORET, other division monitoring programs are evaluating or will consider the storage of data to STORET. In addition to RIBS data, lakes water quality data, harbor estuary data, and sediment data may also be stored in STORET. Furthermore, implementation of the system by the Division will also allow other divisions to become familiar with STORET and perhaps facilitate their consideration of STORET as a database for the storage of their water quality data. Regional use of the system for access to the data is also under consideration.

Beyond the availability of raw data, a more synthesized presentation of the raw data is presented in periodic RIBS Basin Assessment Reports which evaluate the raw data to determine the level of use support in the waters of a target drainage basin. Generally, these individual basin assessment reports are published at the conclusion of each two-year RIBS study, although the schedule for the completion of the reports has been extended during the implementation of the enhanced RIBS monitoring strategy.

The DOW will also continue the development and use of geographic information system (GIS) tools and applications for the evaluation of water quality data. Significant progress has been made in improving the use and access to GIS coverages. As an example, the preparation of the Unified Watershed Assessment (UWA) report was greatly facilitated by the use of the GIS system currently in use and resulted in a set of maps "posted" on the DEC *website* for review by the public and all parties involved in the process. The UWA utilized the geo-referencing of stream segments that are contained in the Waterbody Inventory/Priority Waterbodies List and allowed the display of the segments on stream coverages (Reach File 3). This geographic coverage is linked to tables that identify the segment, type and source of impairment, and other environmental information. As staff continues the use of GIS, additional coverages and tools will be developed to facilitate the evaluation and assessment of water quality. In particular, the use of "web" based GIS applications will be evaluated by the NYS DEC, enabling remote access and use of GIS coverages and data. In the future, direct links to data entered into the STORET system and the GIS will be considered. As data is entered into the system, with appropriate location identifiers, it will be available for display in a GIS format.

The Waterbody Inventory/Priority Waterbodies List (WI/PWL)

The monitoring data and information from the RIBS Program as well as other monitoring efforts both within and outside the division/department is used to update the Waterbody Inventory/Priority Waterbodies List (WI/PWL). The WI/PWL is an inventory database of waterbodies in New York State that characterizes known and/or suspected water quality problems and issues, and tracks progress toward their resolution. It is from the WI/PWL database that assessments which evaluate whether the waters of the state support their designated uses – such as the 305(b) Report – are compiled. In addition to providing this baseline assessment of water quality, the WI/PWL also provides:

A Focus for Division Program Activities

Because of limited resources, various division programs should address those specific water quality issues – both statewide problems (e.g., stormwater, toxic/contaminated sediment) and site/waterbody-specific concerns – where efforts will have the greatest impact.

A Consistent and Objective Inventory
The WI/PWL evaluation of water quality problems/issues is used in the development of program-specific priority ranking/scoring systems and efforts.

A Record of Water Quality History
The WI/PWL provides information for specific waterbodies so that the division can easily respond to questions--from both inside and outside the division (including the public)--concerning what is known about the water quality of specific rivers, lakes and watersheds.

A Measure of Progress
The WI/PWL tracks the progress of division programs and efforts toward improving the water resources of the state.

Recent PWL Modifications

Since its inception in 1983, the PWL – then known as the Priority Water Problems (PWP) List – has served as a tool to manage the flow of water quality information generated by the division, as well as from sources outside the division. However, its effectiveness at providing an appraisal of water quality problems and issues has been limited by inconsistent and subjective water quality information and inadequate review and verification of that information. Recent review of the PWL by the division concluded that while it generally provided an adequate framework for managing this information, the quality of PWL information needed to be improved. Recommended improvements incorporated into the system involved:

! *More Detailed Descriptive Information* that allows for the easy location of waterbodies and identification of the extent of the water quality impairment on a topographic map;

! *Water Use Impairment, Severity, Cause/Source and Documentation Information* that is specifically defined and consistently applied;

! *Tracking of the Resolution and Status of Water Quality Problems/Issues* along a spectrum that includes the verification of a problem, verification of causes and sources, development of corrective strategies, and the implementation of such strategies.

! *Extensive Narrative Discussion* of the details of the water quality problem, causes, sources, history and monitoring/documentation related to the segment, including the source(s) of information;

! *Prioritization of the PWL Segments* that have the "highest potential for resolution" thereby providing a means to allocate limited resources;

! *Regular Review and Update of PWL Segments* in all drainage basins (two or three basins each year) over a five-year cycle that includes a complete and thorough review of all segment information and integrates the PWL update with the results from the *Rotating Intensive Basin Studies (RIBS)* Monitoring Program;

! A *Comprehensive and Inclusive Update Process* that solicits and incorporates water quality information from all Division programs, other quality divisions in the department, other state, federal and local agencies, and citizen/volunteer groups.

An Expanded *Waterbody Inventory*

Recent efforts to update PWL information were accompanied by considerable discussion concerning what segments should be on the PWL and what segments – because of either the lack of a significant problem or limited problem documentation – should be excluded from the list. At the same time, the division recognized a growing need to monitor and report on "*good*" water quality segments, in addition to those segments with problems. In response to both of these issues, the division decided to expand the inventory database of waterbodies to include water quality information for **all** waters in the state (not just waterbodies with problems).

However, while this expanded waterbodies database provides more complete water quality information, for program management purposes the division must also be able to cull from this expanded comprehensive list of waterbody segments a smaller number of "*priority*" segments on which the division can and should spend resources. In other words, the division recognized a need to identify both a comprehensive ***Waterbody Inventory*** of water quality information for all waters in the state, and a subset of waters limited to segments with well documented, potentially resolvable, higher priority problems and issues. This subset of the Waterbody Inventory remains the division's ***PRIORITY Waterbodies List***.

In order to achieve these multiple objectives, segments in the larger comprehensive Waterbody Inventory are segregated into one of four (4) *Water Quality Assessment Categories*.[6] The first two of these categories include:

> **Water Quality Impacted Segments:** These are segments with documented (verified) use impairments with a problem severity of *precluded*, *impaired* or *stressed (threatened* uses are not included in this category). This category includes both *High/Medium Resolvability* segments, where the division considers the expenditure of additional resources to improve water quality to be worthwhile given public interest and/or the expectation that a measurable improvement can be achieved; and *Low Resolvability* segments, with persistent/intractable problems on which the division is not likely to spend any significant resources (e.g., atmospheric deposition, etc.).
>
> **Threatened Waterbody Segments:** These are segments for which uses are not restricted and no water quality problems exist, but where specific land use or other changes in the surrounding watershed are known to, or strongly suspected of, threatening water quality. Also included in this category are waterbodies designated by the division as *Special Protection Waters*. Special Protection Waters experience no use restrictions or immediate threats to water quality, but nonetheless remain highly valued resources deemed worthy of special protection and consideration.

Taken together, the *Water Quality Impacted Segments* and *Threatened Waterbody Segments* comprise the Division of Water Priority Waterbodies List (PWL). These segments are the focus of remedial/corrective and resource protection activities by the division and its watershed partners. The other two *Water Quality Assessment Categories* are:

> **Waterbody Impairments Needing Verification:** These are segments that are thought to have a

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[6] Further discussion of Water Quality Assessment Categories and other aspects of the WI/PWL is contained in Appendix B - *The Waterbody Inventory and Priority Waterbodies List*.

use impairment or water quality impact, but for which there is not sufficient or definitive documentation. These segments are designated to be verified by the division (generally, this will be done during the *Comprehensive Assessment Strategy* rotating basin schedule) or other watershed partners.

Waterbodies Having No Known Impairment: These segments include those waterbodies where monitoring efforts indicate that there are no use impairments or other water quality impacts/issues.

Waterbody Impairments Needing Verification **and** ***Waterbodies Having No Known Impairment*** **are tracked on the comprehensive Waterbody Inventory, but are not considered to be "on the Priority Waterbodies List."** For these waters, additional monitoring and assessment activities to document use impairments, causes and sources are more appropriate than remedial/corrective or resource protection efforts.

The remaining waters of the state are recorded in the Waterbody Inventory as *UnAssessed*. Maintaining a list of unassessed waters also provides useful information for the planning and conduct of future RIBS and other water quality studies.

Maintaining a comprehensive Waterbody Inventory allows division staff to easily respond to questions – from both inside and outside the department – concerning the water quality of specific rivers, lakes and watersheds. And by segregating the database in the manner described above, the division can also identify specific priorities where the coordination of limited resources can most effectively address water quality problems.

Special State Concerns and Recommendations

In the spring of 1997, the Division of Water established a workgroup made up of staff from a variety of monitoring programs in the division. The purpose of the workgroup was to evaluate the current monitoring activities and the sampling data needs of the various water programs and recommend the most cost-effective Division of Water monitoring effort. Based on this evaluation of monitoring activities and goals, the workgroup identified a few critical needs and issues of highest priority. Without resolution of these issues, a truly comprehensive division monitoring program is most likely out of reach. These critical needs and issues include:

- Securing of reliable, sufficient and available analytic resources;
- Availability of similarly reliable and sufficient high-quality stream flow data;
- Establishment of mechanisms to better coordinate monitoring efforts, specifically
  - annual division review of monitoring workplans,
  - focus on the Priority Waterbodies List (PWL), and
  - adoption (where practical) of common rotating basin schedules;
- Defining the proper role and management of volunteer monitoring activities.

Securing of Reliable and Available Analytical Resources

The overall quality of the division's monitoring efforts has been, in recent years, significantly hampered by insufficient, and even more problematic, unreliable analytical services. Specific aspects of this one issue include: the legislative constraint that the bulk of the division lab services be provided by the NYS DOH; the inability of the NYS DOH labs to provide the level of services due to staffing shortages; and the inability to roll-over from one year to the next monies designated for contract lab analyses, which can result in a very short window during which all sampling must be conducted. In order to insure sufficient preparedness and a smooth running monitoring program, reliable and adequate analytic resources are critical. As intractable as this issues has been, the division must resolve them or any comprehensive Division of Water monitoring program will remain consigned to mediocrity.

Coordination of Stream Flow Data Needs
Stream flow data is a critical component of any monitoring program design. To date, the preferred means of securing stream flow data has been through contract with USGS. However, recent budget constraints limit the number of gaging sites that the division can support. The division is currently evaluating the stream flow needs of all its monitoring programs to develop and request support for a baseline network of gaging stations. By reviewing the needs of multiple programs, it may be possible to select sites that allow for the sharing of costs between programs. The needs assessment will consider grant possibilities and partnerships with other agencies and groups to support USGS gaging activities beyond the baseline network. If stream flow data needs still exceed these possibilities, less expensive alternatives to continuous gaging stations – such as developing stage height flow rating curves that could provide stream flow estimates for specific sampling events – will also be considered.

Integration of Monitoring Programs
Greater program integration is a concept supported by most division staff. However, there has not been a clear consensus about how to achieve this integration. The *Comprehensive Assessment Strategy* (outlined in Part III, Chapter 2) offers a specific framework to better link the various separate monitoring and management efforts currently being conducted throughout the division.

The Proper Role of Volunteer Monitoring
Due to a recognition of the importance of water resources, various groups (citizen, academic, private, public) across the state have become more involved in the protection of these resources. One growing aspect of this involvement is in the monitoring of water quality. While the level of interest in volunteer monitoring activities presents the division with a valuable opportunity, there are significant issues that must first be addressed. As one would expect, the quality of results produced by volunteer groups varies considerably and it is unrealistic to expect this data to equal in quality that produced by more experienced, better funded and long-established NYS DEC programs. However, volunteer efforts can supplement division programs by providing basic water quality information at a greater number of sites. To take advantage of this opportunity the division must provide a framework and guidance that recognizes the limitations of volunteer monitoring groups and channels these activities toward producing information that is useful for NYS DEC management programs.

Such a framework exists for lake monitoring; the Citizens Statewide Lake Assessment Program (CSLAP) trains lake association members to collect specific lake quality data and information all across New York State. And currently a volunteer program that relies on biological, chemical and/or physical monitoring to provide similar assessment information for rivers and streams is being piloted in the Lower Hudson River/New York City Watershed. This pilot is a joint effort involving funding from a New York City Watershed grant, direction and oversight from NYS DEC Water staff, and day-to-day implementation by the Hudson Basin RiverWatch (HBRW). HBRW is an extensive and growing partnership of over 100 schools, dozens of environmental organizations and a number of state and local water resource agencies in the Hudson River Basin. Sponsored in large part by the NYS DEC Hudson River Estuary Program, HBRW provides training for teachers, volunteers and regional monitoring coordinators; sponsorship of Clean Water Congresses where students and other participants can share their data and experiences; and technical and organizational support to groups, including a forthcoming Guidance Manual for the design and conduct of monitoring programs. HBRW has also worked extensively with NYS DEC monitoring staff to develop protocols that will meets the needs and data requirements of the Division of Water.

A outline of the NYS DEC/HBRW volunteer monitoring framework for rivers and streams – focusing on screening waters for possible impacts and enabling the division to better target more intensive monitoring and water resource management programs – is included in this report as Appendix D - *Volunteer River Monitoring Program*.

Part III
Water Quality Monitoring and Assessment

Chapter 2 - Comprehensive Assessment Strategy

USEPA has established, and NYS DEC has adopted, a long-term goal of *comprehensive* monitoring and characterization of surface and groundwaters. This effort relies on a variety of strategies targeted at the current condition of – and designated best uses for – these water resources. A *New York State Water Quality Monitoring Strategy*[7] that describes the numerous and varied water quality monitoring and management activities of the NYS DEC Division of Water was prepared and submitted to USEPA in October 1998. Much of what was outlined in the strategy – regarding greater integration of division programs (and other activities outside the division) to produce a more complete and thorough evaluation of monitoring data, a more comprehensive assessment of water quality, and a more coordinated approach to addressing water quality issues and problems throughout New York State – are presented here.

Cornerstones of the Strategy

The three (3) cornerstones of the *Comprehensive Assessment Strategy* are:

- Rotating Basin Schedules
- Enhanced Communication and Information Sharing
- The Waterbody Inventory/Priority Waterbodies List (WI/PWL)

Rotating Drainage Basin Schedules

A rotating drainage basin strategy focuses monitoring and other activities on a portion of the state for a period of time and then turns attention to other parts of the state. This strategy enables multiple programs to conduct coordinated efforts in two or three targeted basins each year, resulting in a comprehensive assessment of the entire state within a five-year cycle. The adoption of a common basin rotation schedule to drive most division programs further facilitates integration of component programs and moves the division toward a more coordinated and unified monitoring strategy. While this approach may not be appropriate for every program, the use of a common rotating basin schedule where possible enhances the *Comprehensive Assessment Strategy*.

Because of its long reliance on a rotating basin schedule, the division's statewide ambient water quality monitoring program – the Rotating Intensive Basin Studies (RIBS) Program – serves as the foundation of the *Comprehensive Assessment Strategy*. Under the new strategy, the RIBS framework has been expanded to accommodate greater integration of other monitoring, assessment and management efforts, both within and outside the division and department.

Enhanced Communication and Information Sharing

The single greatest need for the better integration of the division's water quality monitoring and management activities is better communication between the component programs. There are a number of approaches and tools available to the division for the enhancement of communication among not only the division program staff, but with associated efforts in other divisions and outside the department. Two aspects of the *Comprehensive*

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[7] New York State Water Quality Monitoring Strategy, October 1998. NYS DEC, Division of Water. Albany, New York.

Assessment Strategy where this enhanced communication is highlighted is the Annual Review of Sampling Activities and the Basin Planning Meeting.

At the beginning of each sampling year a group of division staff involved in various monitoring programs meet to review the goals and overall *scope of work* of all division programs planning to conduct monitoring work in the coming year. The purpose of this group is to review each project in light of available resources and point out where efficiencies may be gained through coordination and cooperation. Additionally, for purposes of information sharing, the review group produces for DOW staff an overview of planned division monitoring activities for the year.

In addition to coordinating the division's annual sampling activities, the *Comprehensive Assessment Strategy* includes specific efforts to coordinate a broader range of activities within the targeted drainage basins. At the beginning of a new RIBS comprehensive basin assessment effort, representatives of a variety of central office program staff meet with regional staff from both DOW and other divisions. The purpose of this kick-off meeting is to discuss what the regional staff considers to be the most important water quality issues in the basin and identify where upcoming monitoring activities should focus. Also considered during this meeting are areas where coordination of effort and the sharing of data would benefit everyone.

Waterbody Inventory/Priority Waterbodies List (WI/PWL)
The *Comprehensive Assessment Strategy* also links all these monitoring activities with the Waterbody Inventory/Priority Waterbodies List (WI/PWL), the division's inventory of water quality information for waterbodies throughout the state. The WI/PWL incorporates monitoring data and information from Division of Water programs, as well as other NYS DEC divisions and other agencies.

The WI/PWL also includes a significant public participation component, incorporating input from the public through the Water Management Advisory Committee (WMAC), the Statewide NPS Committee, County Water Quality Coordinating Committees (WQCCs), citizen advisory committees (CAC) for Remedial Action Plans (RAPs) and Lake Management Plans (LaMPs), and other means. Regularly updated to reflect ongoing monitoring efforts, the WI/PWL represents the division's most complete repository of water quality information. As such, it provides the basis for generating the state's periodic water quality assessment reports (including the 305(b) Report to USEPA), identifying areas where additional monitoring is needed, and targeting remediation and pollution prevention efforts and resources.

Component Programs and Activities

Each year the Division of Water targets two or three major watersheds (about 20% of the state) on which to focus the *Comprehensive Assessment Strategy*. The associated monitoring and assessment activities in the target basins continue for three years. As a result, when fully implemented, some component of the *Comprehensive Assessment Strategy* effort will be underway in 60% of the state during any one year. Table 2 presents a schedule for addressing watersheds across the state. Development and implementation of management and restoration activities in the basin are conducted more continuously, but development of specific basin management strategies are scheduled for years four and five.

Detailed below is a more specific outline of the *Comprehensive Assessment Strategy* and its component programs. The framework is very similar to the Rotating Intensive Basin Studies (RIBS) monitoring strategy, but has been expanded to enlist a number of other programs and efforts as participants in reaching its broad goal of a comprehensive assessment of water quality.

Planning and Issue Identification (year 1)
The first year of a *Comprehensive Assessment Strategy* three-year basin effort begins with a review of existing water quality information and the identification of priority water quality issues in the study area. This planning effort leads to more effective targeting of limited monitoring resources. Monitoring activities in the first year are generally limited to the qualitative biological assessment of large numbers of waters in order to document good (or *fully supporting*) water quality, and other water quality screening and problem verification efforts (toxicity testing, fishery community and habitat assessment, etc.).

Watershed Partners - The first task in the RIBS strategy is the identification of other groups or individuals with an interest in water quality and the management of water resources in target drainage basins. Watershed partners are drawn from three general areas:

Central Office program staff, primarily from DOW but also other divisions, who link RIBS with other statewide efforts and provide information about the activities of programs in target basins (this group includes other state and federal government agencies);

Regional Office (including Regional Fisheries and watershed-specific program) staff; and

Other Agency/Public/Community Groups (particularly the County Water Quality Coordinating Committees) that are also active in water quality issues in targeted basins.

Watershed Characterization - At this point, the watershed partners evaluate what is known about water quality in the basins, and what issues need further study and attention. Regional staff input and an improved Waterbody Inventory/Priority Waterbodies List (WI/PWL), in which all partners assist in updating, are necessary for effective watershed characterization.

Ambient Water Quality Screening - The initial RIBS monitoring efforts focus on the qualitative assessment of waters to determine and confirm where there are significant water quality issues and where water quality resources meet designated uses. This component of the program relies primarily on macroinvertebrate assessments but should also incorporate fishery assessments (Regional Fisheries), lake monitoring information, etc.

Facility Screening - In an effort to more effectively target the division's limited facility compliance monitoring resources, relatively inexpensive bioassays can be conducted to determine the toxicity of facility effluents. In instances where significant toxicity is identified, more intensive chemical monitoring and analyses may be appropriate. Where possible, this sampling should be conducted in conjunction with ambient screening of the receiving water.

Volunteer (non-DEC) Monitoring Efforts - Volunteer monitoring data collected in the interval since the RIBS Program last studied a targeted basin may also provide useful information. The reliability of such data could be greatly enhanced by a "formal" volunteer monitoring network supported and coordinated by the division.

Monitoring and Data Collection (year 2)
The results of the *Planning and Issue Identification* phase are used to develop more intensive basin monitoring plans for the target watersheds. The intensive monitoring component of the *Comprehensive Assessment Strategy* begins with the RIBS Sampling Program. Traditionally, the RIBS effort has included

chemical analyses of contaminants in water, bottom sediment and whole organisms (macroinvertebrates and some fish flesh), as well as biological assessments and ambient toxicity evaluations. RIBS assessments have been recently expanded to include lake assessment and classification and may also involve other division and department monitoring elements, such as fishery habitat and community assessment, a greater level of fish tissue contaminant sampling, toxicity screening and chemical sampling of facility effluents, groundwater quality evaluation, pollutant trackdown efforts, and nonpoint source monitoring.

Additional data for water quality assessments is also generated by monitoring programs conducted by other governmental agencies and public interest groups outside the NYS DEC. These programs, which may focus on entire watersheds or individual waterbody segments, provide both chemical constituent data and/or aquatic resource information including macroinvertebrate, plant and fish community assessments. Efforts to cultivate and incorporate other agency (USGS, USF&WS, USEPA, local health and planning agencies) as well as citizen volunteer (lake associations, county WQCCs, colleges and universities, etc.) monitoring activities into the intensive monitoring plan are also being developed.

Intensive Chemical Monitoring - Based on the watershed characterization and water quality screening, a RIBS chemical monitoring plan is developed. This plan incorporates multimedia sampling (water column, bottom sediment, toxicity testing, biological tissue sampling) provided by a number of programs to build a comprehensive water quality assessment.

Lake Classification and Inventory - This effort to assess trophic status and investigate other pertinent lake uses will focus on regionally significant lakes or other waterbodies having information gaps within the WI/PWL.

Point Source Monitoring and Compliance - In addition to the ambient sampling, coordinated monitoring of the more significant point sources should also be conducted. Both biological (toxicity) and chemical monitoring are recommended.

Nonpoint Source Activities - When nonpoint sources are considered significant contributors to water quality problems in a watershed, monitoring and modeling activities should be initiated to characterize the magnitude of loading from these sources. Due to the greater amount of staff, equipment and analytical resources required for the storm-event monitoring associated with nonpoint sources, special and/or dedicated funding would likely be necessary to conduct such efforts. Nonpoint source monitoring would likely continue for two or more years in order to accurately determine inter-annual variability in loading to the watershed. Other local watershed partners may be able to assist with the nonpoint source monitoring component.

Regional Ambient Sampling - Regional ambient monitoring efforts may be used to maintain a monitoring presence in a basin when statewide programs shift their attention to other basins. These activities complement statewide efforts by providing more frequent data or data at additional sites.
Source Water Assessments - The RIBS program and division groundwater resources staff should try to coordinate with the NYS Department of Health to incorporate available source water and groundwater monitoring data into the watershed assessments.

<u>Evaluation and Assessment</u> (year 3)
The third year of the *Comprehensive Assessment Strategy* focuses on the evaluation and assessment of

results from the multi-faceted *Year Two* intensive monitoring effort, and a corresponding update of the WI/PWL. The WI/PWL Update process involves solicitation of input from a wide range of water quality professionals (from both within and outside the division/department) as well as a significant public participation component, which is coordinated through the county WQCCs. The update also incorporates anecdotal information of water quality conditions that need to be verified.

Water Quality Evaluation - After the completion of the intensive monitoring effort, the resulting data must be thoroughly evaluated to determine what additional information can be incorporated into our knowledge of the water resources in the basin. The data analysis should focus on whether waters support designated uses, evaluation of water quality trends, and identification of areas where additional study is needed.

Modifications to Volunteer Programs - The knowledge gained from the intensive effort can be used to better focus ongoing volunteer efforts in the basin.

WI/PWL Update - All watershed partners should be encouraged to participate in the updating of the WI/PWL information for the basin.

305(b) Reporting and Annual Electronic Update - The updated WI/PWL information is used to generate the data files of water quality information for the annual 305(b) electronic submission. Periodic revision and update of the published 305(b) Report, which provides the public with a comprehensive assessment of water quality, will also reflect the most current data and information.

<u>Management/Restoration Strategies and Activities</u> (years 4 and 5; and ongoing)
At the conclusion of the three years of planning, intensive monitoring and assessment, DOW activities focus on water quality management and restoration efforts. The first step is the development of watershed-specific restoration plans, know as Watershed Restoration Action Strategies. The strategies identify existing program resources – from both within and outside the department – to address water quality problems and issues. The subsequent implementation of the strategies involves a variety of watershed partners and activities on state, local and federal levels.

Watershed Restoration Action Strategies - The purpose of the strategies is to develop management plans that bring together all watershed partners to focus support – in the form of grant dollars, technical assistance and other program resources – in order to address priority water and natural resource needs in specific watersheds.

WICSS - The division's Water Integrated Compliance Strategies System is an important tool in the development and tracking of corrective actions used to address specific water quality problems.

Facility Permitting - It may eventually be worthwhile adjusting the facility permitting schedule to reflect the RIBS/WI/PWL rotating basin cycle. In that way, facility permits could be re-issued in light of the coordinated intensive monitoring effort in the basin.

Nonpoint Source Controls - Like permitting, the implementation of corrective actions to address nonpoint sources may be enhanced in light of the additional information generated by the comprehensive monitoring activities.

TMDL Development - The intensive monitoring data and updated WI/PWL information is used to periodically update New York State's Section 303(d) List of waters with impairments to be addressed through the Total Maximum Daily Load program.

Regional Activities - While the RIBS monitoring program focuses its attention on other drainage basins, regional programs will continue management and restoration activities – possibly including the conduct of additional monitoring – to address specific water quality issues.

Volunteer (non-DEC) Monitoring Efforts - Again, water quality data collected by various citizen monitoring groups may be useful in maintaining a monitoring presence while division efforts are focusing on other regions of the state.

Probability-based Monitoring
USEPA encourages states to move to a "probabilistic" monitoring design, which relies on randomly selected monitoring sites and statistical methods to determine overall quality in a watershed. However, while this approach may provide better comprehensive assessments regarding the general water quality in a watershed, it does so at the expense of the site-specific monitoring needed to support other division programs. Recent modifications to the division's Rotating Intensive Basin Studies (RIBS) ambient monitoring program attempts to address both needs. The RIBS approach includes greatly expanded biological screening to provide broader coverage of the entire basin study area; as well as an intensive, site-specific component to collect more complete data in those areas of greater interest where more thorough information is needed.

The NYS DEC Division of Water has been working with USEPA staff to pilot a probabilistic monitoring design for a portion of the New York City Watershed. Sampling for this pilot study was conducted in 1998 and 1999. The results will be evaluated and recommendations presented in a report to be issued in the fall of 2000.

Volunteer Monitoring
As has been discussed previously, the interest and enthusiasm of various groups (citizen, academic, private, public) in protecting water resources has led to a tremendous growth in volunteer monitoring activities throughout the state. The NYS DEC Division of Water has long supported a formalized volunteer monitoring program for lakes – The Citizen Statewide Lake Assessment Program (CSLAP). In collaboration with Hudson Basin RiverWatch (HBRW), the division has recently piloted a similar program for the monitoring of rivers and streams. This effort has produced a Guidance Manual for volunteer monitoring of rivers and streams. The manual is organized around the general framework outlined in Appendix D - *Volunteer River Monitoring Program*.

While the volunteer monitoring framework includes multiple tiers or levels of monitoring effort, the primary focus of the approach would be the use of biological (macroinvertebrate) sampling to screen a large number of waters for possible impairment. This information would be useful to the division in:

! documenting rivers and streams with good water quality, and
! identifying waters where more intensive division monitoring programs might focus.

Due to limited staff and resources, a division volunteer monitoring program for rivers would be more limited than the CSLAP program in terms of the level training and analytic resources that NYS DEC would be able to provide. These components will require other partnerships and commitments from the volunteer groups themselves. But the division can and should support volunteer monitoring efforts by providing a coordinator to arrange training sessions with a contractor, assist groups with getting their programs started, answer questions, develop communication tools, evaluate quality of data, and otherwise manage the implementation and coordination of the program.

Table 2

Schedule of *Comprehensive Assessment Strategy* Activities

Basin/Watershed	1998	1999	2000	2001	2002	2003	2004	2005
Lake Champlain Long Island	WQ Planning and Issue Identification	Monitoring and Data Collection	Evaluation and WQ Assessment	Management/Restoration Strategies and Activities				
Genesee River Delaware River		WQ Planning and Issue Identification	Monitoring and Data Collection	Evaluation and WQ Assessment	Management/Restoration Strategies and Activities			
Niagara River Mohawk River			WQ Planning and Issue Identification	Monitoring and Data Collection	Evaluation and WQ Assessment	Management/Restoration Strategies and Activities		
Allegheny River Oswego-Sen-Oneida Upper Hudson				WQ Planning and Issue Identification	Monitoring and Data Collection	Evaluation and WQ Assessment	Management/Restoration Strategies and Activities	
Chemung River Black River Lower Hudson					WQ Planning and Issue Identification	Monitoring and Data Collection	Evaluation and WQ Assessment	Management/ Strategies an
Susquehanna R. Lake Champlain Long Island						WQ Planning and Issue Identification	Monitoring and Data Collection	Evaluation and WQ Assessment
Genesee River St.Lawrence R. Delaware River							WQ Planning and Issue Identification	Monitoring and Data Collection
Niagara River Mohawk River								WQ Planning and Issue Identification

Part III

Water Quality Monitoring and Assessment

Chapter 3 - Assessment Methodology

Assessment methodology refers to what monitoring approaches are used and how results are interpreted to determine use support and arrive at an assessment of water quality. The various aspects of assessment methodology include the type of monitoring data and water quality information used in the assessments, the source of the data/information, and the level of confidence in the data/information and the resulting assessment. What follows is an outline of specific criteria relating water quality monitoring data and information to the degree of use support. Such criteria are critical to providing a balanced and consistent assessment of the quality of waters throughout New York State.

WI/PWL Water Uses

- Aquatic Life
- Water Supply
- Fish Consumption
- Shellfishing
- Public Bathing
- Recreation
- Aesthetics

Degree of Use Support

The assessment of New York State water resources is based on the ability of waters to support a range of

WI/PWL Severity of Use Impairment

PRECLUDED
Frequent/persistent water quality, or quantity, conditions and/or associated habitat degradation *prevents all aspects* of the waterbody use.

IMPAIRED
Occasional water quality, or quantity, conditions and/or habitat characteristics *periodically prevent* the use of the waterbody, or;
Waterbody uses are not precluded, but some aspects of the use are *limited or restricted*, or;
Waterbody uses are not precluded, but *frequent/persistent* water quality, or quantity, conditions and/or associated habitat degradation *discourage* the use of the waterbody, or;
Support of the waterbody use *requires additional/advanced* measures or treatment.

STRESSED
Waterbody uses are not significantly limited or restricted, but *occasional* water quality, or quantity, conditions and/or associated habitat degradation *periodically discourage* the use of the waterbody.

THREATENED
Water quality currently supports waterbody uses and the ecosystem exhibits no obvious signs of stress, however *existing or changing land use patterns* may result in restricted use or ecosystem disruption, or;
Monitoring *data reveals increasing contamination* or the presence of toxics below the level of concern, or;
Waterbody uses are not restricted and no water quality problems exists, but the waterbody is a *highly valued resource* deemed worthy of special protection and consideration.

specific designated uses (see box, *WI/PWL Water Uses*). The particular uses that a specific waterbody are expected to support is dependent upon the classification of that waterbody (see Water Classifications and Standards System, page 13). For example, only specifically designated waterbodies are considered to have best uses of water supply, shellfishing and public bathing. Use support/impairment information for the waters of the state are maintained in the NYS DEC Waterbody Inventory/Priority Waterbodies List (WI/PWL).

The use support/impairment information in the WI/PWL database is generated from a variety of available sources including statewide ambient network monitoring data, monitoring of toxic substances in fish and wildlife, special intensive surveys, fisheries resource surveys, water quality complaints, beach closure reports, shellfish area closures, etc. Given the growing involvement of local agency and citizen volunteers in water quality monitoring, the WI/PWL updating process also includes a significant public participation and outreach component. This effort relies on a statewide network of local Water Quality Coordinating Committees and county Soil and Water Conservation Districts working in conjunction with the DEC Division of Water to capture additional available water quality information.

After available water quality information is collected, judgements and evaluations are made regarding:

- whether an impairment to a specific use is actually occurring,
- the severity of the impairment to the use, and
- the level of documentation indicating a use impairment.

The focus of a water quality assessment is based on a specific use being restricted. If this is the case, then the severity of use impairment is evaluated as either *precluded*, *impaired*, *stressed* or *threatened*. Based

WI/PWL Level of Documentation

Known - Water quality monitoring data and/or *studies have been completed and conclude* that the use of the waterbody is restricted to the degree indicated by the listed severity.

Suspected - Anecdotal evidence, public perception and/or specific citizen complaints *suggest* that the use of the waterbody may be restricted. However, water quality data/studies that establish an impairment *have not been completed* or there is *conflicting information*.

Possible - Land use or other activities in the watershed are such that the use of the waterbody *could be affected*. However, there is *currently very little, if any, documentation* of an *actual* water quality problem.

Characterization of Unassessed Waters

Historically, limited resources forced the NYS DEC monitoring effort to focus on waterbodies with known or suspected water quality problems and issues. Correspondingly, there was not much emphasis on the monitoring and documentation of waters with good (*fully supporting*) water quality. However, modifications to the NYS DEC Rotating Intensive Basin Studies (RIBS) Sampling Program to correct this bias were piloted in 1996 and began in earnest in 1998. The new RIBS strategy employs a tiered approach where rapid biological screening methods are applied at a large number of sites during the first year of a two-year study. This enables the program to document water quality in a greater percentage of all waters, not just those with known or potential problems. More intensive chemical monitoring is used in the second year to follow-up problems and issues identified by the biological screening effort. While resources are not currently available for a full-blown *probabilistic* monitoring network in the state, the wide coverage of the biological screening allows the RIBS Program to incorporate some of the main ideas behind the probabilistic approach and document good, as well as poor, water quality. However, until the biological screening is employed in a larger percentage of the state, unassessed waterbodies with no reported water quality problems or use impairments will continue to be characterized as *nonimpacted/unassessed*.

on the level of documentation, the impairment is also determined to be *known*, *suspected* or *possible*. The national use support categories used by USEPA to assess waters differ somewhat from those tracked in the NYS DEC WI/PWL system. The general relationship between the USEPA Designated Use Support categories (fully supporting, partially supporting, not supporting) and the WI/PWL severity and documentation categories is shown in Table 3. More detailed relationships between specific monitoring and assessment results and various uses supported are outlined and discussed on the following pages.

Table 3 **Relationships Between USEPA Designated Use Assessments and WI/PWL Severity/Documentation Categories**

Severity of Problem	Level of Problem Documentation		
	Known Problem	**Suspected Problem**	**Possible Problem**
Precluded	Not Supporting	N/A*	N/A*
Impaired	Partially Supporting	Partially Supporting	N/A*
Stressed	Supporting, but Threatened	Supporting, but Threatened	Fully Supporting (needs verification)
Threatened	Supporting, but Threatened	Fully Supporting	Fully Supporting (*Special Protection*)
No Known Impairment	Fully Supporting		

* For more severe Problems (*Precluded, Impaired*) a greater *Level of Documentation* is required.

Aquatic Life Use

The primary focus of the NYS DEC river and stream monitoring effort involves determining the degree to which waters support aquatic life. There are a number of reasons for this emphasis:

- Aquatic life is the most significant use of the large majority of the states rivers,
- Aquatic life use support can be assessed easily and economically using biological (macroinvertebrate) sampling techniques,
- Aquatic life use support is one of the most sensitive of the national use support categories.

The evaluation of Aquatic Life support represents a recent change to the WI/PWL. Prior to 1999, the WI/PWL tracked waterbody support of *Fish Propagation* and *Fish Survival* rather than *Aquatic Life*. This was a reflection of the designated uses outlined in New York State standards. However, the change to the broader category of *Aquatic Life* better represents the results of the monitoring tools (primarily macroinvertebrate sampling) used to assess water quality. The change from *Fish Propagation/Survival* to *Aquatic Life* also provides greater flexibility in reporting water quality and allows tracking of aquatic impacts that are not sufficiently severe as to be apparent in the fishery. The revised category also corresponds more closely to other New England State's and the USEPA national use support category.

The relationship between biological (macroinvertebrate) sampling data and the impairment to *Aquatic Life* support is shown in Table 4.

Table 4 Aquatic Life Use Assessment Criteria

Biological (Macroinvertebrate) Assessment		WI/PWL Use Impairment: Severity	WI/PWL Use Impairment: Documentation	EPA Designated Use Support
Severely Impacted (Very Poor)		Precluded	Known	Not Supporting
Moderately Impacted (Poor)		Impaired	Known	Partially Supporting
Slightly Impacted* (Good)	Other indications of impairment present	Stressed	Suspected or Known	Fully Supporting, but Threatened
	No other indications of impairment	No Known Impairment	Assessment Level: *Evaluated*	Fully Supporting
Non-Impacted (Very Good)		No Known Impairment	Assessment Level: *Monitored*	Fully Supporting

* *Slightly Impacted* represents a broad category ranging from generally good water quality to minor impairment of use. Other water quality information and conditions are generally necessary to determine an appropriate level of *Documentation* and corresponding *USEPA Designated Use Support*.

Table 5 Acid Rain/Aquatic Life Assessment Criteria

Lake pH/Fishery Assessment	WI/PWL Use Impairment: Severity	WI/PWL Use Impairment: Documentation	EPA Designated Use Support
pH less than 5.0	Precluded	Known	Not Supporting
pH between 5.0 and 6.0	Impaired	Known	Partially Supporting
pH greater than 6.0, but fishery surveys indicate no fish, and lake characteristics suggest acid rain as cause	Impaired*	Suspected*	Partially Supporting
other indications of acid rain**	Stressed	Suspected	Fully Supporting, but Threatened
No indications of acid rain effects	No Known Impairment	Assessment: *Evaluated*	Fully Supporting

* Actual use impairment and relationship to acid rain as a cause should be verified with additional monitoring.

** Lake characteristics may indicate possible acid rain effects, but no pH/fish data exists to support an impairment.

Note about *Episodic Acidification*

Episodic Acidification refers to short-term decreases in acid neutralizing capacity (ANC) that may occur during high streamflow events (i.e., spring runoff, snowmelt). Although these events are periodic, bioassays and other fish studies show that the impact on the fishery can be significant and longer lasting. The severity of the impact may result in precluded–rather than merely *impaired*–aquatic life, even though episodic acidification occurs over a short time period. This situation represents an exception to the strict application of the Priority Waterbodies List (PWL) definitions for a precluded use (frequent/persistent water quality condition) and an impaired use (occasional water quality conditions).

<u>Atmospheric Deposition (Acid Rain) Impacts on *Aquatic Life*</u>

In addition to the aquatic life use (macroinvertebrate) assessment criteria outlined in Table 4, separate criteria to determine aquatic life support is applied to waterbodies, particularly lakes and ponds, that are subject to atmospheric deposition, or acid rain. Acid rain has long been a significant problem in New York State. Because of the extent and significance of this issue, extensive chemical sampling efforts to monitor the pH of lakes and ponds in the state have long been in place. The separate aquatic life use support/acid rain criteria takes advantage of the considerable amount of available chemical (pH) data. The relationship between chemical (pH) monitoring data and the impairment to aquatic life is shown in Table 5.

Table 6 Drinking Water Use Assessment Criteria

Criteria	WI/PWL Use Impairment		EPA Designated Use Support
	Severity	Documentation	
Frequent/Persistent Conditions Prevent Use C One or more NYS DOH Drinking water supply closures resulting in closure of the supply for more than 30 days.	Precluded	Known	Not Supporting
Occasional Conditions Prevent Use C One or more NYS DOH drinking water supply closures resulting in closure of the supply for less than 30 days, or	Impaired	Known	Partially Supporting
Frequent/Persistent Conditions Discourage Use C Problems that do not require closure or advisories but adversely affect treatment costs and/or the quality of the finished water (e.g., taste/odors, color, excessive turbidity/dissolved solids, need for activated charcoal filters, etc.). C Monitoring data exceeds contaminant criteria* more than 25% of time.	Impaired	Known or Suspected	Partially Supporting
Occasional Conditions Discourage Use C Monitoring data exceeds contaminant criteria* more than 10% of time.	Stressed	Suspected	Fully Supporting (Threatened)
Conditions Support Uses, Threats Noted C Contaminants are present, but at levels sufficiently low that routine treatment results in acceptable drinking water.	Threatened	Known or Suspected	Full Support or Full Support, (Threatened)
No Known Impairments or Imminent Threats C No drinking water restrictions, and C No additional treatment required, and C No known contaminants present.	*Special Protection Waters**		Fully Supporting

* Waterbodies designated as drinking water sources (Class A and higher) are considered highly valued resources deemed worthy of *Special Protection*. Regardless of impairment, these waters are included on the NYS DEC Priority Waterbodies List.

Drinking Water Use

Drinking water use support is based on New York State Department of Health (NYS DOH) or local health department closures or advisories for drinking water supplies, the need for any additional treatment beyond “reasonable” levels, and monitoring data for contaminants that exceed criteria for the protection of human health. Only those waters specifically designated for drinking water use (i.e., Class A, AA, A/AA-Special waters) are evaluated for their support of this use. Furthermore, waterbodies designated for and used as sources of drinking water are considered highly valued resources deemed worthy of *Special Protection*. Even if such waters have no known impairment or imminent threat, these waters are included on the NYS DEC Priority Waterbodies List as *Special Protection* waters. The relationship between public water supply advisories, other monitoring information and the level of drinking water use support is outlined in Table 6.

Fish Consumption Use

The assessment of fish consumption use is based on NYS DOH advisories regarding the catching and eating of sportfish, and contaminant monitoring in fish tissue, other biological tissue and surficial bottom sediments. The advisories reflect federal government standards for chemicals in food that is sold commercially, including fish. The NYS DEC Division of Fish Wildlife and Marine Resources routinely monitors

Table 7 Fish Consumption Use Assessment Criteria

Criteria	WI/PWL Use Impairment		EPA Designated Use Support
	Severity	Documentation	
Frequent/Persistent Conditions Prevent Use C NYS DOH advisory recommends eating no fish (or none of sub-species) from specific waterbody.	Precluded	Known	Not Supporting
Periodic/Occasional Conditions Prevent Use C NYS DOH advisory recommends limiting consumption of fish from a specific waterbody. C Monitoring of fish tissue shows contaminant levels that exceed levels of concern, but NYS DOH advisory has not been issued.	Impaired	Known or Suspected	Partially Supporting
Occasional (Other) Conditions Discourage Use C Monitoring of macroinvertebrate tissue or surficial bottom sediment shows contaminant levels that exceed levels of concern.	Stressed	Suspected	Fully Supporting (Threatened)
Conditions Support Use, Threats Noted C Monitoring of fish (known) or macroinvertebrate tissue/bottom sediment (suspected) shows contaminant levels present but not exceeding levels of concern.	Threatened	Known or Suspected	Fully Supporting or Fully Supporting (Threatened)
No Known Impairment or Imminent Threats C No fish consumption advisory beyond the NYS DOH *General Advisory for Eating Gamefish*, and C Monitoring data revealing no contaminants in fish, macroinvertebrate tissue or surficial bottom sediment above background levels.	No Known Impairment	Assessment Level: *Monitored*	Fully Supporting

contaminant levels in fish and game. Based on this monitoring data, NYS DOH issues advisories for specific waterbodies and species when contaminant levels in sportfish exceed the federal standards. These advisories are updated and published annually.

In addition to the waterbody-specific advisories, a general advisory recommends eating no more than one meal (one-half pound) per week of fish taken from New York State freshwaters and some marine water at the mouth of the Hudson River. This general advisory is to protect against eating large amounts of fish that have not been tested or that may contain unidentified contaminants. It does not apply to most marine waters. Because the general statewide advisory is precautionary and is not based on any actual contaminant monitoring data, it does not represent any documented impairment of fish consumption use. Consequently, the general statewide advisory is not reflected in the assessment of fish consumption use.

> Because the general advisory for eating sportfish is precautionary and is not based on any actual contaminant monitoring data, it does not represent any documented impairment of fish consumption use. Consequently, the general statewide advisory is not reflected in this assessment of fish consumption use.

The relationship between the waterbody-specific fish consumption advisories and the severity and documentation of an impairment to fish consumption use is reflected in Table 7.

Shellfishing Use

Marine Resources staff from the NYS DEC Division of Fish Wildlife and Marine Resources (DFWMR) assess the quality of nearly 1,200,000 acres of marine waters for shellfishing purposes. DFWMR certification of shellfishing areas is based on bacteriological water quality and an evaluation of potential pollution sources by shoreline surveys. Only those waters specificallyclassified for shellfishing use (i.e., Class SA waters) are evaluated for their support of this use.
The relationship between the shellfishingcertificationand the severity and documentation of an impairment to shellfishing use is reflected in Table 8.

> Restrictions on shellfishing are based on either water quality (bacteriological) monitoring results and/or on the proximity to and expected impact of known discharges and potential sources of contamination.

Public Bathing and Recreation Uses

Swimming and public recreation are important and popular uses for the waters of the state. The assessment of these wide range of activities involves two separate use categories: *Public Bathing* and *Recreation*.

Evaluation of *Public Bathing* use is limited to only those waters classified by New York State for primary contact recreation (i.e., Class B, SB, or higher waters). This classification applies to waters specifically designated as public beaches and bathing areas, which have a higher level of swimming use and are more regularly monitored by public health agencies.

> As a practical matter, not all waters of the state are regularly monitored to assess swimming use support to the degree that designated public bathing areas are. Therefore, general precautions should be taken regarding recreation in these other waters.

The broader *Recreation* use category tracks impairments to a more expansive list of recreational uses, such as fishing, boating, water skiing, and other primary/secondary contact activities, including swimming. The

Table 8	**Shellfishing Use Assessment Criteria**		
Criteria	**WI/PWL Use Impairment**		**EPA Designated Use Support**
	Severity	**Documentation**	
Frequent/Persistent Conditions Prevent Use C NYS DEC Division of Fish Wildlife and Marine Resources (DFWMR) has issued a year-round shellfishing closure for the water.	Precluded	Known	Not Supporting
Periodic/Occasional Conditions Prevent Use C DFWMR has issued a seasonal or partial shellfishing closure for the water.	Impaired	Known	Partially Supporting
Occasional (Other) Conditions Discourage Use C Other uses are impaired.	Stressed	Known or Suspected	Fully Supporting (Threatened)
Conditions Support Use, but Threats Noted C Shellfish Land Certification monitoring reveals contaminant above background, but not sufficient to warrant shellfish bed closure.	Threatened	Known	Fully Supporting (Threatened)
No Known Impairment or Threat to Use C DFWMR has certified (opened) the water for direct market harvesting of shellfish, and C Shellfish Land Certification monitoring (DFWMR) reveals no contaminants above background levels.	No Known Impairment	Assessment Level: *Monitored*	Fully Supporting

Recreation category addresses the federal Clean Water Act goal that all waters be "swimmable."[8] However, while all waters of the state are to be "swimmable," as a practical matter not all waters of the state are regularly monitored to assess swimming use support to the same degree that designated public bathing areas are. As a result of the varying levels of monitoring, *Public Bathing* waters are evaluated separately from other waters for *Recreation* uses.

The assessment of *Public Bathing* and *Recreation* uses rely on various water quality indicators. For waters used as public bathing areas state and local/county health departments conduct regular bacteriological sampling programs and perform sanitary surveys. Based on the findings of these surveys, bathing use may be restricted either permanently or periodically. Localized closings may also occur due to contamination by spills, waterfowl, or stormwater runoff.

In addition to swimming restrictions due to bacteriological contamination, the swimming/recreation uses of some waters are discouraged by other water quality conditions. Excessive weed growth, silty/muddy lake bottoms, and poor water clarity all represent lesser impairment of waters for public bathing use.

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8 In order to meet the federal Clean Water Act goal that all waters be "swimmable," water quality of New York State waters Class C, SC (and above) "shall be suitable for primary and secondary contact recreation." However, other factors (such as flow/depth, access, conflicting use) may limit this use. (See NYS Classifications for Surface Waters, Part 701.1 thru 701.14.)

Table 9 Public Bathing/Recreation Use Assessment Criteria

Criteria	WI/PWL Use Impairment		EPA Designated Use Support
	Severity	Documentatio n	
Frequent/Persistent Conditions Prevent Uses C State/local/county health department has closed beach/water to swimming for the entire season.	Precluded	Known	Not Supporting
Periodic/Occasional Conditions Prevent Uses C State/local/county health department has issued temporary beach closure for the waterbody. C Sufficient stream flow/water level necessary to support recreational uses are artificially restricted.	Impaired	Known	Partially Supporting
Frequent/Persistent Conditions Discourage Uses C Recreational Uses of water require additional measures (e.g., weed harvesting/control). C Monitoring data exceeds *Impaired* criteria* more than 10% (suspected) or 25% (known) of time. C Observational criteria* for restricted use noted more than 75% of the time.	Impaired	Known or Suspected	
Occasional (Other) Conditions Discourage Uses C Monitoring data exceeds *Stressed* criteria* more than 10% (suspected) or 25% (known) of time. C Observational criteria* for restricted use noted more than 25% of the time.	Stressed	Known or Suspected	Fully Supporting (Threatened)
Conditions Support Uses, but Threats Noted C Data exceeds *Threatened* criteria* more than 10% (suspected) or 25% (known) of time. C Observational criteria* for restricted use noted more than 10% of the time.	Threatened	Known or Suspected	Fully Supporting or Full Support, but Threatened
No Known Impairments or Threats to Uses C Monitoring data does not exceed use restriction criteria more than 10% of time. C Observational criteria* for restricted use noted less than 10% of the time.	No Known Impairment	Assessment Level: *Monitored*	Fully Supporting

*** Monitoring Data Criteria**	*Impaired*	*Stressed*	*Threatened*
Total Phosphorus	40 µg/l	30 µg/l	20 µg/l
Chlorophyl a	15 µg/l	12 µg/l	8 µg/l
Clarity (Secchi Disc)	1.2 m	1.5 m	2.0 m

*** Observational Data Criteria**
Swimming/recreation slightly (or more) restricted by specifically identified causes (algae, clarity, etc). [1]

[1] Observational Criteria refers to responses on ***CSLAP Field Observation Forms***. Specifically, *Condition of Lake* notes presence of algae, *Suitability for Recreation* notes some impairment, and *Opinion of Recreational Use* notes weeds and/or clarity problems.

The relationship between water quality monitoring and other indicators and the severity and documentation of an impairment to swimming/bathing use is reflected in Table 9.

Instead, the assessment of aesthetics use support will rely on the WI/PWL definitions for the severity of impairment, level of documentation, and the relationship between severity/documentation and USEPA use support categories as outlined in Table 3.

Monitored and *Evaluated* Waters

In compiling water quality information for their 305(b) Report, states are to distinguish between water quality assessments based on monitoring data, and assessments based on other information.

- "Monitored waters" are those waterbodies for which the use support assessment is based primarily on current (i.e., less than five year old) site-specific ambient monitoring data. Such data should include biological monitoring (macroinvertebrate assessment, toxicity testing) as well as chemical/physical monitoring results. Because fixed-station chemical/physical monitoring represents only a "snapshot" in time, such monitoring should be conducted quarterly or more frequently if it is to accurately portray water quality conditions at the site.

- "Evaluated waters" are those waterbodies for which the use support assessment is based on information other than current site-specific ambient monitoring data. Such assessments may rely on land use data, identification of sources, predictive modeling and questionnaire surveys of water quality and natural resource staff. Also, assessments based on older ambient monitoring data are generally considered to be "evaluated."

While available site-specific ambient monitoring data is incorporated into the WI/PWL, the bulk of the current WI/PWL information is more reflective of "evaluation" as opposed to "monitoring" efforts. This is largely due to limited monitoring resources, and a history of targeting those resources on waters of the state thought to have problems and issues requiring additional investigation. Consequently, available data for "monitored" waters tend to be concentrated in priority or problem areas.

The assessment of waters outside these priority or problem areas has traditionally relied on the public participation of various "watershed partners" in Priority Waterbodies List update efforts. Although input from watershed partners may include current, site-specific, ambient data the level and documentation of the data varies considerably.

As discussed in this report, various efforts are underway to improve the scope of monitoring and quality of water quality assessments for the state. These efforts include the more systematic monitoring of non-priority waters, better documentation of available ambient data, and more consistent interpretation of water quality information and determination of water quality impairment. These efforts–which are outlined in the Comprehensive Assessment Strategy–are to focus on a few drainage basins each year, and cover the entire state over a five-year period. Until a basinwide Comprehensive Assessment Strategy is in place, the assessment of waters in that basin should be considered to be "evaluated."

Until a basinwide Comprehensive Assessment Strategy is in place, the assessment of waters in that basin should be considered to be "evaluated."

Presumed Assessments

While the great majority of waters in New York State are thought to support a variety of uses, because of limited monitoring resources and the emphasis on monitoring in priority/problem waters documentation of good quality waters is generally lacking. This shortcoming was addressed in previous 305(b) assessments by assuming that waterbodies were fully supporting uses, unless there was information to the contrary. However, USEPA has determined such "presumed" assessments to be unacceptable. At about the same time, NYS DEC also recognized the need to increase efforts to document water quality in the great number of waterbodies that do support uses in order to provide a more balanced picture of water quality in the state.

USEPA encourages states to move to a "probabilistic" monitoring design, which relies on randomly selected monitoring sites and statistical methods to determine overall quality in a watershed. But while this approach may provide better comprehensive assessments regarding the general water quality in a watershed, it does so at the expense of the site-specific monitoring needed to support other division programs. Recent modifications to the division's Rotating Intensive Basin Studies (RIBS) ambient monitoring program attempts to address both needs. The RIBS approach includes greatly expanded biological screening to provide broader coverage of the entire basin study area; as well as an intensive, site-specific component to collect more complete data in those areas of greater interest where more thorough information is needed.

Part III
Water Quality Monitoring and Assessment

Chapter 4 - Water Quality Assessment

This section of the report presents a statistical outline of the frequency and severity of water resource use impairments in the state, as drawn from the Division of Water Waterbody Inventory/Priority Waterbodies List (WI/PWL). Statistics for different types of waterbodies (specifically, river/streams, lakes/reservoirs, estuary waters, Great Lakes shoreline and ocean coastline) are calculated separately. This assessment of water resources also includes separate discussions of lakes programs, groundwater assessments, wetlands protection, public health and aquatic life (drinking water, fish consumption, shellfishing, bathing beaches, toxic pollutants, contaminated sediments, fishkills) and Section 303(d) waters and Total Maximum Daily Load (TMDL) development.

Table 10
Summary of Fully Supporting, Threatened, Impaired Waters

Degree of Designated Use Support	Waterbody Type				
	Rivers and Streams (miles)	Lakes and Reservoirs (acres)	Estuaries Waters (sq.mi.)	G. Lakes Shoreline (shore mi.)	Ocean Coastline (shore mi.)
Total Size	52,337	790,782	1530.0	577	120
FULLY SUPPORTING [1] (or Not Assessed)	49,423	388,296	1128.5	120	117
Stressed, *Known/Suspected*	1,819	82,254	10.7	40	0
Threatened, *Known*	14	8,690	0.0	0	0
SUPPORTING, BUT THREATENED [2]	1,833	90,944	10.7	40	0
PARTIALLY SUPPORTING (Impaired, *Known/Suspected*)	910	300,446	225.3	417	0
NOT SUPPORTING (Precluded, *Known*)	171	11,096	165.5	0	3

[1] In order to be consistent with previous reporting, waters that were not specifically assessed are combined with waters in the *Fully Supporting* category. Current and future monitoring and assessment efforts include a focus on documentation of *Fully Supporting* waters and identification of waters *Not Assessed*. (See Part III, Chapter 2 - *Comprehensive Assessment Strategy*.)

[2] The *Supporting, but Threatened* category is a distinct category of water and is NOT a subset of the *Fully Supporting* category.

Surface Water Assessment

The statewide summary of use support is presented in Table 10. A similar representation is illustrated by Figure 1 in the *Executive Summary* (page 3). These two representations differ in that Table 10 focuses on the USEPA use support categories, while Figure 1 is based on the waterbody assessment categorizations and severity of impairment used in the Waterbody Inventory/Priority Waterbodies List. However, the depiction of New York State water quality is generally similar.

Overall, water use support has not changed significantly from that reported in recent 305(b) Reports. Any apparent changes in the statistics presented here are more likely due to the refinement of estimates and assessments or changes in reporting methods rather than any significant changes in water quality.

Additionally, the statistics reported in this document must be viewed as relative, not absolute, measures of New York State water quality. Although the Waterbody Inventory/Priority Waterbodies List (WI/PWL) reporting system allows us to tally overall statistics to the nearest mile or acre, it must be understood that evaluations of the size of a waterbody affected by an impairment are generally only an estimate. In addition, the extent of water quality assessments are often in a state of flux as new and better information allows us to make a more accurate assessment for each waterbody. As the science used for making assessments becomes more sophisticated, some waters which were thought not to have problems, may in fact be found to have long-term problems that had gone undetected.

Summaries outlining the support of individual water uses are presented in Tables 11.a through 11.e on the following pages. Separate tables and accompanying discussions are included for each of five different types of waters: rivers and streams, lakes and reservoirs, estuary waters, Great Lakes shoreline and Ocean coastline.

Sources of Water Quality Impairment

Various sources of water quality impairment are summarized in Tables 12.a though 12.e, with separate tables for each waterbody type. These statistical summaries show the total segment size of each waterbody type affected by each source category tracked in the WI/PWL database. In these tables, a *"Major/Primary" Contribution to Impairment* refers to sources identified as most significant contributors to the primary use impairment for a waterbody segment. A *"Moderate/Secondary"* contribution is any other source linked to that segment. These contributions may be either sources associated with a secondary impairment, or additional sources associated with the primary impairment. Since there can be several of these secondary sources for each waterbody segment, the total size of waters affected by secondary sources can be greater than the total size of waters for each waterbody type. Within the tables, sources are divided into two major categories:

Point Sources which include municipal, industrial, and private wastewater discharges, either treated or untreated. Combined sewer overflows (CSOs), which by design discharge a mixture of municipal sewage and stormwater runoff during significant storm events, are also considered point sources.

Nonpoint Sources are essentially all other sources of pollutants which are not discharged through either a treatment plant effluent, outfall pipe or sewage collection system. This category includes urban/storm runoff from streets, highways, and parking areas, agricultural runoff, runoff from construction sites, leachate from landfills and hazardous waste disposal sites, chemical and petroleum spills, contaminated sediments, streambank/roadbank erosion, and contamination due to failing on-site septic systems. Although storm sewers are now considered "point sources" with respect to regulation by discharge permit, they will be included in this report with nonpoint sources since the reduction of pollutants from them will rely on nonpoint source control technology.

Over the past twenty or so years, significant improvements have been made in water quality due to the control of point sources (industrial and municipal). It is now becoming obvious that our remaining water quality problems are caused by nonpoint sources, which are far more difficult to identify and resolve. The majority of water quality impairments on the WI/PWL (particularly *stressed* and *threatened* waters) can be attributed to nonpoint sources related to land use activities. Nonpoint sources account for about 91% of the water quality impairment in or threat to rivers and streams, and 90% of lake impairment/threat. Such sources include stormwater runoff from developed areas, construction sites, and farms, atmospheric deposition of pollutants, contaminated sediments and hydrologic or habitat modifications such as hydroelectric dams and removal of riparian vegetation for land development and agriculture.

In the point source category, municipal point sources contribute to impairments much more than industrial or private sources. (The high number of lake acres listed in Table 12.b affected by industrial point sources refers entirely to a potential source of salts to Seneca Lake.)

Pollutants Causing Water Quality Impairment

Like the source information, the specific pollutants causing water quality impairment are summarized in Tables 13.a though 13.e, with separate tables for each waterbody type. These statistical summaries show the total segment size of each waterbody type affected by each cause/pollutant tracked in the WI/ PWL database. In these tables, a *"Major/Primary" Contribution to Impairment* refers to the cause identified as the most significant contributor to the primary use impairment for a segment. A *"Moderate/Secondary"* contribution is any other pollutant linked to that segment. These contributions may be either causes associated with a secondary impairment, or additional causes associated with the primary impairment. Note that since there can be several of these secondary causes for each waterbody segment, the total size of waters affected by secondary causes can be greater than the total size of waters for each waterbody type.

Like the source tables, causes/pollutants are divided into two major categories. Collectively, non-toxic pollutants account for more water quality impairment than toxics for all waterbody types except the Great Lakes. This is generally because nonpoint sources contributing non-toxic pollutants are the major cause of impairment in the other waterbody types. The Great Lakes are an exception because toxic pollutants from contaminated sediments are the dominant cause.

In the toxic pollutant category, the most significant primary group of pollutants are the priority organics which include PCBs, chlorinated pesticides, and chlorinated organic compounds. This is because it is the group of pollutants which are responsible for most of the fish consumption advisories in New York State. The remaining advisories are due to mercury contamination.

Rivers and Streams

The river segments cited in the Priority Waterbodies List are generally between five and ten miles long (excluding *threatened* segments, which tend to be longer). Additionally, the distribution of the number of river segments versus the total size of river segments over the range of possible use support is what one would intuitively (and hopefully) expect to find. That is, the total size of segments decreases as one moves from *fully supporting* to *not supporting*.

For rivers and streams, aquatic life support and fish consumption are the uses with the highest level of partial and non-support. The degree of threat to aquatic life and drinking water supply is also significant.

Nonpoint sources are cited as the major source of about 91% of the river and stream miles with a use impairment. Among nonpoint sources, activities associated with *agriculture* are the most frequently cited cause, followed by *streambank erosion*, *hydrologic/habitat modification* and *contaminated sediments*. These sources, along with *failing on-site septic systems* and *urban runoff*, are significant moderate/secondary sources as well. *Municipal point sources* are the most prominent of the point sources.

The most significant causes/pollutants associated with river and stream impairment are *siltation*, *nutrients* and *priority organics*. *Pathogen indicators* are also frequently noted as moderate/secondary causes.

Source Category Notes (referred to in Tables 12.a through 12.e)

1 The WI/PWL category *Private Systems* is reported as *Package Plants (small flow)* under *Municipal Point Sources* in the 305(b) annual electronic updates.
2 *Agriculture* includes all agricultural activities including *Crop-related, Grazing-related* and *Intensive Animal Feeding Operations*.
3 *Urban Runoff* and *Storm Sewers* are listed as separate WI/PWL categories. These values can be summed to obtain a value for the USEPA category of *Urban Runoff/Storm Sewers*.
4 The *Land Disposal* category reflects the sum of the WI/PWL *Landfill/Land Disposal* and *Failing On-site Septic Systems* categories.
5 WI/PWL source categories do not separate/differentiate between *Hydromodification* and *Habitat Modification (non-hydromod)*.
6 *Highway Maintenance and Runoff* corresponds to the WI/PWL category of *Deicing (storage/application)* and includes waters affected by road salt storage facilities.
7 *Spills (accidental)* corresponds to the WI/PWL category of *Chemical Leaks and Spills* and includes waters affected by storage tank leaks.
8 The WI/PWL category *Streambank Erosion* is reported as *Habitat Modification (non-hydromod)* in the 305(b) annual electronic update.
9 The WI/PWL category *Roadbank Erosion* is reported as *Highway/Road/Bridge Runoff* in the 305(b) annual electronic update.
10 The WI/PWL category *Other Sources* refers to sources that are cited infrequently and do not warrant a unique category.

Lakes and Reservoirs

A much larger percentage of lake/reservoir acres is listed as "not supporting" or only "partially supporting" uses (39%) than is the case with river stream miles (2%). One reason for this is because lakes serve as "sinks" for pollutants that are transported downstream within their watersheds. Another explanation that lies behind these statistics involves the impact that a few larger lakes have on the numbers. For example, a fish consumption advisory on the 96,640 acre Lake Champlain accounts for nearly one-third of the lake use impairment in the state. Use impairments to other single large lakes also account for significant percentages of the total lake impairment in the state: Oneida Lake (17%), Seneca Lake (12%), Great Sacandaga Lake (9%), etc. This in no way diminishes the impact of the lake uses that are not being supported, but does provide some perspective.

In contrast to these few large lakes, a great number of very small lakes and ponds included in the PWL due to atmospheric deposition/acid precipitation have significantly less impact on overall lake use support. These relatively small acid rain lakes and ponds (located primarily in the Adirondack Mountain region) represent more than half of the lake segments listed on the PWL. However, the combined area of these waterbodies totals only about three percent (3%) of the lake area with use impairment.

Fish consumption and swimming are the uses with the highest level of partial and non-support in lakes and reservoirs. Again, a few large lakes, including Lake Champlain (fish consumption) and Oneida Lake (swimming), greatly affect these numbers.

Nonpoint sources are cited as the major source of about 90% of the lake and reservoir acres with a use impairment. The most significant source of major impairment is *unknown sources*; however, as discussed above, nearly 78% of the acres in this category are due to the Lake Champlain fish consumption advisory.

Activities associated with *agriculture* are the next most frequently cited nonpoint source, followed by *hydrologic/habitat modification*, *failing on-site septic systems*, *contaminated sediments* and *urban runoff*. *Industrial point sources* are the third highest major source cited; however, this listing is due exclusively to a potential source of salts in one lake (Seneca Lake). *Agriculture*, *failing on-site septic systems*, *streambank/roadbank erosion* and *construction* are the most significant moderate/secondary sources.

With agriculture and failing on-site septic systems being the most significant sources, it is not surprising that *nutrients* are the most frequently cited major/primary cause/pollutant. *Priority organics* (86% of affected lake acres due to Lake Champlain), *salinity/TDS/chlorides* and *flow alteration* are also frequently noted. *Siltation*, *pesticides* and *pathogen indicators* are also frequently mentioned as moderate/secondary causes.

Estuary Waters

About three-quarters (74%) of estuary waters in the state are considered to fully support their designated uses; 15% only "partially support" uses, while 11% are categorized as "not supporting" uses. Almost 97% of the waters "not supporting" uses are the result of shellfishing closures. Shellfishing, fish consumption and swimming are the most frequently noted uses that are "partially supported."

Contaminated sediments, *urban runoff* and *combined sewer overflows* are the most frequently noted sources of major/primary impairment. Because the estuarine areas of the state tend to be in or near highly populated urban areas, the occurrence of *urban runoff* and *CSOs* as significant sources is not surprising. Similarly, the appearance of *municipal point sources* as a significant secondary source is also somewhat expected. *Other sources* are also cited as a secondary source for a considerable amount of estuary area. Generally, these *other sources* are boats/marinas and wildlife/waterfowl.

Pathogen indicators are the most frequently noted major cause/pollutant for estuary water use impairment. *Priority organics* (related to contaminated sediment) are the only other major pollutant of any significant magnitude. *Organic enrichment/low DO*, *metals* and *nutrients* are listed as significant secondary causes.

Similarly, the relatively large proportion of estuary water segments which are in the *precluded* category is because many of these waters are closed to the harvesting of shellfish – *precluding* their use for that purpose. It is unfortunate that the most productive shellfishing waters are the shallow, nearshore embayments which are also the most susceptible to pollutant sources. The situation is further compounded by the proximity of these waters to the New York City-Long Island metropolitan area.

Great Lakes Shoreline

Only fifteen percent (15%) of Great Lakes shoreline in New York State is considered to "fully support" uses. The use support statistics for this waterbody type are dominated by the fish consumption advisory in effect in Lake Ontario for several species. Nearly 90% of the use impairment for the shoreline is related to consumption of fish from the lake.

The most significant primary source (*contaminated sediment*) and cause (*priority organics*) also reflect the impact of the fish consumption advisory for Lake Ontario. *Siltation* and *organic enrichment/low DO* (along with priority organics) are listed as secondary causes/pollutants.

Ocean Coastline

In the ocean coastline category, there is only one segment listed. Approximately three miles of shoreline along the westernmost portion of Long Island where Lower New York Bay meets the Atlantic Ocean is closed to shellfishing due to the carryover of *pathogen indicators* (coliform bacteria) from *combined sewer overflows* to New York Harbor.

Table 11.a

Individual Use Support Summary - Rivers and Streams (in river miles)

Water Quality Goals	Designated Use Categories	Degree of Designated Use Support			
		Fully Supporting	Fully Supporting, but Threatened	Partially Supporting	Not Supporting
Protect and Enhance Ecosystems	Aquatic Life *		1,476.3	500.6	70.8
Protect and Enhance Public Health	Drinking Water	3,964 **	85.1	55.9	0.0
	Fish Consumption	51,975	86.0	259.9	81.5
	Shellfishing	NA	NA	NA	NA
	Public Bathing	52,254 ***	81.8	56.1	19.0
	Sec Contact/Recreation	51,979	27.9	18.5	0.0
Social and Economic	Agricultural	---	---	---	---
	Cultural/Ceremonial	---	---	---	---
	Aesthetics	52,166	76.0	18.5	0.0

* Aquatic Life was previously reported as the sum of Fish Propagation and Fish Survival use support.
** Total river/stream miles classified for use as potable water supply is approximately 4,605 miles.
*** Total river/stream miles classified for Public Bathing use is not available; values reflect river/stream miles for entire state.

Table 11.b

Individual Use Support Summary - Lakes and Reservoirs (in lake acres)

Water Quality Goals	Designated Use Categories	Degree of Designated Use Support			
		Fully Supporting	Fully Supporting, but Threatened	Partially Supporting	Not Supporting
Protect and Enhance Ecosystems0	Aquatic Life *	741,390	7,814	34,739	6,630
Protect and Enhance Public Health	Drinking Water	353,007 **	49,246	16,809	0
	Fish Consumption	641,322	0	151,384	173
	Shellfishing	NA	NA	NA	NA
	Public Bathing	666,251 ***	32,371	88,723	4,293
	Sec Contact/Recreation	771,775	994	8,784	0
Social and Economic	Agricultural	---	---	---	---
	Cultural/Ceremonial	---	---	---	---
	Aesthetics	782,858	519	7	0

* Aquatic Life was previously reported as the sum of Fish Propagation and Fish Survival use support.

** Total lake/reservoir acres classified for use as potable water supply is approximately 417,987 acres.

*** Total lake/reservoir acres classified for Public Bathing use is not available; values reflect lake/reservoir acres for entire state.

Table 11.c

Individual Use Support Summary - Estuary Waters (in square miles)

Water Quality Goals	Designated Use Categories	Degree of Designated Use Support			
		Fully Supporting	Fully Supporting, but Threatened	Partially Supporting	Not Supporting
Protect and Enhance Ecosystems	Aquatic Life *	1515.1	0.0	14.2	0.4
Protect and Enhance Public Health	Drinking Water	NA	NA	NA	NA
	Fish Consumption	1413.2	0.0	110.0	5.7
	Shellfishing	1367.0	0.0	6.1	156.9
	Public Bathing	1430.3 **	0.0	94.7	2.5
	Sec Contact/Recreation	1514.2	0.0	0.1	0.0
Social and Economic	Agricultural	---	---	---	---
	Cultural/Ceremonial	---	---	---	---
	Aesthetics	1529.7	10.7	0.2	0.0

* Aquatic Life was previously reported as the sum of Fish Propagation and Fish Survival use support.

** Total Estuary Waters classified for swimming use is not available; values reflect estuary area for entire state.

Table 11.d

Individual Use Support Summary - Great Lakes Shoreline (in shore miles)

Water Quality Goals	Designated Use Categories	Degree of Designated Use Support			
		Fully Supporting	Fully Supporting, but Threatened	Partially Supporting	Not Supporting
Protect and Enhance Ecosystems	Aquatic Life *	577.0	0.0	0.0	0.0
Protect and Enhance Public Health	Drinking Water	577.0 **	0.0	0.0	0.0
	Fish Consumption	203.1	0.0	373.9	0.0
	Shellfishing	NA	NA	NA	NA
	Public Bathing	506.5 ***	40.3	37.0	0.0
	Sec Contact/Recreation	531.4	0.0	6.0	0.0
Social and Economic	Agricultural	---	---	---	---
	Cultural/Ceremonial	---	---	---	---
	Aesthetics	576.0	0.0	0.0	0.0

* Aquatic Life was previously reported as the sum of Fish Propagation and Fish Survival use support.

** Total lake/reservoir acres classified for use as potable water supply is approximately 417,987 acres.

*** Total river/stream miles classified for swimming use is not available; values reflect river/stream miles for entire state.

Table 11.e

Individual Use Support Summary - Ocean Coastline (in shore miles)

Water Quality Goals	Designated Use Categories	Degree of Designated Use Support			
		Fully Supporting	Fully Supporting, but Threatened	Partially Supporting	Not Supporting
Protect and Enhance Ecosystems	Aquatic Life *	120.0	0.0	0.0	0.0
Protect and Enhance Public Health	Drinking Water	NA	NA	NA	NA
	Fish Consumption	120.0	0.0	0.0	0.0
	Shellfishing	117.0	0.0	0.0	3.0
	Public Bathing	120.0 **	0.0	0.0	0.0
	Sec Contact/Recreation	120.0	0.0	0.0	0.0
Social and Economic	Agricultural	NA	NA	NA	NA
	Cultural/Ceremonial	---	---	---	---
	Aesthetics	120.0	0.0	0.0	0.0

* Aquatic Life was previously reported as the sum of Fish Propagation and Fish Survival use support.

** Total river/stream miles classified for swimming use is not available; values reflect river/stream miles for entire state.

Table 12.a

Total Sizes of Waters Impaired by Various Source Categories
Rivers and Streams (in river miles)

Source Category	Contribution to Impairment	
	Major/Primary	Moderate/Secondary
Industrial Point Sources	54.5	313.2
Municipal Point Sources	138.4	407.5
Combined Sewer Overflows	43.0	158.7
Other: Private Systems [1]	8.0	44.5
TOTAL POINT SOURCES	243.9	923.9
Agriculture [2]	919.7	565.9
Silviculture	0.0	100.0
Construction	38.2	382.7
Urban Runoff [3]	136.3	629.2
Storm Sewers [3]	0.0	178.5
Resource Extraction	68.5	199.5
Land Disposal [4]	149.7	1,317.6
Landfill/Land Disposal [4]	67.5	423.7
Failing On-site Septic Systems [4]	82.2	893.9
Hydro/Habitat Modification [5]	226.8	362.3
Atmospheric Deposition	68.1	32.0
Highway Maintenance/Runoff (salt) [6]	183.1	175.0
Spills (Accidental) [7]	19.0	81.0
Contaminated Sediments	223.9	272.2
Other: Streambank Erosion [8]	353.1	987.1
Other: Roadbank Erosion [9]	0.0	569.9
Other: Miscellaneous [10]	73.5	211.8
Unknown Source	127.6	32.5
TOTAL NONPOINT SOURCES	2,587.5	6,097.2

Table 12.b

Total Sizes of Waters Impaired by Various Source Categories
Lakes and Reservoirs (in lake acres)

Source Category	Contribution to Impairment	
	Major/Primary	Moderate/Secondary
Industrial Point Sources	36,012	11,270
Municipal Point Sources	1,129	83,693
Combined Sewer Overflows	2,944	0
Other: Private Systems [1]	40	483
TOTAL POINT SOURCES	40,125	95,446
Agriculture [2]	93,167	217,721
Silviculture	1	17,311
Construction	1,573	112,153
Urban Runoff [3]	23,270	77,443
Storm Sewers [3]	842	18,086
Resource Extraction	0	25,349
Land Disposal [4]	24,523	254,181
Landfill/Land Disposal [4]	194	85,684
Failing On-site Septic Systems [4]	24,329	168,497
Hydro/Habitat Modification [5]	35,509	16,092
Atmospheric Deposition	15,621	30,472
Highway Maintenance/Runoff (salt) [6]	162	18,762
Spills (Accidental) [7]	0	385
Contaminated Sediments	23,866	59,551
Other: Streambank Erosion [8]	8,811	96,503
Other: Roadbank Erosion [9]	45	114,891
Other: Miscellaneous [10]	10,394	90,990
Unknown Source	124,043	11,220
TOTAL NONPOINT SOURCES	361,827	1,161,110

Table 12.c

Total Sizes of Waters Impaired by Various Source Categories
Estuary Waters (in square miles)

Source Category	Contribution to Impairment	
	Major/Primary	Moderate/Secondary
Industrial Point Sources	0	52.7
Municipal Point Sources	28.7	229.6
Combined Sewer Overflows	100.4	131.7
Other: Private Systems [1]	0.4	0.0
TOTAL POINT SOURCES	129.5	414.0
Agriculture [2]	0	13.5
Silviculture	0	0
Construction	0.1	0.5
Urban Runoff [3]	109.3	137.8
Storm Sewers [3]	13.6	5.3
Resource Extraction	0	0
Land Disposal [4]	21.9	52.7
Landfill/Land Disposal [4]	0.0	22.8
Failing On-site Septic Systems [4]	21.9	29.9
Hydro/Habitat Modification [5]	0	1.7
Atmospheric Deposition	0	0
Highway Maintenance/Runoff (salt) [6]	0	0
Spills (Accidental) [7]	0	0
Contaminated Sediments	125.7	148.0
Other: Streambank Erosion [8]	0	0.1
Other: Roadbank Erosion [9]	0	0
Other: Miscellaneous [10]	1.3	199.9
Unknown Source	0	31.2
TOTAL NONPOINT SOURCES	271.9	590.7

Table 12.d

Total Sizes of Waters Impaired by Various Source Categories
Great Lakes Shoreline (in shore miles)

Source Category	Contribution to Impairment	
	Major/Primary	Moderate/Secondary
Industrial Point Sources	0.0	21.0
Municipal Point Sources	0.0	28.5
Combined Sewer Overflows	21.0	21.0
Other: Private Systems [1]	0.0	1.0
TOTAL POINT SOURCES	21.0	71.5
Agriculture [2]	7.5	49.8
Silviculture	0.0	0.0
Construction	6.0	42.5
Urban Runoff [3]	14.0	35.8
Storm Sewers [3]	1.0	34.8
Resource Extraction	0.0	0.0
Land Disposal [4]	32.8	28.5
Landfill/Land Disposal [4]	0.0	0.0
Failing On-site Septic Systems [4]	32.8	28.5
Hydro/Habitat Modification [5]	0.0	6.0
Atmospheric Deposition	0.0	7.8
Highway Maintenance/Runoff (salt) [6]	0.0	12.8
Spills (Accidental) [7]	0.0	44.0
Contaminated Sediments	373.9	82.3
Other: Streambank Erosion [8]	0.0	59.3
Other: Roadbank Erosion [9]	0.0	6.8
Other: Miscellaneous [10]	0.0	32.8
Unknown Source	1.0	0.0
TOTAL NONPOINT SOURCES	436.2	443.2

Table 12.e

Total Sizes of Waters Impaired by Various Source Categories
Ocean Coastline (in shore miles)

Source Category	Contribution to Impairment	
	Major/Primary	Moderate/Secondary
Industrial Point Sources	0.0	0.0
Municipal Point Sources	0.0	3.0
Combined Sewer Overflows	3.0	0.0
Other: Private Systems [1]	0.0	0.0
TOTAL POINT SOURCES	3.0	3.0
Agriculture [2]	0.0	0.0
Silviculture	0.0	0.0
Construction	0.0	0.0
Urban Runoff [3]	0.0	0.0
Storm Sewers [3]	0.0	0.0
Resource Extraction	0.0	0.0
Land Disposal [4]	0.0	0.0
Landfill/Land Disposal [4]	0.0	0.0
Failing On-site Septic Systems [4]	0.0	0.0
Hydro/Habitat Modification [5]	0.0	0.0
Atmospheric Deposition	0.0	0.0
Highway Maintenance/Runoff (salt) [6]	0.0	0.0
Spills (Accidental) [7]	0.0	0.0
Contaminated Sediments	0.0	0.0
Other: Streambank Erosion [8]	0.0	0.0
Other: Roadbank Erosion [9]	0.0	0.0
Other: Miscellaneous [10]	0.0	0.0
Unknown Source	0.0	0.0
TOTAL NONPOINT SOURCES	0.0	0.0

Table 13.a

Total Sizes of Waters Impaired by Various Cause Categories Rivers and Streams (in river miles)

Cause (Stressor) Category	Contribution to Impairment	
	Major/Primary	Moderate/Secondary
Unknown Toxicity	36.6	118.4
Pesticides	50.5	360.4
Priority Organics	428.4	197.5
Non-Priority Organics	13.0	67.2
Metals	21.5	355.4
Ammonia	0.0	41.2
Chlorine	0.0	52.0
Other Inorganics	0.0	21.5
TOTAL TOXIC CAUSES	550.0	1,213.6
Nutrients	553.6	1,210.7
pH	76.1	0.0
Siltation	1,130.2	892.2
Organic Enrichment/Low DO	92.9	565.8
Salinity/TDS/Chlorides	4.0	173.5
Thermal Modifications	171.3	412.4
Flow Alterations	51.5	318.2
Pathogen Indicators	57.3	881.3
Oil and Grease	5.0	159.0
Other: Aesthetics	103.5	453.9
Other: Miscellaneous	39.0	35.0
TOTAL NON-TOXIC CAUSES	2,284.4	5,102.0

Table 13.b

Total Sizes of Waters Impaired by Various Cause Categories Lakes and Reservoirs (in lake acres)

Cause (Stressor) Category	Contribution to Impairment	
	Major/Primary	Moderate/Secondary
Unknown Toxicity	0	144
Pesticides	14,021	169,555
Priority Organics	113,010	20,350
Non-Priority Organics	0	2,944
Metals	24,525	112,123
Ammonia	0	3,136
Chlorine	0	0
Other Inorganics	0	400
TOTAL TOXIC CAUSES	151,556	308,653
Nutrients	133,426	122,206
pH	7,103	15,335
Siltation	13,486	180,734
Organic Enrichment/Low DO	5,123	84,911
Salinity/TDS/Chlorides	36,012	27,034
Thermal Modifications	0	349
Flow Alterations	32,631	18,596
Pathogen Indicators	19,720	152,812
Oil and Grease	0	96
Other: Aesthetics	2,894	69,739
Other: Miscellaneous	0	1,616
TOTAL NON-TOXIC CAUSES	250,395	673,428

Table 13.c

Total Sizes of Waters Impaired by Various Cause Categories
Estuary Waters (in square miles)

Cause (Stressor) Category	Contribution to Impairment	
	Major/Primary	Moderate/Secondary
Unknown Toxicity	0.0	3.6
Pesticides	0.0	0.5
Priority Organics	125.7	161.6
Non-Priority Organics	0.0	0.0
Metals	0.0	120.0
Ammonia	0.0	0.0
Chlorine	0.0	0.0
Other Inorganics	0.0	0.0
TOTAL TOXIC CAUSES	125.7	285.7
Nutrients	0.0	102.9
pH	0.0	0.0
Siltation	0.1	28.9
Organic Enrichment/Low DO	14.9	145.5
Salinity/TDS/Chlorides	0.0	0.0
Thermal Modifications	0.0	3.6
Flow Alterations	0.0	2.2
Pathogen Indicators	259.9	89.7
Oil and Grease	0.0	26.6
Other: Aesthetics	0.8	107.2
Other: Miscellaneous	0.0	24.4
TOTAL NON-TOXIC CAUSES	275.7	531.0

Table 13.d

Total Sizes of Waters Impaired by Various Cause Categories
Great Lakes Shoreline (in shore miles)

Cause (Stressor) Category	Contribution to Impairment	
	Major/Primary	Moderate/Secondary
Unknown Toxicity	0.0	21.0
Pesticides	0.0	23.0
Priority Organics	373.9	59.3
Non-Priority Organics	0.0	0.0
Metals	0.0	0.0
Ammonia	0.0	0.0
Chlorine	0.0	0.0
Other Inorganics	0.0	0.0
TOTAL TOXIC CAUSES	373.9	103.3
Nutrients	54.3	28.0
pH	0.0	0.0
Siltation	6.0	73.3
Organic Enrichment/Low DO	0.0	68.3
Salinity/TDS/Chlorides	0.0	12.8
Thermal Modifications	0.0	0.0
Flow Alterations	0.0	0.0
Pathogen Indicators	23.0	35.8
Oil and Grease	0.0	0.0
Other: Aesthetics	0.0	52.8
Other: Miscellaneous	0.0	0.0
TOTAL NON-TOXIC CAUSES	83.3	271.0

Table 13.e

Total Sizes of Waters Impaired by Various Cause Categories
Ocean Coastline (in shore miles)

Cause (Stressor) Category	Contribution to Impairment	
	Major/Primary	Moderate/Secondary
Unknown Toxicity	0.0	0.0
Pesticides	0.0	0.0
Priority Organics	0.0	0.0
Non-Priority Organics	0.0	0.0
Metals	0.0	0.0
Ammonia	0.0	0.0
Chlorine	0.0	0.0
Other Inorganics	0.0	0.0
TOTAL TOXIC CAUSES	0.0	0.0
Nutrients	0.0	0.0
pH	0.0	0.0
Siltation	0.0	0.0
Organic Enrichment/Low DO	0.0	0.0
Salinity/TDS/Chlorides	0.0	0.0
Thermal Modifications	0.0	0.0
Flow Alterations	0.0	0.0
Pathogen Indicators	3.0	0.0
Oil and Grease	0.0	0.0
Other: Aesthetics	0.0	0.0
Other: Miscellaneous	0.0	0.0
TOTAL NON-TOXIC CAUSES	3.0	0.0

Clean Lakes Assessment

According to the best available estimates, New York State has 7,849 ponded bodies of water (lakes, ponds, reservoirs, etc.) covering a surface area of over 790,000 acres (not including Lakes Ontario and Erie, which collectively cover more than 3,000,000 acres within New York's borders alone). For this assessment, New York State considers lakes, ponds and reservoirs included in the current state indexing system as "significant" waters. The reporting system in New York State does not distinguish between what might be defined as private versus public lakes, since all of the waters of the state are considered public (public versus private status is usually conferred upon issues of access, not ownership of the waters themselves). As such, this report will consider all sampled waters to be significant publicly owned and subject to assessment in this document. The assessment has been conducted on a total of 1,850 different significant water bodies representing 503,400 acres of surface area (not including Lake Ontario); about 80 percent of these waters are located in the Adirondack Region of the state. This statewide total represents a larger number than reported in 1996, since more than 50 previously unsampled lakes are included in this report.

The characterization of trophic status has been conducted using total phosphorus, chlorophyll a, and Secchi transparency, along with true color to distinguish waters which are stained or "colored" from organic material and have low transparency. True, or soluble, color of the water is a surrogate of organic material in the water and should be included in the evaluation since phosphorus associated with the organic material is unavailable for uptake by organisms but is contained in the total phosphorus results reported from water quality analysis.

About 53 percent (986) of the total (1,850) waters in which trophic indicators were measured had true color values less than or equal to 30 mg/l platinum color units, comprising a surface area of 367,010 acres. These waters were classified into trophic state using total phosphorus and Secchi transparency. There were 207 waters classified as eutrophic based on total phosphorus, 138 waters classified as eutrophic based on Secchi transparency, and 133 waters classified as eutrophic based on chlorophyll *a*. Chlorophyll *a* was not very useful in this analysis since relatively few waters (only 25 percent of the 1,742 assessed) had chlorophyll *a* data available.

Only 86 of the 800 waters with true color values greater than 30 mg/l Pt could be classified into trophic state, using available chlorophyll *a* data (color readings have not bee obtained for the balance of the assessed waters (64)). Based on this criterion, 7 waters were oligotrophic, 37 waters were mesotrophic and 42 waters were eutrophic.

Acidity status was assessed using midsummer pH of the surface water. Waters are considered impaired if pH is < 5.0, threatened if pH is ≥ 5.0 and ≤ 6.0, and acceptable if pH is > 6.0. A total of 1,791 waters in New York State, including 1,376 waters through the Adirondack Lake Survey Corporation study, were assessed for acidity. There were 365 ponded waters impaired, 293 waters threatened, and 1133 waters had acceptable conditions. The waters impaired by acidity represent less than two percent of the total surface area included in the current assessment.

Significant Waters and The Lakes Inventory

New York State uses an indexing system to identify ponded waters within the state. The pond number, or *P-#*, is the number that has been assigned to a specific ponded water by the NYSDEC in Part 800 of its *Codes, Rules and Regulations*.[9] These Rules and regulations pertain to Article 15 of the New York State

[9] State of New York. 1984. Official Compilation of Codes, Rules and Regulations. Title 6, Volumes A-F, New York State Department of State.

Environmental Conservation Law.[10] With reference to the *Guidelines for the Preparation of the 1990 State Water Quality Assessment (305(b) Report*,[11] New York State defines "significant" waters as those lakes, ponds and reservoirs that are included in the indexing system at the present time.

Although New York State has over 7,600 ponded waters within its boundaries, not all of these waters are indexed and included in the state inventory at the present time, and the exact number of ponded waters is not known. Surface area is one fundamental limitation that precludes certain waters within the state from being included in the inventory since waters below a certain size will not appear on USGS topographic maps. The Division of Water has regularly updated the *Codes, Rules and Regulations* to reclassify some waters and add many of the ponded waters that are not indexed.

A partial inventory of state waters is included in *Characteristics of New York State Lakes; Gazetteer of Lakes, Ponds and Reservoirs*, 3rd Edition (1987), which lists about 3,000 ponded waters that have surface areas greater than 6.4 acres, appear on USGS 7.5 minute topographic maps, are named and indexed. The 6.4 acre, or 0.01 square mile, surface area was the minimum size included in the previous gazetteer by Greeson and Robinson[12] and has remained the minimum ponded water acreage in all recent updates. A summary of different categories of ponded waters within the state with reference to the current inventory process is presented below.

Table 14

Categories of Ponded Waters in New York State

Number of Lakes/Ponds	Lake/Pond Characteristics		
	Size/Surface Area	Included in Inventory	Named Lake/Pond
135	Greater than 500 acres	yes	yes
2,911	6.4 to 500 acres	yes	yes and no
832	less than 6.4 acres	yes	yes and no
3770 (est)	less than 6.4 acres	no	yes and no

The total number of lake waterbodies in the state is currently estimated to be 7,849 representing are total cumulative surface area estimated to be over 790,000 acres (not including Lakes Ontario and Erie).

Lake Assessment Methods

The data that were used to prepare this lake assessment were compiled from several local, State and Federal

10 State Of New York. 1984. Environmental Conservation Law of New York. Volumes 1-11, New York State Department of State.

11 United States Environmental Protection Agency. 1997. Guidelines for the Preparation of the State Water Quality Assessment (305(b) Report) and Electronic Updates. Assessment and Watershed Protection Division (4503F), Washington, D.C.

12 Greeson, P. E. and F. L. Robinson. 1970. Characteristics of New York State Lakes. Part I. Gazetteer of Lakes, Ponds and Reservoirs. Bulletin 68, U. S. Geological Survey and N. Y. S. Department of Environmental Conservation. 124 p.

sources. Samples included in the current assessment were collected between 1982 and 1999. The 1982 cutoff corresponds with a previous lake water quality assessment report submitted to USEPA by New York State (Mikol, 1983). The sources of data in the present report are the Adirondack Lake Survey (NYS Department of Environmental Conservation and Empire State Electric Energy Research Corporation, 1984 through 1987), the Eastern Lake Survey (USEPA, 1984) which was Phase IA of the National Surface Water Survey, the Lake Classification and Inventory Project (NYSDEC, 1982 through 1991, and beginning again in 1996), the Citizens' Statewide Lake Assessment Program (NYSDEC, 1986 through 1999), the Water Quality Surveillance Network (NYSDEC, 1982 to 1986), the Rensselaer County Water Quality Program (1990), the Adirondack Effects Assessment Program (AEAP; Rensselaer Polytechnic Institute, NYSDEC, and other institutions, 1994-99) and various Clean Lakes Projects and special studies. Water quality data for approximately 150 lakes throughout the state were also collected by the USEPA and USFWS through the Environmental Monitoring and Assessment Program (EMAP)-Surface Water and TIME (Temporally Integrated Monitoring of Ecosystems) programs (1991 through 1996), but these data have only been released for individual lakes through 1993; all later data cannot be included in this assessment. Systematic monitoring of the eleven Finger Lakes was commenced in 1996 by the NYSDEC Lake Services Section and Upstate Freshwater Institute. All of the data were collected and analyzed using USEPA approved quality assurance - quality control protocols. Except for several of the Clean Lakes Projects and the Rensselaer County data, all laboratory analyses were conducted by either NYSDEC or New York State Department of Health laboratories prior to 1998. Beginning in 1998, analyses were performed by either one or more contract laboratories (for sampling conducted for the LCI, Finger Lakes, and AEAP programs) or the NYS Department of Health (CSLAP, except for phosphorus analyses during June through August in 1998).

All data were obtained from the original sources in computer compatible form and were entered into a database using Microsoft Excel 97, running on an Dell Pentium computer. Although the full database contains information on a wide variety of water quality measurements, the present draft of this report has been restricted to a summary of parameters related to trophic classification and acidity status, unless otherwise noted.

The data were coded with a single character to identify the source. The codes were *L* (NYSDEC Lake Classification and Inventory), *C* (Citizens' Statewide Lake Assessment Program), *B* (NYSDEC Biota Survey), *W* (NYSDEC Water Quality Surveillance Network), *A* (Adirondack Lake Survey Corporation), *E* (USEPA Eastern Lake Survey), *R* (Rensselaer County), *T (*TIME and USEPA/USFWS EMAP Program), *P* (RPI/NYSDEC/etc. Adirondack Effects Assessment program), *F (*Finger Lakes study), and *S* (Special studies). An *M* (multiple source) indicates that more than one program collected information on the ponded water.

Certain identifying information has been presented for most of the lakes and ponds in the data summary including the name of the water body, the index number (*Pond No,*) which consists of the watershed number and the pond number, the surface area (*Surf. Area*) in hectares (ha), the current water quality classification (*W.Q.Class.*), and the county code (*County*) for the location of the water body.

The water quality data summary was produced using **EXCEL** to calculate average values for the various parameters included in the assessment. The data summary represents samples that were collected during midsummer from the upper portion of the water column (sample depth ≤ 3m). Data summaries were prepared for the following parameters: Secchi depth (*Secchi*, in meters), trophic state based upon Secchi (*Secchi T.S.*), chlorophyll *a* (*Chl a*, in µg/l), trophic state based upon Chlorophyll *a* (*Chl a T.S.*), total phosphorus (*TotP*, in mg/l), trophic state based upon total phosphorus (*TotP T.S.*), pH (*pH*, in standard units), pH status (*pH Status*), acid neutering capacity (*ANC*, in µeq/l), true color (*True Color*, in mg Pt units/l), and the code (*Code*) to indicate the source of the data. For lakes from which samples were collected over several years or programs, reported averages correspond to the summer mean values from all programs averaged over the number of years sampled.

The USEPA Eastern Lakes Survey (ELS) data collected on 240 ponded waters were not incorporated into the calculation of average values for the data summary since the ELS field sampling was conducted during the fall, not midsummer, of 1984. As a result, significant differences occurred in the values of certain parameters collected from the same ponded water by one source during midsummer and by the ELS during the fall.

Lake Trophic Status

The current assessment has employed the traditional classification of trophic status, i.e., oligotrophy, mesotrophy and eutrophy, as a framework for water quality assessment by using the values and ranges for transparency, total phosphorus and chlorophyll *a* outlined in Table 15.

Table 15

Assessment Criteria for Lake Trophic Status

Parameter	Oligotrophic	Mesotrophic	Eutrophic
Transparency (m)	> 5	2 - 5	< 2
Total Phosphorus (µg/l)	< 10	10 - 20	> 20
Chlorophyll *a* (µg/l)	< 2	2 - 8	> 8

The values and ranges of values generally agree with trophic status criteria that are reported in the literature, although the ranges for chlorophyll *a* are somewhat lower than have been used in historical versions of this report. The present report will highlight any apparent discrepancies or “trends” that are actually the result of the shift in reporting ranges. New York State has not adopted a statistical definition related to the categories hypereutrophic or dystrophic; therefore, these categories are not included here.

Classification of trophic status using traditional criteria has very limited application in certain regions of New York State, however. In the Adirondacks and Catskills, for example, transparency is not a good indicator for all water bodies since many waters are stained or "colored" and have low transparency from humic and fulvic acids. The presence of these compounds in the water indicates the incomplete microbial decomposition of the organic compounds of green plants and does not necessarily relate to productivity. True, or soluble, color of the water is a surrogate of this organic material and should be included in the evaluation of trophic status since phosphorus associated with organic material in the water is unavailable for uptake by organisms but is a portion of the total phosphorus analyzed in water samples.

Information presented in Table 16 from a recent analysis of trophic status in the Adirondacks[12] illustrates the significance of adding true color to the classification of trophic status. The results are total phosphorus and true

[12] Sutherland, J. W., S. A. Kishbaugh, J. A. Bloomfield, W. T. Lavery, and F. E. VanAlstyne. 1990. Water Resources and Water Quality in the Adirondack Park. Issue Paper #5e in Volume II, Technical Reports, Commission on the Adirondacks in the Twenty-first Century. Division of Water, NYSDEC, Albany, N.Y. 141 p.

Table 16
True Color as Indicator of Trophic Status

True Color	Total Phosphorus			Total Lakes/Ponds
	<10	10 - 20	> 20	
≤ 30	314	225	99	638
> 30	76	296	358	730
Total Lakes/Ponds	390 (29%)	521 (38%)	457 (33%)	1,368

color analyses for 1469 Adirondack waters that were sampled by the ALSC between 1984 and 1987.

Just over 50 percent (730) of the Adirondack waters surveyed had high color imparted by organic material, and most of these waters had moderate to high levels of unavailable phosphorus associated with the organic material and part of the total phosphorus fraction. The balance (638) of the waters surveyed are clear, and can be separated into trophic categories, based on phosphorus concentration, as shown in Table 17.

As shown in the tables, evaluating the trophic status of Adirondack waters without consideration of true color would lead to 33 percent (457) of the waters being categorized as eutrophic instead of 15 percent (99) of the waters.

Table 17
Lake Trophic Status for "Clear" Waters (True Color > 30)

	Oligotrophic	Mesotrophic	Eutrophic
Total Phosphorus (µg/l)	< 10	10 - 20	> 20
Total Lakes/Ponds	314 (49%)	225 (35%)	99 (15%)

Since about 80 percent of the water bodies included on the current water quality assessment list for New York State are within the Adirondack Region, true color has been incorporated into the current analysis of trophic status as an indicator of organic material (and associated phosphorus). Adding this information allows clearwater lakes and ponds (true color ≤ 30 mg Pt/l, or simply 30 Ptu) to be distinguished from waters with a visible stained appearance (true color > 30 mg Pt/l). In ponded waters with visible color (true color > 30 mg Pt/l), the Secchi depth was not included in the evaluation of trophic condition. If a value for true color was not available then the soluble organic carbon (SOC) value was used instead. If the SOC was greater than 7.0 mg/l, the Secchi was not used to assess trophic status. Both true color and SOC typically are used to characterize the level of yellow organic (humic and fulvic) acids.

There is one other limitation in the current assessment that must be mentioned. Chlorophyll *a*, although a good indicator of trophic state, was not very useful in the current analysis since relatively few waters (only 21 percent of the 1,850 assessed for trophic indicators) had any chlorophyll *a* data. Most of the water quality data for this assessment were collected by the ALSC during the Adirondack survey, 1984 through 1987, and chlorophyll *a* was not one of the parameters sampled in this program.

The results of the current assessment of trophic status of significant waterbodies are presented in Table 18 and show number of waters and surface area in acres (in brackets) for each category (these area data do not include Lake Ontario).

If it is assumed that an equivalent percentage (in the assessed database) of unassessed lake numbers and lake areas possess color readings less than 30 Ptu, then trophic conditions in weakly colored waters are not known for approximately 3200 lakes comprising an area of 226,600 acres.

A total of 797 waters in the current assessment had true color values greater than 30 mg/l Pt, and total phosphorus and Secchi transparency were not used to evaluate the trophic status. Unfortunately, only 86 of these waters had chlorophyll *a* data and could be classified. The results are presented in Table 19.

Table 18

Lake/Pond Condition for Waters with True Color ≤ 30

(985 Lakes/Ponds covering 367,010 acres)

Assessment Based on:	Oligotrophic	Mesotrophic	Eutrophic	No Data
Total Phosphorus	425 lakes (119,367 Ac)	344 (151,944)	207 (94,950)	10 (749)
Secchi	160 (110,972)	529 (221,761)	138 (28,723)	158 (5,554)
Chlorophyll	52 (35,677)	179 (240,537)	133 (63,655)	621 (27,141)

Table 19

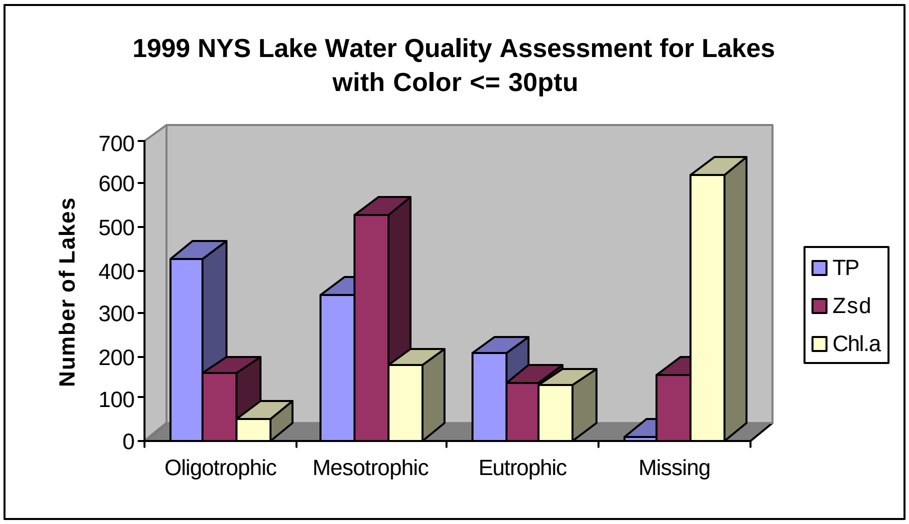
Lake/Pond Condition for Waters with True Color > 30

(797 Lakes/Ponds covering 28,685 acres)

Assessment Based on:	Oligotrophic	Mesotrophic	Eutrophic	No Data
Chlorophyll	7 (4,072)	37 (3,402)	42 (3,106)	711 (18,105)

A total of 67 waters were excluded from the above analyses because true color data were not available. If it is assumed that an equivalent percentage (in the assessed database) of unassessed lake numbers and lake areas possess color readings greater than 30 Ptu, then trophic conditions in highly colored waters are not known for approximately 2600 lakes comprising an area of 12,900 acres. The evaluation of trophic status itemized above also is presented graphically in Figure 6.

Figure 6



In summary, a total of 1,850 waters are included in the current water quality assessment, and about 80 percent of these waters are located in the Adirondack Region of the state. About 53 percent (945) of the total waters assessed had true color values less than 30 mg/l Pt and these waters were classified into trophic state using total phosphorus, Secchi transparency, and chlorophyll *a*. There were 207 waters classified as eutrophic based on total phosphorus, 138 waters classified as eutrophic based on Secchi transparency, and 133 waters classified as eutrophic based on chlorophyll *a*. Only 86 of the 797 waters with true color values greater than 30 mg/l Pt could be classified into trophic state at the present time, using chlorophyll *a* data.

The itemization of trophic status for the ELS waters surveyed in New York State is presented in Table 20. As mentioned previously, these data were kept separate from the remainder of the database since the ELS was conducted during the fall instead of during midsummer. Chlorophyll *a* was not determined by the ELS, and so the assessment of trophic status is based upon total phosphorus, Secchi depth and true color. There were 158 of the 240 ELS waters with true color ≤ 30 mg/l Pt and the assessment of trophic state is presented below. Seventy-eight ELS waters had true color values > 30 mg/l Pt and were not assessed for trophic state. True color was missing in 4 ELS waters (surface area = 410.0 acres), and these waters were not included in the current analysis.

Table 20

Lake/Pond Condition for ELS Waters with True Color ≤ 30 Ptu

(158 Lakes/Ponds covering 69,262 acres)

Assessment Based on:	Oligotrophic	Mesotrophic	Eutrophic	No Data
Total Phosphorus	99 lakes (58,522 Ac)	20 (4,392)	13 (981)	26 (5,367)
Secchi	41 (53,950)	91 (11,105)	26 (4,206)	0 (0)

It has been determined that at least half of the 240 waters sampled by the ELS also were sampled by some other program in the current dataset.

Water Quality Standards Applicable to Ponded Waters

New York State classifies all surface waters by *best use*, a designation that takes into account such factors as stream flow, existing water quality, and the past, present and desired uses of the waters and bordering lands. Best use is defined as the use that requires the "cleanest" water and includes drinking waters, swimming, fish (or shellfish) propagation and survival. For example, all surface fresh and salt waters must be safe, at least, for aquatic organisms, all fresh groundwater must be protected for drinking water supply. Although waters are classified to achieve best use, including all uses that require less demanding water quality standards, the best use may not be achievable under current conditions. A summary of New York State Water Quality Classifications is presented in Appendix C of this report. NYSDEC continues to reclassify waters within the state as better information becomes available to aid in this process.

The water quality standards most applicable to New York State lakes are the standards corresponding to pH, and dissolved oxygen, although guidance values and safety requirements on swimming beaches are also applicable to total phosphorus concentrations and water clarity, respectively. While other numeric or narrative water quality standards may be of concern for individual waters within the state, either the existing database does not support broad assessment of the resources of the state for applicable standards (such as bacteria) or the standards are not violated for the vast majority of waterbodies in the state.

The state pH standard for all waters Class C or higher is between 6.5 and 8.5. For Class D waters, the pH standard is between 6.5 and 9.5

The state dissolved oxygen standard is as follows: for all but Class D and A-special lakes (none in either category assessed in this report):

> "For cold waters suitable for trout spawning, the DO concentration shall not be less than 7.0 mg/L from other than natural conditions. For trout waters, the minimum daily average shall not be less than 6.0 mg/L, and at no time shall the concentration be less than 5.0 mg/L. For non-trout waters, the minimum daily average shall not be less than 5.0 mg/L, and at no time shall the DO concentration be less than 4.0 mg/L".

Evaluation of lake DO data can be confounded by the time of sampling (samples generally collected prior to June or after September may correspond to destratified lake conditions, in which temperature and oxygen concentrations are usually uniform throughout the water column), depth of the lake (shallow lakes and ponds may not thermally stratify, limiting shifts in DO to the microlayer just above the sediment-water interface, a zone difficult to accurately monitor), and samples collected outside the deepest hole in the lake. It may be most appropriate to evaluate oxygen conditions only in waterbodies sufficiently deep (say > 5 meters) to thermally stratify, during the period in which thermal stratification is stable (generally June through September).

The phosphorus guidance value for Class B and higher waters corresponds to 0.020 mg/L. No such value has been designated for any lakes classified as Class C or lower.

The minimum recommended (by the NYS Department of Health Sanitary Code) water clarity for designated swimming beaches is 4 feet (= 1.2 meters). While this recommendation could apply to all Class B and higher waters (and even to many of the Class C waters that are used for contact recreation), the lack of an inventory of waterbodies with "designated" swimming beaches precludes a strict application of this recommendation. However, the water clarity database will be presented for the purposes of broadly assessing water quality conditions as related to potential for swimming impairments.

Table 21 summarizes the extent to which these standards and/or guidance values have been violated. pH, water clarity, and phosphorus criteria are evaluated against mean values for each analyte, while the dissolved oxygen criteria is evaluated against minimum values within the hypolimnion. While most of the sampling programs include pH, water clarity, and phosphorus among the measured parameters, dissolved oxygen data are either not universally collected (for example, in CSLAP or in some isothermal lakes) or have not been electronically stored (in the ALSC and many other monitoring programs from prior to 1990). It should also be noted that, in many monitoring programs such as the ALSC project, oxygen "profiles" are often limited to discrete samples at a small number of points (usually two) within the water column.

The data in Table 21 suggest that violation of water quality standards and/or guidance values or criteria is common among assessed lakes. The violations of the pH standard and phosphorus guidance value have been discussed above. A relatively small number of lakes have experienced systematic violations of the recommended water clarity readings at swimming beaches. It is likely that a larger percentage of sampled lakes have experienced occasionally low water clarity readings; as such, these figures may not accurately reflect the percentage of lakes in which poor water clarity results in at least some aesthetic and bathing impairments. However, these figures also include some moderately colored waters and a small number of very shallow lakes for which water clarity is measurable (i.e. the Secchi disk is not visible while sitting on the lake bottom) but is nonetheless adversely affected by lake depth. In other words, these figures also include some waterbodies for which water clarity may not be an accurate "water quality" indicator.

Table 21 also suggests that, at least among the relatively small number of assessed waterbodies, dissolved oxygen standards are commonly violated, and anoxic conditions (functionally defined as DO readings < 1 mg/l to account for inaccuracies in very low level dissolved oxygen measurements and the lack of DO data within

Table 21

Statewide Assessment of Lake Water Quality

Water Quality Indicator		Water Quality Criterion	Percent of All Lakes that: (Percent of Assessed Lakes that:)			
			Violate Standard	Meet Standard	Sampled, but Not Assessed**	Sampled, but Not for this Indicator
pH	Lower	6.5 SU	44%	56%	< 1%	< 1%
	Upper	8.5 SU	1%	98%	< 1%	< 1%
Dissolved Oxygen	Trout Waters	5.0-6.0 mg/l	7% (71%)	5% (29%)	83%	6%
	Non-Trout Water	4.0 mg/l	7% (75%)	2% (25%)	82%	10%
	Hypoxia*	4.0 mg/l	7% (71%)	3% (29%)	83%	8%
	Anoxia*	1.0 mg/l	- - - (59%)	- - - (41%)		
Total Phosphorus (Class B and higher)		20 µg/l	30%	68%	< 1%	2%
Water Clarity (Class B and higher)		1.2 m	7%	83%	10%	< 1%

* Analysis limited to thermally stratified lakes sampled from June through September.
** Dissolved Oxygen data for these lakes have either not been converted to electronic formats or were not collected as part of depth profiles, thus limiting their utility. It is anticipated that subsequent editions of the 305(b) Report will include these data.

the last meter or two of water depth immediately above the sediment-water interface) are routinely experienced. This Table shows that **more than 70% of assessed waters that are thermally stratified experience hypoxia in the hypolimnion.** There has been much discussion about the occurrence of "natural" DO depletion in lakes due to morphometry and focusing. Without sediment coring data for the vast majority of these lakes, it is impossible to separate out natural and culturally-induced DO depletion in these lakes. It must also be conceded that Table 9 reflects a database (mostly publicly accessible, moderately sized, moderately high profile LCI lakes, often with some pre-sampling evidence of water quality problems that led to its inclusion in the monitoring program) that may not be fully representative of the "typical" NYS lake. However, the high percentage of assessed lakes experiencing hypoxic conditions suggests that this phenomenon needs to be far more closely monitored and evaluated. The NYSDEC will devote significant effort in the upcoming 305b cycle to fully assessing the existing (electronic and hard copy) dissolved oxygen database, recognizing the limitations inherent in comprehensively evaluating the paucity of full profile data, as well as a renewed effort to collect additional full water column profiles in all subsequently sampled lakes

New York State Lake Programs

Lake water quality monitoring by New York State is currently being conducted by the NYSDEC and includes the following ongoing components: the Citizens' Statewide Lake Assessment Program, the Lake Classification and Inventory Survey, the Lake Champlain Monitoring Program and special studies involving acid rain, lake use impairment, USEPA Clean Lakes projects, special projects as related to local, short-term problem assessment, and other miscellaneous activities. The NYSDEC Lake Services Section also works jointly with other institutions in other contemporary or recently completed lake monitoring projects, including the Adirondack Effects Assessment Program (AEAP, with RPI and others), Finger Lakes Monitoring (with UFI), the Environmental Monitoring and Assessment Program (EMAP, with USEPA, USFWS, and others), and stormwater monitoring of tributaries to several NYS lakes, including Lake George and several NYC reservoirs.

The *Citizens' Statewide Lake Assessment Program* was started in 1986 and is a scientific and educational program in which citizen volunteers are trained to collect water quality information. The program is a cooperative effort between the NYSDEC and the Federation of Lake Associations, Inc., a coalition of organizations dedicated to the preservation and restoration of all lakes, ponds and rivers throughout New York State. During 1999, there were about 175 lakes and ponds associated with the program, although only about 100 are actively sampled in any particular year. Biweekly sampling begins in mid-June and continues for 15 weeks through early October. Water quality data collected as part of the program include Secchi disk transparency and the following chemical parameters: total phosphorus, nitrate-nitrogen, true color, pH, specific conductance, and chlorophyll *a*. At some lakes, dissolved oxygen, lake level, amount and pH of precipitation, and aquatic plant populations also are assessed. Volunteer monitors also complete user and (since 1992) field perception surveys, the latter of which are cross-referenced against instantaneous water quality data collected to provide a linkage between public opinion and measured eutrophication parameters. These linkages are being utilized to develop phosphorus guidance values serving as the endpoint in the revision of aforementioned phosphorus effluent TOGS.

The *Lake Classification and Inventory Program*[13] was initiated in 1982. Each year, approximately 10-25 water bodies are sampled in a specific geographic region of the State. The waters selected for sampling are considered to be the most significant in that particular region, both in terms of water quality and level of public access. Samples are collected for pH, ANC, specific conductance, temperature, oxygen, chlorophyll *a*, nutrients and plankton at the surface and with depth at the deepest point of the lake, four-seven times per year (with stratified lakes sampled more frequently than shallow lakes). Sampling generally begins during May and ends in October. This project had been suspended after 1992, due to resource (mostly staff time) limitations, but was resumed on a smaller lakeset beginning again in 1996. Since 1998, this program has been geographically linked with the Rotating Intensive Basin Sampling (RIBS) stream monitoring program conducted by the NYSDEC Bureau of Watershed Assessment. LCI sites are chosen within the RIBS monitoring basins (Susquehanna River basin in 1998, Long Island Sound/Atlantic Ocean and Lake Champlain basins in 1999, Genesee and Delaware River basins in 2000) from among the waterbodies listed on the NYS Priority Waterbody list for which water quality data are incomplete or absent.

New York State Lake Restoration Efforts

NYSDEC does not have an organizational unit that is responsible for statewide lake management. However, within the Division of Water, the Lake Services Section (LSS) comes the closest to fulfilling that responsibility. The LSS consists of five scientists, three engineers, nine Regional Lake Managers and associated support staff (from the NYSDEC regions) who work on various aspects of lake management. The LSS is responsible for administering the Federal Clean Lakes Program and equivalent State-funded projects. In recent State Fiscal

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13 New York State Department of Environmental Conservation. 1982. New York State Lake Classification and Inventory Annual Report - 1982. Bureau of Water Research, Albany, N.Y.

Years, the latter consisted of projects exceeding $1 million, affecting more than 50 lakes. The State-funded projects are not part of a competitive grants program, but rather the State legislature determines annual eligibility for funding. The LSS staff is then responsible for working with the locality to prepare a Program Narrative, developed with the guidelines contained in the Federal Clean Lakes Rules and Regulations. A second difference between the Federal and State programs is that monitoring, diagnosis, feasibility and implementation can all be conducted simultaneously by the locality. The State program has no requirement for phased design and implementation.

The LSS staff also assists local governments in the conduct of specific State and Federal Clean Lakes Projects. They also are responsible for carrying out all the lake monitoring for NYSDEC (except for fish sampling). The LSS staff also acts as a liaison to the public for lake-related matters and are involved in the preparation of Lake Management Plans for specific lakes. This responsibility has necessarily been reduced by the limited scope of the Federal Clean Lakes Program in recent years.

In most lake restoration projects, a cooperative agreement between the public and governmental agencies must be reached to ensure success. Working relationships between federal (USDA-SCS, USEPA), state (NYSDEC, NYSDOH), county planning or environmental management councils, health, lake protection and preservation districts, and local offices all contribute to the management of the lake and surrounding watershed.

<u>Restoration Techniques</u>

The techniques used for lake restoration can be categorized as into in-lake treatments and watershed management programs. Watershed management involves the implementation of methods to reduce nutrients and/or sediments from entering the lake. This requires the identification of the problem(s), assessment of the magnitude of the problem(s), and the development of management practices/controls to mitigate the controllable problem(s). Most restoration projects consist of a combination of in-lake and watershed management techniques in order to achieve long-term benefits.

In-lake restoration techniques are typically applied after nutrient reduction or diversion plans have been accomplished. The purpose of employing in-lake restoration techniques is to remove the sediments and/or nutrients to reduce algal blooms, reduce the nuisance growth of aquatic plants and eliminate oxygen depletions in the deeper waters. The method selected will be determined in large part by what is causing the water quality impairment. In some instances, the use of multiple restoration methods may be required.

The following is a discussion of in-lake restoration techniques that have been conducted in New York State through USEPA Clean Lakes Phase II projects or other lake management efforts. The list is ranked by the frequency of use as a restoration technique, although it is likely that locally-funded and sponsored projects utilize some techniques such as drawdown and mechanical weed harvesting more frequently. Several techniques which have not been utilized within the State Clean Lakes process, but to some extent via "private" projects, include lake aeration/circulation, dilution/flushing, and biological controls, such as sterile grass carp. These techniques will be discussed at the end of this section. The use of aquatic herbicides and algaecides has not been associated with any Clean Lakes projects, although these lake management strategies have been commonly utilized by lake communities and managers.

> **Dredging** has been used more frequently in New York than any other type of in-lake restoration technique, with the possible exception of drawdown. Used in conjunction with diversion or measures to reduce siltation upstream, dredging removes the sediments that may continue to be a significant source of nutrients to the overlying water column. This technique is also useful to control aquatic plant growth by the reduction in light penetration to the deeper waters.

There are two types of dredging for lake restoration projects, hydraulic and dry excavation. The method selected will depend upon the degree of treatment required, lake morphology, whether the lake can be drained properly and cost. The use of dry excavation has been utilized on eight Phase II projects in New York State, while hydraulic dredging has been used on two other Phase II restoration or demonstration projects since 1976. Smaller scale dredging activities have been conducted on many more small NYS lakes.

The disposal of the spoils from the dredging operation, the disruption of the littoral zone and benthic fauna and flora, destruction of wetland habitat (including the submergent vegetation), increased turbidity to the surrounding waters and possible impairment of use during the dredging operation all have increased the difficulty of obtaining the necessary environmental permits that are required to initiate new projects. Restrictions on the location of new spoils area and new, more restrictive weight limits for dump trucks also have contributed substantially to an increase in the costs of these projects.

The benefits derived from a dredging project generally are considered to last longer than the benefits derived from other lake restoration techniques, thus ameliorating the cost differences.

Phosphorus precipitation/inactivation is also used in conjunction with nutrient diversion or reduction. The degree of treatment, i.e. the amount of chemical applied, determines which method is being utilized. Phosphorus precipitation is employed when the lake sediments are not a significant source of nutrients. Phosphorus inactivation is used in all other applications.

The object of phosphorus precipitation is to add enough chemical to bind with the soluble phosphorus in the water column, forming a chemical floc which then settles to the bottom. Phosphorus inactivation not only strips the phosphorus in the water column, but enough additional chemicals are applied to form a barrier on top of the sediments that inhibits the release of phosphorus back into the water. The expected benefits from phosphorus inactivation may last several years.

Alum is the chemical most often used for phosphorus precipitation/inactivation. The addition of alum will lower the pH of the water, through a series of chemical reactions. If the pH is lowered below 4.5, the aluminum can be solublized and create a toxicity problem to fish and invertebrates. The dosage rates of alum has to be carefully determined and monitored during the application to maintain the pH above 4.5.

In New York, Saratoga Lake and Irondequoit Bay have been treated with alum in an experimental manner to determine its effectiveness in phosphorus inactivation. The Irondequoit Bay, treated during the summer of 1987, has increased water clarity, reduced levels of chlorophyll *a* and lowered phosphorus levels within the hypolimnetic waters. The long-term effect on the recycling of nutrients from the sediments will be determined by further monitoring. There was no appreciable improvement in the water quality in Saratoga Lake as a result of the alum application. This was due to the small treatment area and low application rates.

This technique will be utilized more often in the future, possibly to replace dredging in certain cases due to costs and environmental considerations. It may be especially well suited in small lakes or ponds to control algal blooms.

Lake-Level Drawdown has been used to control the growth of aquatic vegetation in near shore areas where lake levels can be controlled. Since drawdown effects only plants growing near shore, it is often utilized in conjunction with other in-lake restoration techniques. The control of vegetation is achieved through the freezing action on the exposed sediments during the winter months. Not all vegetation responds to the freezing action in the same manner. While some species may be affected negatively, others may not be affected at all, or may actually increase in abundance.

Drawdown during the winter months also allows ice scouring to disrupt the roots of plants. The exposed soils are compacted and much of the fine grained organic materials are removed to deeper waters. Another advantage of this technique is that it requires little or no expense.

In addition to possible shift in aquatic plant species, drawdown can result in increased turbidity and/or algae blooms. The turbidity increase is usually the result of a lack of vegetation along the shoreline which acted as a buffer to the wave energy. Lowering of the lake during the winter months may also result in a fish kill if an insufficient amount of water volume remains. Lake levels need to be restored to near normal by spring to provide adequate fish spawning areas. Finally, lake residents are often concerned that the lake will not reach its normal lake level by summer. There is no guarantee that adequate runoff will fill the lake by the time people want to use it.

The use of drawdown has been used annually on Saratoga Lake, Galway Lake and many other NYS lakes (not affiliated with the Clean Lakes program) with good results. No negative effects have been observed in using drawdown on most of these lakes, although a different mix of invasive plants have often colonized and dominated the aquatic plant community after drawn down lakes reach an equilibrium after a few years.

Mechanical Aquatic Plant Harvesting is restricted to applications where macrophyte growth impairs the use of the lake. The aquatic harvesters cut and remove vegetation below the surface of the water and transport the biomass to a conveyer for disposal away from the lake. Although the plants will grow back, some species requiring several harvests during a growing season, this technique removes the vegetation and associated nutrients from the lake. There also is evidence that the long-term harvesting, especially late in the season, causes some disruption to the growth cycle of some species of plants.

Although harvesting is only a temporary solution to vegetation problems and generally is not fundable as a sole restoration technique through the Clean Lakes Program, it has been used on the Saratoga Lake project in conjunction with other lake restoration techniques and watershed management programs. In fact, this technique is the most commonly used short-term method of vegetation control by lakes in this State, whether done “formally” with full-sized mechanical harvesters, informally with cutting bars and hand removal of floating plants, or individual cutting with plants removed from downwind shorelines. Aquatic plant harvesting has been conducted on many NYS lakes (Copake Lake, Kinderhook Lake, Hampton Manor Lake, and many of the Finger Lakes, to name but a few), usually funded by local lake association dues, local government contributions, and other means.

Another type of mechanical harvesting, suction harvesting, utilizes divers, hoses, and a pump to create suction to remove aquatic plants. This technique is relatively new, but may provide longer term control of vegetation by removing the roots as well as the plants. The process of having diver(s) remove aquatic plants by suction hoses is more selective at removing only the nuisance species, thus leaving the native plants to recolonize the disturbed area. The removed plants and roots are discharged to a collection basket where they are then properly disposed of.

Suction harvesting is a slow and expensive operation when compared to mechanical harvesters, but is ideally suited as a secondary treatment when combined with rotovating or dredging and for new infestations of exotic plants. Several lakes are experimenting with this technique in New York, including Lake George, East Caroga Lake and Saratoga Lake. Results from these studies indicate suction harvesting to be an effective means for controlling weed populations when applied under the appropriate circumstances.

Aeration/Artificial Circulation have been used in other state Clean Lake projects to alleviate depleted oxygen in the hypolimnion with limited success. These two techniques have not been used on any Clean Lake projects in New York, although they have been utilized in privately-funded work. Aeration introduces oxygen to the hypolimnion without disrupting the temperature gradients, while artificial circulation mixes the entire water column. This latter treatment is not recommended in lakes where cold water fish species are present.

The use of imported water to replace existing lake water is referred to as dilution or flushing techniques. The objective is to exchange the high nutrient waters with water that is low in nutrients. The use of groundwater or nearby streams with low nutrient concentrations are sources for flushing. The lack of sufficient water of desirable quality and the cost of operation and maintenance limit the use of this technique.

Aquatic Herbicides and Algicides have been utilized for the control of nuisance aquatic plants; *herbicides* have been used to reduce populations of excessive rooted aquatic macrophytes, while *algicides* have been used to control nuisance algae growth (including macroalga such as *Chara*). Herbicides are available in liquid or granular form, utilizing a variety of formulations and active agents. Some herbicides elicit toxic reactions to the plant leaves and/or root structure, while other herbicides disrupt the photosynthetic or metabolic processes in plants. Algicides control algae by toxicity. While algae control has required primarily whole-lake treatments, herbicidal control of nuisance weeds has occurred as both spot and whole-lake treatments. Treatment duration, effectiveness, and selectivity are largely a function of the choice of herbicide, extent and type of plant coverage, bottom sediment structure, hydrologic characteristics of the lake, and a variety of other factors.

The primary aquatic herbicides registered for use in New York State are 2,4-D, Endothall (and other like formulations), Diquat, Rodeo, and Sonar. While herbicide treatments have historically focused on a variety of nuisance native and exotic submergent and emergent plants, much attention in recent years has been focused on exotic submergent species, primarily *Myriophyllum spicatum* (Eurasian water milfoil). Sonar, a fluridone-based compound utilized in other states for control of *M. spicatum* (and other nuisance macrophytes), was permitted for use in New York state in 1995, and has been utilized increasingly for the control of *M. spicatum* in NYS lakes (at least 20 lakes larger than 25 acres), although not in any lakes utilizing Clean Lakes funding. However, 2,4-D and other herbicides have a long history of use for controlling Eurasian water milfoil throughout the state. Algicides are primarily formulations of copper-based compounds. Both herbicides and algicides are regulated through an extensive licensing and permitting process by the NYSDEC.

Biological Controls of nuisance aquatic plants have been used for several years on small NYS ponds and lakes, and in the last few years on larger lakes with control structures, though there have been no treatments through the Clean Lakes Program. The use of sterile hybrid grass carp (*Ctenopharyngodon idella* x *Hypophthalmichthys nobilis*) was approved in New York on June 1, 1990, for waterbodies less than five acres, having no inlet or outlet and which lie wholly within the boundaries of the individuals requesting a permit. Up to 15 certified triploid grass carp per acre will be allowed where submergent vegetation and/or duckweed (*Lemnaceae*) occupy over 30% of the water's surface area and significantly impair the intended use of the waterbody. A more rigid permitting process is utilized for applications in larger lakes.

Biomanipulation is another restoration alternative that has not been widely used but may prove useful in some situations. The objective of this technique is to control the growth of algae by increasing the populations of zooplankton which graze on the algae. This is accomplished by reducing or eliminating small fish which feed on the zooplankton by increasing predation or restocking.

Herbivorous insects have been increasingly used in NYS lakes to control the growth of nuisance levels of *Myriophyllum spicatum.* Although several different herbivorous insects have been implicated in natural crashes of Eurasian watermilfoil through North America, only two have been reared and stocked in NYS lakes. *Euhrychiopsis lecontei*, the milfoil weevil, is native to many NYS lakes and is stocked commercially by a private company in Ohio. Adult weevils live submersed and lay eggs on milfoil meristems. The larvae eat the meristem and bore down through the stem, consuming the cortex, and then metamorphose lower on the stem. The consumption of meristem and stem mining by larvae are the two main effects of weevils on the plant and this damage can suppress plant growth, reduce root biomass and carbohydrate stores and cause the plant to sink from the water column (information from Ray Newman, University of Minnesota, Department of Fisheries and Wildlife). The milfoil weevil has been stocked in four NYS lakes since 1998. At present it is too early to evaluate the effectiveness of these stockings.

The milfoil moth, *Acentria ephemerella*, has been cited as the cause of a substantial crash of Eurasian watermilfoil in the northern end of Cayuga Lake. Although not native to NYS lakes, it has effectively become naturalized in many lakes since the late 1920s, and is now found in most surveyed NYS lakes. The moth caterpillars use their silken thread to bind milfoil's feathery leaves into individual nests (larval retreats), effectively halting growth of the plant stems. The moth has been introduced experimentally on a small scale into Dryden Lake and on a larger scale into Lincoln Pond. Commercial or other non-experimental stocking activities have not yet been conducted.

Current and Completed Clean Lakes Projects.
Over the past 20 years the Department of Environmental Conservation, under the Federal Clean Lakes Program (Section 314 of the Federal Clean Water Act), has conducted 26 lake management and restoration projects on *public* lakes. The various projects cover almost every aspect of lake management from vegetation harvesting to the control of agricultural runoff. Since 1983, NYSDEC, through its Lake Services Section, also has supervised nearly 80 additional projects, financed solely with State funds, amounting to almost $15 million dollars. These projects, conducted in areas that comprise over 75 percent of the State's population, have improved the use of lakes and ponds as water supplies, and for swimming, fishing, and water-based recreational activities.

The Clean Lakes program is broken down into two components, Phase I and Phase II cooperative agreements. Phase I projects are the diagnostic/feasibility studies to determine a lake's quality, evaluate possible solutions to existing pollution problems and recommend a feasible program to restore or preserve the quality of the lake. A Phase II project is undertaken to implement the recommended methods for controlling pollution entering the lake, and to restore the lake. Applications to the U.S. Environmental Protection Agency (USEPA) for a Clean Lakes project must be made by the NYSDEC. The proposal to conduct a Phase I or Phase II project can be submitted to the NYSDEC by any government entity for a public water body.

Federal cost-sharing for Phase I projects are 70 percent of the total budget, with a maximum Federal grant of $100,000. Phase II grants are 50/50 cost sharing, with no maximum limit. The match to the Federal grant can be composed of state and/or local monies which are not being matched to any other Federal program.

Prior to 1980, USEPA funded Demonstration projects that were similar, in scope, to the present Phase II projects. New York completed seven of these demonstration projects before the regulation was adopted that established the present Clean Lakes program. Since that time, the State has completed ten Phase I studies, four Phase II projects, and currently has five Phase II programs that are active.

During 1994, the Department submitted six new Phase I applications and one Phase II grant application to USEPA. USEPA Region 2 recommended that one of the Phase I applications be funded while no Phase II studies or other Phase I grant applications be awarded. USEPA Region 2 also recommended funding the state lake water quality assessment grant, used to fund some of the aforementioned monitoring activities. Since funding for Section 314 projects has been eliminated, no additional Phase I or Phase II applications have been submitted to the USEPA since 1994, and some activities funded under the Water Quality Assessment Grant have been transferred to the Nutrient Assessment program.

The following is a summary of the completed and ongoing Clean Lakes projects.

I. Demonstration Projects.

A. *Washington Park Lake* and *Buckingham Lake*, City of Albany ($46,500 Federal, $46,500 Local). Project completed in 1978. Lakes were dredged of accumulated bottom sediments to restore water depth.
B. *Hampton Manor Lake*, Town of East Greenbush ($50,000 Federal, $50,000 Local). Project completed in 1979. Project consisted of hydraulic dredging to increase water depth.
C. *Steinmetz Lake*, City of Schenectady ($36,680 Federal, $36,680 Local). Project completed in 1979. Restoration consisted of dredging of bottom sediments to increase water depth and to reduce aquatic plant growth.
D. *Tivoli Lake*, City of Albany ($202,645 Federal, $202,645 Local). Project completed in 1981. Restoration included dredging contaminated sediment, diversion of stormwater runoff around the lake, rehabilitation of the earthen dam and establishment of wetland wildlife areas. The Lake was also restocked with Largemouth bass, and presently is the only "natural" city park in upstate New York.
E. *Central Park Pond*, City of New York ($498,000 Federal, $498,000 Local). Project completed in 1981. Project consisted of dredging of accumulated sediment, rehabilitation of inlet and outlet structures and improvement of shoreline rip-rap. The purpose of the project was to increase water depth, as the pond is in a high use area of Central Park, Manhattan.
F. *Scudder's Pond*, Village of Sea Cliff and Glen Cove ($50,000 Federal, $50,000 Local). Project completed in 1982. Restoration included dredging of accumulated sediment, and construction of sediment traps to treat surface runoff. The pond is part of an environmental recreation area and is used for fishing.
G. *Ann Lee Pond*, Albany County ($98,246 Federal, $98,246 Local). Project completed in 1982. Restoration measures consisted of hydraulic dredging to increase water depth, and repair of the outlet dam. The pond is now used for fishing and is the focus of a wildlife area.

II. Completed Phase I Projects:

A. Lake Champlain, NYSDEC ($234,860 Federal, $100,654 State). Project period from 6/26/89 to 12/30/93. A cooperative Phase I diagnostic/feasibility study with the State of Vermont, completed as merger with Lake Champlain Management Plan.
B. Otsego Lake, SUNY Oneonta ($100,000 Federal, $50,000 Local). Project period from 7/22/91 to 6/30/97. A diagnostic/feasibility study examining nutrient inputs from the watershed and develop management plan to maintain current water quality.
C. *Upper Saranac Lake*, NYSDEC and the Upper Saranac Lake Association ($100,000 Federal, $136,000 State). Project period from 10/1/94 to 9/30/96. A diagnostic/feasibility study examining nutrient inputs and development of a management plan for Upper Saranac Lake and its watershed.

III. Completed Phase II Projects (Phase I project completed prior to implementation).

A. *Hyde Park Lake*, Niagara County ($894,667 Federal, $894,667 Local). Project completed in 1984. Restoration included dredging of accumulated sediment, excavating the inlet and outlet tributaries and providing for a source of clean make up water for dilution. The lake is in the only park in the City of Niagara Falls, and is used for boating, fishing and aesthetic enjoyment.

B. *Delaware Park Lake*, City of Buffalo ($3,741,500 Federal, $2,000,000 State, $1,741,500 Local). Project completed in 1985. Restoration included diversion of the incoming stream around the Lake, rerouting of storm sewers, and dredging to remove accumulated sediment. The Lake is in a major city park and is used for fishing, boating and aesthetic enjoyment.

C. *Lake Ronkonkoma*, Suffolk County ($335,572 Federal, $335,572 Local). Project completed in 1986. Project consisted of public land acquisition, and the development of a management plan for the lake and its watershed. Two experimental biofilters for treating stormwater were constructed and evaluated as part of the project.

D. *Iroquois Lake*, City of Schenectady ($290,747 Federal, $240,000 State, $50,747 Local). Project completed 1987. Restoration consisted of dredging for deepening and vegetation control, stormwater diversion and sealing of the bottom with clean fill. The Lake was restocked with fish and is used for boating, fishing, and aesthetic enjoyment.

E. *Irondequoit Bay*, Monroe County ($329,743 Federal, $165,000 State, $164,743 Local). Project period 6/1/85 to 12/21/89. Project consisted of alum addition for the control of phosphorus release from deep anoxic sediments. Monroe County also has developed a management plan for reducing urban and agricultural runoff impacts from the Lake's watershed.

F. *Belmont Lake*, NYSOPR&HP, Suffolk County ($290,000 Federal, $290,000 State). Project period 9/1/83 to 12/21/89. Restoration consists of removal of accumulated bottom sediment for control of the exotic plant fanwort (*Cabomba caroliniana*). The Lake is used extensively for boating, fishing, and aesthetic enjoyment.

G. *Saratoga Lake*, NYSDEC, Saratoga County ($339,241 Federal, $180,000 State, $159,241 Local). Project period 6/1/84 to 5/31/89. Project consists of water level control, agricultural runoff controls, aquatic vegetation harvesting, alum addition for nutrient inactivation, and formation of a lake management district. The Lake is an excellent warm water fishery with a severe infestation of Eurasian watermilfoil (*Myriophyllum spicatum*).

H. *Van Cortlandt Park Lake*, City of New York ($88,759 Federal, $88,759 Local). Project period 6/1/86 to 5/31/92. Restoration was to consist of dredging to increase water depth, stormwater diversion and the use of existing wetlands to filter stormwater runoff. No work done due to City unable to come up with match for project.

I. *Collins Lake*, Village of Scotia ($221,821 Federal, $110,000 State, $111,821 Local). Project period 4/1/85 to 3/31/95. Project to include hydraulic dredging to increase water depth by 1 meter to reduce growth of the exotic plant Curlyleaf pondweed (*Potamogeton crispus*). The Lake is used extensively for swimming, boating and fishing

J. *Greenwood Lake*, Greenwood Lake Watershed Management District, Inc. ($369,000 Federal, $240,000 State, $129,600 Local). Project period 6/26/89 to 9/30/95. Project to control aquatic vegetation and reduce nutrient loadings to the lake. Methods include drawdown, mechanical harvesting, stormwater management, development of a septic management district, fisheries survey, and a basin-wide sensitive lands management plan.

K. *Lake George*, NYSDEC ($367,390 Federal, $367,390 State/Local). Project period from 6/26/89 to 5/31/93. Project includes aquatic plant management, critical land acquisition, and monitoring. An increase in federal funds for this project is currently being requested.

IV. Ongoing Phase I Projects:

A. *Chautauqua Lake*, Chautauqua County Planning Dept. ($100,000 Federal, $50,000 Local). Project period from 7/22/91 to 4/30/97. A diagnostic/feasibility study examining nutrient inputs and develop management plan to reduce eutrophication in lake. Final report is in draft.

VI. Special Grants

A. Water Quality Assessment Grant, NYSDEC ($50,000 Federal, $21,429 State). Project period from 9/1/94 to 8/31/96. A grant to assist DEC in the administration of its Lake Water Quality Assessment Program.
B. Onondaga Lake Management Conference, NYSDEC ($1,750,000 Federal, $750,000 State). Project period from 6/26/89 to 9/30/94. A compilation of studies and review to determine what additional monitoring will be necessary and what strategies would succeed in the restoration of Onondaga Lake.
C. Lake Champlain Management Conference, NYSDEC ($2,000,000 Federal, $857,143 State). Project period from to 9/30/94. To convene a management conference to study and address the water quality concern in Lake Champlain. The project is also conducted with the State of Vermont.

D. TMDL-Mini Grant for In-Lake Sedimentation Study ($15,000 Federal). Project Period 10/1/93 to 9/30/94. A grant to conduct sedimentation chemistry and rate studies on several lakes of various trophic conditions
E. Nutrient Assessment Grants (two grants, total $125,000 Federal, $53,573 State). Project Period 7/1/98 to 9/30/00. A grant to assist DEC in the administration of its Nutrient Assessment Program.

Acidification of Lakes
The assessment of lakes and ponds for acidity in New York State is based upon a system to categorize waters as being in acceptable, threatened or impaired ("affected") condition as determined by midsummer acidity levels (Pfeiffer and Festa, 1980). The system relates the environmental requirements for survival of endemic fish populations and current acidification status. The categories of pH are

Impaired condition	pH $<$ 5.0 standard units
Threatened condition	pH $\geq$ 5.0 and $\leq$ 6.0 standard units
Acceptable condition	pH $>$ 6.0 standard units

In previous 305(b) reports, the presence of a viable fish population also was used to determine acidity status. Although not a direct measure of trophic state, this classification provides important information about the concurrent use impairment due to the severity of the acidification problem.

A total of 1,850 lakes and ponds representing 503,400 acres have been assessed for acidity in New York State (not including Lake Ontario). Most of the information for the current evaluation came from the Adirondack Lakes Survey Corporation field investigations of 1,469 ponded waters between 1984 and 1987. The ELS waters were not sampled during midsummer and are not included in the current assessment. The 1,376 waters included in the current assessment from the ALSC report represent about 50 percent of the total number of water bodies in the Adirondack Region.

The results of the current assessment for acidity status based upon midsummer air-equilibrated pH values are outlined on Table 22 (with the ALSC data summarized in parentheses).

Table 22

Assessment of Lake Acidification

	Impaired	Threatened	Acceptable
Air-Equilibrated pH	< 5.0	5.0 - 6.0	> 6.0
Number of Lakes/Ponds	365 (326)	289 (257)	1184 (793)
Percent of Total Assessed	20% (24%)	16% (19%)	64% (58%)
Total Number of Lake Acres	7,210 (4,155)	16,374 (8,030)	436,311 (36,255)

The 365 ponded waters impaired by acidity represents about 20 percent of the total number of lakes, but less than 2% of the total surface area included in the current acidity status assessment.

The specific sources of acidity in the acid deposition that affects Adirondack lakes and ponds are the millions of tons of sulfur dioxide and oxides of nitrogen that are emitted annually into the atmosphere. Deposition of sulfate and nitric acid takes place in both "wet" (precipitation) and "dry" (direct deposition to the ground surface) forms.

Ohio, Pennsylvania and West Virginia, immediately southwest of New York State, are major contributors of sulfur dioxide. In previous years these three states together contribute 21 percent of the sulfur deposition at the Whiteface receptor, 23 percent at the western Adirondack receptor, and 36 percent at the Catskill receptor. These three states, together with New York State, Ontario and Quebec at one time accounted for most of the sulfur dioxide emissions west of, and within, 1000 km of the Adirondacks, 68 percent of the deposition at Whiteface, 67 percent of the deposition in the western Adirondacks, and 68 percent of the deposition at the Catskill receptor. The remaining 30 percent of the deposition at these three receptors was contributed by several widely separated regions. New York State's contribution to total sulfur deposition at all receptors in New York State ranged from 14 percent to 31 percent.

The predominant contributors to oxides of nitrogen emissions are motor vehicles located in heavily urbanized areas. The largest non-New York contributors to the New York receptors are located immediately to the southwest of the State and include the western Pennsylvania, eastern Ohio, and West Virginia areas. This region contributes about 14 percent of the total emissions sources. The Canadian contribution to nitrate deposition at some receptors is considerably higher than that found for sulfate deposition, which reflects the influence of large Canadian metropolitan areas such as Montreal and Toronto. New York State's contributions to emissions in the general area at one time ranged from 2.6 percent at Muskoka, which is west of New York State, to 32 percent at Brookhaven on the eastern end of Long Island.

Based on ionic contributions and other evidence, acidification of waters in the Adirondacks has occurred primarily from the atmospheric deposition of sulfate. Higher concentrations of nitrate occur during events such as snowmelt and influence short-term changes in pH and ANC.

The NYSDEC began neutralizing certain acidic waters in 1959 as a management tool used to help restore or protect valuable fisheries. The neutralizing material used is agricultural limestone. The NYSDEC liming program has in recent years included 32 waters, all of which are located within the Adirondack Park. As another alternative to mitigate the harmful effects of high acidity, the Lake Acidification Mitigation Project (LAMP) conducted research on watershed liming to determine the effects of liming the entire ecosystem on the water chemistry, terrestrial vegetation and soil biota.

Assessment of Lake Water Quality Trends
The Lake Services Section feels that there is insufficient information to make any definitive assessment on the long term water quality trends of the lakes in New York State at this time. It is our intention to continue compiling historic and current water quality information so that some assessment can be performed for this and future 305(b) Report updates.

The Citizens Statewide Lake Assessment Program will continue to monitor individual lakes for at least five years. At the end of this time, the individual lake association can continue to monitor the lake at their own expense or be dropped from the program to include other lakes on the waiting list. A five year monitoring program will not provide the long-term data to provide a water quality trend. Approximately 5 CSLAP lakes have been sampled, at present, for ten years under this program. The original twenty-five participating lake associations (and all subsequently sampled lakes) were provided an opportunity to return to CSLAP beginning in 1996.

Data have been collected for a few lakes for over ten years, although they may not have had contiguous records. It is anticipated, as a primary goal of CSLAP, that lake residents can begin to collect long-term monitoring data on many of the less-publicized lakes in the state. The EMAP Program is likewise intended to support the collection of long-term baseline data to identify water quality trends. However, since this section of the report is dealing with water quality data collected primarily since 1982, the paucity of long-term data for the majority of state lakes precludes an adequate trend analysis. It is anticipated that future reports will include (verifiable) historical data, for estimating any trends in water quality.

In recent years, rudimentary statistical analyses have been conducted on individual CSLAP lakes. These analyses can be grouped to provide a summarized simple analys1s of water quality trends in these lakes (and by extension a subset of NYS lakes) since the mid-1980s.

There are more than 100 lakes that have been sampled in two or more of the 1970s, 1980s, and 1990s by one or more of the above described monitoring programs and/or ambient water quality monitoring conducted by the NYSDEC during the 1970s but not summarized in this report. However, since many of these programs collected information on a subset of NYS lakes that may not be representative of the entirety of water resources in the state, such as the mostly acidified lakes sampled in the ALSC project, the larger public access lakes sampled in the LCI, and the mostly larger populated lakes sampled through CSLAP, comparing results from one program to the next (and therefore from one “decade” to the next) may not provide great insights about the recent historical condition of NYS lakes.

Among the lakes sampled in two or more decades since the early 1970s, the trophic condition of these lakes are described in Table 23.

Review of the data in Table 23 shows that comparisons from one decade to the next are extremely difficult since only a small subset of lakes were sampled in the 1970s, 1980s, and 1990s. However, with the larger pool of lakes sampled from the 1970s to the 1990s and then from the 1980s to the 1990s, a tentative assessment of changing trophic status can be presented. This assessment is shown in Table 24.

It appears that there is a trend toward decreasing productivity (trophy) in the subset of commonly sampled lakes, although it is clear that the majority of these lakes did not change in trophic status over the twenty years of data collection. The discrepancy between chlorophyll *a* and the other indicators reflects both the relative

Table 23

Trophic Condition of Lakes in the 1970s, 1980s and 1990s

Trophic Status Based on:	Oligotrophic	Mesotrophic	Eutrophic	Total Lakes/Ponds
1970s Lake Assessment *				
Total Phosphorus	14	9	19	42
Secchi	9	20	13	42
Chlorophyll	13	9	12	34
1980s Lake Assessment **				
Total Phosphorus	40	58	33	131
Secchi	21	82	26	129
Chlorophyll	13	22	16	51
1990s Lake Assessment ***				
Total Phosphorus	86	45	34	165
Secchi	36	90	39	165
Chlorophyll	40	84	42	166

* CSLAP Lakes sampled in the 1970s, and also sampled in the 1990s (by CSLAP, the LCI, EMAP and/or the AEAP programs) and sometimes in the 1980s (by the LCI or ALSC programs).

** LCI and/or ALSC Lakes sampled in the 1980s, and also sampled in the 1990s (by CSLAP, LCI, EMAP, or AEAP).

*** CSLAP, AEAP, LCI and/or EMAP Lakes sampled in the 1990s, and also sampled in the 1980s (by LCI or ALSC) and/or the 1970s (by NYSDEC).

lack of chlorophyll *a* data from the 1980s (it was not collected through the ALSC project) and perhaps the greater consistency in the data collected in the 1990s (in which mean values may be unduly influenced by extremely high early and late summer readings). The large "drop" in trophy from the 1980s to the 1990s as assessed by total phosphorus concentrations may be due in part to questionable (overestimated) total phosphorus data from the ALSC (1980s) study. However, in comparing data from common lakes sampled in the LCI (1980s) and CSLAP and AEAP programs (1990s), where laboratory methodologies are consistent, 30% showed a decrease in trophic status (lower productivity), while only 3% showed an increase. Moreover, the decrease in trophy over the same period via water transparency data suggests that lower productivity is not solely a laboratory artifact. This change is not readily apparent from the chlorophyll *a* data, particularly in the 1970 to 1990 dataset, but this is not unexpected, since chlorophyll *a* is the least reliable of these trophic indicators.

Long-term trends can also be evaluated by looking at the summary findings of individual lakes from a consistent data set, such as CSLAP, and attempt to extrapolate consistent findings to the rest of the lakes. Given the non-Gaussian distribution of many of the water quality parameters evaluated in this report, non-parametric tools may be the most effective means for assessing the presence of a water quality trend. However, these tools do not indicate the magnitude of the trend. As such, a combination of parametric and non-parametric tools may need to be employed to evaluate trends.

Table 24 **Trophic Condition of Lakes: 1970s/80s vs 1980s/90s**			
Trophic Status Based on:	**Increasing Productivity**	**Decreasing Productivity**	**No Change in Productivity**
1970s/80s Lake Assessment			
Total Phosphorus	4	12	26
Secchi	7	13	22
Chlorophyll	5	2	27
1980s/90s Lake Assessment			
Total Phosphorus	10	43	79
Secchi	14	15	101
Chlorophyll	10	5	38

The Kendall tau ranking coefficient has been utilized by several researches and state water quality agencies to evaluate water quality trends via non-parametric analyses. Kendall tau ranking orders paired observations by one of the variables (say arranging water clarity readings by date). Starting with the left-hand (say earliest date) pair, the number of times that the variable not ordered (in this case clarity readings) is exceeded by the same variable in subsequent pairs is computed as P, and the number of times in which the unordered variable is not exceeded is computed as Q. This computation is completed for each ordered pair, with N= total number of pairs, and the sum of the differences $S = \Sigma$ P-Q. The Kendall tau rank correlation coefficient **t** is computed as:

$\tau = 2S/(N*(N-1))$

Values for τ range from –1 (complete negative correlation) to +1 (complete positive correlation). As above, strong correlations (or simply "significance") may be associated with values for τ greater than 0.5 (or less than –0.5), and moderate correlations may be associated with values for τ between 0.3 and 0.5 (or between –0.3 and –0.5), but the "significance" of this correlation must be further computed. Standard charts for computing the probabilities for testing the significance of S are provided in most statistics text books, and for values of N greater than 10, a standard normal deviate D can be computed by calculating the quotient

$D= S\sqrt{18} /\sqrt{[(N(N-1)(2N+5)]}$

and attributing the following significance:

$D > 3.29$ = 0.05% significance

$2.58 < D < 3.29$ = 0.5% significance

$1.96 < D < 2.58$ = 2.5% significance

$D < 1.96$ = > 2.5% significance

For the purpose of this exercise, 2.5% significance or less is necessary to assign validity (or, using the vernacular above, "significance") to the trend determined by the Kendall tau correlation. It should be noted again that this evaluation does not determine the magnitude of the trend, but only if a trend is likely to occur.

Parametric trends can be defined by standard best-fit linear regression lines, with the significance of these data customarily defined by the magnitude of the best fit regression coefficient ® or R^2). This can be conducted using raw or individual data points, or seasonal summaries (using some indicator of central tendency, such as mean or median). Since the former can be adversely influenced by seasonal variability and/or imprecision in the length and breadth of the sampling season during any given year, seasonal summaries may provide more realistic measures for long-term trend analyses. However, since the summaries may not adequately reflect variability within any given sampling season, it may be appropriate to compare deviations from seasonal means or medians with the "modeled" change in the mean/median resulting from the regression analyses.

When similar parametric and non-parametric tools are utilized to evaluate long-term trends in NYS lakes, a few assumptions must be adopted:

1. Using the non-parametric tools, trend "significance" (defined as no more than appx. 3% "likelihood" that a trend is calculated when none exists) can only be achieved with at least four years of averaged water quality data. When looking at all summer data points (as opposed to data averaging), a minimum of forty data points is required to achieve some confidence in data significance. This corresponds to at least five years of CSLAP data. The "lesson" in these assumptions is that data trends assigned to data sets collected over fewer than five years assume only marginal significance.

2. As noted above, summer data only are utilized (as in the previous analyses) to minimize seasonal effects and different sampling schedules around the fringes (primarily May and September) of the sampling season. This reduces the number of data points used to compile averages or whole data sets, but is considered necessary to best evaluate the CSLAP datasets.

As of 1999, there were 106 CSLAP lakes that have been sampled for more than four years, and 68 CSLAP lakes that were sampled for at least five years. The following table summarizes the "trend" indicated from the parametric and non-parametric analyses – the latter consists of both methods indicated in note 1) above, while the former consists of the best-fit analysis of summer (July and August) averages for each of the eutrophication indicators (with trends attributable to instances in which deviations in annual means exceed the deviations found in the calculation of any single annual mean). As alluded to earlier, this table includes only those lakes with at least four years of water quality data.

These data suggest that while most NYS lakes have not demonstrated a significant change, those lakes that have experienced some change show a trend toward less productive conditions. The lesser significance associated with the chlorophyll *a* readings is probably the result of higher sample-to-sample variability associated with this analysis. There does not appear to be any obvious shared characteristics among these lakes. Some are highly productive, others are quite unproductive, some have been actively managed, some have been sampled for only a few years or are small shallow lakes or are located in the western part of the state, while others are just the opposite. As noted above, there does not appear to be any clear pattern between weather and water quality changes. However, all of these lakes may be the long-term beneficiaries of the ban on phosphorus in detergents in the early 1970's, which with other local circumstances (perhaps locally more "favorable" weather, local management, etc.) has resulted in less productive conditions.

Table 25

Parametric/Non-Parametric Trends in Lake Water Quality

Water Quality Indicator	Percent of CSLAP Lakes Showing:			
	Parametric Trends	Non-Parametric Trends	Either Trend	Both Trends
Total Phosphorus				
Increasing	4 (4%)	5 (5%)	6 (6%)	2 (2%)
Decreasing	7 (6%)	12 (11%)	12 (11%)	6 (6%)
No Trend	95 (90%)	89 (84%)	88 (83%)	98 (92%)
Secchi Disk:				
Increasing	15 (14%)	10 (9%)	16 (15%)	9 (8%)
Decreasing	2 (2%)	6 (6%)	7 (6%)	1 (1%)
No Trend	89 (84%)	90 (85%)	83 (78%)	96 (91%)
Chlorophyll *a*:				
Increasing	2 (2%)	2 (2%)	4 (4%)	2 (2%)
Decreasing	14 (13%)	9 (8%)	18 (17%)	4 (4%)
No Trend	90 (85%)	95 (90%)	84 (79%)	100 (94%)

Groundwater Quality Assessment

Approximately six million people, or about one-third of New York State residents use groundwater as a source of drinking water. About half of these people live on Long Island and the remainder are in upstate New York. About half of the population of the Long Island counties of Nassau, Suffolk, Queens and the Borough of Brooklyn use groundwater. Within the counties of Nassau and Suffolk, nearly 100% of the population relies on groundwater. About one-third of the upstate population uses groundwater.

The NYS Department of Health (NYS DOH) has reported 312 wells or springs statewide have been contaminated to some degree by organic pollutants[14]. These water supply sources have a total capacity of 417 million gallons per day (MGD) and serve 93 public water systems. Of these, 121 wells on Long Island with a total capacity of 166 mg/d and 39 upstate wells with a total capacity of 34 mg/d remain closed or abandoned. These represent about three percent of the State's 5262 community water supply system wells (i.e. those serving cities, towns, apartments, and trailer parks). Other categories of wells regulated by NYS DOH are non-transient non-community, e.g., schools, offices, etc. (1,009 wells), and transient non-community, e.g., restaurants, motels, camps, etc. (7,307 wells). The number of public water supply wells in New York (community, non-transient non-community, and transient non-community) totals 13,578 (as of April 1998).

Contaminants from nonpoint sources threaten groundwater throughout New York State. Four specific categories of contaminants (microbial, synthetic organic chemical, nitrate and chloride, and naturally occurring contaminants) are discussed below.

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14 New York State Department of Health, Bureau of Public Water Supply Protection, “Community Water System Sources Affected by Organic Contamination,” interoffice memorandum, November, 1991.

Microbial Contamination

Viruses, bacteria (including *E. coli*) and protozoans such as *Giardia* and *Cryptosporidium* can enter groundwater aquifers from nonpoint sources. Subsurface human waste discharges such as septic tanks, leaks in wastewater collection (storm, sanitary and combined) sewers, and agricultural sources may introduce microbial contamination into drinking water. Another entry route may be via a poorly constructed well, whether from point or nonpoint sources. Other microbial contamination can enter water supplies from groundwater sources after the water leaves a treatment plant via infiltration into transmission mains and distribution pipelines. Microbial contaminants may pose the most immediate (acute) health risk.

Synthetic Organic Chemical Contamination

NYS DOH has reported synthetic organic chemical pollutants in less than five percent of wells and springs statewide. The three categories of synthetic organic contaminants detected most frequently in groundwater are:

> **Industrial/Commercial** chemicals include synthetic organic solvents (primarily 1,1,1-trichloroethane, trichloroethylene and tetrachloroethylene) which account for the majority of public water supply well closures attributed to organic chemical contamination. These materials are widely used in industry and commerce. They are heavier than water and sink to the bottom of aquifers, contaminating the soils of the aquifer as they travel. This makes subsequent removal difficult and expensive. Spills, leaks, and improper handling at industrial and commercial facilities are the primary sources of organic chemical contamination in groundwater. Other sources include SPDES effluent discharge permit violations, discharge related to cleaning and unclogging sewer lines and cesspools, disposal of consumer products (paint thinners, degreasing agents, etc.) via on-lot subsurface disposal systems, certain types of underground injection, and underground storage tanks.
>
> **Gasoline and Other Petroleum Products** which may also contain methyl-tertiary-butyl-ether (MTBE), benzene, toluene and xylene impact many private wells. Primary sources of this contamination include inland spills or leaking underground storage tanks. Many old tanks have no leak detection capability and leaks have occurred at many locations. With the implementation of the bulk storage program, leak detection is required so leaking tanks should be less of a problem in the future. However, many abandoned tank sites may be contaminated and, to date, have not yet been remediated.
>
> Sixty-five percent of reported private well contamination caused by organic chemicals in upstate New York is petroleum related (the large majority of contamination cases are microbial or inorganic chemicals). Statewide, there are approximately 110,000 active, registered petroleum storage tanks at facilities with a total capacity greater than 1,100 gallons. Over half of these tanks are buried in the ground where leaks may go undetected for long periods, unless tanks are protected from corrosion and a leak detection device or system is implemented. About 20,000 were installed after the 1985 Petroleum Bulk Storage regulations took effect. Groundwater clean-up operations are often marginally effective and are particularly difficult and expensive in sandy soils such as those encountered on Long Island, and in the valley fill materials in the Upstate area due to the rapid migration of contaminants prior to the discovery of a leak or spill.

Table 26

Major Sources of Groundwater Contamination

Contaminant Source	Priority Sources	Factors Considered	Contaminants
Agricultural Activities			
Various Agricultural Sources, including: chemical facilities, feedlots, drainage wells, fertilizer/pesticide applications,	Moderate	See Note* Below	See Table 27
Storage and Treatment Activities			
Land Application (regulated/permitted)	Low	See Note* Below	See Table 27
Material Stockpiles	Low		
Storage Tanks (above-ground)	Low		
Storage Tanks (underground)	High		
Surface Impoundments	Low		
Waste Piles	Low		
Waste Tailings	Low		
Disposal Activities			
Landfills (municipal, industrial, other)	High	See Note* Below	See Table 27
Septic Systems	High		
Shallow Injection Wells	Moderate		
Deep Injection Wells	Low		
Other Activities			
Hazardous Waste Generators	Low	See Note* Below	See Table 27
Hazardous Waste Sites (abandoned)	High		
Hazardous Waste Sites (regulated)	Low		
Large Industrial Facilities	Low		
Material Transfer Operations	Low		
Mining and Mine Drainage	Low		
Pipelines and Sewer Lines	Low		
Salt Storage and Road Salting	Moderate		
Salt Water Intrusion	Moderate		
Hazardous Waste Spills	High		
Transportation of Materials	Low		
Urban Runoff	Low		
Small-scale Manufacturing/Repair Shops	Low		

* Factors include human health/environmental risk, size of population, proximity to drinking water sources, number/size of sources, hydrogeologic sensitivity, documentation, geographic distribution/occurrence.

Additional groundwater quality problems arise when MTBE is released into the environment. MTBE is a fuel additive that has been used in gasoline since 1979 as an octane enhancer. MTBE travels through soil rapidly and is much more soluble in water than most other petroleum constituents. As a result, it can travel further than other gasoline constituents and impact more domestic water supplies with relatively high concentrations of MTBE. It is also very difficult and costly to remediate MTBE contamination due to its high water solubility and resistance to biodegradation.

Agricultural Pesticides (primarily aldicarb and carbofuran) have been detected in private wells in New York State, but pesticide contamination above Maximum Contaminant Levels (MCL's) in public water supply wells is still very rare. Aldicarb, an insecticide, was observed in groundwater on Long Island in 1979 and resulted in well closure or treatment system installation at 2,900 private wells. A well sampling survey of 330 wells adjacent to farms detected aldicarb at concentrations exceeding the NYS DOH recommended guidelines in 23 percent of the wells. Residents whose wells exceeded the guideline were advised not to use the water and were subsequently provided with activated carbon filtration systems at the expense of the aldicarb manufacturer. It should be noted that aldicarb is no longer registered for use on agricultural crops in New York State.

Nitrate and Chloride Contamination

These inorganics also threaten groundwater sources. Nitrates can originate from agricultural and domestic use of fertilizer, subsurface disposal of sewage, or other agricultural practices. Chloride contamination has been found upstate in some private wells. Uncovered piles of salt are the primary cause, although application to roads is also a source.

Naturally Occurring Contaminants

In some locations, naturally occurring substances can be the principal cause of drinking water quality problems. Site specific studies by the USGS have identified elevated levels of arsenic and barium, but how widespread these parameters are is unknown. Instances of high chlorides, hydrogen sulfide and methane gas have been identified in many areas of the state, particularly in areas of shale bedrock. The full extent of the problem is not seen in the number of public water supply wells closed due to this type of contamination, since many well sites would be abandoned in the exploration or development phase without ever becoming a public water supply source.

Groundwater Management and Protection

In New York State, the management and protection of groundwater resources is a responsibility shared by state agencies and local governments, as well as federal agencies. NYS DEC, in accordance with the Environmental Conservation Law, has the lead responsibility for groundwater resource management and protection. NYS DOH, which has lead responsibility for public water supply management and protection, retains legal authority to adopt watershed rules and regulations where site-specific controls are warranted. Roles and responsibilities of other agencies are generally indirect. For example, the Departments of State and Agriculture and Markets have key roles in management of nonpoint sources of pollution, and other agencies (e.g., Transportation) have responsibility for facilities/operations that may impact groundwater.

Local governments, including county health departments, town boards and municipalities, share some responsibilities through state delegation of programs, but have the lead responsibility for zoning, land use planning and the management of some key potential sources of groundwater pollution (e.g., septic tanks). Local governments also have initiated many wellhead protection programs for their water supplies.

Table 27

Groundwater Contaminants

Contaminant	Discussion
Microbial	Viruses, bacteria (including *E. coli*) and protozoans such as *Giardia* and *Cryptosporidium* can enter groundwater aquifers from various nonpoint sources including septic tanks, leaks in wastewater collection (storm, sanitary and combined) sewers, and agricultural sources. Microbial contaminants may pose the most immediate (acute) health risk.
Organic Chemicals	Organic chemical contamination is responsible for the closure of numerous Long Island and upstate wells. The organics most commonly found in water supply wells are the halogenated organic solvents trichloroethylene, tetrachloroethylene, and 1,1,1 trichloroethane.
Nitrate	High nitrate levels have been found in wells on both Long Island and at some upstate locations. Nitrate contamination is related to fertilizer use (both agricultural and domestic) and to on-site septic systems. Serious nitrate contamination is not widespread in New York, but may be a problem in some specific areas (e.g., Long Island).
Pesticides	Pesticide contamination of groundwater is extensive on eastern Long Island. Recent findings indicate that pesticides could also be a threat in upstate areas. Further investigations of the potential pesticide contamination of upstate groundwaters will be required.
Gasoline/Petroleum Products	Numerous instances have been recorded of localized well contamination by gasoline and petroleum product constituents as well as other hazardous material leaks or spills. In addition to the threat to public water supplies, petroleum product constituents are the most commonly reported type of organic contamination of private household-type wells.
Radon	Based on a NYS DOH study[15] of radon in public water supplies, it is estimated that as many as 2,000 community water system wells would require radon removal if the USEPA sets a maximum contaminant level (MCL) of 500 picocuries per liter for radon. It is also estimated that the number of affected wells would drop to 200 if the MCL is set at 2,000 picocuries per liter.

The DEC Division of Water provides for coordination of state programs to manage groundwater resources, and establishment of the basic groundwater protection goals and priorities for all relevant programs (e.g., solid and hazardous wastes, remediation, minerals, pesticides, etc.). To support the development and implementation of

15 K.E. Slade, Report of Statewide Surveillance for Radon in Selected Community Water Systems, New York State Department of Health, Bureau of Public Water Supply Protection, September, 1990.

specific management program elements, the Division of Water adopted the Upstate Groundwater Management Program (1987) and Long Island Groundwater Management Program (1986). These programs established five fundamental policies as the basis for New York's groundwater management program:

1. Protect and conserve groundwater for a best use as a drinking water supply,
2. Address quantity as well as quality concerns,
3. Emphasize problem prevention,
4. Target the groundwater program to most effectively use available resources by focusing special emphasis on critical, high yielding aquifer systems, and
5. Foster a state/local partnership.

The policies and specific program actions that have resulted from the Upstate and Long Island Groundwater Management Programs are consistent with the criteria outlined by the United States Environmental Protection Agency (USEPA) for Comprehensive State Groundwater Protection Programs (CSGWPP). The six strategic activities outlined by USEPA, and a very brief synopsis of New York's program elements pertaining to the USEPA criteria, are as follows:

- <u>Establish Groundwater Protection Goals</u>
  The groundwater protection goal in New York State is to preserve all fresh groundwaters (Class GA) for their designated best usage - as a potential source of potable water supply. Standards and guidance values have been adopted for this goal.
- <u>Identify Priorities that Support Protection Goals</u>
  Most state-level programs (e.g., bulk storage) are uniform across the state. The aquifer priority system (Primary and Principal) guides specific state program decision-making (e.g., solid waste). Wellhead protection areas (where adopted) guide local government actions.
- <u>Coordinate Program Management among Responsible Agencies</u>
  The Environmental Conservation Law (ECL) designates the NYS DEC as the lead state agency responsible for the "coordinated management of water resources" (ECL Section 3-0301), and the control of water pollution and maintenance of reasonable standards of purity for both ground and surface waters (ECL Article 17). The ECL and Public Health Law identify the specific authorities for regulation of sources of pollution and for protection of public water supplies. The Division of Water has the lead responsibility for program coordination.
- <u>Develop Information Systems to Support Groundwater Program</u>
  A key need in New York's groundwater management program is the further development of a comprehensive information base on the geographic distribution, potential productivity, use, and quality of New York's groundwater resources along with geographic information system (GIS) coverage of the distribution of potential sources of groundwater contamination. Information systems include groundwater resource mapping, well-log data, water quality data, and information on the distribution of regulated facilities and other potential contamination sources. Such a comprehensive and integrated information system–which NYS DEC is currently developing–will serve many program applications, including the State's Source Water Assessment Program, local government wellhead protection programs, and support for priority decisions for many state prevention and remediation programs.
- <u>Implement Groundwater Protection and Remediation Program</u>
  The groundwater protection program in New York is implemented through a combination of state-level actions (e.g., discharge permits, bulk storage controls, solid and hazardous waste controls, pesticide management, etc.) and local government actions (e.g., wellhead protection, septic tank controls, nonpoint

source management, etc.) along with supplementary federal program actions (e.g., underground injection control). Remediation programs address both hazardous substances and petroleum and are implemented under NYS DEC oversight, with some sites addressed by the Environmental Protection Agency.

! Support Public Participation Efforts

Public participation, outreach and education programs related to groundwater are activities shared by both state and local agencies. The New York State Water Management Advisory Committee provides for public input into the policies and program actions of the Division of Water. Other public participation is provided for through the State's Administrative Procedures Act. Other outreach partners include regional and county agencies, Cornell Cooperative Extension, Soil and Water Conservation Districts, and municipal governments.

Cooperation with US Geological Survey

The Division of Water has enhanced the groundwater component of the NYS DEC/USGS cooperative agreement to include an increased level of effort in identifying and evaluating the groundwater resources of New York State. The enhanced effort includes studies that will access groundwater quality in specific areas of the state. The cooperative agreement for the groundwater work currently includes quarterly meetings with the USGS to review progress and develop new studies. As an example, the geotechnical staff of the division will meet with the USGS to discuss the feasibility of using the water well driller reporting program to identify wells, and sample for groundwater quality in areas of the state. The areas will conform to those basins being evaluated for surface water quality conditions under the Rotating Intensive Basin Studies Program approach. Other areas where specific studies are underway include the Delaware River Basin, and the Susquehanna River Basin in the vicinity of Sidney-Colliersville and mapping in the Waverly area. As groundwater quality information is collected for these study areas, a database will be assembled indicating laboratory results.

NYS DOH Source Water Assessment Program (SWAP)

Amendments to the Safe Drinking Water Act passed by Congress in 1996 call for new investment in public water supply systems. Drinking water sources will be evaluated as one of the first steps of the Source Water Assessment Program. Planning for this effort was begun by NYS DOH in mid-1997. All steps of the process of planning the program and distributing benefits involve public participation. Groundwater and surface sources will be evaluated using available geographical information systems (GIS) and other information sources to determine whether they are or will be vulnerable to contamination.

Next Steps for Program Enhancement

The NYS DEC Division of Water is currently reviewing and revising its groundwater management policies. Outlined below are proposed initiatives aimed at enhancing division groundwater resource management efforts.

1. Improve the information base currently available.
   This is necessary in order to support an effective groundwater management program and involves updating and improving our current geographical information system (GIS) in order to serve as the basis for a comprehensive, integrated information system. One aspect of achieving this goal is requiring that programs which obtain permit and other information incorporate location data (latitude/longitude).
2. Seek funding to re-establish a cooperative mapping effort with the USGS.
   In the past, this effort led to high quality mapping of groundwater aquifers. The mapping of aquifers will be prioritized through the PAL.
3. Incorporate/enhance groundwater assessment activities into the 305(b) process.
   As per USEPA guidance, sources of data in the assessment of groundwater quality will include untreated

or finished water quality data from groundwater-based public water supply wells, and untreated or finished water quality data from private or unregulated wells. Additional sources of data are now also available from a recently implemented well drillers registration program. The program requires that NYS DEC be notified when and where wells are to be drilled, which allows Division staff to sample wells in key areas prior to the installation of any pumping equipment.

4. Improve integration of information systems.
   Integration among numerous NYS DEC programs must be improved. Specifically, locational data must be collected and verified, and information systems for unregulated or locally regulated facilities must be enhanced. All of this information must be made readily available via computer link to staff and the public.
5. Promote legislation to enhance groundwater program.
   Specifically, the division is pursuing legislation to enhance the water withdrawal regulatory program to include industrial, commercial, and agricultural water supply uses (already done in Long Island) in order to develop an adequate information base and to allow for assessments of impacts on other water supplies and on total water resources, both surface and groundwater. The recent passage of legislation and subsequent creation of a statewide well-driller registration program enhances the groundwater program by providing subsurface geology and new well construction information.
6. Create *Priority Aquifer List (PAL)*.
   Uses of a PAL to enhance groundwater program management will include 1) prioritization of existing *Primary* and *Principal* aquifers, aquifers identified by USGS and NYS DEC Division of Water as likely *Principal* aquifers, and other aquifers considered for potential detailed mapping efforts, and 2) tracking/management of groundwater problems and issues to be addressed by division programs and staff. Note: Contaminated groundwater sites which are the responsibility of other NYS DEC programs (e.g., spill sites, hazardous wastes sites, and solid waste sites) will not be included on the PAL since information regarding such sites are available through those other programs.
7. Maintain list of closed public supply wells.
   The NYS DOH will maintain an inventory of those public supply wells that have been closed due to contamination.
8. Continue state and local source water assessment and protection activities.
   These activities include completion of the NYS DOH Source Water Assessment Program effort by November, 2001, and encouragement of communities to develop local management and protection programs as a follow-up to the Source Water Assessments and PAL. NYS DEC support should include technical assistance to communities for the delineation of groundwater areas targeted for protection.

Groundwater Monitoring and Assessment

Groundwater sampling is problematic due to the expense associated with the installation of groundwater monitoring wells. With a limited budget, it is unlikely the Division of Water will be able to install wells and operate a dedicated groundwater monitoring well network. As per USEPA guidelines[16] states may choose to use several potential data sources in the assessment of groundwater quality. The division groundwater sampling program utilizes two of these sources: untreated or finished water from public supply wells, and untreated or finished water from private wells.

The most extensive source of groundwater quality data comes from untreated or finished water quality data

[16] Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305b Reports) and Electronic Updates, USEPA 841-B-97-002A, September 1997.

collected under the Safe Drinking Water Act from groundwater-based public water supply wells. In New York State this data is collected by local health departments and reported to the NYS Department of Health. Another allowable source of data utilized by the division is untreated or finished water quality data from private or unregulated wells. Samples are collected from as many of these type of wells as is possible.

Parameters of Concern

Samples collected under the NYS DOH public water supply program vary depending upon the circumstances of each well. Therefore, this source does not provide a consistent set of parameters for water quality assessment. A more recent NYS DEC groundwater sampling effort aimed at private or unregulated wells conducts analyses for the following parameters:

Purgeable halocarbons, USEPA method 601
Purgeable aromatics, USEPA method 602
Chloride
Nitrogen series (ammonia, TKN, nitrite, nitrate)
Metals (iron, manganese, copper, lead, nickel, zinc)
Hardness

Groundwater data collection efforts will follow the rotating drainage basin strategy established by the RIBS Sampling Program (see Part III, Chapter 1). This strategy enables staff to focus monitoring on a portion of the state for a period of time and then turn their attention to other parts of the state. Each year two or three major watersheds are targeted for monitoring and assessment activities. Over a period of five years, all of the watersheds within the state will have been monitored and the cycle will repeat. The schedule of watersheds to be monitored/assessed is given in Table 2, on page 43.

Groundwater Assessment Criteria

A number of environmental indicators (assessment criteria) have been proposed for the evaluation of groundwater resources. These indicators include:

! *Groundwater supply systems that are closed or are violating health-based requirements.*
  NYS DOH maintains reports of contamination observed in public water systems.
! *Source water protection plans.*
  Source water assessments will delineate boundaries of source water areas, inventory significant potential contamination sources, and assess the susceptibility of drinking water sources to contamination. The information will be summarized and maps of source areas will be made available to the public. Assessments will note those areas for which Source Water Protection Plans are pending or in place. In other areas, assessments may serve as a first step toward protection.
! *Selected parameters for the 305b GW monitoring program.*
  With appropriate funding levels, groundwater quality information will continue to be gathered and entered into a database (STORET). Parameters currently sampled as part of the groundwater 305(b) program are: purgeable halocarbons (USEPA method 601), purgeable aromatics (USEPA method 602), chloride, nitrogen series (ammonia, TKN, nitrite, nitrate), metals (iron, manganese, copper, lead, nickel, zinc), and hardness. Current sources of groundwater data collected for the 305(b) program include NYS DOH public water supply data and sampling conducted by the Division of Water at private wells.
! *Point source loading permit violations of UIC class V well injection limits.*
  In New York State, the Underground Injection Control (UIC) program is administered by USEPA. The

UIC program regulates both deep well injection (below the lowermost aquifer) and shallow injection (above the uppermost aquifer). Shallow injection wells are called Class V wells. NYSDEC, via the SPDES program, issues permits to some EPA regulated Class V wells. NYSDEC will continue to inspect SPDES groundwater facilities and will initiate appropriate enforcement for violations of SPDES permits.

! *Groundwater depletion.*
Groundwater levels are collected from a statewide observation well network and tracked for trends to determine drought severity or over pumping. The current observation well network is being maintained through the USGS/DEC Cooperative Program. DOW will continue to chair the New York State Drought Management Task Force.

The refinement and incorporation of these criteria into the evolving Division of Water groundwater monitoring and assessment program will result in future groundwater quality assessments that are complete and comprehensive. With these enhanced assessments the division will be better able to provide the more specific groundwater contaminant and aquifer monitoring data requested in the USEPA 305(b) guidance.

Wetlands Assessment

As stated in New York State freshwater and tidal wetlands laws (Articles 24 and 25 of the Environmental Conservation Law) it is the policy of the state to preserve, protect and conserve wetlands and the benefits derived therefrom, to prevent the despoliation and destruction of wetlands, and to regulate use and development to secure the natural benefits of wetlands, consistent with the general welfare and beneficial economic, social and agricultural development of the state. Protection of wetlands is a priority in the state.

Wetlands provide a suite of functions and benefits to the environment and the people of the state, including: flood and storm water control; erosion and sedimentation control; water quality maintenance; fish and wildlife habitat; recreation, open space, and educational opportunities (see Table 28).

Table 28 Functions and Values of Wetlands

Function	Value
Flood and Storm Water Control	During heavy rains and spring snow melt, wetlands serve as natural reservoirs for excess water, slowing the movement of water and reducing flooding.
Erosion/Sedimentation Control	By decreasing water velocity, wetland vegetation filters sediment and prevents suspended particles from entering navigational channels, lakes and reservoirs. Similarly, wetlands also reduce shoreline erosion by buffering adjacent lands from wave or stream current effects.
Pollution Treatment/Reduction	Microorganisms in wetlands break down and use nutrients, reducing loads to surface water. In fact, studies are underway to investigate the use of wetlands in tertiary wastewater treatment.
Recharging Groundwater	Wetlands sometimes are helpful in recharging groundwater. This function is especially important where groundwater is the sole-source drinking water or constitutes the major source of useable water.

Fish and Wildlife Habitat	Wetlands provide important habitats for many migratory and resident birds species and wildlife, including species identified as endangered, threatened or of special concern. Wetlands also provide spawning grounds for numerous fish species. Tidal wetlands, in particular, are critically important for marine species and the support of a significant commercial and recreational fishery.
Nutrient Cycling	Wetlands filtering and recycling of sediment and organic and chemical nutrients is an important link in the food web.
Recreational Opportunities	Wetlands provide numerous recreational uses including hunting, fishing, boating, hiking, bird watching, photography and camping. Countless New Yorkers (and out-of-state tourists) participate in these activities, generating millions of dollars annually.
Open Space	Wetlands are often the only undeveloped areas along crowded riverfronts and coastal regions, providing some protection against over-development.
Educational/Research Opportunities	Wetlands provide readily accessible outdoor biophysical laboratories, living classrooms and vast training and education resources.

Extent of Wetlands Resources

New York has an estimated 2.4 million acres of freshwater wetlands and 25,000 acres of tidal wetlands. They encompass less than nine percent of the land mass of New York. Wetlands types include marshes; hardwood, coniferous and shrub swamps; wet meadows; bogs; fens; and coastal marshes.

Four wetland inventories are available for New York State. Two are regulatory inventories prepared under state statutes. The tidal wetlands inventory shows tidal wetlands on Long Island, in New York City, and in certain counties along the southern reaches of the Hudson River. Tidal wetlands currently are being mapped in the Hudson River up to the Troy Dam. The freshwater wetlands inventory shows all freshwater wetlands protected under Article 24, which outside the Adirondack Park includes those wetlands greater than 12.4 acres in size, and certain smaller wetlands of unusual local importance. Inside the Park, wetlands are protected down to one acre, or smaller if they are connected to an open water body. In the mid 1970s, a biological wetland inventory was prepared of all wetlands down to approximately 6.5 acres in size, and it provides relevant biological data on wetlands in the state in the 1970s. The National Wetlands Inventory maps, produced by the U.S. Fish and Wildlife Service, are not yet complete for the state, but provide significant coverage at this time. Rare wetlands communities are mapped by the New York Natural Heritage program.

The U.S. Fish and Wildlife Service estimates that over half of New York's wetlands have been lost since colonization. Staff in the Bureau of Marine Resources are undertaking a status and trends study of tidal wetlands on the south shore of Long Island. Results are preliminary for both studies, but indicate that losses have slowed (but not stopped) from development (probably due to regulatory programs), and that some gains are occurring through sea level rise and reversion of abandoned agricultural land.

A status and trends report of freshwater wetlands was completed, showing that New York had a net gain of approximately 15,000 acres of wetlands between 1985 and 1995. The report compared mid-1980 and mid-1990 aerial photographs of a sample of sites in five ecological zones of the state. Gains, losses, and changes in covertype were identified, and the causes of those changes noted. Approximately 22,000 acres of wetlands were lost to causes primarily associated with development and agriculture. Approximately 37,000 acres of wetlands were gained, primarily from abandoned agricultural land reverting back to wetland, and from increased runoff flooding previously dry areas. The majority of gains were in the Lake Plains ecological zone. In the Appalachian highlands (southern tier), Adirondacks, and coastal plains (Long Island) gains and losses balanced each other. Net losses occurred in the Hudson valley.

While a net gain of acreage is good news for the state as a whole, it must be celebrated cautiously. There were still 11,000 acres of wetlands lost to development, resulting in a loss of wetlands benefits and wildlife habitat in urbanized areas. Gains were from abandoned agricultural land, resulting in gains in rural areas. Gains also occurred mostly in the lake plains, and net losses occurred in the Hudson Valley. Consequently we have seen a shift in where wetlands are located. Furthermore, most of the gains occurred from causes not attributable to wetlands conservation programs, but from changes in land use. When no more previously-drained farmland is abandoned, and reversion of wetlands declines, we may again see a net loss of wetlands in the state. A wetlands tracking system is in development to better account for gains and losses attributable to regulatory programs (short term system goals) and to other governmental programs (long term system goals).

Wetlands Protection Strategies

NYS DEC administers a broad array of regulatory and non-regulatory programs, undertaken in partnership with other federal, state and local governmental agencies and with the non-governmental sector, to preserve, protect and conserve wetlands. Through efforts such as restoration, acquisition, regulation, and management (outlined below), NYS DEC strives to achieve a no overall net loss of wetlands acreage and function, and net gain in wetlands where feasible and desirable.

<u>Planning</u>

Planning is the means for providing a vision and context for wetlands conservation. It is integral to effectively implementing any wetlands conservation program because it establishes the context for implementation, but planning is also an important tool by itself. There has been limited planning specifically for wetlands in the past, but it is increasing in use and interest in the state. The State Wetlands Conservation Plan was drafted to provide a broad context for wetlands conservation programs and activities in the state; regional and local planning is occurring also. In addition, plans developed for broader purposes–such as the State Open Space Conservation Plan or for specific watersheds–can also affect wetlands within the scope of that program plan. Planning can occur at any level of government or by the non-governmental sector but is often most effective when done locally or on a regional basis, and when it is integrated with other land use and resource planning efforts. DEC's freshwater wetlands inventory and the National Wetlands Inventory are now available through GIS, which increases the utility of the data in local planning efforts.

<u>Acquisition</u>

Acquisition is an important component of a long-term wetland conservation strategy, and New York has a rich history of purchasing wetlands. In the past, the wetlands acquisition program was funded by Environmental Quality Bond Acts, and through various federal funding sources. Recently, the wetlands acquisition program is coordinated through the State Open Space Conservation Plan. Acquisition, however, is expensive and other options are being sought, such as cooperative easements and agreements with landowners. There is also an increasing effort to coordinate acquisition efforts, pool resources, and emphasize a partnership approach.

<u>Regulation</u>

Regulation is often viewed as the primary wetlands conservation tool, and is often equated with government's overall wetlands conservation program, despite the full array of effective, positive efforts ongoing and available.

Wetlands regulation at the state level began in the 1970s with the adoption of the Tidal Wetlands Act (Article 25 of the Environmental Conservation Law) in 1973. Certain freshwater wetlands are protected under the 1975 Freshwater Wetlands Act (Article 24 of the ECL). Both statutes require mapping of jurisdictional wetlands. Outside of the Adirondack Park, Article 24 only protects wetlands over 12.4 acres (5 hectares) in size or smaller wetlands of unusual local importance. Inside the Park, wetlands are protected down to one acre, or smaller if there is an open water connection with a permanent water body. A 100 foot adjacent area is also protected as a buffer to the wetland. Wetlands are then regulated according to wise use, considering alternatives and lost benefits, and compensatory mitigation is sought to offset impacts allowed under permit. Permits are required to conduct regulated activities, such as draining, filling, polluting and dredging. Certain activities are exempt from regulation, including most normal agricultural activities (except filling). Wetlands also are regulated under Article 15, Protection of Waters Act, if they are adjacent to protected streams or state navigable waters. The vast majority of habitat protection efforts are funded by hunting and fishing license and excise tax fees, not through any EPA funding through the Division of Water.

Wetlands also are regulated under Section 404 of the federal Clean Water Act and Section 10 of the River and Harbors Act. Federal statutes have no size thresholds, and regulate any dredging, filling, or mechanized land clearing activities that impair the nation's waters, or if under Section10, any navigability of the nation's water.

Finally, local governments can regulate wetlands either pursuant to Article 24, or independently under Home Rule Authority. Three municipalities implement Article 24, and a few dozen have local ordinances affecting wetlands. In these areas, three permits may be required to conduct a regulated activity in certain wetlands.

<u>Restoration, Creation and Management</u>
These options include actual on-the-ground manipulation conducted to maintain, improve or bring back degraded or altered wetlands. There is a broad variety of restoration and management efforts underway in the state, most of which are well coordinated and done in partnership between agencies and other stakeholders. Until recently, most of the restoration and management was for fish and wildlife habitat, and was focused through the North American Waterfowl Management Plan and other similar efforts. As a result of the Unified Watershed Assessment efforts and more recently the Watershed Restoration Action Strategies, restoration for aquatic habitat, water quality, and broad ecosystem restoration is becoming increasingly of interest in the state.

<u>Incentive and Disincentives</u>
These options generally receive unanimous support from all sectors, yet it is a very infrequently used approach to wetlands conservation, most likely because it usually includes financial motivation. Disincentive programs are often linked to denying economic benefits if a wetland is negatively impacted. While not regulatory, it still is viewed as punitive by those affected. Incentive programs try to make wetland ownership profitable, or at least less costly (e.g. tax breaks for landowners). Sometimes technical assistance or recognition may be sufficient incentive for landowners to take positive steps for conservation.

<u>Research</u> - Knowledge about wetlands has increased exponentially in the past ten years, particularly for wetland functions such as water quality. Research on wetlands continues and interest by academic institutions appears to be increasing at a pace that exceeds available funding. Gathering data through inventories, mapping and monitoring is increasing, but gaps still remain. Use of Geographic Information Systems has drastically improved our ability to manage and track information about wetlands systems. All DEC's regulatory freshwater wetlands maps are available digitally, as are some of Adirondack Park Agency's (APA) maps. A limited number of the National Wetlands Inventory maps – primarily for the New York City watershed areas – are also digitized.

Education, Outreach and Technical Assistance - These programs provide the building blocks of sound conservation programs: information. They provide the delivery mechanism for information gathered through research, inventories and monitoring and provide information to decision makers to develop or modify programs. These programs deliver maps and inventory information to people who need it to make land purchases or to conduct site planning. Thus information is translated into reality, as when agency staff work with a landowner to restore a wetland on an abandoned farm field. Education, outreach and technical assistance are universally supported, but rarely adequately funded. The USEPA Region II Office has taken an interest in education and outreach in the state and has funded a number of initiatives and publications to improve the public's understanding of wetlands functions and programs to protect wetlands. DEC and other agencies have been partners to these programs. Education through schools and not-for profit groups has also increased in recent years.

Development of Wetland Water Quality Standards

Wetlands, as waters of the United States, receive full protection under the Clean Water Act, including water quality standards under Section 303 and monitoring under Section 305(b). In 1995, DEC received a grant from USEPA under Section 104(b)(3) to develop narrative wetland water quality standards. The standards were developed by NYS DEC Division of Fish, Wildlife, and Marine Resources (FW&MR), wherein the expertise and responsibility reside for wetlands protection and conservation. Table 29 summarizes the status of this initiative as of July 2000.

Procedurally, FW&MR staff met with numerous agencies and organizations to discuss the proposed wetland water quality standards. These agencies and organizations included the Governor's Office of Regulatory Reform, Department of State, Department of Transportation, Adirondack Park Agency, Department of Agriculture and Markets, and the New York Soil and Water Committee. Four meetings were held across the state with staff from county Soil and Water Conservation Districts and with county water quality committee members. Meetings also were held with representatives of conservation organizations, including: The Nature Conservancy, Sierra Club, National Audubon Society, New York Conservation Council, Conservation Fund Advisory Board, and the Adirondack Council. Similar meetings were held with organizations representing the regulated public, including: New York Business Council, Farm Bureau of New York, and the New York Builders' Association. Presentations on the wetland water quality standards were given at numerous Interagency Wetlands Meetings, the New York State Wetlands Forum, and the annual Business Council Meeting. Meetings were held in each of the nine regions with staff from the Divisions of Water; Legal Affairs; Environmental Permitting and FW&MR to discuss the initiative and to solicit feedback. However, adoption of the standards has halted for the interim, pending resolution of funding staff to implement the standards.

Further Integration of Wetlands Assessments

Development of wetland water quality standards is an important step in better integrating wetlands protection into other aspects of implementation of the Clean Water Act. According to USEPA guidance: "Development of wetland water quality standards provides a regulatory basis for a variety of water quality management activities including, but not limited to, monitoring and assessment under Section 305(b), permitting under Sections 402 and 404, water quality certification under Section 401, and control of nonpoint source pollution under Section 319."

Table 29

Wetlands Water Quality Standards Development

Description of Wetland Standard	Status of Wetland Standard:	
	Standard In Place	Standard Under Development
Designation of *Best Uses* of Wetlands		U see a. below
Development of Narrative Wetlands Water Quality Standards		U see b. below
Adoption of Antidegradation Policy for Wetlands	as policy only, not proposed for adoption in regulation at this time	
Development of Implementation Guidance for Wetlands Standards		U see c. below

NOTES:

a. *Designation of Best Uses*: The following best uses have been proposed as part of the draft wetland water quality standards: flood and stormwater control; erosion control; nutrient cycling and food chain support; fish, shellfish, wildlife, and hydrophytic plant propagation, survival and habitat; surface and groundwater exchange; and public enjoyment.

b. *Development of Narrative Standards*: Narrative standards have been drafted for inclusion in 6NYCRR Parts 703.2. In addition, existing numeric chemical standards developed for surface waters will remain in place for wetlands.

c. *Development of Implementation Guidance*: A number of guidance documents were developed and distributed to help NYS DEC staff implement wetland water quality standards when adopted, including; "Guidelines for Implementing Water Quality Standards," "Description of Wetlands Best Uses," "Water Quality Classification," and "Rapid Assessment of Wetland Functions and Values." NYS DEC also has prepared administrative documents, including a regulatory impact statement, necessary for promulgation of amended regulations.

Unfortunately, New York State, to date, has done little to integrate wetlands into existing surface water monitoring programs nor to develop efforts to monitor the biological, physical, and chemical integrity of wetlands.

Conversely, efforts to integrate wetlands conservation into watershed protection or basin-wide approaches has dramatically improved in the last year via the Watershed Restoration Action Strategies and in implementation of certain Section 319 projects, although wetlands are not consistently a component of Section 319 watershed efforts. Wetlands conservation is included as a component of a number of watershed plans, including those for Lake Champlain, the Hudson River ecosystem, and Long Island Sound.

Because no formal, coordinated monitoring of wetlands exists within NYS DEC, it is not possible to report on attainment of designated uses or to identify causes or stressors and sources of impairment at this time. The Priority Waterbodies List effort has been modified to include wetland and other natural resources in determining impairments and wetlands will be factored into future work. Both FW&MR and the Division of Water recognize the need to work together to integrate wetlands into all appropriate aspects of the NYS DEC overall program to protect the chemical, physical and biological integrity of New York State waters.

Public Health and Aquatic Life

Because of the significant impact they have on public health and/or aquatic life, certain water quality problems and issues are reasonably considered to be statewide concerns. These more sweeping categories of use impairment include:

- Drinking Water Restrictions
- Fish Consumption Advisories
- Shellfishing Restrictions
- Bathing Beach Closures
- Toxic Pollutants
- Contaminated Sediments
- Fish Kills

Specific sources and pollutants causing these use impairments will likely differ from one occurrence to the next. However, for water quality management purposes, it is useful and generally more effective to consider instances of these impairments together. These public health and aquatic life concerns as well as an evaluation of progress toward reducing their occurrence and/or impact are discussed below.

Drinking Water Restrictions

Although 160 groundwater wells serving public water supply systems have been closed because of toxic organics contamination (see *Groundwater Assessment*, page 77), toxic substances in surface waters used for public water supplies have not been implicated as a significant public health concern in New York State. In groundwater, toxic substances do not disperse as readily as they do in surface water. Additionally, groundwaters are not exposed to natural physical and chemical processes such as volatilization and photolysis which would reduce concentrations of toxics.

> For additional information regarding **Drinking Water Supply Issues**, please contact:
>
> NYS DOH, Bureau of Water Supply
> 547 River Street
> Troy, NY 12180
>
> or website:
>
> *www.health.state.ny.us/nysdoh/bpwsp/annual.h*

The substances most frequently associated with public water supply well closures have been organic industrial solvents. Petroleum products and agricultural pesticides have also been involved, but less frequently.

There is also a growing concern regarding microbial contamination of drinking water supplies. Viruses, bacteria, and protozoans (such as *Giardia* and *Cryptosporidium*) can enter water supplies from a variety of nonpoint sources. Recent cases of *E-coli* contamination have also raised concern regarding the contamination of surface and groundwater supplies. Microbial contaminants likely pose the most immediate (acute) health risk.

Overview of New York State's Public Drinking Water Program

The New York State Department of Health (NYS DOH) has regulatory responsibility for overseeing the Public Water Supply Program in New York State. This responsibility entails overseeing the delivery of public drinking water to ensure that it is suitable for people to drink. Regulatory oversight of these systems is carried out by a central office and 46 local health departments.

In New York, a public water system is defined as one that provides piped water to the public for people to drink. The system must also have at least five service connections or regularly serve an average of at least 25 people daily for at least 60 days a year. Public water systems are categorized as one of the following types of systems: community, nontransient noncommunity or noncommunity. Examples of community systems are towns, villages and cities. Nontransient noncommunity systems generally serve facilities such as schools and factories. Hotels, motels and restaurants are examples of noncommunity public water systems. There are 10,620 public water systems in New York.

Under the federal Safe Drinking Water Act and its amendments, national limits on the levels of contaminants in drinking water have been established to ensure the public drinking water is safe for people to drink. In New York State, drinking water standards are known as maximum contaminant levels, also called MCLs. For some regulations the water is treated to control unacceptable levels of contamination in the water, rather than applying a maximum contaminant level; these are called treatment techniques. A good example of this case is when the water has a great deal of turbidity; the water is treated rather than tested for a maximum contaminant level. Regulations have been developed regarding how often public water systems must monitor their water quality and report the results of those tests to the State. Generally, the larger the population served by a public water system, the more frequently the system must monitor and report results to the State. Water suppliers are required to notify the public when they have violated any of these regulations. In addition, the federal Safe Drinking Water Act requires some water systems to monitor for contaminants that are not regulated. This data will be used for future regulatory development.

Annual Report of Public Water Systems Violations

NYS DOH prepares annually a report on public water supply violations. The most recent currently available report is the 1998 Annual Report, issued in June 1999. The report tracks and summarizes four major categories of violation: maximum contaminant violations; treatment technique violations; variances and exemptions; and significant monitoring violations. Each of these four categories, and how the NYS DOH works with water suppliers to address violations and other issues, are explained in more detail below.

<u>Maximum Contaminant Levels</u> - The federal and state governments have set limits on the level of contaminants in drinking water. These limits, called maximum contaminant levels (MCLs), are established to ensure that the water is safe for people to drink. The Department reviews each system to ensure that no contaminants are above the prescribed limits.

<u>Treatment Technique Violations</u> - In some cases, techniques to treat the water have been established instead of a maximum contaminant level. Filtration of surface water sources, such as reservoirs, rivers and lakes is an example of water supply treatment technique. The Department reviews each system to assure that all required treatment technologies are properly designed, installed and operated.

<u>Variances and Exemptions</u> - Variances and exemptions to specific requirements may be granted if a public water system cannot meet a maximum contaminant level due to reasons beyond the system's control and there is no unreasonable risk that the water quality will be impacted. No variances have been issued in New York in 1998. The only exemptions in place are to systems in the process of complying with the requirements of the Surface Water Treatment Rule. Each of these exemptions includes a schedule to bring the system into full

compliance.

Significant Monitoring Violations - A public water system is required to periodically monitor its water quality to verify that the maximum contaminant levels are not being exceeded. If a public water supply fails to take the required tests and/or fails to report the results of the tests to the Department then a monitoring violation has occurred. There are two types of monitoring violations. A major violation is when no tests were taken and/or no test results were submitted to the Department. A minor violation is when some, but not all, of the required samples were collected and/or submitted. The Department, in cooperation with local health departments, reviews the results of this monitoring to ensure compliance with MCLs, as well as to assure that all required monitoring be conducted.

Results of 1998 Annual Report of Public Water System Violations.
Highlights of the 1998 Annual Report are outlined below.

Public Water Systems with a Failure to Filter
These systems are often out of compliance due to the Surface Water Treatment Rule that went into effect in 1993 and is a product of the 1986 Safe Drinking Water Act Amendments. The Rule requires that all sources of public water that come from surface waterbodies (e.g. lake, river, stream) and fall within certain criteria must filter the water before it is delivered to the public. For many systems, coming into compliance with the Surface Water Treatment Rule requires completion of a major long term project, such as construction of a water filtration plant. In the interim, systems must provide increased disinfection to assure the safety of their supply. In 1998, five systems came into compliance. Compliance schedules have been established for the remaining forty-eight systems.

Public Water Systems with Microbiological Maximum Contaminant Level (MCL) Violations
In 1998, there were a total of 61 systems that had monthly violations and 32 systems with acute (one-time) violations. Monthly violations are related to problems in routine water quality monitoring while acute (one time) violations are those associated with the identification of fecal coliform or E. coli, potentially harmful bacteria, in a water supply. These violations are usually dealt with quickly by disinfecting of the water system. Disinfection kills microorganisms. Public water systems with this type of violation need to be on a regular disinfection program.

Public Water Systems with MCL Violations - Excluding Microbiological Contamination
There were 17 public water systems that had maximum contaminant levels violations, excluding microbiological contamination. These violations were mainly chemicals in primarily small systems. The contamination is generally mitigated through treatment or by finding another water source.

Fish Consumption Advisories

The New York State Department of Health (NYS DOH) issues advisories on eating sportfish and game because some of these foods contain chemicals at levels which may be harmful to

For additional information regarding **Fish Consumption Advisories**, please contact:

NYS DEC, Bureau of Habitat
50 Wolf Road, Room 576
Albany, NY 12233

or website:
www.health.state.ny.us/nysdoh/environ/fish.htm

Table 30

Recent Changes to Fish Consumption Advisories

Waterbody (County)	New/Modified Recommendations	Chemical
Ashokan Reservoir (Ulster County)	NEW ADVISORY: Limiting consumption of smallmouth bass >16", and walleye	Mercury
Canadice Lake (Ontario County)	NEW ADVISORY: Limiting consumption of lake or brown trout	PCBs
Hoosic River (Rensselaer County)	NEW ADVISORY: Limiting consumption of brown trout >14"	PCBs
Hudson River	MODIFIED ADVISORY: restrictions added from Troy dam south to bridge at Catskill and Dobbs Ferry south to Greystone	PCBs
Onondaga Lake (Onondaga County)	NEW ADVISORY: Recommend eating no walleye; limiting consumption of all other species	Mercury
Beaver Lake (Lewis County)	NEW ADVISORY: Limiting consumption of chain pickerel	Mercury
Cannonsville Reservoir (Delaware County)	NEW ADVISORY: Limiting consumption of smallmouth bass >15"	Mercury
Chenango River	NEW ADVISORY: Limiting consumption of walleye >22"	Mercury
Susquehanna River	NEW ADVISORY: Limiting consumption of walleye >22"	Mercury
Lake Champlain	MODIFIED ADVISORY: Recommending eating no brown bullhead	PCBs
Unadilla River	NEW ADVISORY: Limiting consumption of walleye >22"	Mercury
Lake Capri (Nassau County)	NEW ADVISORY: Limiting consumption of American eel and carp	Cadmium, Chlordane
Schroon River (Warren/Essex County)	MODIFIED ADVISORY: Limiting consumption of yellow perch >13", smallmouth bass	PCBs, Mercury
Sauquoit Creek (Oneida County)	MODIFIED ADVISORY: Extent of advisory area decreased	PCBs
Pepacton Reservoir (Delaware County)	NEW ADVISORY: Limiting consumption of smallmouth bass >15"	Mercury

humans if consumed. These advisories are for sportfish and game taken by individuals and do not apply to fish and game sold commercially. The health advisories include advice concerning the consumption of fish taken from specific waters in New York State, as well as a general health advisory recommending eating no more than one meal per week of fish taken from state waters. This general advisory is intended to protect against eating large amounts of fish that have not been tested or that may contain unidentified contaminants. It should NOT be interpreted as an indication that all fish in the state have elevated contaminant levels. Rather, the general advisory merely reflects an inability to test all waters.

A brief outline of changes to fish consumption advisories for specific waters since the issuing of the previous (1998) 305(b) Report is presented in Table 30. A complete listing of fish consumption advisories is published as *NYS DOH Health Advisories: Chemicals in Sportfish and Game*, and included as Appendix F.

Shellfishing Restrictions

Bacteriological contamination from urban runoff and storm sewer and other discharges results in prohibitions against shellfishing in some of the marine waters around New York City and Long Island. Marine Resources staff from the NYS DEC Division of Fish Wildlife and Marine Resources (FW&MR) conduct the Shellfish Land Certification Program, the objective of which is to safeguard public health by determining those waters that are safe for shellfishing and close areas deemed unsafe. Certification is based on both actual bacteriological sampling results and evaluation of potential pollution sources along the shore.

> For additional information regarding **Shellfish Bed Closures and Restrictions**, please contact:
>
> NYS DEC, Shellfisheries
> 205 North Belle Meade Road, Suite 1
> East Setauket, NY 11733

FW&MR staff assess the quality of nearly 1,200,000 acres of marine waters for shellfishing purposes. About 84 percent, or some 1,000,000 acres, are currently certified (open) for direct market harvesting. Unfortunately, the 16 percent which are closed contain some of the State's most productive nearshore beds.

The amount of certified and uncertified acreage has remained relatively constant over the past 10 years with most changes reflecting adjustments to uncertified area boundaries. The number of conditional harvesting programs for resource recovery has increased threefold (from 3-4/year to 10/year) during this time.

The Shellfish Land Certification Program also evaluates uncertified (closed) areas for resource recovery programs such as Conditioned Harvesting Programs, which allow harvesting under specifically defined environmental conditions, and Transplant or Depuration Harvesting Programs, in which shellfish are removed from polluted areas for cleansing in certified areas (transplants) or in shoreside facilities (depuration).

Bathing Beach Closures

The New York State Department of Health (NYS DOH) and local/county health departments conduct regular beach bacteriological sampling programs and perform sanitary surveys at public bathing areas.[17] Based on the findings of these surveys, bathing use may be restricted, either permanently or temporarily. Localized closings may also occur due to contamination by spills, waterfowl, or stormwater runoff.

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[17] State and local health departments recommend against swimming at areas which are not regularly inspected as public bathing areas.

While such monitoring occurs across the state, monitoring of the marine waters of the New York City and Long Island metropolitan area is quite extensive. New York City, Westchester, Nassau and Suffolk Counties, and Connecticut and New Jersey all have programs in place to monitor water quality at public beaches. Typical of these programs is the New York City Department of Health (NYC DOH) effort. NYC DOH, which samples city beaches throughout the year, issues public advisories at the start of the bathing season evaluating and grading city beach front areas. Only beaches with a proven history of acceptable water quality are recommended for swimming. Additionally, bathing restrictions may be imposed during the season if periodic sampling indicates a confirmed total coliform count greater than 5,000 mpn/100 ml. The New York City Health Department also publishes a comprehensive annual report of water quality conditions found at these beaches.

For additional information regarding **Bathing Beach Closures and Monitoring**, please contact:

NYS DOH, Community Sanitation
and Food Protection
547 River Street
Troy, NY 12180

Toxic Pollutants

The incorporation of toxic pollutants into NYS DEC ambient water quality monitoring efforts began in the early 1980s. Analytic results for water column samples collected early in the program (1982-86) revealed heavy metals were detected more frequently than volatile halogenated organics (VHOs). Detection frequencies varied up to 80% for metals and up to 20% for VHOs, but were generally less than 50% and 15%, respectively. The frequencies at which standards or guidance values were exceeded were lower, generally around 15% or less for metals, and less than 2% for VHOs. (More recent data for heavy metals and VHOs show generally similar results.) The remaining priority pollutants (base/neutral and acid extractables and pesticides) were detected in less than five percent of the samples.

This pattern of detections was substantiated by information from the department's Industrial Chemical Survey on industrial chemical use in New York State. This survey indicated that of the twenty substances most widely used, six were heavy metals, ten were volatile halogenated organics, and only one was a base/neutral compound. (The other three were asbestos, cyanide, and phenols). As a result of these findings, the current Rotating Intensive Basin Studies (RIBS) monitoring program was designed to focus primarily on heavy metals and VHOs. Subsequent monitoring for the other hydrophobic priority organics focused on concentrations in sediment and aquatic macroinvertebrate and fish tissue.

For additional information regarding **Toxic Pollutant Issues**, please contact:

NYS DEC, Watershed Assessment
and Research
50 Wolf Road, Room 392
Albany, NY 12233-3502

More recent RIBS ambient surface water monitoring results show lead, iron, phenols, and copper to be the four most frequently cited *parameters of concern* at the stations where they were monitored.[18] Frequencies ranged from 40 to 80%.[19] The number of specific VHO

[18] J.A. Myers, R.L. Gabriel and R.M. Garry. The Biennial Rotating Intensive Basin Studies (RIBS) Report Series, 1987-94. NYS DEC Division of Water Technical Report. Albany, NY. Published in December 1990, May 1992, February 1994, January 1996, April 1996, June 1996, February 1997.

[19] Analytic reporting levels for lead may be too high – relative to the lead assessment criteria of between 1 and 3.5 ug/l – to permit an accurate assessment of its impact on the water quality. For instance, the number of samples which exceeded criteria

Segment Name	Segment ID	Segment Type	Segment Size	Class	Primary Use Affected	Severity	Dcmt.	Primary Pollutant	Primary Source
DRAINAGE BASIN: Lake Erie-Niagara River									
Barge Canal/Ton C	0102-0022	River	18.0 Miles	C	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Bergholtz Creek	0101-0004	River	0.5 Miles	C	Aquatic Life	Stressed	Poss	Priority Organics	Tox/Contam. Sediment
Black Creek	0101-0003	River	2.5 Miles	C	Aquatic Life	Stressed	Poss	Priority Organics	Tox/Contam. Sediment
Black Rock Canal	0101-0025	River	7.5 Miles	B	Aquatic Life	Stressed	Poss	Metals	Tox/Contam. Sediment
Buffalo River	0103-0001	River	8.0 Miles	C	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Cayuga Creek	0101-0001	River	1.5 Miles	C	Fish Consumption	Precluded	Known	Priority Organics	Tox/Contam. Sediment
Cayuga Creek	0101-0024	River	2.7 Miles	C	Fish Consumption	Precluded	Known	Priority Organics	Tox/Contam. Sediment
Gill Creek	0101-0002	River	2.5 Miles	C	Fish Consumption	Precluded	Known	Priority Organics	Tox/Contam. Sediment
Niagara River	0101-0006	River	38.0 Miles	A(S)	Fish Consumption	Impaired	Known	Priority Organics	Landfill/Land Disp.
DRAINAGE BASIN: Allegheny River									
Chadakoin River	0202-0018	River	10.0 Miles	C	Aquatic Life	Stressed	Susp	Metals	Unknown Source
Olean Creek	0201-0017	River	7.5 Miles	A	Water Supply	Stressed	Susp	Priority Organics	Resource Extraction
DRAINAGE BASIN: Lake Ontario									
Eighteenmile Ck	0301-0002	River	14.7 Miles	B,C,D	Fish Consumption	Precluded	Known	Priority Organics	Tox/Contam. Sediment
Four Mile Creek	0302-0006	River	5.5 Miles	C	Aquatic Life	Stressed	Poss	Unknown Toxicity	Landfill/Land Disp.
Lake Ontario	0300-0001	G.Lakes	373.9 ShrMi	A(S)	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Mill Creek	0302-0025	River	6.0 Miles	C	Aquatic Life	Stressed	Poss	Priority Organics	Landfill/Land Disp.
Salmon River	0303-0016	River	2.0 Miles	C(T)	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Sandy Creek	0301-0006	River	17.0 Miles	C	Aesthetics	Stressed	Poss	Unknown Toxicity	Landfill/Land Disp.
Wine Creek	0303-0001	River	1.0 Miles	C	Aquatic Life	Stressed	Poss	Unknown Toxicity	Landfill/Land Disp.
DRAINAGE BASIN: Genesee River									
Canadice Lake	0402-0002	Lake(R)	672.0 Acres	AA	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Genesee River	0402-0026	River	0.1 Miles	B	Aquatic Life	Stressed	Poss	Unknown Toxicity	Landfill/Land Disp.
DRAINAGE BASIN: Chemung River									
Canacadea Creek	0503-0008	River	2.0 Miles	C	Aquatic Life	Impaired	Susp	Unknown Toxicity	Unknown Source
Canisteo River	0503-0001	River	6.0 Miles	C	Aquatic Life	Stressed	Poss	Unknown Toxicity	Other Source

dropped from 65 percent to 28 percent when the minimum reporting level was lowered from 1.0 ug/l to 0.5 ug/l. Typically, minimum reporting levels should be an order of magnitude less than the criteria to produce reasonable confidence in the result.

TABLE 31 **Waterbody Inventory/Priority Waterbodies List (WI/PWL)** **Segments Affected by Toxic Pollutants**

Segment Name	Segment ID	Segment Type	Segment Size	Class	Primary Use Affected	Severity	Dcmt.	Primary Pollutant	Primary Source
Koppers Pond	0501-0012	Lake	15.0 Acres	C	Fish Consumption	Impaired	Known	Priority Organics	Landfill/Land Disp.
DRAINAGE BASIN: Susquehanna River									
Brooks Creek and tribs	0602-0001	River	0.0 Miles	C	Aquatic Life	Stressed	Poss	Metals	Landfill/Land Disp.
Ocquionis Creek	0601-0034	River	0.5 Miles	C(T)	Aquatic Life	Stressed	Poss	Unknown Toxicity	Municipal
Susquehanna River	0601-0020	River	6.0 Miles	B	Aquatic Life	Stressed	Susp	Unknown Toxicity	Other Source
DRAINAGE BASIN: Oswego-Seneca-Oneida River (Finger Lakes)									
Black Brook	0704-0007	River	6.0 Miles	C	Aesthetics	Stressed	Susp	Unknown Toxicity	Landfill/Land Disp.
Bolter Creek Trib	0705-0039	River	0.5 Miles	C	Aquatic Life	Stressed	Poss	Metals	Landfill/Land Disp.
Canada Creek	0703-0010	River	2.0 Miles	C(T)	Aquatic Life	Stressed	Poss	Priority Organics	Landfill/Land Disp.
Canandaigua Lake	0704-0001	Lake	10730.0 Acres	AA(T)	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Crusoe Creek	0705-0028	River	0.5 Miles	C<D	Water Supply	Stressed	Poss	Pesticides	Agriculture
Flint Creek	0704-0006	River	5.0 Miles	A	Water Supply	Stressed	Poss	Pesticides	Agriculture
Ganargua Creek	0704-0013	River	12.0 Miles	C,D	Aquatic Life	Stressed	Poss	Pesticides	Agriculture
Ganargua Creek	0704-0026	River	6.6 Miles	C	Aquatic Life	Stressed	Poss	Pesticides	Agriculture
Geddes Brook	0702-0007	River	0.5 Miles	D	Aquatic Life	Impaired	Susp	Metals	Industrial
Hector Falls Ck	0705-0007	River	2.0 Miles	C(T)	Aquatic Life	Stressed	Poss	Unknown Toxicity	Landfill/Land Disp.
Keuka Lake	0705-0003	Lake	11849.0 Acres	AA(TS)	Fish Consumption	Impaired	Known	Pesticides	Tox/Contam. Sediment
Marbletown Creek	0704-0003	River	0.5 Miles	C	Aquatic Life	Precluded	Known	Pesticides	Agriculture
Oswego River	0701-0006	River	11.4 Miles	B	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Skaneateles Creek	0707-0003	River	14.0 Miles	C(T)	Fish Consumption	Impaired	Known	Priority Organics	Unknown Source
DRAINAGE BASIN: Black River									
Big Moose Lake	0801-0035	Lake	1286.0 Acres	A(T)	Fish Consumption	Impaired	Known	Metals	Unknown Source
Black River	0801-0190	River	31.0 Miles	C	Fish Consumption	Stressed	Susp	Priority Organics	Unknown Source
Fourth Lake	0801-0098	Lake	2137.0 Acres	A	Fish Consumption	Impaired	Known	Pesticides	Unknown Source
Francis Lake	0801-0192	Lake	136.0 Acres	C(T)	Fish Consumption	Impaired	Known	Metals	Unknown Source
Halfmoon Lake	0801-0193	Lake	17.0 Acres	C	Fish Consumption	Impaired	Known	Metals	Unknown Source
Kelsey Creek	0801-0191	River	1.0 Miles	C	Aquatic Life	Impaired	Known	Priority Organics	Industrial
Moshier Reservoir	0801-0194	Lake(R)	284.0 Acres	C(T)	Fish Consumption	Impaired	Known	Metals	Unknown Source
Stillwater Reservoir	0801-0184	Lake(R)	6195.0 Acres	C(T)	Fish Consumption	Impaired	Known	Metals	Atmosph. Deposition
Sunday Lake	0801-0195	Lake	19.0 Acres	C(T)	Fish Consumption	Impaired	Known	Metals	Unknown Source
DRAINAGE BASIN: Saint Lawrence River									
Carry Falls Reservoir	0903-0055	Lake(R)	5753.0 Acres	B	Fish Consumption	Impaired	Known	Metals	Unknown Source
Cranberry Lake	0905-0007	Lake	6976.0 Acres	A(T)	Fish Consumption	Impaired	Known	Metals	Unknown Source
Grass River	0904-0009	River	6.0 Miles	B	Fish Consumption	Precluded	Known	Priority Organics	Tox/Contam. Sediment

Segment Name	Segment ID	Segment Type	Segment Size	Class	Primary Use Affected	Severity	Dcmt.	Primary Pollutant	Primary Source
Indian Lake	0906-0003	Lake	172.0 Acres	C	Fish Consumption	Impaired	Known	Metals	Unknown Source
Long Pond	0905-0058	Lake	154.0 Acres	C(T)	Fish Consumption	Impaired	Known	Metals	Unknown Source
Massena Power Canal	0904-0012	River	2.5 Miles	D	Fish Consumption	Impaired	Known	Priority Organics	Industrial
Meacham Lake	0902-0039	Lake	1203.0 Acres	FP	Fish Consumption	Impaired	Known	Metals	Unknown Source
St.Lawrence River	0901-0001	River	102.0 Miles	A	Fish Consumption	Impaired	Known	PriorityOrganics	Tox/Contam. Sediment
St.Lawrence River	0901-0002	River	7.0 Miles	A	Fish Consumption	Impaired	Known	Priority Organics	Industrial
Turnpike Creek	0905-0100	River	3.0 Miles	C	Aquatic Life	Threatend	Known	Metals	Resource Extraction
DRAINAGE BASIN: Lake Champlain									
Lake Champlain	1000-0001	Lake	96640.0 Acres	A	Fish Consumption	Impaired	Known	Priority Organics	Unknown Source
Little Chazy River	1002-0003	River	5.0 Miles	C	Aquatic Life	Impaired	Susp	Unknown Toxicity	Agriculture
DRAINAGE BASIN: Upper Hudson River									
Clover Mill Brook	1101-0004	River	1.5 Miles	C(T)	Aquatic Life	Precluded	Known	Unknown Toxicity	Landfill/Land Disp.
Hoosic River	1102-0002	River	17.0 Miles	C	Fish Consumption	Impaired	Known	Priority Organics	Unknown Source
Hudson River	1101-0002	River	40.1 Miles	C	Fish Consumption	Precluded	Known	Priority Organics	Tox/Contam. Sediment
Hudson River	1101-0027	River	0.1 Miles	C	Aquatic Life	Stressed	Poss	Unknown Toxicity	Landfill/Land Disp.
Hudson River	1101-0040	River	4.0 Miles	A	Fish Consumption	Precluded	Known	Priority Organics	Landfill/Land Disp.
Hudson River	1101-0041	River	6.0 Miles	B	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Johnsonville Res.	1102-0003	Lake(R)	269.0 Acres	B	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Round Pond	1104-0073	Lake	224.0 Acres	FP	Fish Consumption	Impaired	Known	Metals	Atmosph. Deposition
Schroon Lake	1104-0002	Lake	4128.0 Acres	AA	Fish Consumption	Impaired	Known	Priority Organics	Unknown Source
Walloomsac River	1102-0001	River	7.0 Miles	C(T)	Aquatic Life	Impaired	Susp	Metals	Tox/Contam. Sediment
DRAINAGE BASIN: Mohawk River									
Mathew Creek	1201-0018	River	0.1 Miles	C(T)	Aquatic Life	Impaired	Susp	Unknown Toxicity	Unknown Source
Mohawk River	1201-0006	River	29.5 Miles	C	Aesthetics	Stressed	Susp	Priority Organics	Industrial
Mohawk River	1201-0010	River	29.0 Miles	B	Fish Consumption	Impaired	Known	Priority Organics	Unknown Source
Mohawk River	1201-0042	River	13.0 Miles	A	Water Supply	Stressed	Known	Nonpriority Org	Deicing (stor/appl)
Mohawk River	1201-0073	River	8.3 Miles	A	Water Supply	Stressed	Poss	Unknown Toxicity	Urban Runoff
Mud Creek	1201-0062	River	2.0 Miles	C	Aquatic Life	Stressed	Susp	Priority Organics	Chemical Leak/Spill
Poentic Kill	1201-0005	River	1.5 Miles	B	Aquatic Life	Impaired	Susp	Priority Organics	Landfill/Land Disp.
Sauquoit Creek	1201-0069	River	12.0 Miles	C(T)	Aquatic Life	Stressed	Known	Priority Organics	Chemical Leak/Spill
Three Mile Creek	1201-0025	River	3.0 Miles	C	Fish Consumption	Impaired	Known	Priority Organics	Unknown Source

Segment Name	Segment ID	Segment Type	Segment Size	Class	Primary Use Affected	Severity	Dcmt.	Primary Pollutant	Primary Source
DRAINAGE BASIN: Lower Hudson River									
East Branch Croton River	1302-0055	River	2.5 Miles	AA(T)	Water Supply	Threatend	Known	Priority Organics	Landfill/Land Disp.
Hudson River (Class A)	1301-0001	River	26720.0 Acres	A	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Hudson River (Class B)	1301-0003	Estuary	9080.0 Acres	B	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Hudson River (Class C)	1301-0002	Estuary	3620.0 Acres	C	Fish Consumption	Precluded	Known	Priority Organics	Tox/Contam. Sediment
Hudson River (Class I)	1301-0006	Estuary	3330.0 Acres	I	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Hudson River (Class SB)	1301-0005	Estuary	790.0 Acres	SB	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Hudson River (Class SB)	1301-0094	Estuary	30180.0 Acres	SB	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Kinderhook Lake	1310-0002	Lake	345.7 Acres	B	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment

Segment Name	Segment ID	Segment Type	Segment Size	Class	Primary Use Affected	Severity	Dcmt.	Primary Pollutant	Primary Source
DRAINAGE BASIN: Lower Hudson River (con't)									
Kromma Kill	1301-0027	River	4.0 Miles	D>C	Aquatic Life	Impaired	Known	Unknown Toxicity	Industrial
Krumkill Creek	1311-0004	River	4.0 Miles	C(T)	Aquatic Life	Impaired	Known	Unknown Toxicity	Comb. Sewer Overflow
Nassau Lake	1310-0001	Lake	172.7 Acres	B	Fish Consumption	Precluded	Known	Priority Organics	Landfill/Land Disp.
Quassaic Creek	1301-0079	River	6.0 Miles	D	Aquatic Life	Impaired	Known	Unknown Toxicity	Urban Runoff
Rondout Reservoir	1306-0003	Lake(R)	2099.1 Acres	AA	Fish Consumption	Impaired	Known	Metals	Atmosph. Deposition
Valatie Kill	1310-0003	River	10.0 Miles	C(T)	Fish Consumption	Precluded	Known	Priority Organics	Landfill/Land Disp.
Wallkill River, Lower	1306-0027	River	50.0 Miles	B	Fish Consumption	Stressed	Susp	Pesticides	Agriculture
DRAINAGE BASIN: Delaware River									
Cadosia Creek	1403-0003	River	1.0 Miles	C(TS)	Aesthetics	Stressed	Poss	Unknown Toxicity	Landfill/Land Disp.
Delaware River	1401-0019	River	1.3 Miles	A	Water Supply	Threatend	Susp.	Priority Organics	Landfill/Land Disp.
DRAINAGE BASIN: Atlantic Ocean/Long Island Sound									
Belmont Lake	1701-0021	Lake	26.0 Acres	C	Fish Consumption	Impaired	Known	Pesticides	Urban Runoff
Grant Park Pond	1701-0054	Lake	6.0 Acres	C	Fish Consumption	Impaired	Known	Priority Organics	Urban Runoff
Halls Pond	1701-0027	Lake	2.0 Acres	C	Fish Consumption	Impaired	Known	Priority Organics	Urban Runoff
Lake Capri	1701-0175	Lake	6.5 Acres	C	Fish Consumption	Impaired	Known	Metals	Landfill/Land Disp.
Lofts Pond	1701-0029	Lake	4.0 Acres	C	Fish Consumption	Impaired	Known	Priority Organics	Urban Runoff
Massapequa Reserv	1701-0157	Lake(R)	20.0 Acres	A	Fish Consumption	Impaired	Known	Priority Organics	Urban Runoff
Ridders Pond	1701-0176	Lake	1.0 Acres	C	Fish Consumption	Impaired	Known	Pesticides	Urban Runoff
Santapogue Creek	1701-0016	River	2.0 Miles	C(T)	Aquatic Life	Impaired	Susp	Unknown Toxicity	Unknown Source
Sheldrake River	1702-0069	River	2.0 Miles	C	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Smith Pd (rsevlt)	1701-0136	Lake	6.0 Acres	C	Fish Consumption	Impaired	Known	Priority Organics	Urban Runoff
Spring Lake	1701-0022	Lake	2.0 Acres	B	Fish Consumption	Impaired	Known	Pesticides	Urban Runoff
St James Pond	1702-0049	Lake	0.2 Acres	C	Fish Consumption	Impaired	Known	Pesticides	Urban Runoff
Upper Ny Bay	1702-0095	Estuary	6740.0 Acres	I	Aesthetics	Stressed	Susp	Priority Organics	Tox/Contam. Sediment
Wantagh Pond	1701-0159	Lake	44.0 Acres	A	Aquatic Life	Stressed	Poss	Priority Organics	Urban Runoff
Whitney Lake	1702-0101	Lake	6.0 Acres	C	Fish Consumption	Impaired	Known	Pesticides	Urban Runoff

compounds monitored in the water column has been reduced from 27 to the eight which have been most frequently detected in the past. Further, monitoring of VHOs is currently limited to the larger rivers sampled in the (RIBS) *Routine Network* and not at the sites on smaller tributaries where VHOs are rarely detected.

Though not as common as conventional or non-toxic pollutants, toxics are a significant source of water use impairment in parts of the state. Toxic pollutants such as priority organics (PCBs, dioxin, etc.), trace metals, pesticides, chlorine and ammonia affect 550 river miles, over 150,000 lake acres, about 125 square miles of estuary waters, and nearly 375 miles of Great Lakes shoreline (Lake Ontario). To limit water use restrictions due to toxics, the NYS DEC Division of Water has adopted numeric water quality standards or guidance values for over 400 substances.[20]

A significant percentage of the toxic pollutants restricting water uses in the state are PCBs and other priority organics contained in contaminated sediment. As a percentage of waterbody area listed on the WI/PWL as being affected by toxic pollutants, contaminated sediments account for about 37% of river miles, 16% of lake acres, and virtually all estuary waters and Great Lakes shoreline impairment. (The contaminated sediment issue is discussed in greater detail later in the next section of the report.) Other significant sources of toxic pollutants include urban runoff, land disposal and agricultural activities. A number of waterbody segments affected by toxics are listed as having unknown sources.

The most frequently cited use that is limited due to toxic pollutants is fish consumption. These are most often associated with fish and other aquatic animal health advisories. The specific contaminants resulting in advisories (listed in decreasing order of frequency) are: PCB, chlordane, mercury, mirex, DDT, dioxin, cadmium, lead, dieldrin, and heptachlor epoxide.

A listing of specific waterbodies affected by toxic pollutants appears as Table 31.

Contaminated Sediments

As stated previously, a significant percentage of the toxic pollutants cited in the WI/PWL as restricting water uses in the state are PCBs and other priority organics contained in contaminated sediment. And a large portion of this impairment occurs in two important waters: the Hudson River and Lake Ontario.

Once toxics enter the sediments they are difficult and expensive to remove. A project to dredge PCB "hot spots" in the upper Hudson River has been proposed, but it will be costly, and it has not been implemented yet due to administrative delays and public controversy concerning the siting of the disposal area. Dredging is not practical for large areas of contamination such as Lake Ontario. Yet, unless addressed, contaminants in sediments are a continuing problem because they bioaccumulate in fish and other aquatic animals at levels which can cause reproductive impairment or other harmful effects and can also cause their flesh to be unsuitable for human or animal consumption.

For additional information regarding **Contaminated Sediment Issues**, please contact:

NYS DEC, Sediment Assessment
and Management
50 Wolf Road, Room 392
Albany, NY 12233-3502

[20] *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*. NYS DEC Division of Water Technical Operation and Guidance Series (TOGS) 1.1.1. June 1998.

In 1991, NYS DEC Division of Water established the Sediment Assessment and Management Section in response to contaminant sediment issues in the Great Lakes. Since then the activities of the section have expanded to encompass contaminated sediment issues throughout the state. However, the primary focus of the program is on the New York-New Jersey Harbor, the New York City Watershed, the Hudson River Estuary and the Great Lakes. The majority of Sediment Assessment and Management Section activities involve:

> For additional information regarding **Fish Kill Issues**, please contact:
>
> NYS DEC, Bureau of Habitat
> Hale Creek Field Station
> 182 Steele Avenue Ext.
> Gloversville, NY 12078

- the collection and chemical and biological (toxicity, bioaccumulation, benthic community structure) evaluation of surficial sediment samples, and
- collection and evaluation (including radio-dating) of sediment cores to determine deposition rates, recent/active contamination sources, and contaminant trends.

Fish Kills

Data concerning the occurrence of pollution-caused fish kills in New York State are collected and compiled by the NYS DEC Division of Fish Wildlife and Marine Resources (FW&MR). Chemical/pollutant spills, discharges, and nonpoint source runoff loads are some of the causes of fish kills. The most common pollutants include agricultural wastes (manure), ammonia or chlorine discharges from wastewater treatment plants, and oil/fuel spills. The most frequently cited sources are outlined in Table 20. These include industrial sources (including schools and state facilities), municipal discharges, and agricultural activities. Sources of a significant percentage of fish kills go unidentified and are attributed to unknown sources.

Table 32 Suspected Sources of Fish Kills
(For the period 1984-1998)

Suspected Source	Number of Fish Kills	Percent of Fish Kills
Business/Industry [a]	73	24
Municipal Discharges [b]	73	24
Unknown Sources	53	17
Agricultural Activities [c]	51	17
Transportation	21	7
Aquatic Pest Control [d]	17	6
Fire Related	8	3
Household	6	2
Construction	3	1
Landfills	2	< 1
TOTALS	**307**	**100 [e]**

[a] includes schools and state facilities
[b] includes WWTPs, storm sewers, water treatment, swimming pools, etc.
[c] includes fertilizer and pesticides
[d] includes weed and fish control
[e] total does not equal 100% due to rounding errors

Annual summaries of fish mortality events are published by FW&MR, the most recent for the years 1997-98.[21] Generally, the number of notifications of fish kills, field investigations by NYS DEC staff and documentation of pollution-caused kills have all decreased over time. In both 1997 and 1998 only eleven fish kills were attributed to pollution. These were associated with a fairly unremarkable assortment of discharges and spills, representative of the information in Table 32.

Section 303(d) Waters and TMDLs

Section 303(d) of the Clean Water Act requires states to develop and submit a list of waters for which required technology-based pollution controls are not stringent enough to attain or maintain compliance with applicable state water quality standards. This list targets these waters as priorities for total maximum daily load (TMDL) development. However, USEPA recently issued a final rule to significantly revise the Section 303(d) Water Quality Planning and Management Regulation and TMDL Regulations. The new rule expands the scope of previous 303(d) Lists to include waters impaired by nonpoint as well as point sources, and requires more detailed implementation plans for the restoration of these waters.

Recognizing the significant impact of the changing Section 303(d)/TMDL program, USEPA issued a separate rule removing the requirement for states to submit a biennial Section 303(d) List in the year 2000. As a result, New York State's 1998 Section 303(d) List is and remains the most current version of the list. Discussion of the 1998 List is presented below, and a complete copy of the list is included in Appendix E - *The 1998 New York State Section 303(d) List*. The next list is to be submitted to USEPA by April 1, 2002.

NYS DEC has followed the development of the new rule very closely, paying particular attention to the likely impacts of the changes on current monitoring, assessment and management programs. Because of its call to provide a comprehensive listing of polluted and impaired waters, the new rule will have several impacts on future Section 305(b) reporting; a fact recognized by USEPA in their recent call for the development of a Consolidated Assessment and Listing Methodology. The development of this methodology is designed to integrate, enhance and streamline the water quality reporting requirements in both Sections 305(b) and 303(d) of the Act.

As the implementation of these modifications to the 303(d) and TMDL process move forward, and their impacts on 305(b) reporting become more clear, NYS DEC will work with USEPA to identify and secure the additional resources needed to successfully implement this program expansion and see that the new rules achieve, in practice, their intended goals.

The 1998 New York State Section 303(d) List

The rules governing a state development of the 1998 Section 303(d) Lists required the inclusion of water quality limited waters requiring total maximum daily loads, primary pollutants and sources causing the impairment, and waters targeted for TMDL development over the next two years.

The 1998 New York State Section 303(d) List has identified the following as priority waters:

- New York Harbor
- Long Island Sound
- New York City Water Supply Watershed
- Onondaga Lake
- Lake Champlain

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21 J. Spodaryk, 2000. *Fish Mortalities in NYS - 1997/1998 Annual Summaries*. NYS DEC, Division of Fish Wildlife and Marine Resources. Hale Creek Field Station, New York.

Designation as a "priority water" does not necessarily mean that TMDLs will be completed during the 2 year period that a list is in effect, but that priority effort will be given to developing solutions to these water quality problems. TMDL development has been targeted for these priority waters which may continue beyond the 2 year period of this list. In addition, the list also identifies other lesser priority waters that will be evaluated for TMDL development.

In compiling their 303(d) lists, states are to consider all existing and readily available water quality-related data and information. However, the review and evaluation of available water quality information is not unique to 303(d) list development. Rather, it is a continuous process that drives virtually the entire state water quality management program–of which the 303(d) list and TMDL development is but one element. As previously discussed, the NYS DEC Division of Water utilizes a monitoring and assessment strategy that integrates numerous division program activities. The goal of this strategy is to provide a complete and thorough evaluation of monitoring data and a comprehensive assessment of water quality throughout the state. The process for developing the 1998–and future–303(d) Lists has been modified to take advantage of this *Comprehensive Assessment Strategy*. This strategy links monitoring activities and the WI/PWL assessment process with the 303(d) List development. The compilation of WI/PWL information and generation of the state's 305(b) Report marks formal beginning of the 303(d) List development.

The WI/PWL lists over 1400 segments, all of which are potential candidates for inclusion on the 1998 303(d) List. Note that a considerable number of these segments were not included on the 303(d) List because verification of the listed problem is needed. While it is useful to track undocumented segments on the WI/PWL, it is not beneficial to include them on the 303(d) list until the water quality problem has been verified. If and when verified, these segments will be added to future editions of the 303(d) List.

Listing Criteria

The state water quality assessment process uses all readily available monitoring data and information contained in the Waterbody Inventory/Priority Waterbody List. For 303(d) List development, waterbody information in the 1,400+ segment WI/PWL was reviewed and evaluated based on the extent and severity of the water quality problem and the amount and quality of the information available. The quality of information in the WI/PWL documenting impairments varies from segment to segment. Generally, segments with information designated as "good" were given preference for 303(d) listing. Over 800 of the 1,400 segment were in the "good" category.

In addition to WI/PWL information, surface water quality data from the RIBS Sampling Program was also evaluated during 303(d) List development. This data was generally restricted to that collected within the most recent 7 to 8 years. Data collected prior to that time may not have had as defined a quality assurance/quality control program as the more current data, especially concerning sample collection methods, analytical procedures and detection levels.

Priority ranking for TMDL development was determined by the: 1) use impaired, 2) extent and severity of the impairment, and 3) the resources available. Highest priority is given to threats to human health (i.e., water supply source protection) and important aquatic species protection.

The number of segments contained in the 1998 list has increased significantly from previous lists, based primarily on recent USEPA guidance (August 27, 1997) on 303(d) listing decisions. The added segments reflect waters that have documented use impairments, like acid rain lakes, fish consumption advisories and closed shellfish harvesting waters. Similarly, the Department believes that certain waterbodies should be removed from the list because they were inappropriately listed in the past or actions have been taken to correct water quality problems. These waterbodies are contained in the category entitled "Requiring Verification," and will be evaluated during the comprehensive water quality assessment including the RIBS Sampling Program.

Based on the evaluation of available WI/PWL information and data (and to ease management and planning activities), waterbodies contained in the 303(d) List were assigned to one of six categories. These waterbody categories are outlined below.

1. Waters Designated as Priority for TMDL Development (over the next 2 years)
2. Waterbodies Impacted by Atmospheric Deposition
3. Waterbodies with Fish Consumption Advisories
4. Waterbodies Closed to Shellfish Harvesting
5. Waterbodies with Documented Exceedences of Water Quality Standards
6. Waterbodies with Problems Requiring Verification

Separate inventories outlining the specific waterbody segments in each of these categories has been compiled. Taken together, these inventories comprise the 1998 303(d) List. A copy of the list is included in Appendix E - *The 1998 New York State Section 303(d) List*.

Table 33 **Schedule for TMDL Development**

Waterbody Category	Target Date for TMDL Completion
A. Priority Waters	
New York Harbor	2002
Long Island Sound	1998
New York City Watershed	1999
Onondaga Lake	1998
Lake Champlain	1998
B. Atmospheric Deposition Waters	2003 (USEPA)
C. Fish Consumption Advisory Waters	2000-2005
D. Closed Shellfishing Waters	2000-2002
E. Documented Standard Exceedence Waters	2008
F. Waters Requiring Verification	2000-2005

Bureau of Watershed Assessment and Research
Division of Water
NYS Department of Environmental Conservation

New York State Water Quality 2000

Submitted Pursuant to
Section 305(b)
of the
Federal Clean Water Act
Amendments of 1977 (PL 95-217)

Appendices

Appendix A

Watershed/Basin Water Quality Summaries

This appendix provides more detailed water quality information for each of the major drainage basins in New York State. A narrative summary of general background information as well as specific water quality issues and concerns are presented for each basin.

Each basin summary also includes an outline of the Waterbody Inventory/Priority Waterbodies List (WI/PWL) segments in the watershed. For more detailed information about theWI/PWL database and the type of information that it contains refer to Appendix B. More complete discussion of the specific waterbodies and water quality issues and concerns listed in the summaries can be found in the most recent in the series of *Waterbody Inventory/Priority Waterbodies List Drainage Basin Reports*.

Recent water quality monitoring data and results can be found in the continuing series of *Rotating Intensive Basin Studies (RIBS) Reports*. These reports summarize the findings of the NYS DEC Division of Water ambient surface water monitoring activities.

Both the Waterbody Inventory/Priority Waterbodies List and the RIBS Drainage Basin Reports are regularly updated on a rotating basin schedule. This schedule allows for the review and assessment of water quality information in two or three basins each year, resulting in coverage of the entire state over a five-year period. More information about the update schedule is presented and discussed in the *Comprehensive Assessment Strategy* section (Part III, Chapter 2) of this report.

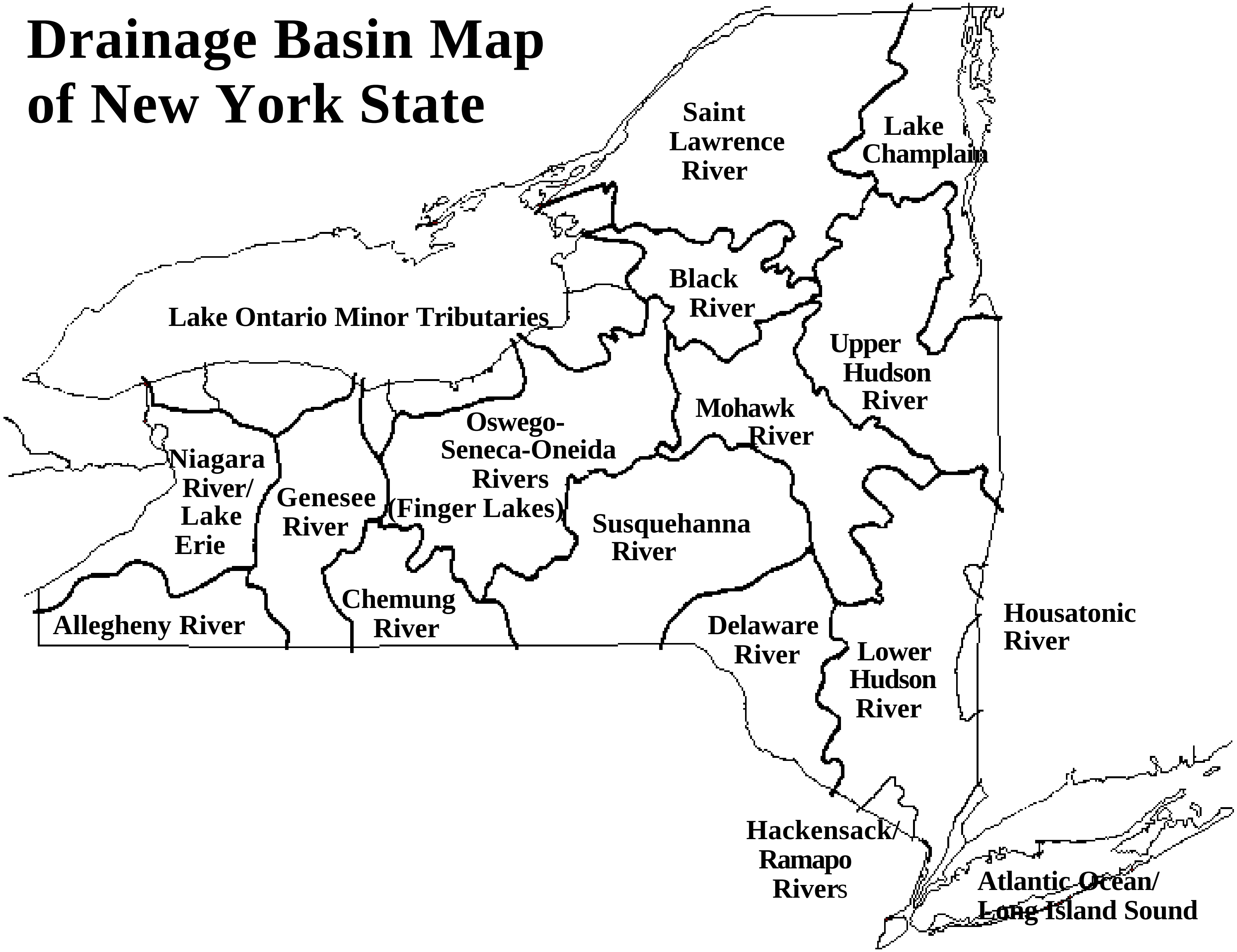
While New York State has used a rotating watershed/basin approach to conduct its water quality monitoring program since 1987, the incorporation of this approach to water quality assessment and reporting activities in New York State is fairly recent. As a result of the phasing in of this approach, only a portion of the state's waters have been re-evaluated since publication of the *1998 New York State Section 305(b) Water Quality Report*. (See box)

Drainage Basins Assessed Since the 1998 305(b) Report:

- Chemung River Basin
- Black River Basin
- Saint Lawrence River Basin
- Lower Hudson River Basin

Furthermore, the recent adoption of the rotating basin approach to assessment and reporting was accompanied by a host of other enhancements to the New York State *Waterbody Inventory and Priority Waterbodies List*. (Many of these enhancements are discussed in Appendix B.) Again, because these enhancements are being phased in, the Water Quality Summaries for those basins updated since the 1998 Report contain additional information, as well as a different format from previous basin summaries.

Drainage Basin Map of New York State



The Niagara River/Lake Erie Basin

Background

The Niagara River/Lake Erie Basin drains some 2,300 miles inhabited by approximately 1.3 million persons making it the state's second most densely populated drainage area. The Buffalo and Niagara Falls Metropolitan Statistical Areas account for most of the basin's population and contain the largest concentration of heavy industry in the state. As the distance from these major metropolitan areas increases, the rest of the basin tends to be suburban residential and then becomes predominately rural and agricultural.

The Niagara River drains not only a large part of western New York State, but also the four Great Lakes upstream of Lake Ontario, and the municipal and industrial discharges entering those lakes from the most highly industrialized regions of the United States and Canada.

Water Quality Issues and Concerns

The primary water quality issues in the Niagara River-Lake Erie Drainage Basin are associated with Niagara River and Buffalo River Areas of Concern (AOC). These are two of 43 AOCs in the Great Lakes Basin identified by the International Joint Commission (IJC) where pollutants seriously impair the beneficial uses of a waterbody. Remedial Action Plans (RAPs) for these AOCs are currently being developed and implemented to restore and protect these uses.

Niagara River Remedial Action Plan (RAP)

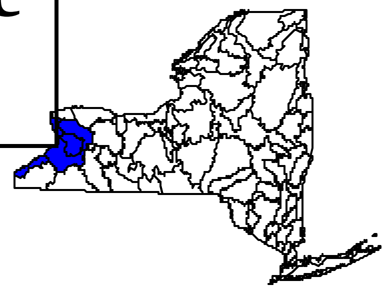
In 1989, a group of citizens was appointed by NYS DEC as the Niagara River Action Committee to help develop the Remedial Action Plan for the New York portion of this connecting channel AOC. The committee consisted of twenty-six representatives from environmental, industrial, sporting, academic, community, and local government interests. Committee persons and NYS DEC staff created an Executive Committee that directed RAP development. The Executive Committee established RAP goals, mapped out a workplan, defined responsibilities, and reviewed draft sections of the RAP. The Remedial Action Plan document, that effectively combines the Stage 1 and Stage 2 RAP elements, was completed September 1994. A Status Report for the Niagara River RAP that updates remedial actions was recently published in June 2000. The RAP addresses use impairments, sources, and existing remediation programs, and recommends future remedial strategies. NYS DEC has appointed persons to a Remedial Advisory Committee (RAC) to advise and assist NYS DEC in RAP implementation. Committee members include local government, academia, public and economic interest groups, and private citizens. The RAP process involves various components: periodic progress status reports with remedial strategy identification; regular Remedial Advisory Committee meetings; project and plan reviews as part of ongoing activities; monitoring and tracking progress; and public participation coordinated through the RAC. In the Niagara River RAP,

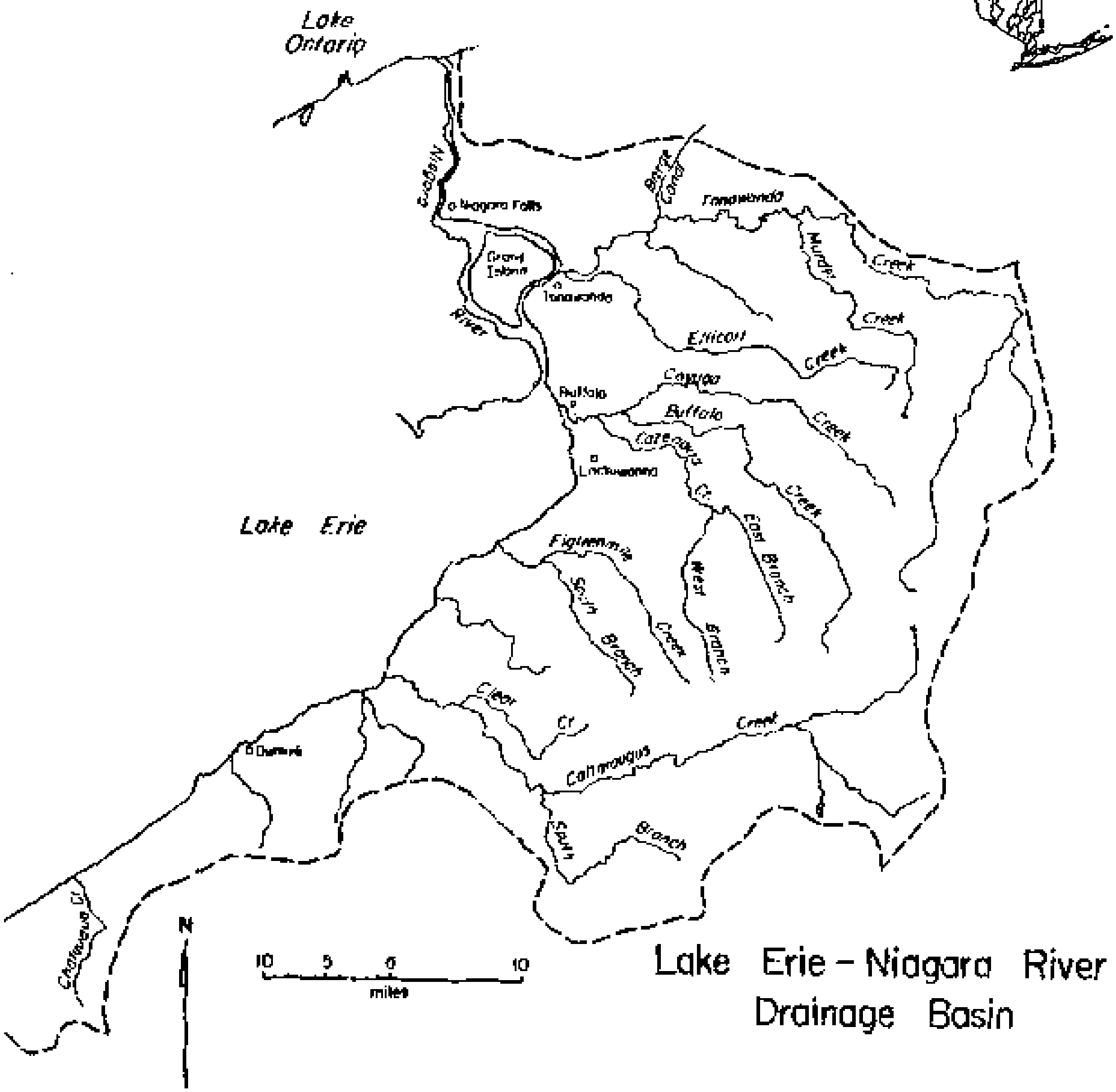
Remedial Action Plans

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 finally seek to document and

Niagara River/Lake Erie Drainage Basin Map





Lake Erie – Niagara River
Drainage Basin

priority activities and strategies address: stream water quality; inactive hazardous waste site remediation; contaminated river sediments; point source control programs; fish and wildlife habitat improvements; and enhanced environmental monitoring activities. A multiple committee approach was utilized to address the complexities of implementation. A technical subcommittee was formed to develop ways to quantify concerns and to communicate progress to address the impaired uses. A public outreach subcommittee was created to develop a binational strategy to address the many issues involved with achieving sustainable development, and an International Advisory Committee was established to foster binational cooperation. Recently, a Niagara River RAP public information video was completed by the RAC members. This accomplishment of a video by the RAC was based on earlier international cooperation in the development of a slide show.

Buffalo River Remedial Action Plan (RAP)

The Buffalo River RAP process was developed as a working partnership between NYS DEC staff and the Buffalo River Citizens' Committee (BRCC) and its work groups. The BRCC was established by NYS DEC in 1987 and is made up of representatives from community, environmental, sporting, and local government interests. Together, NYS DEC staff and members of the BRCC comprised a steering committee to develop project workplans and outline responsibilities for key RAP tasks. The combined Stage 1 and Stage 2 Remedial Action Plan was completed in November 1989 as a working document. NYS DEC uses the RAP as a management document to guide and coordinate remedial actions by various concerned groups for an improved federal, state and local partnership. A Remedial Advisory Committee (RAC) continues to assist NYS DEC in RAP implementation. RAP Status Reports have been published since 1991 to update commitments, track implementation, and celebrate accomplishments. Remedial activity efforts are focused in six major areas: stream water quality monitoring, river bottom sediments, inactive hazardous waste sites, municipal and industrial wastewater treatment facilities, combined sewer overflows, and fish and wildlife habitat. RAP strategies and remedial activity progress are updated in the most current Buffalo River RAP Status Report dated June, 1999. Ongoing assessment activities include the evaluation of remedial options through the modeling of scour and deposition characteristics. Needs include further sampling, treatment assessment, and sediment criteria guidance development to assist the decision making process in addressing contaminated sediments. Three habitat improvement projects have been constructed to address habitat impairments with funding provided through USEPA. Habitat project plans were developed by Erie County in cooperation with the City of Buffalo, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and NYS DEC. These habitat projects have been completed. The Buffalo Sewer Authority has received New York State Bond Act funding to address overflows.

Lake Erie Lake Management Plan (LaMP)

The Great Lakes Water Quality Agreement and its amendments also call for the development and implementation of Lakewide Management Plans (LaMPs), including one for Lake Erie. A binational Management Committee, co-chaired by USEPA Region 5 and Environment Canada, oversees the development and implementation of Lake Erie LaMP activities. The goal of the Lake Erie LaMP is to restore and protect beneficial uses of the lake. Like the RAPs, the Lake Erie LaMP applies the ecosystem approach and involves the public through the Binational Public Forum to address water quality and natural resources management issues. The LaMP applies the 14 use impairment indicators with a focus on critical pollutants and the ecosystem in both near shore and open lake water considerations. A comprehensive Lake Erie LaMP 2000 report was recently published which sets forth the current status of the use impairment indications and remedial actions. A Work Group and five subcommittees are working on implementation: Ecosystems Objectives; Sources and Loads; Beneficial Use Impairment Assessments; Human Health; and, Public Involvement.

Other Issues

Toxic pollutants are a significant concern in the basin. Fish consumption advisories are in effect for several major waterbodies including the Barge Canal and lower Tonawanda Creek, the Buffalo River and Harbor, and the Niagara River. Several smaller waterbodies also have advisories in effect, including Cayuga Creek, Delaware Park Lake, and Gill Creek.

The 1996 Priority Waterbodies List (PWL) identified streambank erosion as a major source of water quality impairment in the tributaries to Lake Erie and Buffalo River sub-basins. Contaminated sediments and on-site systems were the major sources in the Niagara River and Tonawanda Creek sub-basins, respectively.

More Information

A summary listing of waterbodies included on the NYS-DEC Priority Waterbodies List is included as Table A.1. A list of waterbodies that may have been previously listed on theWI/PWL but have since been determined to need verification of possible water quality impairment is also included. More complete information about the water quality problems and issues in the basin can be found in the most recent (1996) series of Priority Waterbodies List Drainage Basin Reports.[1]

Water quality monitoring and assessment results from the NYS DEC Division of Water ambient surface water monitoring activities are summarized in the continuing series of Rotating Intensive Basin Studies (RIBS) Drainage Basin Reports. The most recent RIBS Report for the Niagara River-Lake Erie Drainage Basin outlines results from monitoring conducted in 1993-94.[2]

The next RIBS monitoring effort in the basin is scheduled for 2000-2001, with water quality assessment to be conducted in 2002.

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[1] NYS DEC, 1996. The 1996 Priority Waterbodies List for the Niagara River-Lake Erie Basin. NYS DEC Division of Water Technical Report. Albany, NY. September 1996.

[2] J.A. Myers, R.L. Gabriel and R.M. Garry. The Niagara River -Lake Erie Drainage Basin RIBS Report, 1993-94 . DEC Division of Water Technical Report. Albany, NY. February 1997.

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
DRAINAGE BASIN: Niagara River/Lake Erie										
SubBasin: Niagara River Main Stem										
Cayuga Creek	0101-0001	Niagara	River	1.5 Miles	C	Fish Consumption	Precluded	Known	Priority Organics	Tox/Contam. Sediment
Cayuga Creek	0101-0024	Niagara	River	2.7 Miles	C	Fish Consumption	Precluded	Known	Priority Organics	Tox/Contam. Sediment
Delaware Park Lke	0101-0026	Erie	Lake	33.0 Acres	B	Public Bathing	Stressed	Known	Nutrients	Urban Runoff
Gill Creek	0101-0002	Niagara	River	2.5 Miles	C	Fish Consumption	Precluded	Known	Priority Organics	Tox/Contam. Sediment
Niagara River	0101-0006	Erie	River	38.0 Miles	A(S)	Fish Consumption	Impaired	Known	Priority Organics	Landfill/Land Disp.
Scajaquada Creek	0101-0023	Erie	River	8.0 Miles	B	Public Bathing	Stressed	Susp	Aesthetics	Comb. Sewer Overflow
Smoke Creek	0101-0007	Erie	River	2.0 Miles	C	Aquatic Life	Stressed	Known	Aesthetics	Industrial
Two Mile Creek	0101-0005	Erie	River	5.0 Miles	B	Public Bathing	Impaired	Susp	Pathogens	Municipal
DRAINAGE BASIN: Niagara River/Lake Erie										
SubBasin: Tonawanda Creek										
Barge Canal/Ton C	0102-0022	Niagara	River	18.0 Miles	C	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Crow Creek	0102-0023	Erie	River	6.0 Miles	A	Water Supply	Threatened	Known	Nutrients	Agriculture
Ellicott Creek	0102-0018	Erie	River	20.0 Miles	B	Aquatic Life	Stressed	Known	Aesthetics	Hydro/Habitat Modif.
Lit.Tonawanda Ck.	0102-0001	Genesee	River	5.0 Miles	A(T)	Water Supply	Impaired	Susp	Silt/sediment	Other Source
Ransom Creek	0102-0004	Erie	River	3.0 Miles	C(T)	Aquatic Life	Impaired	Susp	Nutrients	Failing On-Site Syst
Tonawanda Creek	0102-0006	Erie	River	10.0 Miles	B	Aquatic Life	Stressed	Susp	Silt/sediment	Streambank Erosion
Tonawanda Creek	0102-0002	Genesee	River	8.0 Miles	C	Aquatic Life	Impaired	Susp	Silt/sediment	Agriculture
Tonawanda Creek	0102-0003	Genesee	River	8.0 Miles	A	Water Supply	Impaired	Susp	Silt/sediment	Streambank Erosion
DRAINAGE BASIN: Niagara River/Lake Erie										
SubBasin: Buffalo River										
Buffalo Creek	0103-0003	Erie	River	8.0 Miles	A	Aquatic Life	Impaired	Susp	Thermal Changes	Agriculture
Buffalo River	0103-0001	Erie	River	8.0 Miles	C	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Cayuga Creek	0103-0002	Wyoming	River	2.0 Miles	B	Public Bathing	Impaired	Susp	Pathogens	Failing On-Site Syst
Cayuga Creek	0103-0007	Erie	River	21.0 Miles	B,C	Aquatic Life	Stressed	Susp	Silt/sediment	Streambank Erosion
Cazenovia Creek	0103-0009	Erie	River	35.0 Miles	B,C	Aquatic Life	Stressed	Susp	Silt/sediment	Streambank Erosion
DRAINAGE BASIN: Niagara River/Lake Erie										
SubBasin: Eastern Lake Erie										
Cattaraugus Creek	0104-0029	Erie	River	28.0 Miles	BT,CT	Aquatic Life	Stressed	Susp	Silt/sediment	Streambank Erosion
Clear Creek	0104-0024	Erie	River	6.0 Miles	C(TS)	Aquatic Life	Stressed	Susp	Silt/sediment	Streambank Erosion
Eighteen Mile Ck	0104-0030	Erie	River	5.5 Miles	B	Public Bathing	Stressed	Susp	Silt/sediment	Urban Runoff

Elton Creek	0104-0008	Cattaraugus	River	10.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Agriculture
Lime Lake	0104-0001	Cattaraugus	Lake	150.0 Acres	B	Public Bathing	Impaired	Susp	Nutrients	Failing On-Site Syst
Rush Creek	0104-0018	Erie	River	5.0 Miles	B,C	Public Bathing	Impaired	Known	Pathogens	Municipal
So. Br. Eightn Mi	0104-0016	Erie	River	10.0 Miles	B	Aquatic Life	Stressed	Susp	Silt/sediment	Streambank Erosion

DRAINAGE BASIN: Niagara River/Lake Erie

SubBasin: Western Lake Erie

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
Chautauqua Creek	0105-0001	Chautauqua	River	1.0 Miles	C(T)	Aquatic Life	Impaired	Susp	Silt/sediment	Industrial
Lake Erie	0105-0009	Chautauqua	G.Lakes	1.0ShrMi	A(S)	Public Bathing	Impaired	Known	Pathogens	Unknown Source
Ripley Reservoir	0105-0002	Chautauqua	Lake(R)	1.0 Acres	A	Water Supply	Stressed	Susp	Silt/sediment	Silviculture
Slippery Rock Ck	0105-0010	Cattaraugus	River	2.0 Miles	C	Aquatic Life	Stressed	Susp	Aesthetics	Industrial

Waterbody Inventory - Waters Needing Verification of Impairment

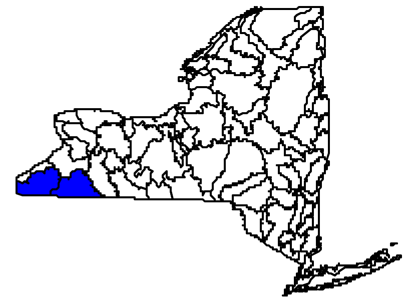
Segment Name	Segment ID	County

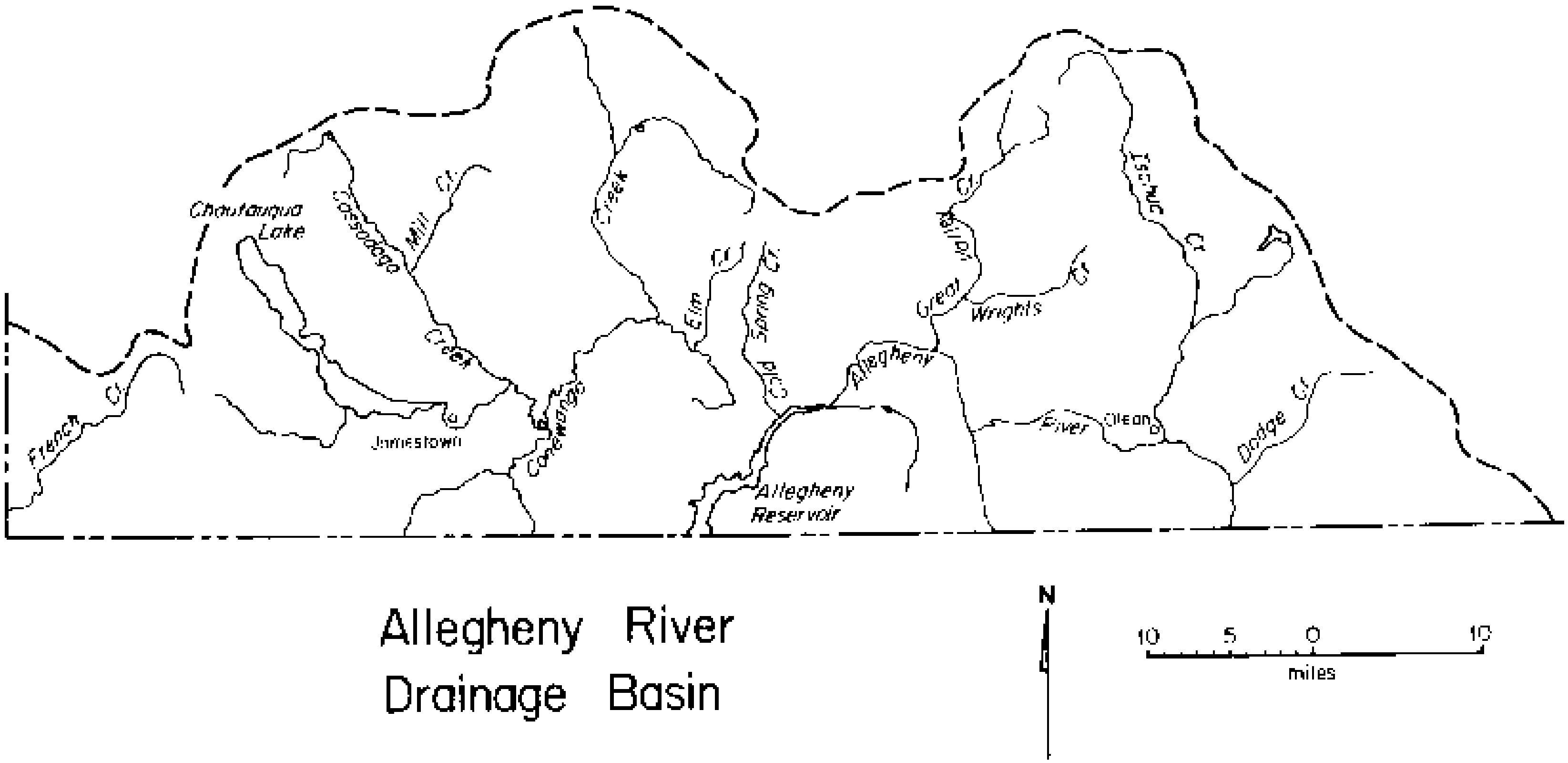
Niagara River/Lake Erie Basin

Segment Name	Segment ID	County
Niagara River SubBasin		
Bergholtz Creek	0101-0004	Niagara
Big Six Mile Cr	0101-0020	Erie
Black Creek	0101-0003	Niagara
Black Rock Canal	0101-0025	Erie
Gun Creek	0101-0011	Erie
Spicer Creek	0101-0021	Erie
Woods Creek	0101-0022	Erie
Tonawanda Creek SubBasin		
Dorsch Creek	0102-0019	Erie
Ledge Creek	0102-0012	Erie
Buffalo Creek SubBasin		
Buffalo Creek	0103-0004	Wyoming
Little Buffalo Cr	0103-0008	Erie
Eastern Lake Erie SubBasin		
Big Sister Creek	0104-0013	Erie
Cattaraugus Creek	0104-0005	Wyoming
Cattaraugus Creek	0104-0020	Erie
Clear Creek	0104-0031	Cattaraugus
Eighteen Mile Crk	0104-0017	Erie
Java Lake	0104-0004	Wyoming
Point Peter Brook	0104-0003	Cattaraugus
S. Branch Catt Cr	0104-0006	Cattaraugus
Spooner Brook	0104-0025	Erie
Spring Brook	0104-0021	Erie
Western Lake Erie SubBasin		
Canadaway Creek	0105-0008	Chautauqua
Silver Creek	0105-0007	Chautauqua
Twenty Mile Creek	0105-0003	Chautauqua
Walnut Creek	0105-0006	Chautauqua

Many of the waterbody segments included on previous editions of the Priority Waterbodies List have limited recent documentation of specific water quality impairment. In an effort to improve the quality of information in theWI/PWL, these waterbody segments Needing Verification of an Impairment are tracked on a list separate from the Priority Waterbodies List.

Allegheny River Drainage Basin Map





The Allegheny River Basin

Background

The Allegheny River Basin in New York State comprises a portion of the headwaters of the larger Ohio River Basin. A total of approximately 1,900 square miles of the basin lie within New York State, populated by about 170,000 people. It consists of most of Cattaraugus and Chautauqua Counties and a small portion of Allegheny County. The geology of the area is mainly a highly dissected plateau of deep, flat-bottomed valleys. The nature of the area varies from the rugged, heavily wooded Allegheny Hills along the Pennsylvania border to the flatter lands in the north and west. The basin is primarily rural-agricultural with several population centers and industries located along the major waterways. Other primary activities include silviculture, oil and gas production, and recreation. Steady progress has been made toward cleaning up the waters of the Allegheny River Basin. Most notable have been some of the industrial and municipal sewage treatment plant abatement efforts.

Water Quality Issues and Concerns

This basin has relatively good water quality, with some exceptions. A significant nonpoint source of pollution is created by abandoned and active oil and gas wells. Oil and brine from the oil fields occasionally drain into streams, causing water quality problems. Tunungwant Creek has impaired fishing and fish survival due to oil pollution from both oilfields and a refinery.

Heavy Metals

In the 1996 NYS DEC Priority Waterbodies List (PWL), the Chadakoin River is considered stressed for fish propagation by metals from an unknown source(s). An intensive site at South Dow Street was sampled in 1989-1990 as part of the Rotating Intensive Basin Study (RIBS) program with various metals found to be parameters of concern in the water column and bottom sediment. Macroinvertebrate tissue analysis showed copper and PCB above background levels and the macroinvertebrate community was moderately impaired. Fish tissue results from 1989 and prior revealed elevated levels of PCB in various species taken near the Dow Street RIBS site. These results and the historical use of the Chadakoin and the area near it for disposal of industrial waste prompted a desktop evaluation of the river, including its current status and recommended strategy.[3] Further macroinvertebrate work in 1994 and sampling during the 1995-1996 RIBS cycle have also been conducted.

Cuba Lake

At Cuba Lake, funds from the Aquatic Vegetation Control and Lake Management Program (AVCLMP) have been used to carry out many different water quality projects. The Allegheny County Soil and Water Conservation District (SWCD), the Cuba Lake District, USDA Natural Resources Conservation Service (NRCS) and other cooperating agencies have undertaken a model watershed management and planning program in the lake's 16,000 acre watershed. A detailed state-of-the-art soil survey was established for the watershed to be input into a new GIS system along with other information such as land use. Using AVCLMP funds through the USDA's cost-sharing program, the SWCD has constructed a manure handling facility on a thousand-cow dairy farm identified as contributing pollutants to the watershed. Property has also been purchased for the construction of a sediment control basin adjacent to a stream known to contribute sediments

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[3] Leece, Cynthia. Chadakoin River: Status and Recommended Strategy. NYS DEC Division of Water Technical Report. Albany, NY. March 1994.

to Cuba Lake. Investigation has been done into installing a trunkline to take effluent from individual septic systems in wet, inadequate soils around the lake to a miniature treatment plant. Additional work has been done in the areas of education, planning and water quality monitoring. A mobile automated monitoring unit has been purchased, and an inventory and evaluation of nonpoint sources of pollution in the watershed have been undertaken. A set of management perspectives is being developed for a plan to be distributed to five townships, two counties, Cuba Lake District, the Seneca Nation of Indians, Cuba Lake cottage associations and other interested parties in the Cuba Lake watershed.

Other Issues

Five lakes in the basin (Bear Lake, Findley Lake, and Upper, Middle and Lower Cassadaga Lakes) have impaired uses (bathing and fishing) caused by the increase of algae and weed growth due to nutrients. The primary sources of the nutrients are agriculture and on-site septic systems. In addition, two other lakes are stressed from nutrients and pathogens from nonpoint sources (mainly agriculture and on-site systems). About twenty river segments have uses (mostly fishing-related) which are considered stressed or threatened by silt and other pollutants from agriculture, streambank erosion and resource extraction.

More Information

A summary listing of waterbodies included on the NYS-DEC Priority Waterbodies List is included as Table A.2. A list of waterbodies that may have been previously listed on theWI/PWL but have since been determined to need verification of possible water quality impairment is also included. More complete information about the water quality problems and issues in the basin can be found in the most recent (1996) series of Priority Waterbodies List Drainage Basin Reports.[4]

Water quality monitoring and assessment results from the NYS DEC Division of Water ambient surface water monitoring activities are summarized in the continuing series of Rotating Intensive Basin Studies (RIBS) Drainage Basin Reports. The most recent RIBS Report for the Allegheny River Drainage Basin outlines results from monitoring conducted in 1995-96.[5]

The next RIBS monitoring effort in the basin is scheduled for 2001-2002, with water quality assessment to be conducted in 2003.

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4 NYS DEC, 1996. The 1996 Priority Waterbodies List for the Allegheny River Basin. NYS DEC Division of Water Technical Report. Albany, NY. September 1996.

5 J.A. Myers, R.L. Gabriel and B.Andrews. The Allegheny River Basin RIBS Report, 1995-96. DEC Division of Water Technical Report. Albany, NY. February 1999.

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
DRAINAGE BASIN: Allegheny River										
SubBasin: Allegheny River Main Stem										
Case Lake	0201-0020	Cattaraugus	Lake	80.0 Acres	C(T)	Aquatic Life	Impaired	Known	Nutrients	Agriculture
Cold Spring Creek	0201-0014	Cattaraugus	River	20.0 Miles	C(T),C	Aquatic Life	Stressed	Susp	Silt/sediment	Agriculture
Cuba Lake	0201-0016	Allegany	Lake	454.0 Acres	B	Public Bathing	Impaired	Susp	Pathogens	Failing On-Site Syst
Haskell Creek	0201-0009	Cattaraugus	River	5.0 Miles	C(T),C	Aquatic Life	Stressed	Susp	Thermal Changes	Agriculture
Little Valley Crk	0201-0013	Cattaraugus	River	10.0 Miles	C(T),C	Aquatic Life	Stressed	Susp	Thermal Changes	Agriculture
Olean Creek	0201-0017	Cattaraugus	River	7.5 Miles	A	Water Supply	Stressed	Susp	Priority Organics	Resource Extraction
DRAINAGE BASIN: Allegheny River										
SubBasin: Conewango Creek										
Cassadaga Creek	0202-0012	Chautauqua	River	30.0 Miles	C	Aquatic Life	Stressed	Susp	Silt/sediment	Streambank Erosion
Chadakoin River	0202-0018	Chautauqua	River	10.0 Miles	C	Aquatic Life	Stressed	Susp	Metals	Unknown Source
Chautauqua Lake	0202-0020	Chautauqua	Lake	13400.0 Acres	A	Public Bathing	Impaired	Known	Nutrients	Agriculture
Conewango Ck&trib	0202-0017	Cattaraugus	River	15.0 Miles	C(T),C	Aquatic Life	Stressed	Susp	Oxygen Demand	Agriculture
Findley Lake	0202-0004	Chautauqua	Lake	311.0 Acres	B	Aquatic Life	Impaired	Susp	Nutrients	Agriculture
French Creek	0202-0015	Chautauqua	River	50.0 Miles	C,C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Agriculture
Lower Cassadaga L	0202-0003	Chautauqua	Lake	83.0 Acres	B	Public Bathing	Impaired	Susp	Nutrients	Agriculture
Upper Cassadaga L	0202-0001	Chautauqua	Lake	102.0 Acres	B	Public Bathing	Impaired	Susp	Nutrients	Agriculture

Waterbody Inventory - Waters Needing Verification of Impairment

Segment Name	Segment ID	County

Allegheny River Basin

Segment Name	Segment ID	County
Allegheny River Main Stem SubBasin		
Bear Lake	0201-0003	Chautauqua
Great Valley Ck	0201-0012	Cattaraugus
Ischua Creek	0201-0008	Cattaraugus
Little Genesee Cr	0201-0001	Allegany
Lower Stillwater	0201-0007	Chautauqua
Tunungwant Creek	0201-0002	Cattaraugus
Conewango Creek SubBasin		
Broken Straw Crk	0202-0005	Chautauqua
Conewango Cr-low	0202-0014	Chautauqua
Conewango Cr-up	0202-0006	Chautauqua
Dewittville Creek	0202-0022	Chautauqua
Goose Creek	0202-0023	Chautauqua
Hartfield Creek	0202-0021	Chautauqua
Mid. Cassadaga L.	0202-0002	Chautauqua
Mill Creek	0202-0019	Chautauqua
Prendergast Creek	0202-0024	Chautauqua
Tributary #26	0202-0025	Chautauqua

Many of the waterbody segments included on previous editions of the Priority Waterbodies List have limited recent documentation of specific water quality impairment. In an effort to improve the quality of information in theWI/PWL, these waterbody segments Needing Verification of an Impairment are tracked on a list separate from the Priority Waterbodies List.

The Lake Ontario (Minor Tributaries) Basin

This section of the report addresses water quality in Lake Ontario and its smaller tributaries. The larger tributaries to Lake Ontario (Niagara River, Genesee River, Oswego River and Black River) are discussed in separate sections of this appendix.

Additionally, while the Minor Tributaries to Lake Ontario have generally been considered separately as one of the 17 major drainage basins of New York State, for the purposes of the RIBS Sampling Program and the Priority Waterbodies List (PWL) update cycle, these smaller tributary waters draining into Lake Ontario have recently been assigned to – and will be monitored, assessed and, in the future, reported with – the waters in one of the larger river watersheds (Niagara, Genesee, Oswego, Black) draining into the lake.

Background

The Lake Ontario Basin in New York State drains an area of about 3,000 square miles inhabited by approximately 700,000 people. Except for the Rochester Metropolitan Statistical Area, the basin is primarily rural-agricultural in nature with smaller population centers and some industry located along major transportation corridors and tributaries and near the large cities located in adjacent drainage basins. There are approximately 4,000 miles of rivers and streams and 200 lakes in the basin.

Water Quality Issues and Concerns

Steady progress has been made toward cleaning up the waters of the Lake Ontario Basin. Most notable has been the regionalization of treatment facilities in the Rochester area resulting in the elimination of numerous significant individual discharges to Lake Ontario, Irondequoit Creek and four other lake tributaries. Remaining water quality problem segments in the basin's tributaries and near shore waters are primarily due to eutrophication and siltation caused by excess nutrients and runoff from agricultural operations and on-site disposal systems. Other potential sources of contamination to the lake within New York State have been evaluated and outlined by the NYS DEC Division of Water.[6]

Lake Ontario

A discussion of the water quality management problems affecting the basin waters defined by Lake Ontario and its minor tributaries must consider two essential (but not necessarily related) points:

! The near shore waters of Lake Ontario are impacted by inflow from the Niagara, Genesee, Black and Oswego Rivers. The sources of the pollution found in the inflow are ultimately the water quality management problems associated with activities occurring in or along those rivers. A specific example is Ontario Beach on Lake Ontario in the Rochester Embayment at the mouth of the Genesee River which has to be closed during storm events due to high turbidity and carry over of stormwater in the Genesee from the City of Rochester and its environs. The Niagara River inflow requires an even more complex analysis in order to trace the original source of pollutants, as the river carries pollutants from the upper Great Lakes as well as those generated along the river itself.

! Water Quality problems offshore are diminished by the large volume of water in the lake, and offshore water quality is generally considered to be excellent. However, fish consumption advisories are in effect for several species, which are discussed further below.

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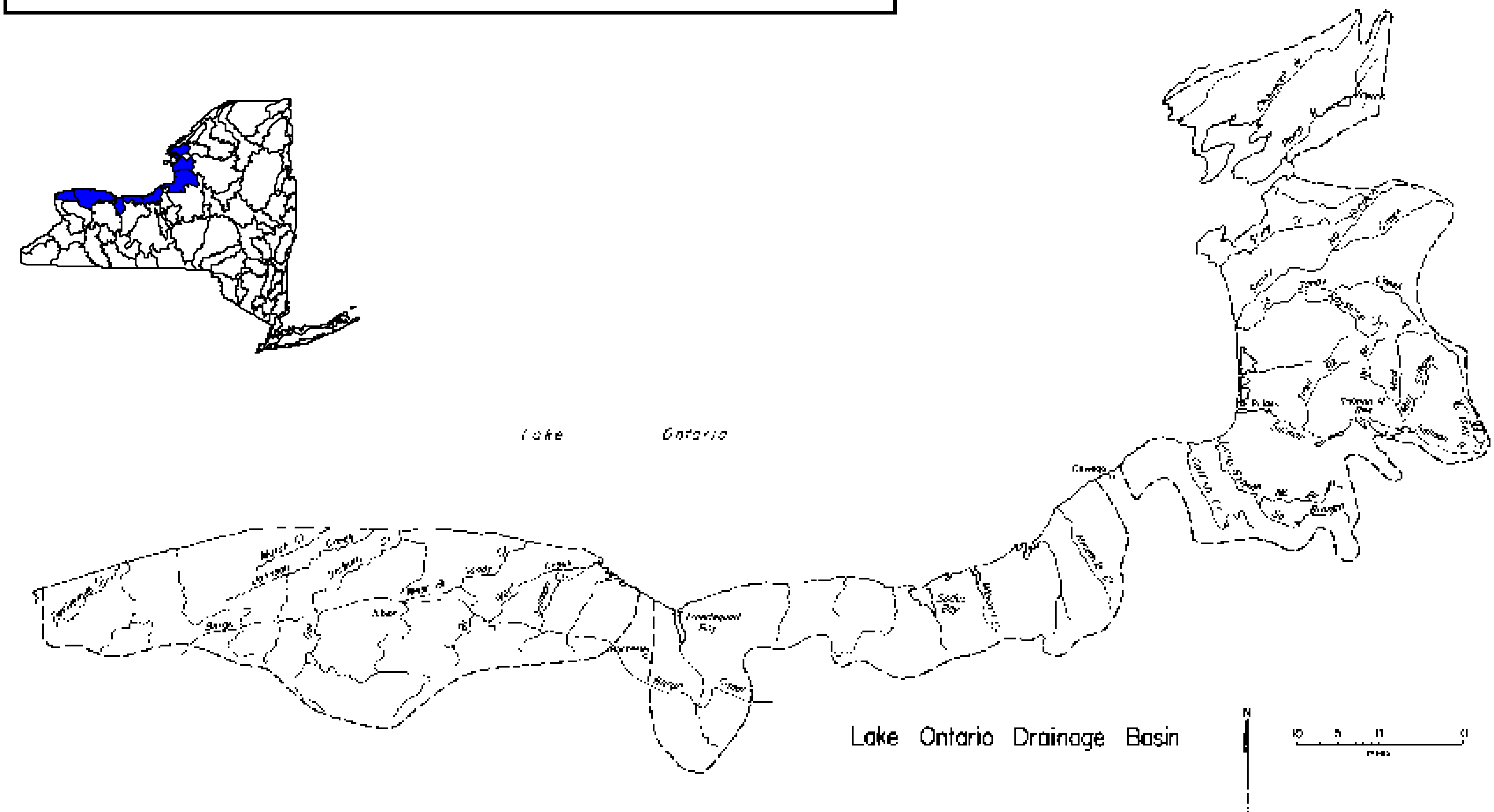
[6] F. Luckey. Potential Sources of Priority Contaminants in the Lake Ontario Drainage Basin of New York State. Under the direction of NYS DEC Division of Water, with USEPA Region II and the New England Interstate Water Pollution Control Commission. Albany, NY. September 1997.

Lake Ontario (Minor Tribs) Drainage Basin Map



The United States and Canada identified eutrophication of Lake Ontario as a major concern in the 1960s. In signing the 1972 Great Lake Water Quality Agreement, both countries agreed to control phosphorus entering the lake. A steady decrease in phosphorus loading to the lake was observed almost immediately. Many of the U.S. municipalities have met the 1 mg/l requirement; and it appears that Lake Ontario is responding to the nutrient reduction effort.

There are no persistent lakewide eutrophication problems at this time, although near shore and major tributary impairments have been noted. A 1993 report[7] prepared by the Department to consider lakewide impacts of critical pollutants indicates phosphorus levels have fallen below the 10 ug/l target level established by the International Joint Commission (IJC). Since the early 1980s, Secchi depth (an index of water clarity), increased by 20%, photosynthesis has declined about 18% and late summer zooplankton production has declined by 50%,[8] reflecting an overall shift of the lake towards a more oligotrophic condition. Shifts in phytoplankton community structure also indicate an improvement in the lake's trophic status.[9]

Spring open lake total surface phosphorus levels peaked in 1973 at 25 to 30 ug/l and then declined at an average rate of 1.35 ug/l per year between 1973 and 1986. By 1986 the 10 ug/l target level for open lake phosphorus had been achieved.[10] Decreases in phosphorus levels have been accompanied by decreases in Lake Ontario algal biomass. *Cladophora*, a green filamentous algae commonly known as "maidens hair," provides an important habitat for many aquatic invertebrates. However, the biomass and growth rate of *Cladophora* exploded under the eutrophic conditions of the 1960s and 1970s, causing serious aesthetic problems. Rotting *Cladophora* covered shorelines, allowing the growth of bacteria and creating serious odor problems. After the implementation of phosphorus reduction programs in the early 1970s, Lake Ontario *Cladophora* biomass and growth rate decreased 50% between 1972 and 1982.[11] Similar decreases were seen in phytoplankton biomass over the same period. [12]

Nitrogen, another important nutrient, was not included in loadings reduction programs because it was not considered to be a major cause of the eutrophication problems of the 1960s and 1970s. However, Lake Ontario's total nitrate plus nitrite concentrations have been increasing at a rate of approximately 10 ug/l per year since the 1970s. Increasing nitrogen levels could result in shifts in the phytoplankton community structure, causing changes in food web dynamics. Increasing nitrogen levels have been observed throughout the Great Lakes, the causes of which are not well understood. Agricultural and atmospheric sources are

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7 Lakewide Impacts of Critical Pollutants on United States Boundary Waters of Lake Ontario. NYS DEC, Division of Water and USEPA Region II, Water Management Division Technical Report. Albany, NY. December 1993.

8 Status of the Lake Ontario Offshore Pelagic Fish Community and Related Ecosystem in 1992. Lake Ontario Committee of the Great Lakes Fishery Commission. July 1992.

9 J.C. Makarewicz, T.W. Lewis and R.K. Williams. Nutrient Loadings of Streams Entering Sodus Bay and Port Bay, NY, April 1, 1990 to June 30, 1991. Wayne County Soil and Water Conservation District. Sodus, NY. September 1991.

10 1987 Report on Great Lakes Water Quality, Report to the International Joint Commission. Great Lakes Water Quality Board (GLWQB). 1989.

11 D.S. Painter and G. Kamaitis. Reduction of Cladophora Biomass and Tissues Phosphorus Concentrations in Lake Ontario, 1972-83. Canadian Journal of Fisheries and Aquatic Sciences, 44:2212-2215. 1985.

12 I.M. Gray. Differences Between Nearshore and Offshore Phytoplankton Communities in Lake Ontario. Canadian Journal of Fisheries and Aquatic Sciences, 44:2155-2163. 1987.

considered to be the most likely major sources.[13]

The effect of pollutants entering Lake Ontario via tributaries is illustrated most dramatically by the bio-accumulation of toxic substances such as mirex, PCB, dioxin and DDT. Sediment analyses have confirmed the major mirex sources as the Niagara and Oswego Rivers. The Great Lakes Water Quality Board of the International Joint Commission, an organization formed by the governments of the United States and Canada to oversee Great Lakes water quality, has categorized Lake Ontario as the most contaminated of the Great Lakes with respect to the diversity and concentrations of persistent toxic substances.

Under the 1987 agreement on the Niagara River, the four parties (NYS DEC, USEPA, Ontario Ministry of the Environment, Environment Canada) agreed to develop a joint Lake Ontario Toxics Management Plan. This plan, completed in 1989, establishes a process for the United States and Canada to use current and developing programs to the maximum extent possible to reduce toxic pollutants entering Lake Ontario. The plan further requires all four agencies to explore the need for additional measures to reduce toxics so "the Lake will provide drinking water and fish that are safe for unlimited human consumption, and allow natural reproduction, within the ecosystem, of the most sensitive native species..."

The Plan was developed with public input and is being carried out with public participation at all levels of the process. It contains commitments to control and monitor water quality as well as processes to collect and analyze the information needed to improve the effectiveness of agency programs.

The Lake Ontario Toxics Management Plan noted substantial improvements with respect to concentration trends in biota since the 1960s for a number of contaminants (e.g. PCB, DDT, mirex, and dioxin) due to restrictions placed on their manufacture and use. However, since the early 1980s this downward trend has leveled off for some substances such as PCB and mirex ,with some occasional increases in concentration also noted. This suggests continuing inputs or recycling of these substances within the system. Fish consumption advisories remain in effect for Lake Ontario for several species including American eel, channel catfish, carp, lake trout, chinook salmon, coho salmon, rainbow trout, brown trout, white perch and white sucker because of contamination by PCB, mirex and dioxin.

Five of the six Areas of Concern (AOC) identified by the IJC in New York State are tributary to Lake Ontario. These AOCs are the Niagara River and Buffalo River (discussed in the Niagara River-Lake Erie section of this report), the Rochester Embayment (Genesee River section), Oswego River/Harbor (Oswego-Seneca-Oneida River section) and Eighteenmile Creek.

Eighteenmile Creek Remedial Action Plan (RAP)

Development of the Eighteenmile Creek RAP was initiated in March 1994 with the establishment of a Remedial Action Committee (RAC). The Areas of Concern include Olcott Harbor on Lake Ontario and Eighteenmile Creek upstream to a point just below the Burt Dam in the Hamlet of Burt. A combined final Stage 1 and Stage 2 RAP document was completed and published in August 1997 by NYS DEC, in cooperation with the

Additional information on Remedial Action Plans and the RAP process is outlined on Page A-3.

[13] GLWQB, 1989.

Eighteenmile Creek RAC. Efforts to complete this publication included conducting two RAP review workshops, public information and comment meetings and field trips, as well as numerous meetings of the RAC. Past industrial and municipal waste disposal practices have contributed to the causes of use impairments in Eighteenmile Creek. Fish consumption restrictions exist because of PCBs and dioxins found in fish flesh. This is linked to Lake Ontario. The health of the benthos has been impaired by PCBs and metals in sediments. Bird and animal health is likely impaired by PCBs, dioxins, DDT and its metabolites, and dieldrin found in fish flesh. PCB and metal contamination prevents open lake disposal of dredged sediment material. Additional investigations need to be conducted concerning fish and wildlife populations, the presence of fish tumors or other deformities, and the status of plankton populations. The Remedial Advisory Committee continues to advise and assist DEC in the implementation of the RAP. Remedial strategies include the continued investigation and assessment of creek sediments (including the Barge Canal), the determination of the sources of PCBs and other contaminants, remediation of inactive hazardous waste sites, continued stream monitoring, improvements to CSOs and other discharges as necessary, and surveillance activities involving ongoing discharge control programs. Ongoing implementation projects include sediment core sampling, hazardous waste investigation at Williams Street Island, and sewer system evaluation in the City of Lockport. A study of the plankton community is planned to establish the status of this use impairment indicator.

Other Issues

The 1996 Priority Waterbodies List (PWL) cites several major embayments and connected bays as showing evidence of eutrophication and other impairments caused by non-point sources. They include Braddock Bay, the Rochester Embayment, Irondequoit Bay, Sodus Bay, East Bay, Port Bay, Little Sodus Bay, Chaumont Bay and Mud Bay. Nutrients from agricultural runoff and on-site waste disposal systems are the most frequently cited pollutant and sources. Exceptions are Braddock Bay where siltation from construction, and the Rochester Embayment where pathogen indicator bacteria from combined sewer overflows are cited as the primary pollutants and sources, respectively. A number of tributary streams are also listed as affected by pollutants from agricultural sources.

More Information

A summary listing of waterbodies included on the NYS-DEC Priority Waterbodies List is included as Table A.3. A list of waterbodies that may have been previously listed on theWI/PWL but have since been determined to need verification of possible water quality impairment is also included. More complete information about the water quality problems and issues in the basin can be found in the most recent (1996) series of Priority Waterbodies List Drainage Basin Reports.[14]

> While the Minor Tributaries to Lake Ontario are generally considered separately as one of the 17 major drainage basins of New York State, for the purposes of the RIBS Sampling Program and the Priority Waterbodies List (PWL) update cycle, the smaller tributary waters draining into Lake Ontario have recently been assigned to – and will be monitored, assessed and, in the future, reported with – the waters in one of the larger river watersheds (Niagara, Genesee, Oswego, Black) draining into the lake.

Water quality monitoring and assessment results from the NYS DEC Division of Water ambient surface water monitoring activities are summarized in the continuing series of Rotating Intensive Basin Studies (RIBS) Drainage Basin Reports.

The next RIBS monitoring effort in this basin will be incorporated into RIBS activities in the larger drainage basins of Lake Ontario.

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14 NYS DEC, 1996. The 1996 Priority Waterbodies List Basin Report Series (Niagara River-Lake Erie, Genesee River, Oswego-Seneca-Oneida Rivers, Black River). NYS DEC Division of Water Technical Report. Albany, NY. September 1996.

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
DRAINAGE BASIN: Lake Ontario										
Lake Ontario	0300-0001	multiple	G.Lakes	373.9ShrMi	A(S)	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
DRAINAGE BASIN: Lake Ontario										
SubBasin: Lake Ontario West										
Bond Lake	0301-0012	Niagara	Lake	33.0 Acres	B	Public Bathing	Stressed	Susp	Nutrients	Agriculture
Braddock Bay	0301-0010	Monroe	G.Lakes	6.0ShrMi	B	Recreation	Impaired	Susp	Silt/sediment	Construction
Eighteenmile Ck	0301-0002	Niagara	River	14.7 Miles	B,C,D	Fish Consumption	Precluded	Known	Priority Organics	Tox/Contam. Sediment
Oak Orchard Creek	0301-0014	Genesee	River	14.7 Miles	C	Aquatic Life	Impaired	Susp	Nutrients	Agriculture
Oak Orchard Creek	0301-0009	Orleans	River	4.0 Miles	C	Aquatic Life	Threatened	Known	Nutrients	Agriculture
DRAINAGE BASIN: Lake Ontario										
SubBasin: Lake Ontario Central										
Blind Sodus Bay	0302-0021	Wayne	G.Lakes	3.0ShrMi	B	Public Bathing	Stressed	Susp	Nutrients	Failing On-Site Syst
Irondequoit Bay	0302-0001	Monroe	G.Lakes	14.0ShrMi	B	Public Bathing	Impaired	Known	Nutrients	Urban Runoff
Little Sodus Bay	0302-0017	Cayuga	G.Lakes	6.8ShrMi	B	Public Bathing	Stressed	Susp	Nutrients	Failing On-Site Syst
Mink Creek	0302-0016	Wayne	River	5.5 Miles	C	Aquatic Life	Stressed	Known	Nutrients	Agriculture
Mudge Creek	0302-0010	Wayne	River	1.7 Miles	C	Aquatic Life	Stressed	Susp	Nutrients	Agriculture
Port Bay	0302-0012	Wayne	G.Lakes	7.5ShrMi	B	Public Bathing	Stressed	Known	Nutrients	Agriculture
Roch. Embayment	0302-0002	Monroe	G.Lakes	21.0ShrMi	A	Public Bathing	Impaired	Known	Pathogens	Comb. Sewer Overflow
Shipbuilders Ck	0302-0026	Monroe	River	5.0 Miles	C	Aquatic Life	Stressed	Susp	Silt/sediment	Construction
Sodus Bay	0302-0020	Wayne	G.Lakes	23.0ShrMi	B	Public Bathing	Stressed	Known	Nutrients	Failing On-Site Syst
Sodus Creek	0302-0007	Wayne	River	6.0 Miles	C(T)	Aquatic Life	Stressed	Known	Nutrients	Agriculture
Wolcott Creek	0302-0013	Wayne	River	12.0 Miles	C	Aquatic Life	Stressed	Known	Nutrients	Agriculture
DRAINAGE BASIN: Lake Ontario										
SubBasin: Lake Ontario East										
Black Pond	0303-0008	Jefferson	Lake	19.0 Acres	C	Aesthetics	Stressed	Susp	Silt/sediment	Other Source
Chaumont Bay	0303-0011	Jefferson	Bay	9000.0 Acres	C	Public Bathing	Stressed	Known	Nutrients	Failing On-Site Syst
Chaumont River	0303-0010	Jefferson	River	11.0 Miles	C	Aquatic Life	Impaired	Known	Nutrients	Failing On-Site Syst
Little Stony Creek	0303-0019	Jefferson	River	10.0 Miles	C	Aquatic Life	Stressed	Susp	Nutrients	Agriculture
Salmon River	0303-0016	Oswego	River	2.0 Miles	C(T)	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Sandy Creek	0303-0005	Jefferson	River	17.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Nutrients	Agriculture
Sandy Creek	0303-0020	Jefferson	River	200.0 Miles	C	Aquatic Life	Stressed	Susp	Nutrients	Agriculture
Stony Creek	0303-0018	Jefferson	River	20.0 Miles	C	Aquatic Life	Stressed	Susp	Nutrients	Agriculture

Waterbody Inventory - Waters Needing Verification of Impairment

Segment Name	Segment ID	County

Lake Ontario Basin (minor tributaries)

Lake Ontario West SubBasin

Buck Pond	0301-0017	Monroe
Cranberry Pond	0301-0016	Monroe
Johnson Creek	0301-0007	Orleans
Long Pond	0301-0015	Monroe
Northrup Creek	0301-0019	Monroe
Nys Barge Canal	0301-0008	Orleans
Oak Orchard Creek	0301-0004	Orleans
Oak Orchard Creek	0301-0005	Orleans
Round Pond	0301-0018	Monroe
Sandy Creek	0301-0006	Orleans
Twelve Mile Creek	0301-0011	Niagara

Lake Ontario Central

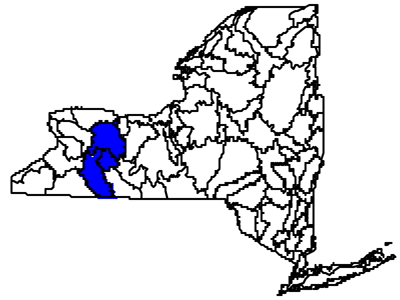
Allen Creek	0302-0022	Monroe
East Bay	0302-0011	Wayne
First Creek	0302-0008	Wayne
Four Mile Creek	0302-0006	Monroe
Irondequoit Creek	0302-0024	Monroe
Mill Creek	0302-0025	Monroe
Ninemile Creek	0302-0005	Oswego
Red Creek	0302-0014	Wayne
Sterling Creek	0302-0018	Cayuga
Thomas Creek	0302-0023	Monroe
Wolcott Ck. West	0302-0027	Wayne

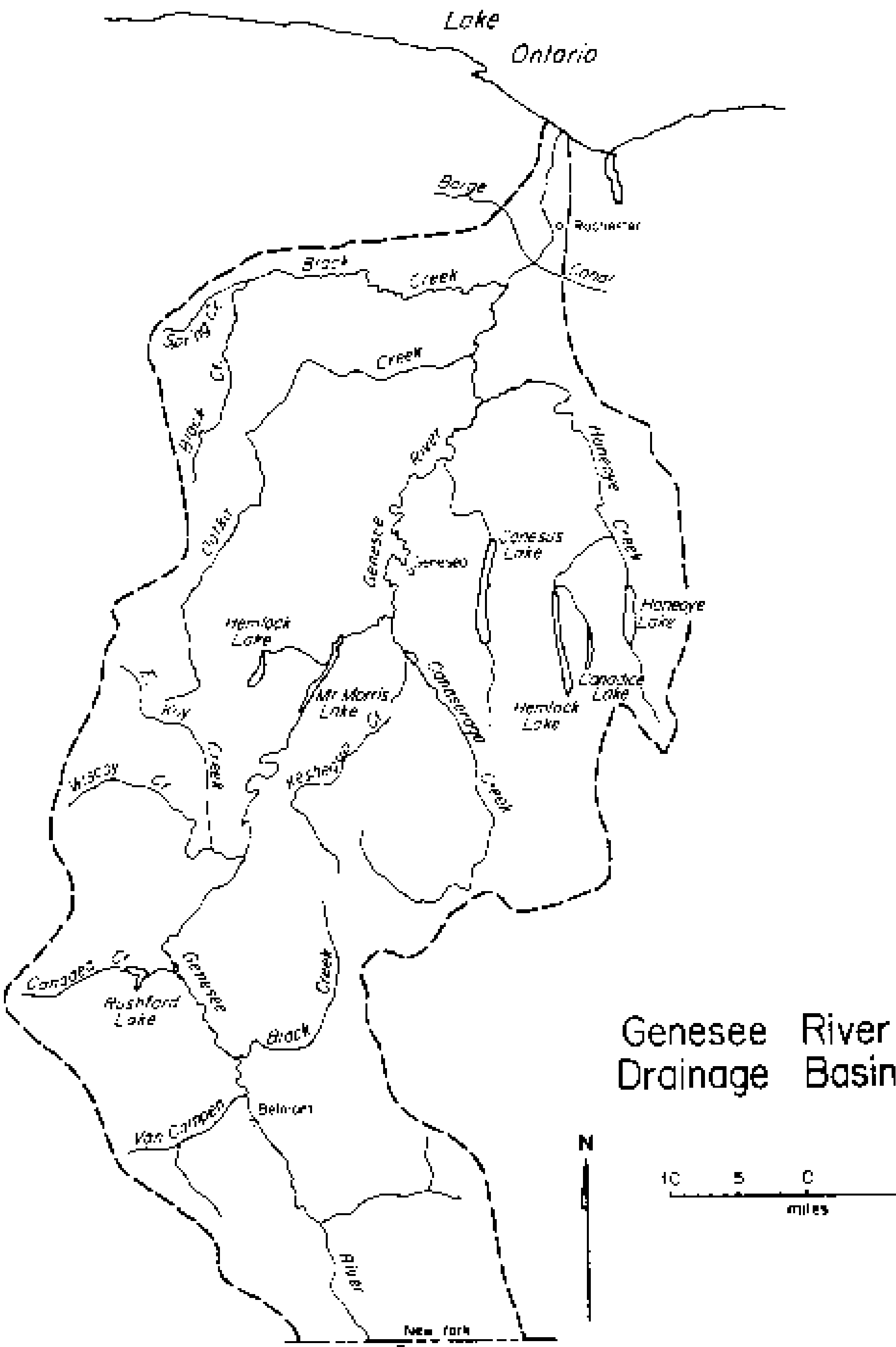
Lake Ontario East

Lake Ontario	0303-0017	Oswego
Little Salmon Riv	0303-0015	Oswego
Little Sandy Crk	0303-0013	Oswego
N&S Sandy Pond	0303-0002	Oswego
Stony Creek	0303-0009	Jefferson
Wine Creek	0303-0001	Oswego

Many of the waterbody segments included on previous editions of the Priority Waterbodies List have limited recent documentation of specific water quality impairment. In an effort to improve the quality of information in theWI/PWL, these waterbody segments Needing Verification of an Impairment are tracked on a list separate from the Priority Waterbodies List.

Genesee River Drainage Basin Map





The Genesee River Basin

Background

The Genesee River basin has its headwaters in Pennsylvania and flows north across the width of the western arm of New York State to Lake Ontario. The drainage basin consists of 2,400 square miles in New York and is inhabited by approximately 400,000 persons. A major portion of this population resides in the Rochester Metropolitan Statistical Area which also contains most of the industrial and commercial activity in the basin. The rest of the basin is lightly populated and primarily rural-agricultural in character with small population centers.

Water Quality Issues and Concerns

As mentioned above, industrial/commercial activities and other effects of the more densely populated Rochester area are responsible for water quality impairments in the Lower Genesee Basin. Upstream of the Rochester metropolitan area, water quality is generally good but often impacted by various nonpoint sources.

Rochester Embayment Remedial Action Plan (RAP)

The Monroe County Department of Health has and continues to provide a lead role in the development and implementation of the Remedial Action Plan (RAP) for the Rochester Embayment. This process initially received USEPA funding and continues with NYS DEC technical assistance. The Stage 1 document was completed in August 1993. Twelve of the fourteen specific use impairments outlined by the International Joint Commission (IJC) were identified as existing in the Rochester Embayment Area of Concern. The development of the Stage 2 RAP was completed and published in September 1997. The Area of Concern includes a 35 sq.mi. portion of Lake Ontario and a six mile reach of the lower Genesee River. The Monroe County Water Quality Management Advisory Committee (WQMAC) and four oversight committees that report to the WQMAC provide advice and oversight on RAP implementation and on RAP/general water quality public participation activities. The Monroe County Water Quality Coordinating Committee (WQCC), a technical advisory committee consisting of municipal, county, state, and federal agency representatives, continues to maintain a function of guiding the implementation of the RAP. Four task groups have been established. These four task groups and one of the oversight committees are advancing the implementation of five new RAP actions. The focus of the new actions are lawn care education, pollution prevention for auto recyclers, maximizing phosphorus removal at small wastewater treatment plants, creation of a water quality education collaborative organization, and establishment of a phosphorus loading goal. Activities completed or already underway that contribute to RAP implementation include: three watershed planning projects; point and nonpoint source pollution abatement projects; combined sewer overflow abatement; mercury pollution prevention project including two outstanding publications; monitoring activities; and educational efforts. An addendum to the RAP was published in 1999 to update and report on remedial measures, studies, and monitoring methods. Considerable progress has been made in establishing delisting criteria and monitoring needs to work towards the goal of restoring and protecting beneficial uses.

Additional information on Remedial Action Plans and the RAP process is outlined on Page A-3.

Other Issues

In the primarily rural and agricultural upper Genesee Basin, silt and nutrients from agricultural sources are the primary cause of water quality impairment. A few WI/PWL segments are listed because of toxic pollutants. One is Canadice Lake which has a fish consumption advisory in effect for lake trout and brown trout due to PCB contamination. Another is the Genesee River at Wellsville which is listed because the village's water supply had to be moved upstream to avoid contamination by pollutants from an abandoned oil refinery landfill which is now a state Superfund site.

More Information

A summary listing of waterbodies included on the NYS-DEC Priority Waterbodies List is included as Table A.4. A list of waterbodies that may have been previously listed on theWI/PWL but have since been determined to need verification of possible water quality impairment is also included. More complete information about the water quality problems and issues in the basin can be found in the most recent (1996) series of Priority Waterbodies List Drainage Basin Reports.[15]

Water quality monitoring data from the NYS DEC Rotating Intensive Basin Studies (RIBS) Program is also available. The most recent completed RIBS effort in the Genesee River Drainage Basin was conducted in 1995-96; data for this study are available. The most recent available RIBS Report for the basin outlines results from a study conducted in 1989-90.[16]

The next RIBS monitoring effort in the basin is currently underway (1999-2000), with water quality assessment to be conducted in 2001.

[15] NYS DEC, 1996. The 1996 Priority Waterbodies List for the Genesee River Basin. NYS DEC Division of Water Technical Report. Albany, NY. September 1996.

[16] J.A. Myers, R.L. Gabriel and R.M. Garry. The Biennial RIBS Report, 1989-90. DEC Division of Water Technical Report. Albany, NY. May 1992.

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
DRAINAGE BASIN: Genesee River										
SubBasin: Barge Canal to Lake Ontario										
Genesee River	0401-0001	Monroe	River	6.0 Miles	B	Public Bathing	Stressed	Susp	Other Pollutants	Unknown Source
Genesee River	0401-0003	Monroe	River	19.0 Miles	B	Aquatic Life	Stressed	Susp	Silt/sediment	Hydro/Habitat Modif.
Lake Ontario Shre	0401-0011	Monroe	G.Lakes	1.0ShrMi	A	Public Bathing	Impaired	Known	Pathogens	Storm Sewers
DRAINAGE BASIN: Genesee River										
SubBasin: Mt. Morris to Barge Canal										
Black Creek	0402-0028	Monroe	River	2.0 Miles	B	Public Bathing	Impaired	Susp	Nutrients	Other Source
Black Creek	0402-0033	Monroe	River	17.0 Miles	B	Recreation	Impaired	Known	Other Pollutants	Other Source
Browns Creek	0402-0034	Livingston	River	4.0 Miles	C	Aquatic Life	Impaired	Known	Oxygen Demand	Failing On-Site Syst
Canadice Lake	0402-0002	Ontario	Lake(R)	672.0 Acres	AA	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Conesus Lake	0402-0004	Livingston	Lake	3180.0 Acres	AA	Public Bathing	Impaired	Known	Nutrients	Other Source
Genesee River	0402-0009	Livingston	River	25.0 Miles	C	Aquatic Life	Stressed	Susp	Silt/sediment	Hydro/Habitat Modif.
Hemlock Lake	0402-0011	Livingston	Lake(R)	2070.0 Acres	AA(T)	Water Supply	Impaired	Known	Silt/sediment	Hydro/Habitat Modif.
Lake Lagrange	0402-0008	Wyoming	Lake	64.0 Acres	A	Water Supply	Threatened	Known	Nutrients	Agriculture
Le Roy Reservoir	0402-0003	Genesee	Lake(R)	51.0 Acres	A	Water Supply	Impaired	Known	Nutrients	Agriculture
Upper Bigelow Ck	0402-0016	Genesee	River	3.7 Miles	B	Public Bathing	Stressed	Susp	Silt/sediment	Agriculture
DRAINAGE BASIN: Genesee River										
SubBasin: PA Border to Mt. Morris										
Genesee River	0403-0001	Allegany	River	10.0 Miles	A(T)	Water Supply	Stressed	Susp	Silt/sediment	Streambank Erosion
Rushford Lake	0403-0024	Allegany	Lake	570.0 Acres	B(T)	Public Bathing	Stressed	Susp	Pathogens	Failing On-Site Syst
Van Campen Creek	0403-0025	Allegany	River	2.0 Miles	C	Aquatic Life	Impaired	Susp	Oxygen Demand	Municipal
DRAINAGE BASIN: Genesee River										
SubBasin: Canaseraga Creek										

Waterbody Inventory - Waters Needing Verification of Impairment

Segment Name	Segment ID	County

Genesee River Basin

Segment Name	Segment ID	County
Barge Canal to Lake Ontraio		
NYS Barge Canal	0401-0012	Monroe
Mt. Morris to Barge Canal		
Genesee River	0402-0026	Monroe
Hemlock Outlet	0402-0013	Livingston
Honeoye Lake	0402-0032	Ontario
Limekiln Creek	0402-0007	Livingston
Little Beards Ck	0402-0014	Livingston
Lower Honeoye Ck	0402-0019	Ontario
Oatka Creek	0402-0029	Wyoming
Oatka Creek	0402-0027	Monroe
Oatka Creek	0402-0031	Genesee
Red Creek	0402-0024	Monroe
PA Border to Mt.Morris		
Caneadea Creek	0403-0008	Allegany
Dyke Creek	0403-0004	Allegany
East Koy Creek	0403-0020	Wyoming
Genesee River	0403-0022	Allegany
Genesee River	0403-0006	Livingston
Silver Lake	0403-0002	Wyoming
Van Der Mark Ck	0403-0011	Allegany
Wiscoy Creek	0403-0019	Wyoming
Wiscoy Creek	0403-0023	Allegany
Wolf Creek	0403-0003	Wyoming
Canseraga Creek SubBasin		
Canaseraga Creek	0404-0002	Allegany
Canaseraga Creek	0404-0001	Livingston

Many of the waterbody segments included on previous editions of the Priority Waterbodies List have limited recent documentation of specific water quality impairment. In an effort to improve the quality of information in theWI/PWL, these waterbody segments Needing Verification of an Impairment are tracked on a list separate from the Priority Waterbodies List.

The Chemung River Basin

Background

The Chemung River drains a portion of the New York State (and Pennsylvania) highlands south of Central New York's Finger Lakes before joining the main stem of the Susquehanna River a short distance across the New York State border. Approximately 1,700 of the 2,600 square mile basin lies within New York State, encompassing most of Steuben and Chemung Counties, a significant portion of Schuyler County and smaller portions of Allegany, Livingston, Ontario and Yates Counties. The basin also includes portions of Tioga, Potter and Bradford Counties in Pennsylvania. The Chemung River Basin represents about one-eighth of the larger Susquehanna River drainage which eventually empties into the Chesapeake Bay.

The population of the Chemung River Basin totals approximately 190,000 (1990). It is a lightly populated, mostly rural, agricultural region with larger urban population centers at Elmira, Corning and Hornell. About half of the basin residents live in the Elmira Metropolitan Statistical Area.

The 38-mile long Chemung River originates just west of Corning at the confluence of the Cohocton and Tioga Rivers. The Canisteo River, which joins the Tioga just above its mouth is another major tributary. Approximately 1,530 miles (or 60%) of the Chemung Basin's river and stream miles lie within New York State. More than half of the lakes, reservoirs and ponds in the basin (58 of 109) are also located in New York. These 58 waterbodies cover 2,430 acres.

Water Quality Issues and Concerns

Water quality problems in the Chemung River Basin, relative to those in some other parts of New York State, are fairly limited in their impact. However, the significant agricultural activities and the basin's large rural population (generally served by on-site septic systems) result in nonpoint source pollution problems that have become a growing concern all across the state and nation.

Nonpoint Sources

The most frequently cited impairments to waters in the Chemung River Basin are bathing/swimming in area lakes, and aquatic life support. In both cases, nutrient runoff from agricultural activity and failing and/or inadequate on-site septic systems are often identified as the source of the impairment.

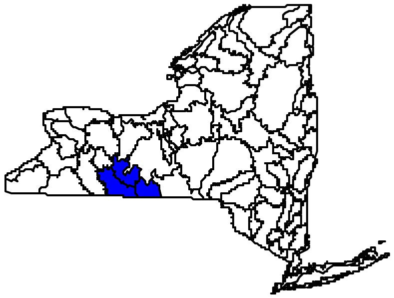
Siltation and high sediment loads which affect fish populations, bathing, and aesthetics are also cited as primary water quality problems in the basin. Streambank erosion, a consequence of steep topography and natural geology (easily eroded sedimentary rock), accounts for much of this problem. Resource extraction (mining and logging) has also been noted as a contributing factor to the erosion problem.

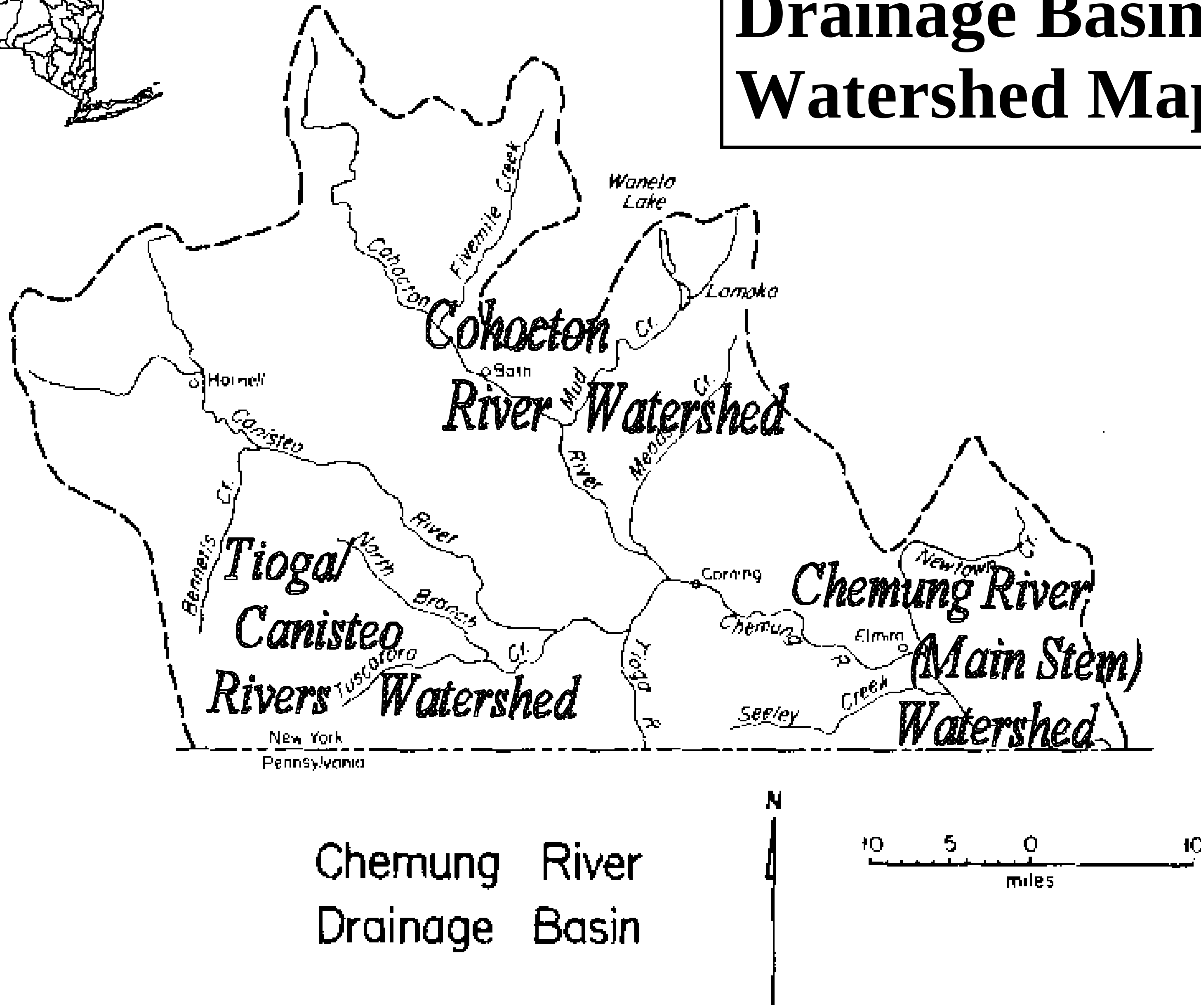
A much larger percentage of lake acres (as opposed to river miles) in the basin are listed as experiencing use impairments. The three (3) largest lakes in the New York State portion of the basin (Lamoka Lake, Waneta Lake and Almond Lake) which have impairments to bathing/swimming comprise over 85% of the total lake acres. Failing and/or inadequate on-site septic systems are most often cited as explanation for the excessive aquatic weed growth limiting lake recreation.

Flooding

A tendency toward flooding in the basin is attributable to topography that features short, steeply sloping tributary valleys. Storm and spring snowmelt runoff patterns are quite flashy; streams that are virtually dry can erupt into raging torrents after a heavy rainfall. The region has benefitted from significant federal investment in flood control structures. The most recent projects were, in large part, a response to the damage from Hurricane Agnes in 1972 which devastated the area.

Chemung River Drainage Basin Watershed Map





Water Quality Assessment

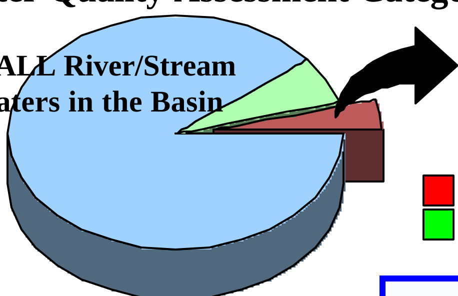
The series of charts presented here provide an overall assessment of waterbody impairments in the Chemung River Basin. For each of the waterbody types in the basin (rivers/streams, lakes/reservoirs) the first pie chart reveals the percentage of the miles/acres of waters in the basin that fall into various *Water Quality Assessment Categories*. The red slice of the pie indicates the percentage of waters characterized as segments with *Known Water Quality Problems/Impairments* or as *Threatened Segments*. Taken together, these waters represent the ***Priority Waterbodies*** (for that waterbody type) within the basin. The second pie chart shows the severity of the primary use impairment for those *Priority Waterbodies*.

The bar charts indicate the pollutant sources that are most frequently cited as primary contributors to the water quality impairments for *Priority Waterbodies* in the Chemung River Basin. The charts reflect the percentage of the total waterbody area on the Priority Waterbodies List where the source is listed as the primary contributor to the impairment. For each source, the data are further segregated by the severity of the water use impairment (*precluded*, *impaired*, *stressed*, *threatened*) caused by the source.

Rivers/Streams

Water Quality Assessment Categories

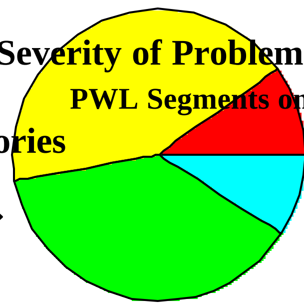
for ALL River/Stream Waters in the Basin



Priority Waterbody Segments
Segments Needing Verification
NonImpacted/UnAssessed

Severity of Problems

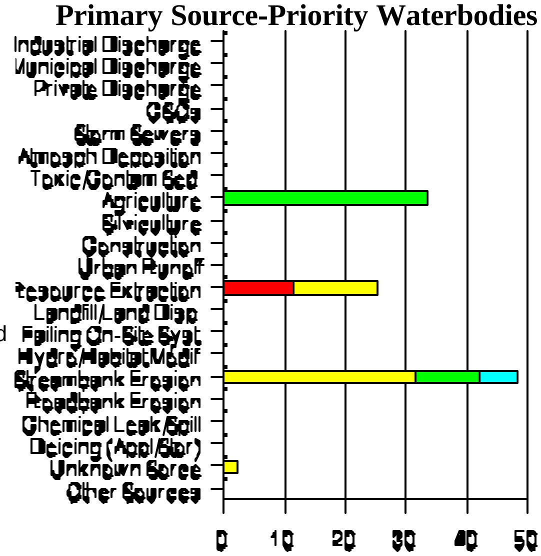
PWL Segments only



Precluded
Stressed
Impaired
Threatened

Chemung River Basin
Total River Miles: 1529

Primary Source-Priority Waterbodies

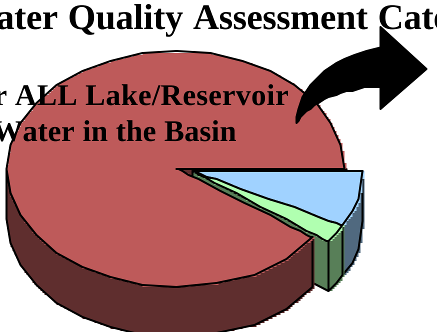


Percent of PWL Waters Affected

Lakes/Reservoirs

Water Quality Assessment Categories

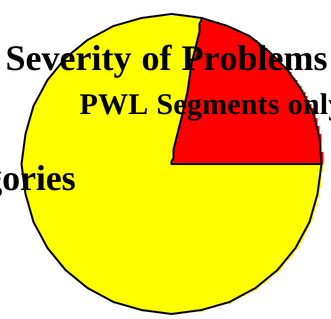
for ALL Lake/Reservoir Water in the Basin



Priority Waterbody Segments
Segments Needing Verification
NonImpacted/UnAssessed

Severity of Problems

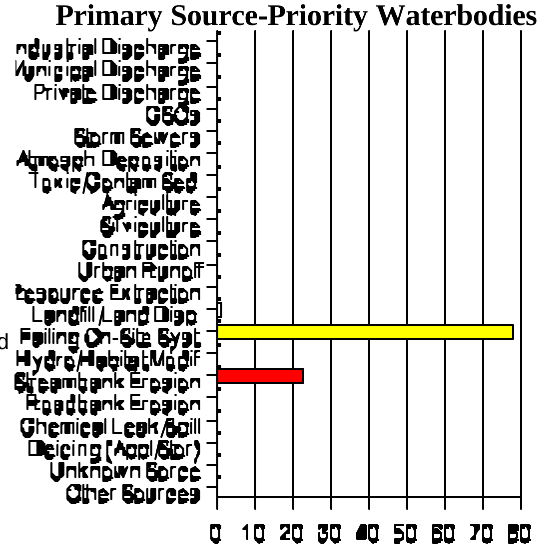
PWL Segments only



Precluded
Stressed
Impaired
Threatened

Chemung River Basin
Total Lake Acres: 2,432

Primary Source-Priority Waterbodies



Percent of PWL Waters Affected

More Information

A summary listing of waterbodies included on the NYS-DEC Priority Waterbodies List is included as Tables A.5a-b. Segments with known water quality impacts/impairments or concerns are listed in Table A.5a; Table A.5b lists segments where water quality is threatened by ongoing activities in the watershed. The Threatened Waterbodies list also includes Special Protection waters. These waters experience no use restrictions or immediate threats to water quality but nonetheless remain highly valued resources deemed worthy of special protection and consideration. A table of waterbodies needing the verification of possible water quality impairment is also included (Table A.5c).

More complete information about the water quality problems and issues in the basin can be found in the most recent Waterbody Inventory/Priority Waterbodies List Report for the Chemung River Basin.[17]

Water quality monitoring data from the NYS DEC Rotating Intensive Basin Studies (RIBS) Program is also available. The most recent RIBS effort in the Chemung River Drainage Basin was conducted in 1997-98; data for this study are available. The most recent available RIBS Report for the basin outlines results from a study conducted in 1991-92.[18]

The next RIBS monitoring effort in the basin is scheduled for 2002-2003, with water quality assessment to be conducted in 2004.

[17] NYS DEC, 2000. The 1998 Chemung River Basin Waterbody Inventory and Priority Waterbodies List. NYS DEC Division of Water Technical Report. Albany, NY. December 1998.

[18] J.A. Myers, R.L. Gabriel and R.M. Garry. The Biennial RIBS Report, 1991-92. NYS DEC Division of Water Technical Report. Albany, NY. February 1994.

Chemung River Basin PWL - Water Quality Impacted Segments Table A.5a

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Stream Class
PA 3-28- 6- 1- 3-13a	KOPPERS POND (0501-0012)	Chemung Co.	15.0 Acre	Lake	C
	Fish Consumption KNOWN to be IMPAIRED by Priority Organics (known) from Landfill/Land Disp. (known)				
PA 3-28-11	BEAVER BROOK/TRIBS (0501-0003)	Chemung Co.	7.0 Mile	River	C(T)
	Fish Propagation KNOWN to be PRECLUDED by Silt/sediment (suspected) from Resource Extraction (suspected)				
PA 3-57	TIOGA RIVER (0503-0004)	Steuben Co.	8.0 Mile	River	C
	Fish Propagation SUSPECTED IMPAIRED by Acid/Base (pH) (suspected) from Resource Extraction (suspected)				
PA 3-57-5-47	CANACADEA CREEK (0503-0008)	Steuben Co.	2.0 Mile	River	C
	Fish Propagation SUSPECTED IMPAIRED by Unknown Toxicity (suspected) from Unknown Source (suspected)				
PA 3-57-5-47-P29c	ALMOND LAKE (0503-0003)	Steuben Co.	480.0 Acre	Lake	B
	Bathing/Swimming KNOWN to be PRECLUDED by Silt/sediment (known) from Streambank Erosion (known)				
PA 3-57-5-47	CANACADEA CREEK (0503-0005)	Allegany Co.	6.5 Mile	River	C(TS)
	Fish Propagation SUSPECTED STRESSED by Silt/sediment (known) from Streambank Erosion (known)				
PA 3-58	COHOCTON RIVER (0502-0010)	Steuben Co.	20.0 Mile	River	C
	Fish Propagation SUSPECTED STRESSED by Nutrients (possible) from Agriculture (possible)				
PA 3-58-3	MEADS CREEK (0502-0008)	Schuyler Co.	19.0 Mile	River	C(T)
	Fish Propagation SUSPECTED IMPAIRED by Silt/sediment (known) from Streambank Erosion (known)				
PA 3-58-15-P47	LAMOKA LAKE (0502-0001)	Schuyler Co.	835.0 Acre	Lake	A
	Bathing/Swimming KNOWN to be IMPAIRED by Nutrients (known) from Failing On-Site Syst (known)				
PA 3-58-15-P47-4-P48	WANETA LAKE (0502-0002)	Schuyler Co.	781.0 Acre	Lake	A
	Bathing/Swimming KNOWN to be IMPAIRED by Nutrients (known) from Failing On-Site Syst (known)				
PA 3-58-20..P51	LAKE SALUBRIA (0502-0011)	Steuben Co.	50.0 Acre	Lake	B
	Bathing/Swimming KNOWN to be IMPAIRED by Nutrients (suspected) from Failing On-Site Syst (suspected)				
PA 3-58-31-10-P68	DEMMONS POND (0502-0015)	Steuben Co.	32.0 Acre	Lake	B
	Bathing/Swimming KNOWN to be IMPAIRED by Nutrients (suspected) from Failing On-Site Syst (suspected)				

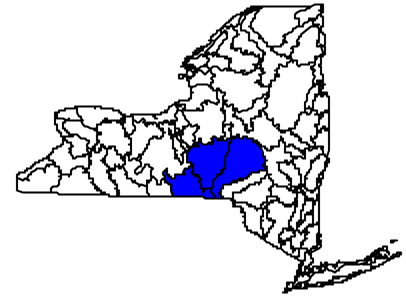
Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Stream Class
PA 3-18	SEELEY CREEK (0501-0013) Fish Propagation KNOWN to be THREATENED by Silt/Sediment (known) from Streambank Erosion (known)	Chemung Co.	6.0 Mile	River	C(T)

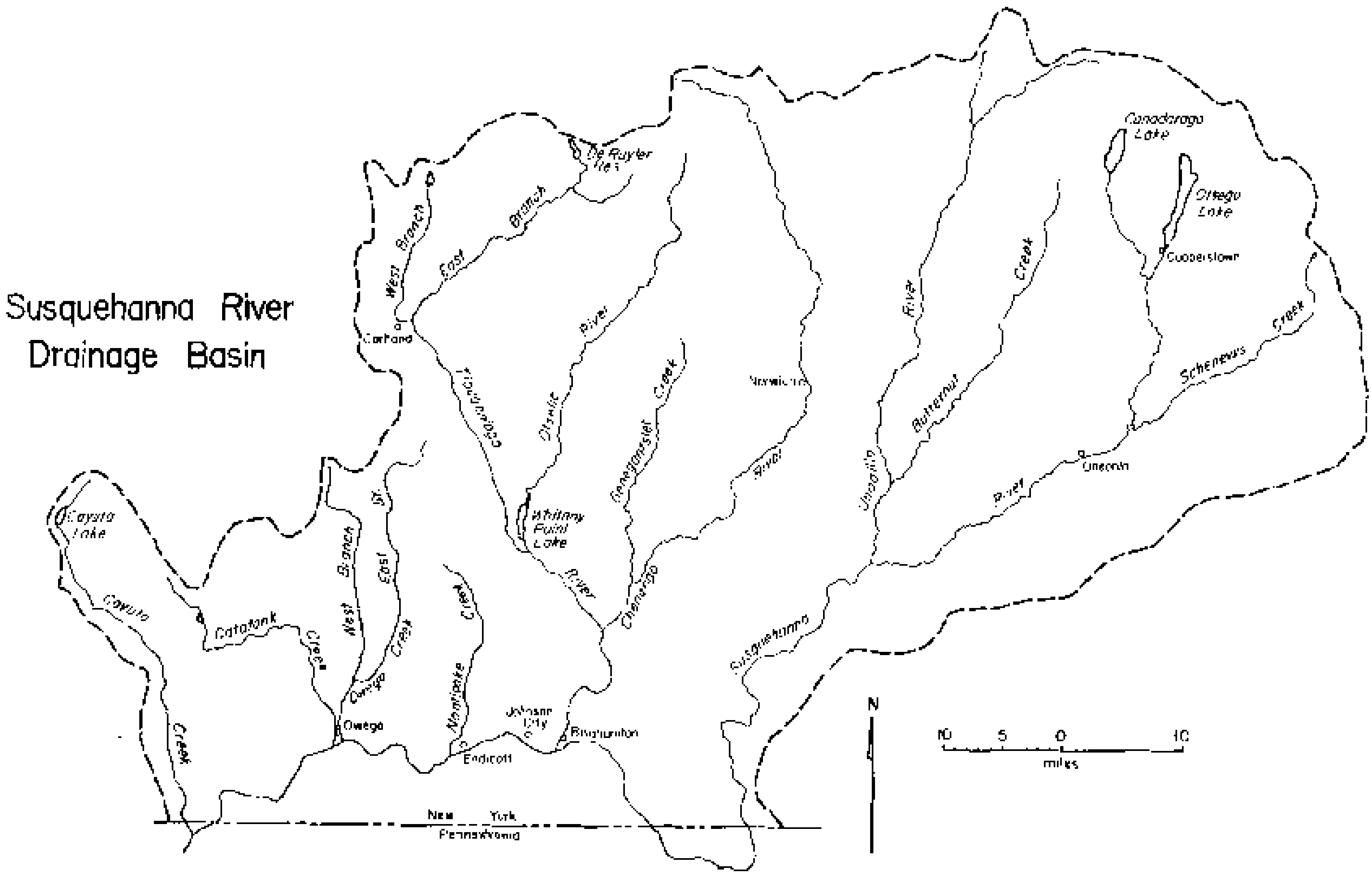
While there are, undoubtedly, other waterbodies whose water uses are "threatened" in some manner or another, these other segments do not meet the *specific* criteria necessary to be listed on the *Threatened Waterbodies List*.

Chemung River Basin Waterbody Impairments Needing Verification Table A.5c

Water Index Number	Waterbody/Segment Name (ID)	County	Seg Size	Type	Stream Class
	Use Impairment/Pollutant/Cause Information				
PA 3-28	NEWTOWN CREEK (0501-0007)	Chemung Co.	8.0 Mile	River	C
	Fish Propagation POSSIBLY STRESSED by Thermal Changes (possible) from Hydro/Habitat Modif. (possible)				
PA 3-52	POST CREEK (0501-0004)	Schuyler Co.	10.0 Mile	River	C(TS)
	Fish Propagation POSSIBLY STRESSED by Silt/sediment (suspected) from Streambank Erosion (suspected)				
PA 3-57-5	CANISTEO RIVER (0503-0006)	Steuben Co.	26.0 Mile	River	C
	Fish Propagation POSSIBLY STRESSED by Silt/sediment (suspected) from Streambank Erosion (suspected)				
PA 3-57-5	CANISTEO RIVER (0503-0001)	Steuben Co.	6.0 Mile	River	C
	Fish Propagation SUSPECTED IMPAIRED by Unknown Toxicity (possible) from Other Source (possible)				
PA 3-57-5-40	BENNETTS CREEK (0503-0007)	Steuben Co.	11.0 Mile	River	C(T)
	Fish Propagation POSSIBLY STRESSED by Silt/sediment (suspected) from Streambank Erosion (suspected)				
PA 3-58-15-P47-6	TOBEHANNA CREEK (0502-0007)	Schuyler Co.	9.0 Mile	River	C
	Boating POSSIBLY STRESSED by Nutrients (suspected) from Agriculture (suspected)				
PA 3-58-19	STOCKING CREEK (0502-0016)	Steuben Co.	7.5 Mile	River	C(T)
	Fish Propagation POSSIBLY STRESSED by Nutrients (possible) from Agriculture (possible)				
PA 3-58	COHOCTON RIVER (0502-0003)	Steuben Co.	5.0 Mile	River	C(T)
	Fish Propagation POSSIBLY STRESSED by Nutrients (possible) from Other Source (possible)				
PA 3-58-31	GOFF CREEK (0502-0013)	Steuben Co.	10.0 Mile	River	C(TS)
	Fish Propagation POSSIBLY STRESSED by Nutrients (possible) from Agriculture (possible)				
PA 3-58-31-7-P66	SMITH POND (0502-0012)	Steuben Co.	60.0 Acre	Lake	B
	Bathing/Swimming SUSPECTED STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected)				
PA 3-58-38-1	CASTLE CREEK (0502-0014)	Steuben Co.	10.0 Mile	River	C(TS)
	Fish Propagation POSSIBLY STRESSED by Nutrients (possible) from Agriculture (possible)				

Susquehanna River Drainage Basin Map





The Susquehanna River Basin

Background

The Susquehanna River Basin drains some 4,500 square miles within New York State and contains about 5,500 miles of rivers and streams. Included are major portions of the counties of Broome, Tioga, Chenango, Cortland, and Otsego, and varying portions of the counties of Delaware, Schoharie, Herkimer, Oneida, Madison, Onondaga, Tompkins, Schuyler, and Chemung. The total population of the basin is approximately 500,000, with about half residing in the Binghamton Metropolitan Statistical Area (MSA). The Susquehanna River begins at the outlet of Otsego Lake at Cooperstown and flows southward across the Pennsylvania border south of Windsor, New York, where it flows through Pennsylvania for a short distance and then flows back into New York near Kirkwood. It then continues north and west to Binghamton, then west to be joined by the Chemung River south of the state line near Sayre, PA. The Susquehanna River continues through central Pennsylvania and Maryland, emptying into the Chesapeake Bay.

Water Quality Issues and Concerns

Due to the primarily rural-agricultural character of the Susquehanna River Drainage Basin, most of the water quality problems in the basin tend to be the result of agricultural activities and other nonpoint sources that are becoming a growing concern all across the state and throughout the country. Current conservation problems center around poor management of pasturelands, grasslands, and woodlands, and flooding that results in soil and streambank erosion. Some municipal discharges have also been cited as contributing to localized nutrient enrichment problems. Toxic pollutants have not been identified as a significant water quality problem in the basin. There are no specific fish consumption advisories currently in effect in the Susquehanna River Basin. Point source issues in the basin are primarily related to ammonia and nitrogen compounds. Several of the larger wastewater treatment plants in the basin are being modified to increase ammonia removal in order to meet the appropriate ammonia standards in the river. Some of these same plants are also undergoing construction to achieve nitrogen removal, high loadings of which are of concern in the Chesapeake Bay.

Agricultural/Nonpoint Sources

The 1996 Priority Waterbodies List (PWL) indicates that nutrient enrichment is the most frequently cited problem in the rivers and lakes of the Susquehanna River Basin. These problems are generally attributed to agricultural runoff and/or failing on-site waste systems. Some municipal wastewater treatment plant discharges have also been identified as contributing excessive nutrients to the waters; however, many of these facilities have undergone recent upgrades and their impact is thought to have been reduced. Excessive growth of aquatic vegetation extending from lakeshores makes access to the open water difficult, decreases the use of the water for boating and bathing, and is aesthetically unpleasing.

Other Issues

Siltation and high sediment loads resulting from streambank erosion, construction, and agricultural practices are also cited as a water quality problem. Aquatic life support was identified as the primary use impairment in the streams in this basin. Streambank erosion and nutrient runoff from farms eliminate good fish habitats by covering the stream bottoms and preventing the growth of vegetation that is beneficial to the fish. Silt and sedimentation also contribute to problems farther downstream in Pennsylvania where impoundments behind dams are filling in with solids.

Combined Sewer Overflows (CSOs) in the more urban Binghamton-Endicott-Johnson City area are cited as causing aesthetic problems and affecting aquatic life. These CSOs are being addressed through a Consent Order with the municipalities and are on schedule to meet federal policy on CSOs by 2002.

Though not a surface water issue, past industrial discharges have resulted in the contamination of groundwater at several locations in the basin.

More Information

A summary listing of waterbodies included on the NYS-DEC Priority Waterbodies List is included as Table A.6. A list of waterbodies that may have been previously listed on theWI/PWL but have since been determined to need verification of possible water quality impairment is also included. More complete information about the water quality problems and issues in the basin can be found in the most recent (1996) series of Priority Waterbodies List Drainage Basin Reports.[19]

Water quality monitoring data from the NYS DEC Rotating Intensive Basin Studies (RIBS) Program are also available. The most recent RIBS effort in the Susquehanna River Drainage Basin was conducted in 1997-98; data from this study is available. The most recent available RIBS Report for the basin outlines results from a study conducted in 1991-92.[20]

The sampling component of 1998-99 water quality assessment of the basin has been completed. The assessment of those sampling results is currently underway, with a revised WI/PWL due out in Fall 2000. The next RIBS monitoring effort in the basin is scheduled for 2003-2004.

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19 NYS DEC, 1996. The 1996 Priority Waterbodies List for the Susquehanna River Basin. NYS DEC Division of Water Technical Report. Albany, NY. September 1996.

20 J.A. Myers, R.L. Gabriel and R.M. Garry. The Biennial RIBS Report, 1991-92. NYS DEC Division of Water Technical Report. Albany, NY. February 1994.

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
DRAINAGE BASIN: Susquehanna River										
SubBasin: Upper Susquehanna/Unadilla River										
Canadarago Lake	0601-0016	Otsego	Lake	1894.0 Acres	B	Aquatic Life	Stressed	Susp	Nutrients	Agriculture
Cripple Creek	0601-0032	Otsego	River	1.5 Miles	C(T)	Aquatic Life	Stressed	Susp	Nutrients	Agriculture
Goodyear Lake	0601-0015	Otsego	Lake	365.0 Acres	B	Recreation	Stressed	Susp	Nutrients	Failing On-Site Syst
North Winfield Cr	0601-0035	Herkimer	River	4.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Agriculture
Susquehanna River	0601-0020	Otsego	River	6.0 Miles	B	Aquatic Life	Stressed	Susp	Unknown Toxicity	Other Source
Unadilla River	0601-0037	Herkimer	River	3.2 Miles	C(T)	Aquatic Life	Impaired	Known	Silt/sediment	Agriculture
Young Lake	0601-0026	Herkimer	Lake	10.0 Acres	B	Aquatic Life	Stressed	Susp	Nutrients	Agriculture
DRAINAGE BASIN: Susquehanna River										
SubBasin: Chenango/Tioughnioga River										
Brooks Creek	0602-0001	Broome	River	1.0 Miles	C	Aquatic Life	Impaired	Susp	Metals	Landfill/Land Disp.
Chenango River	0602-0009	Chenango	River	45.0 Miles	B,C,BT	Aquatic Life	Stressed	Susp	Nutrients	Municipal
Dudley Creek	0602-0037	Broome	River	5.0 Miles	C,C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Agriculture
Eaton Brook Res.	0602-0041	Madison	Lake	35.0 Acres	B	Public Bathing	Threatened	Known	Nutrients	Failing On-Site Syst
Gorton Lake	0602-0040	Madison	Lake	7.0 Acres	B	Recreation	Stressed	Susp	Nutrients	Failing On-Site Syst
Lake Moraine	0602-0007	Madison	Lake	235.0 Acres	B	Recreation	Impaired	Known	Nutrients	Failing On-Site Syst
Norwich Reservoir	0602-0010	Chenango	Lake(R)	15.0 Acres	A	Water Supply	Stressed	Susp	Nutrients	Failing On-Site Syst
Otselic River	0602-0015	Chenango	River	15.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Thermal Changes	Agriculture
Otselic River	0602-0043	Madison	River	6.0 Miles	CT, C	Aquatic Life	Impaired	Known	Thermal Changes	Agriculture
Phelps Creek	0602-0035	Broome	River	3.0 Miles	C	Aesthetics	Stressed	Susp	Silt/sediment	Construction
Plymouth Reservr.	0602-0014	Chenango	Lake	78.0 Acres	B	Recreation	Stressed	Susp	Nutrients	Failing On-Site Syst
Song Lake	0602-0019	Cortland	Lake	109.0 Acres	B	Public Bathing	Impaired	Known	Nutrients	Agriculture
Tioughnioga River	0602-0002	Cortland	River	13.5 Miles	B(T)	Aquatic Life	Impaired	Susp	Other Pollutants	Unknown Source
Tully Lake	0602-0018	Cortland	Lake	115.0 Acres	B	Public Bathing	Impaired	Known	Nutrients	Municipal
Tully Lake	0602-0047	Onondaga	Lake	115.0 Acres	B	Public Bathing	Impaired	Known	Nutrients	Municipal
Upper Lit.York Lk	0602-0017	Cortland	Lake	102.0 Acres	B	Public Bathing	Impaired	Known	Nutrients	Agriculture
Whitney Pt. Res.	0602-0004	Broome	Lake	1200.0 Acres	C	Aquatic Life	Impaired	Known	Nutrients	Agriculture
Woodman Pond	0602-0048	Madison	Lake(R)	118.0 Acres	A	Water Supply	Stressed	Susp	Nutrients	Other Source
DRAINAGE BASIN: Susquehanna River										
SubBasin: Lower Susquehanna										
Catatonk Creek	0603-0007	Tioga	River	25.0 Miles	C	Aquatic Life	Stressed	Susp	Silt/sediment	Agriculture
Doolittle Creek	0603-0010	Tioga	River	10.0 Miles	C, CT	Aquatic Life	Stressed	Known	Silt/sediment	Streambank Erosion
Nanticoke Creek	0603-0004	Broome	River	10.0 Miles	C(T)	Aquatic Life	Impaired	Susp	Silt/sediment	Streambank Erosion
Susquehanna River, Lowe	0603-0002	Broome	River	13.0 Miles	A	Public Bathing	Impaired	Known	Pathogens	Municipal
Susquehanna River, Lowe	0603-0013	Tioga	River	11.0 Miles	B	Aquatic Life	Stressed	Susp	Silt/sediment	Construction
Susquehanna River, Lowe	0603-0015	Tioga	River	4.0 Miles	C	Aquatic Life	Stressed	Susp	Nutrients	Agriculture
Susquehanna River, Lowe	0603-0016	Tioga	River	11.0 Miles	B	Aquatic Life	Stressed	Susp	Nutrients	Agriculture
W. Br. Owego Crk.	0603-0011	Tioga	River	20.0 Miles	C, CT	Aquatic Life	Threatened	Known	Silt/sediment	

Waterbody Inventory - Waters Needing Verification of Impairment

Segment Name	Segment ID	County

Susquehanna River Basin

Upper Susquehanna/Unadilla Rivers SubBasin

Segment Name	Segment ID	County
Afton Lake	0601-0010	Chenango
Carrs Creek	0601-0005	Delaware
Charlotte Creek	0601-0014	Schoharie
Chenango Lake	0601-0013	Chenango
Cherry Valley Ck	0601-0022	Otsego
Cripple Creek	0601-0027	Herkimer
East Sidney Lake	0601-0001	Delaware
Elk Creek	0601-0019	Otsego
Guilford Lake	0601-0012	Chenango
Ocquionis Creek	0601-0034	Otsego
Otsego Lake	0601-0033	Otsego
Park Creek	0601-0031	Broome
Pierce Creek	0601-0028	Broome
Silver Lake	0601-0023	Otsego
Summit Lake	0601-0024	Otsego
Unadilla River	0601-0003	Chenango
Weaver Lake	0601-0025	Herkimer

Chenango/Tioughnioga Rivers SubBasin

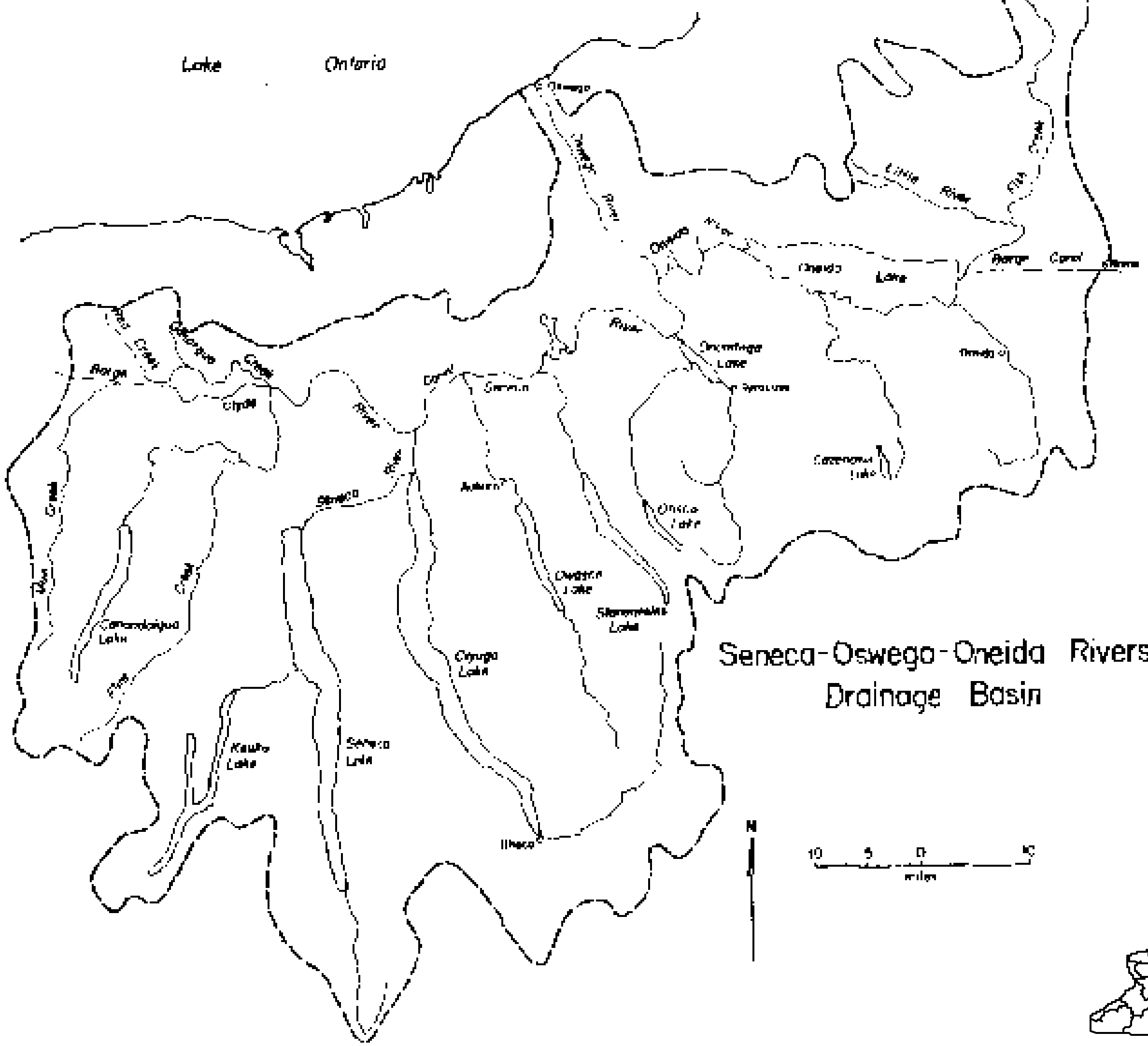
Segment Name	Segment ID	County
Ballyhack Creek	0602-0034	Broome
Brakel Creek	0602-0046	Cortland
Brakel Creek	0602-0049	Chenango
Canasawacta Creek	0602-0013	Chenango
Chenango River	0602-0033	Broome
Chenango River	0602-0050	Broome
Cold Brook	0602-0011	Chenango
E.Br.Tioughnioga	0602-0020	Cortland
Fabius Brook	0602-0026	Onondaga
Factory Brook	0602-0025	Cortland
Fly Creek	0602-0012	Chenango
Hunt Creek	0602-0051	Madison
Osborne Creek	0602-0030	Broome
Otselic River	0602-0024	Cortland
Otselic River	0602-0028	Broome
Page Brook	0602-0029	Broome
Page Brook	0602-0036	Broome
Payne Brook	0602-0003	Madison

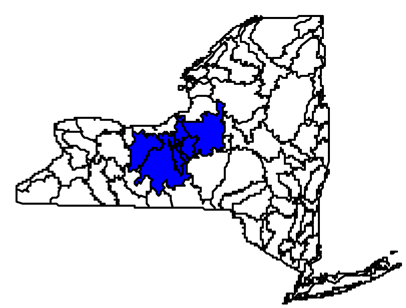
Many of the waterbody segments included on previous editions of the Priority Waterbodies List have limited recent documentation of specific water quality impairment. In an effort to improve the quality of information in theWI/PWL, these waterbody segments Needing Verification of an Impairment are tracked on a list separate from the Priority Waterbodies List.

Waterbody Inventory - Waters Needing Verification of Impairment

Segment Name	Segment ID	County
Lower Susquehann SubBasin		
Apalachin Creek	0603-0014	Tioga
Catatonk Tribs	0603-0008	Tioga
Cayuta Creek	0603-0022	Tioga
Cayuta Lake	0603-0005	Schuyler
Choconut Creek	0603-0019	Broome
E. Br. Owego Crk.	0603-0012	Tioga
Jackson Creek	0603-0006	Schuyler
Little Choconut	0603-0017	Broome
Little Choconut	0603-0018	Broome
Little Choconut C	0603-0001	Broome

Oswego-Seneca-Oneida Rivers Drainage Basin Map





The Oswego-Seneca-Oneida (Finger Lakes) Basin

Background

The Seneca-Oneida-Oswego Basin drains over 5,000 square miles within central New York, with a population of about one million. Its only major population and industrial-commercial center is the Syracuse metropolitan area in the eastern portion of the basin, where approximately two-thirds of the population resides. The remainder of the basin is primarily rural and agricultural with several small population centers. This basin contains seven of New York's Finger Lakes. The combined surface area of the basin's nine major lakes - Canandaigua, Keuka, Seneca, Cayuga, Owasco, Skaneateles, Otisco, Onondaga and Oneida - is over 208 square miles and represents about 4 percent of the total basin land area.

Water Quality Issues and Concerns

The Finger Lakes are the most dominant feature of the basin. Their importance to the region is due both to size – Oneida (79 sq.mi.), Cayuga (67 sq.mi.), and Seneca Lakes (67 sq.mi.) Are the largest lakes entirely within New York State – and their resource value. Significant water quality issues surround many of these lakes. The most notable of these water quality issues concerns Onondaga Lake.

Onondaga Lake

Onondaga Lake and its tributaries are affected by the numerous point and nonpoint discharges in this highly urbanized and industrialized area. Onondaga Lake has an area of 2,930 acres and is located in the City of Syracuse and two adjacent suburban towns. Onondaga Lake was once a major commercial and recreational resource. Its potential remains. Much of the eleven miles of shoreline is owned by Onondaga County, which has actively pursued park and shoreline trail development. Present uses include speedboat races, water-ski shows and a catch-and-release warmwater fishery. But the lake that was once a recreational center for Syracuse has also been the recipient of serious municipal and industrial pollution. Today, there is a managed effort to restore the lake through the Onondaga Lake partnership, a federal court order for correction of municipal sources, and state Superfund efforts to address hazardous waste issues.

Industries discharged large volumes of waste to Onondaga Lake from the late 1800s through the mid-1980s. Mercury and salts comprised the bulk of these wastes, with discharges of aromatic hydrocarbons, solvents, and PCBs noted to a lesser degree. During the period from 1946 to 1970, more than 200,000 lbs. of mercury was discharged to the lake by Allied Chemical facilities. Allied also discharged salts to the lake through its waste beds. After the company closed in the mid-1980s, active waste bed loading ceased and lake salinity dropped dramatically. Large volumes of raw or partially treated municipal sewage were also discharged until construction of the Syracuse Metro secondary treatment plant in the late 1970s.

Today, lake use and productivity remains severely restricted. Public bathing areas cannot be permitted because of poor transparency and high pathogen indicator levels. Fish reproduction is impaired by high chlorides and ammonia, inadequate dissolved oxygen, and the destruction of habitat. The lake was closed to public fishing in 1970 due to high levels of mercury in the flesh of lake fish. Fishing has been allowed since 1986 on a catch-and-release basis only.

Pollutants and their sources to the lake are numerous. Mercury continues to accumulate in fish from sources that include bottom sediments and/or tributary flows. Treated municipal wastewater, combined sewer overflows (CSOs), nonpoint sources and bottom sediments provide phosphorus for lush algal growths that rob oxygen from the waters upon decay. Combined sewer overflows provide both organic food for bacteria that depress dissolved oxygen levels, and coliform bacteria at levels considered unsafe for bathing by health authorities. Turbidity comes from both organic (such as phytoplankton) and inorganic (such as calcite) sources, including mud boils in Onondaga Creek and one of its tributaries. Inactive industrial sites still leach organic and inorganic pollutants to the lake watershed. Other sources remain suspect.

Significant interest and resource commitment have existed for many years toward recapturing the lake resource. These efforts were bolstered by federal legislation introduced by Senator Daniel Patrick Moynihan in the early 1990s. An Onondaga Lake Management Conference (OLMC) was established to develop and implement a restoration plan with federal support of 70% for appropriate costs. The Conference included a number of Federal and State agency members, with input provided through both Technical and Citizen Advisory groups. The Onondaga Lake Partnership, led by the US Army Corps of Engineers, established in 1999 replaced the OLMC in August 2000.

The Conference-endorsed plan[21] recommends implementation of the federal Amended Consent Judgment (ACJ), which requires substantial construction of ammonia and phosphorus treatment at the Metropolitan Sewage Treatment Plant. The plan also recommends a combination of floatables control, sewer separation and equivalent primary treatment to control more than sixty CSOs located along tributaries to the lake.

In regard to industrial pollution, the plan recommends that the state continue and complete its enforcement actions against Allied Signal, Inc., begun in July 1989, which culminated in the issuance of a consent decree. The consent decree requires Allied to perform a Remedial Investigation and Feasibility Study to determine the nature and extent of Allied's contamination of the lake and to propose cleanup technologies. The company, now Honeywell, is currently completing the RI portion of the cleanup.

Remediation of Onondaga Lake for full use will be difficult in terms of technical, social, economic, and geographic issues. Solutions will not be quick or easy. The collective resolve of agencies at all levels of government involved remains strong to restore lake uses for the enjoyment of New York's citizens.

The Oswego Harbor Remedial Action Plan (RAP)

NYS DEC initiated public input into the development of the Oswego Harbor Remedial Action Plan (RAP) in 1987 with the establishment of a Citizen Advisory Committee. The Stage 1 RAP was completed in 1990. Primary use impairments involve fish and wildlife habitat and population loss, consumption restrictions, and undesirable algae. The Stage 2 RAP, completed in 1991, identifies remedial strategy activities necessary to restore water quality in the lower river and harbor and eliminate adverse impacts to Lake Ontario from sources of pollutants carried by the Oswego River. Following completion of the Stage 2 RAP, a Remedial Advisory Committee (RAC) was formed as a multi-stakeholder structure to assist NYS DEC in RAP implementation. RAC participants include persons from industry, environmental groups, government, academia, and private interests. A comprehensive RAP Update document was published in December 1996, which established a revised format to identify remedial strategies and track progress. Studies performed as a direct result of the RAP on the Oswego River and Harbor water quality and sediments, as well as a fish pathology report, are summarized in the update document. A two-day workshop was conducted in June 1998 to evaluate study results and assess use impairment impacts and needs. Delisting criteria for the Oswego Harbor Area of Concern (AOC) have been developed. Important elements of the RAP remedial strategies include: the federal relicensing of the Oswego River power dams and the restoration of habitat through hydrologic modification; inactive hazardous waste site remediation including the Onondaga Lake cleanup; results of ongoing fish flesh studies involving Lake Ontario and the Oswego River area; further contaminated river study and evaluation; and identifying and conducting further investigations needed to assist in use impairment remediation. Habitat restoration has been identified as the key activity that needs to be addressed in order to move the RAP forward in the implementation process. A Workshop Summary and RAP Update document was published in May 1999 that provides workshop proceedings, summary study results, and RAP implementation strategies.

Additional information on Remedial Action Plans and the RAP process is outlined on Page A-3.

[21] Onondaga Lake: A Plan for Action. The Onondaga Lake Management Conference. Syracuse, NY. December 1993.

The Finger Lakes

Elevated sodium levels have been documented in Seneca Lake. The situation has led to some concern regarding the use of the lake for drinking water. Industrial salt processing is cited as the primary cause, although a recent study by researchers at Hobart and William Smith Colleges indicates that naturally saline groundwater, possibly exacerbated by deep well disposal of salt processing waste, may be the cause.[22] Some eutrophic symptoms have also been noted. Cayuga, the largest Finger Lake, is showing more severe signs of eutrophication, turbidity from tributary streams, and excessive weed growth.

Other Finger Lakes in the basin (Otisco, Owasco, and Skaneateles) are also showing evidence of eutrophication. Nutrients and sediments from shoreline development, lake tributaries, and agriculture are likely contributors. Several other major lakes in the basin, including Cazenovia Lake, Cross Lake, DeRuyter Reservoir, Jamesville Reservoir, Lake Neatahwanta, and Oneida Lake are affected by similar problems. Two of the smaller Finger Lakes, Keuka and Canandaigua, have fish consumption advisories in effect for large lake trout due to contamination by toxics (PCB in Canandaigua, DDT in Keuka).

Other Issues

The major issue in the Seneca River is low dissolved oxygen in the reach between Jack's Reef and Phoenix. High loadings of organic material in the Seneca River from the outlets of the Finger Lakes and from other nutrient and organic inputs, combined with a favorable habitat, have encouraged the growth of a dense colony of zebra mussels in the rock cut in the canal at Jack's Reef. Dissolved oxygen measurements made by the Upstate Freshwater Institute have shown a deterioration in dissolved oxygen in both upper and lower waters in the Baldwinsville-Three Rivers section of the river between the years 1991 and 1993. In July 1993, upper waters were less than 4 mg/l on several occasions, and river bottom readings were at or near 0 mg/l throughout the month. However, water clarity has improved dramatically. It has been estimated that the mass of mussels in the river could filter 50 - 100 percent of the river at flows less than 960 cfs, and may account for 75 - 100 percent of the oxygen loss.

The dissolved oxygen problem is exacerbated by density stratification in the Baldwinsville-Phoenix reach caused by the input of high dissolved inorganic salt loadings from Onondaga Lake. This stratification inhibits vertical mixing of oxygenated surface waters and, coupled with additional nutrient loading from the lake, further depletes these already oxygen-deficient bottom waters, resulting in anoxic conditions along the bottom of the river. Although no fish kills have been reported, these anoxic conditions significantly limit available habitat for bottom-dwelling species.

The outlets of the major lakes in the basin show the effects of organic enrichment from municipal point sources, stormwater overflows, municipal and agricultural stormwater runoff, and the introduction of rich plankton communities from the lake outflows. Also, Skaneateles Creek has a fish consumption advisory in effect for large brown trout due to PCB contamination. A study is underway to determine its location.

More Information

A summary listing of waterbodies included on the NYS-DEC Priority Waterbodies List is included as Table A.7. A list of waterbodies that may have been previously listed on theWI/PWL but have since been determined to need verification of possible water quality impairment is also included. More complete information about the water quality problems and issues in the basin can be found in the most recent (1996)

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[22] M.R. Wing, A. Preston, N. Acquisto and W.F. Ahrnsbrak. *Intrusion of Saline Groundwater into Seneca and Cayuga Lakes, New York.* Excerpt published in the quarterly newsletter of the Seneca Lake Pure Water Association. 1994.

series of Priority Waterbodies List Drainage Basin Reports.[23]

Water quality monitoring and assessment results from the NYS DEC Division of Water ambient surface water monitoring activities are summarized in the continuing series of Rotating Intensive Basin Studies (RIBS) Drainage Basin Reports. The most recent RIBS Report for the Oswego-Seneca-Oneida Rivers (Finger Lakes) Drainage Basin outlines results from monitoring conducted in 1995-96.[24]

The next RIBS monitoring effort in the basin is scheduled for 2001-2002, with water quality assessment to be conducted in 2003.

[23] NYS DEC, 1996. The 1996 Priority Waterbodies List for the Oswego-Seneca -Oneida Rivers Basin. NYS DEC Division of Water Technical Report. Albany, NY. September 1996.

[24] J.A. Myers, R.L. Gabriel and B.Andrews. The Oswego-Seneca-Oneida Rivers Basin RIBS Report, 1995-96. DEC Division of Water Technical Report. Albany, NY. April 1999.

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
DRAINAGE BASIN: Oswego-Seneca-Oneida Rivers (Finger Lakes)										
SubBasin: Lower Seneca/Oswego Rivers										
Beaver Lake	0701-0005	Onondaga	Lake	200.0 Acres	C	Aquatic Life	Impaired	Susp	Nutrients	Other Source
Cross Lake	0701-0002	Cayuga	Lake	2086.0 Acres	B	Public Bathing	Impaired	Susp	Nutrients	Other Source
Lake Neatahwanta	0701-0018	Oswego	Lake	750.0 Acres	B	Public Bathing	Precluded	Known	Nutrients	Storm Sewers
Oswego River	0701-0006	Oswego	River	11.4 Miles	B	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Oswego River	0701-0021	Oswego	River	10.0 Miles	B,C	Public Bathing	Threatened	Known	Water Level/Flow	Hydro/Habitat Modif.
Otter Lake	0701-0004	Cayuga	Lake	282.0 Acres	C	Public Bathing	Impaired	Susp	Nutrients	Other Source
Seneca River	0701-0003	Cayuga	River	25.0 Miles	C	Aquatic Life	Impaired	Susp	Silt/sediment	Agriculture
Seneca River	0701-0008	Onondaga	River	1.5 Miles	C	Public Bathing	Precluded	Known	Pathogens	Failing On-Site Syst
DRAINAGE BASIN: Oswego-Seneca-Oneida Rivers (Finger Lakes)										
SubBasin: Onondaga Lake										
Bloody Brook	0702-0006	Onondaga	River	0.5 Miles	B	Public Bathing	Precluded	Known	Pathogens	Municipal
Furnace Brook	0702-0014	Onondaga	River	1.0 Miles	B	Aquatic Life	Stressed	Susp	Silt/sediment	Hydro/Habitat Modif.
Geddes Brook	0702-0007	Onondaga	River	0.5 Miles	D	Aquatic Life	Impaired	Susp	Metals	Industrial
Ley Creek & Tribs	0702-0001	Onondaga	River	3.0 Miles	B	Aquatic Life	Impaired	Susp	Aesthetics	Comb. Sewer Overflow
Ninemile Creek	0702-0005	Onondaga	River	1.0 Miles	D	Aquatic Life	Precluded	Known	Salts	Industrial
Onondaga Creek	0702-0004	Onondaga	River	17.0 Miles	D	Public Bathing	Precluded	Known	Silt/sediment	Other Source
Onondaga L.& Out.	0702-0003	Onondaga	Lake	2944.0 Acres	B	Public Bathing	Precluded	Known	Pathogens	Comb. Sewer Overflow
Otisco Lake	0702-0011	Onondaga	Lake	400.0 Acres	AA	Public Bathing	Impaired	Susp	Silt/sediment	Other Source
DRAINAGE BASIN: Oswego-Seneca-Oneida Rivers (Finger Lakes)										
SubBasin: Oneida Lake										
Canaseraga Creek	0703-0034	Madison	River	4.0 Miles	C	Aquatic Life	Stressed	Susp	Oxygen Demand	Agriculture
Cazenovia Lake	0703-0021	Madison	Lake	1233.0 Acres	A	Public Bathing	Stressed	Susp	Nutrients	Failing On-Site Syst
Captaining Creek	0703-0005	Onondaga	River	3.0 Miles	C	Aquatic Life	Impaired	Susp	Nutrients	Agriculture
Caecilian Creek	0703-0033	Madison	River	12.0 Miles	C	Aquatic Life	Stressed	Susp	Oxygen Demand	Agriculture
DeRuyter Res.	0703-0004	Madison	Lake	600.0 Acres	B	Recreation	Impaired	Susp	Nutrients	Agriculture
Jamesville Reservr	0703-0015	Onondaga	Lake(R)	640.0 Acres	AA	Public Bathing	Impaired	Susp	Silt/sediment	Agriculture
Limestone Creek	0703-0008	Onondaga	River	2.0 Miles	C(T)	Aquatic Life	Impaired	Susp	Silt/sediment	Resource Extraction
Little Bay Creek	0703-0035	Oswego	River	2.0 Miles	D	Aquatic Life	Stressed	Susp	Oxygen Demand	Municipal
Oneida Lake	0703-0001	Oswego	Lake	51090.0 Acres	B	Public Bathing	Impaired	Susp	Nutrients	Agriculture
Oneida Lake	0703-0023	Madison	Lake	0.0 Acres	B	Public Bathing	Impaired	Susp	Nutrients	Agriculture
Pennellville Pond	0703-0018	Oswego	Lake	40.0 Acres	C(T)	Public Bathing	Impaired	Susp	Nutrients	Private System
Sconondoa Creek	0703-0003	Oneida	River	7.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Oxygen Demand	Municipal

DRAINAGE BASIN: Oswego-Seneca-Oneida Rivers (Finger Lakes)
SubBasin: Clyde River

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
Black Brook	0704-0007	Seneca	River	6.0 Miles	C	Aesthetics	Stressed	Susp	Unknown Toxicity	Landfill/Land Disp.
Canandaigua Lake	0704-0001	Ontario	Lake	10730.0 Acres	AA(T)	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Canandaigua Outlet	0704-0011	Ontario	River	9.0 Miles	C	Aquatic Life	Stressed	Susp	Nutrients	Urban Runoff
Clyde River	0704-0017	Wayne	River	9.4 Miles	C	Recreation	Stressed	Known	Oxygen Demand	Agriculture
Dublin Brook	0704-0004	Seneca	River	3.0 Miles	C	Aquatic Life	Precluded	Known	Oxygen Demand	Agriculture
Duck Lake	0704-0025	Cayuga	Lake	198.0 Acres	C	Public Bathing	Impaired	Susp	Nutrients	Other Source
Marbletown Creek	0704-0003	Wayne	River	0.5 Miles	C	Aquatic Life	Precluded	Known	Pesticides	Agriculture

DRAINAGE BASIN: Oswego-Seneca-Oneida Rivers (Finger Lakes)
SubBasin: Upper Seneca/Finger Lakes

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
Catherine Creek	0705-0011	Schuyler	River	8.5 Miles	C	Recreation	Stressed	Susp	Silt/sediment	Agriculture
Cayuga Inlet	0705-0041	Tompkins	River	10.0 Miles	C,C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Agriculture
Cayuga Lake	0705-0030	Cayuga	Lake	3000.0 Acres	A(T)	Recreation	Impaired	Susp	Nutrients	Failing On-Site Syst
Cayuga Lake	0705-0025	Seneca	Lake	3000.0 Acres	A(T)	Public Bathing	Impaired	Susp	Nutrients	Failing On-Site Syst
Dryden Lake	0705-0042	Tompkins	Lake	104.0 Acres	C	Recreation	Stressed	Susp	Nutrients	Agriculture
Fall Creek	0705-0036	Tompkins	River	5.0 Miles	B, A	Aquatic Life	Stressed	Susp	Silt/sediment	Streambank Erosion
Kashong Creek	0705-0017	Yates	River	2.0 Miles	C>D	Aquatic Life	Stressed	Susp	Silt/sediment	Agriculture
Kashong Creek	0705-0038	Ontario	River	4.5 Miles	C<D	Aquatic Life	Stressed	Susp	Silt/sediment	Agriculture
Kendig Creek	0705-0024	Seneca	River	10.5 Miles	C	Aquatic Life	Threatened	Known	Silt/sediment	Agriculture
Keuka Lake	0705-0003	Yates	Lake	11849.0 Acres	AA(TS)	Fish Consumption	Impaired	Known	Pesticides	Tox/Contam. Sediment
Keuka Lake Outlet	0705-0020	Yates	River	7.0 Miles	C(T)	Aquatic Life	Impaired	Susp	Thermal Changes	Hydro/Habitat Modif.
Lake Como	0705-0029	Cayuga	Lake	64.0 Acres	B	Recreation	Impaired	Susp	Nutrients	Failing On-Site Syst
Punch Bowl Lake	0705-0010	Schuyler	Lake	13.0 Acres	B	Public Bathing	Stressed	Susp	Silt/sediment	Streambank Erosion
Seneca Lake	0705-0021	Yates	Lake	12193.0 Acres	A	Water Supply	Stressed	Susp	Salts	Industrial
Seneca Lake	0705-0026	Seneca	Lake	23819.0 Acres	A	Water Supply	Stressed	Susp	Salts	Industrial
Seneca Lake/tribs	0705-0027	Ontario	Lake	0.0 Acres	A	Water Supply	Stressed	Susp	Salts	Industrial
Six Mile Creek	0705-0043	Tompkins	River	19.0 Miles	A	Water Supply	Stressed	Known	Silt/sediment	Streambank Erosion
Sugar Creek	0705-0018	Yates	River	10.0 Miles	C	Aquatic Life	Stressed	Susp	Silt/sediment	Streambank Erosion
Upper Dam Lake	0705-0008	Schuyler	Lake	2.0 Acres	B	Public Bathing	Stressed	Susp	Silt/sediment	Streambank Erosion
Whites Hollow Lk	0705-0009	Schuyler	Lake	13.0 Acres	B	Public Bathing	Stressed	Susp	Silt/sediment	Streambank Erosion
Yawger Creek	0705-0006	Cayuga	River	15.0 Miles	C(TS)	Aquatic Life	Impaired	Known	Silt/sediment	Agriculture

DRAINAGE BASIN: Oswego-Seneca-Oneida Rivers (FingerLakes)
SubBasin: Owasco Creek

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
Dutch Hollow Bk.	0706-0003	Cayuga	River	5.0 Miles	C(TS)	Aquatic Life	Stressed	Known	Silt/sediment	Hydro/Habitat Modif.
Owasco In. Tribs.	0706-0002	Cayuga	River	4.0 Miles	C(T)	Aquatic Life	Precluded	Known	Silt/sediment	Other Source
Owasco Lake	0706-0009	Cayuga	Lake	6784.0 Acres	AA(T)	Public Bathing	Impaired	Known	Pathogens	Failing On-Site Syst
Owasco Outlet	0706-0008	Cayuga	River	18.0 Miles	C	Aquatic Life	Impaired	Susp	Nutrients	Comb. Sewer Overflow

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
DRAINAGE BASIN: Oswego-Seneca-Oneida Rivers (FingerLakes)										
SubBasin: Skaneateles Creek										
Skaneateles Creek	0707-0003	Onondaga	River	14.0 Miles	C(T)	Fish Consumption	Impaired	Known	Priority Organics	Unknown Source
Skaneateles L&tri	0707-0004	Onondaga	Lake	5803.0 Acres	AA	Water Supply	Stressed	Known	Pathogens	Agriculture

Waterbody Inventory - Waters Needing Verification of Impairment

Segment Name	Segment ID	County

Oswego-Seneca-Oneida Rivers (Finger Lakes) Basin

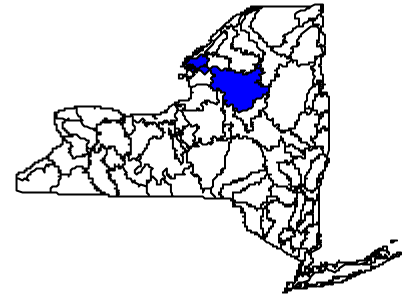
Segment Name	Segment ID	County
Oswego/Lower Seneca Rivers SubBasin		
Oswego River	0701-0022	Oswego
Oswego/Seneca R.	0701-0001	Onondaga
Onondaga Lake SubBasin		
Geddes Brook	0702-0019	Onondaga
Harbor Brook	0702-0002	Onondaga
Harbor Brook	0702-0012	Onondaga
Oneida Lake SubBasin		
Butternut Creek	0703-0039	Onondaga
Butternut Crk Trb	0703-0040	Onondaga
Canada Creek	0703-0010	Oneida
Canastota Creek	0703-0002	Madison
Captaining Creek	0703-0025	Madison
Lower Oneida Crk	0703-0032	Oneida
Meadow Brook	0703-0036	Onondaga
Oneida Lake Trib	0703-0038	Onondaga
Oneida River	0703-0020	Onondaga
Pools Brook	0703-0037	Onondaga
Pools Brook &trib	0703-0016	Onondaga
Tuscarora Lake	0703-0022	Madison
Wood Creek	0703-0012	Oneida
Clyde River SubBasin		
Crane Brook	0704-0024	Cayuga
Flint Creek	0704-0006	Yates
Ganargua Creek	0704-0013	Ontario
Ganargua Creek	0704-0026	Wayne
Grimes Ck Raceway	0704-0002	Ontario
Military Run	0704-0019	Wayne
Nys Barge Canal	0704-0020	Wayne
Red Creek	0704-0015	Wayne
Seneca River	0704-0016	Wayne
White Brook	0704-0008	Seneca

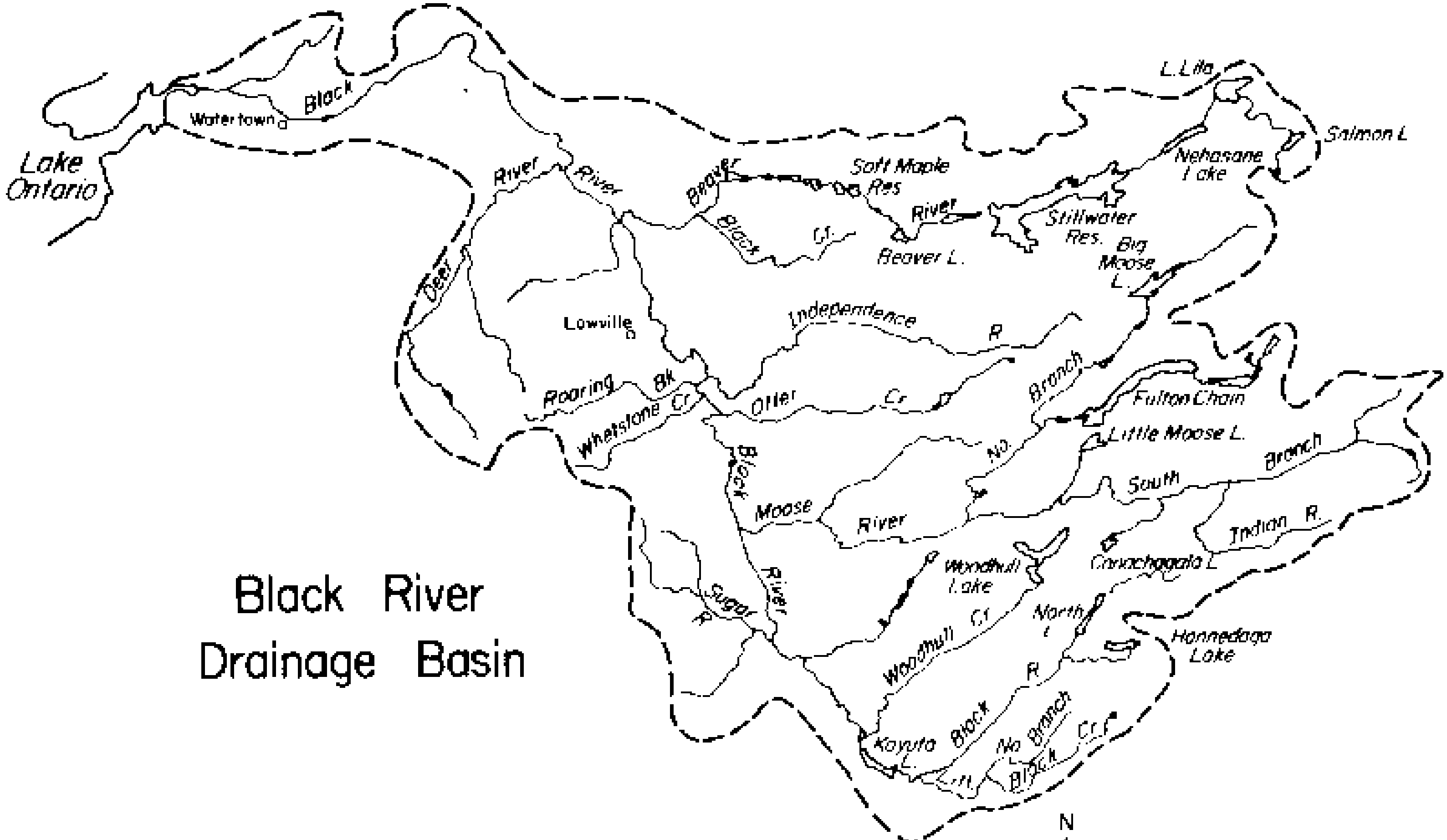
Many of the waterbody segments included on previous editions of the Priority Waterbodies List have limited recent documentation of specific water quality impairment. In an effort to improve the quality of information in theWI/PWL, these waterbody segments Needing Verification of an Impairment are tracked on a list separate from the Priority Waterbodies List.

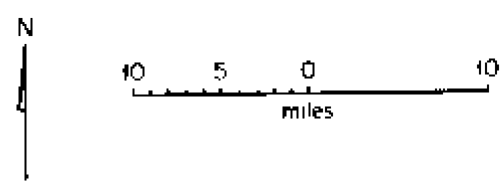
Waterbody Inventory - Waters Needing Verification of Impairment

Segment Name	Segment ID	County
Upper Seneca/Finger Lakes SubBasin		
Bolter Creek	0705-0013	Schuyler
Bolter Creek Trib	0705-0039	Seneca
Cascadilla Creek	0705-0035	Tompkins
Catharine Creek	0705-0015	Chemung
Cayuga Lake	0705-0040	Tompkins
Cayuga/Seneca Cnl	0705-0023	Seneca
Crusoe Creek	0705-0028	Wayne
Hector Falls Ck	0705-0007	Schuyler
Seneca Lake	0705-0014	Schuyler
Owasco Creek SubBasin		
Big Salmon Creek	0706-0012	Cayuga
Little Salmon Crk	0706-0013	Cayuga
Owasco Out. Trib.	0706-0001	Cayuga
Sucker Brook	0706-0010	Cayuga
Veness Brook	0706-0011	Cayuga
Skaneateles Creek SubBasin		
Grout Brook	0707-0001	Cortland

Black River
Drainage Basin Map







<u>NOTE:</u>

Some waters in the eastern portion Lake Ontario (Minor Tribs) Drainage Basin are included in this basin assessment.

The Black River Basin

Background

The Black River and smaller tributaries to the northeastern Lake Ontario Shoreline drain about 2,500 square miles in north-central New York State. This area includes portions of the western Adirondack Mountains, the Tug Hill Plateau and lowlands along the Lake Ontario shore. The Black River itself drains 1,920 square miles encompassing much of Lewis County, large parts of Jefferson and Herkimer Counties, and smaller portions of Hamilton and Oneida Counties. The smaller tributaries to Lake Ontario addressed in this report drain the remainder of Jefferson County and a very small portion of Oswego County. This area includes 280 square miles between the Saint Lawrence and Black Rivers and about 350 square miles to the south of the Black.

> While the Minor Tributaries to Lake Ontario are often considered separately as one of the 17 major drainage basins of New York State, for the purposes of the monitoring (RIBS) and assessment (WI/PWL) programs these smaller tributaries to Lake Ontario have been assigned to – and will be monitored and assessed with – the waters of one of the four larger river watersheds (Niagara, Genesee, Oswego, Black) draining into the lake.
>
> The Black River Basin includes all waters that enter Lake Ontario between Tibbetts Point (at the mouth of the Saint Lawrence) and the Jefferson-Oswego County line, at the northern end of North Pond. This includes tributaries Ont 1 through Ont 46 and P1040.

Although it is one of the smaller of the state's major drainage basins, the overall land use and character of the Black River Basin is rather diverse. The eastern portion of the basin features densely forested woodlands of the western Adirondack Mountains. The primary land uses in this sparsely populated region are silviculture and tourism/recreation. Small population centers (Carthage, Lowville, Lyons Falls/Port Leyden, Boonville) along the valley between the Adirondacks and the Tug Hill Plateau support considerable agricultural activities and a significant paper manufacturing industry. The City of Watertown, near the mouth of the Black, is easily the largest urban population center in the basin. The Fort Drum Military Reservation lies just outside the city. In the lowlands along Lake Ontario, agricultural activities predominate. With about 116,000 (1996) residents, the Black River/Northeastern Lake Ontario Basin is both the least populated and least densely populated of major drainage basins in New York State. About half (55%) of the population is rural/residential (town), while 20% is urban/residential (village) and 25% is urban (city).

The water resources of the Black River Basin are also diverse. The swift headwaters which tumble out of the Adirondacks feature numerous lakes and ponds. The Moose and Beaver Rivers are the largest of these Black River tributaries. Smaller streams such as the Sugar and Deer Rivers drain the Tug Hill Plateau before joining the Black from the west. Slower, more sluggish streams (Chaumont, Perch and Sandy Creek) drain the marshy Lake Ontario lowlands. All together, the Black River (and Northeastern Lake Ontario) Basin includes about 3,180 miles of streams, more than 360 lakes and ponds covering about 33,500 acres and about one-third of the 356 mile Lake Ontario shoreline within New York State.

Water Quality Issues and Concerns

While most of the waters in the basin are of good to excellent quality, there are a few issues and water quality problems that need to be addressed. The most prevalent of these are atmospheric deposition/acid precipitation and fish consumption advisories (which in many cases may also be attributed to atmospheric deposition of mercury). Taken together, these problems account for 94% of the lake impairment, nearly 30% of the river impairment in the basin and 100% of the Great Lake Shoreline impairment.

Atmospheric Deposition/Acid Rain

Low pH (frequently < 5) attributed to atmospheric deposition/acid precipitation has been documented in over 150 lakes and ponds in the basin, while episodic acidification of smaller headwater streams has also been documented during periods of snowmelt/runoff. And it is assumed that the problem affects additional lakes and streams that have not been monitored due to access and/or limited resources. Such conditions are known to impair and often preclude aquatic life support in these basin lakes and ponds.

Fish Consumption Advisories

Health advisories restricting the consumption of fish are in effect for a number of lakes and all of the Lake Ontario Shoreline within the basin. The source of contamination for Lake Ontario is attributed to historic discharges of priority organics (PCBs, mirex and dioxin). In some interior lakes, atmospheric deposition has been suggested as the likely source of elevated mercury levels in fish. Other suspected sources of PCBs may also be contributing to fish consumption restrictions in the basin.

Other Issues

Various recreational uses (swimming, boating, aesthetics) and fishery resources in some waterbodies in the basin have been listed as having impairments as well. The most frequently cited sources of these impairments include agricultural activities and failing on-site septic systems serving rural and lake shore residences.

Water Quality Assessment

The series of charts presented here provide an overall assessment of waterbody impairments in the Black River Basin. For each of the waterbody types in the basin (rivers, lakes/reservoirs, etc.), the first pie chart reveals the percentage of the miles/acres of waters in the basin that fall into each of the four *Water Quality Assessment Categories*. The red slice of the pie indicates the percentage of waters characterized as segments with *Known Water Quality Problems/Impairments* or as *Threatened Segments*. Taken together, these waters represent the ***Priority Waterbodies*** (for that waterbody type) within the basin. The second pie chart shows the severity of the primary use impairment for those *Priority Waterbodies*.

The bar charts indicate the pollutant sources that are most frequently cited as primary contributors to the water quality impairments for *Priority Waterbodies* in the Black River Basin. The charts reflect the percentage of the total waterbody area on the Priority Waterbodies List where the source is listed as the primary contributor to the impairment. For each source, the data are further segregated by the severity of the water use impairment (*precluded*, *impaired*, *stressed*, *threatened*) caused by the source.

More Information

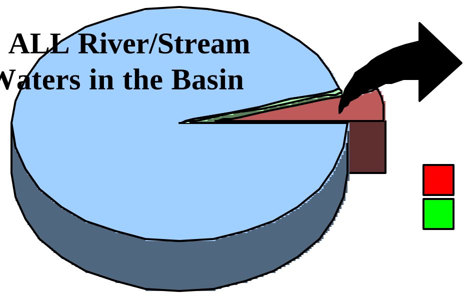
A summary listing of waterbodies included on the NYS-DEC Priority Waterbodies List is included as Tables A.8a-b. Segments with known water quality impacts/impairments or concerns (except for waterbodies affected by atmospheric deposition/acid rain, see below) are listed in Table A.8a; Table A.8b lists segments where water quality is threatened by ongoing activities in the watershed. The Threatened Waterbodies list also includes Special Protection waters. These waters experience no use restrictions or immediate threats to water quality, but nonetheless remain highly valued resources deemed worthy of special protection and consideration. A table of waterbodies needing the verification of possible water quality impairment is also included (Table A.8c).

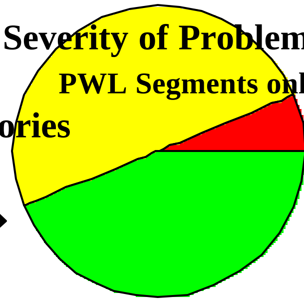
Because there are a large number of waterbodies affected by atmospheric deposition/acid rain, they have been summarized on a separate list rather than included in Table A.8a. However, these atmospheric deposition/acid rain waterbodies are still considered Priority Waterbodies, and this is reflected in the water quality assessment charts.

Rivers/Streams

Severity of Problems
PWL Segments only

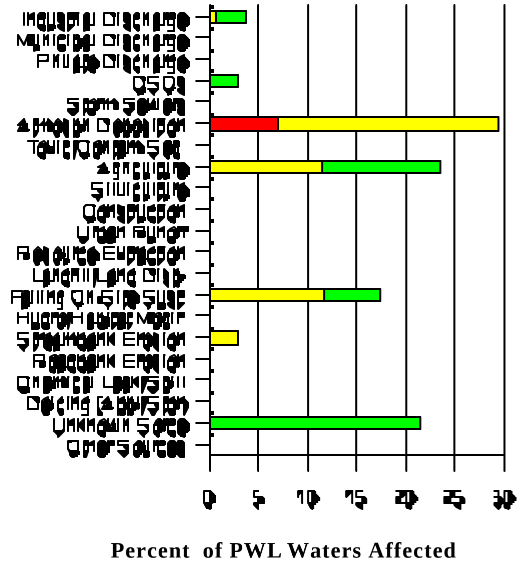
Water Quality Assessment Categories
for ALL River/Stream Waters in the Basin





Precluded
Impaired
Stressed
Threatened

Primary Source-Priority Waterbodies



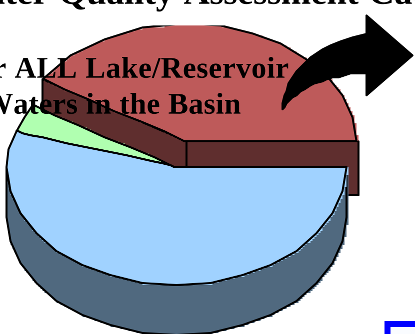
Priority Waterbody Segments
Segments Needing Verification
NonImpacted/UnAssessed

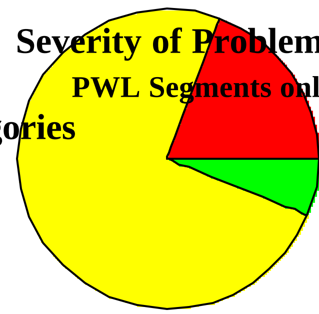
Black River Basin
Total River Miles: 3180

Lakes/Reservoirs

Severity of Problems
PWL Segments only

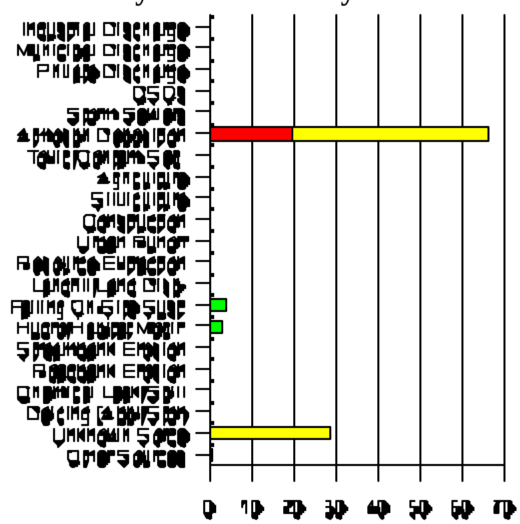
Water Quality Assessment Categories
for ALL Lake/Reservoir Waters in the Basin





Precluded
Impaired
Stressed
Threatened

Primary Source-Priority Waterbodies



Priority Waterbody Segments
Segments Needing Verification
NonImpacted/UnAssessed

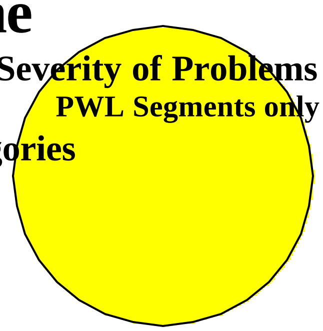
Black River Basin
Total Lake Acres: 33,500

Great Lake Shoreline

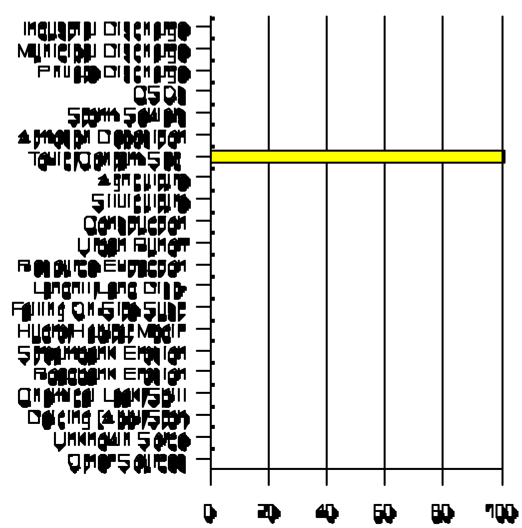
Primary Source-Priority Waterbodies

Severity of Problems
PWL Segments only

Water Quality Assessment Categories
for ALL Great Lakes Shoreline in the Basin



Precluded
Impaired
Stressed
Threatened



Priority Waterbody Segments
Segments Needing Verification
NonImpacted/UnAssessed

Black River Basin
Total Shoreline Miles: 120

More complete information about the water quality problems and issues in the basin can be found in the most recent Waterbody Inventory/Priority Waterbodies List Report for the Black River Basin.[25]

Water quality monitoring data from the NYS DEC Rotating Intensive Basin Studies (RIBS) Program are also available. The most recent RIBS effort in the Black River Drainage Basin was conducted in 1996-97; data from this study are available. The most recent available RIBS Report for the basin outlines results from a study conducted in 1991-92.[26]

The next RIBS monitoring effort in the basin is scheduled for 2002-2003, with water quality assessment to be conducted in 2004.

[25] NYS DEC, 2000. The 1998 Black River Basin Waterbody Inventory and Priority Waterbodies List. NYS DEC Division of Water Technical Report. Albany, NY. July 1999. 1998.

[26] J.A. Myers, R.L. Gabriel and R.M. Garry. The Biennial RIBS Report, 1991-92. NYS DEC Division of Water Technical Report. Albany, NY. February 1994.

Black River Basin — PWL - Water Quality Impacted Segments — Table A.8a

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Stream Class
Ont	LAKE ONTARIO (0300-0001) Fish Consumption KNOWN to be IMPAIRED by Priority Organics (known) from Tox/Contam. Sediment (known) .	multiple	373.9 ShrMi	G.Lakes	A(S)
Ont	CHAUMONT BAY (0303-0011) Public Bathing KNOWN to be STRESSED by Nutrients (known) from Failing On-Site Syst (known) .	Jefferson	9000.0 Acre	Bay	C
Ont 8	CHAUMONT RIVER (0303-0010) Fish Propagation KNOWN to be IMPAIRED by Nutrients (suspected) from Failing On-Site Syst (possible) .	Jefferson	11.0 Mile	River	C
Ont 19	BLACK RIVER (0801-0190) Fish Consumption SUSPECTED STRESSED by Priority Organics (known) from Unknown Source (possible) .	Jefferson	31.0 Mile	River	C
Ont 19	BLACK RIVER (0801-0202) Water Supply KNOWN to be IMPAIRED by Silt/sediment (known) from Streambank Erosion (known) .	Jefferson	4.0 Mile	River	A
Ont 19	BLACK RIVER (0801-0199) Aesthetics KNOWN to be STRESSED by Aesthetics (known) from Industrial (known) .	Lewis	4.0 Mile	River	C
Ont 19- 3 (-4)	PHILOMEL CREEK (& TRIB 4) (0801-0196) Aesthetics KNOWN to be STRESSED by Aesthetics (known) from Failing On-Site Syst (known) .	Jefferson	2.0 Mile	River	C
Ont 19- 6 (-1)	KELSEY CREEK (0801-0191) Fish Survival KNOWN to be IMPAIRED by Priority Organics (known) from Industrial (known) .	Jefferson	1.0 Mile	River	C
Ont 19- 31	DEER RIVER (0801-0170) Aesthetics SUSPECTED STRESSED by Aesthetics (suspected) from Failing On-Site Syst (known) .	Lewis	6.0 Mile	River	C
Ont 19- 40	BEAVER RIVER (0801-0197) Aesthetics KNOWN to be IMPAIRED by Aesthetics (known) from Failing On-Site Syst (known) .	Lewis	5.5 Mile	River	C
Ont 19- 40-P426	EFFLEY FALLS RESERVOIR (0801-0172) Fish Propagation SUSPECTED STRESSED by Water Level/Flow (known) from Hydro/Habitat Modif. (known) .	Lewis	343.0 Acre	Lake	C(T)
Ont 19- 40-P449-2-P450-2-P451	FRANCIS LAKE (0801-0192) Fish Consumption KNOWN to be IMPAIRED by Metals (known) from Unknown Source (possible) .	Lewis	136.0 Acre	Lake	C(T)
Ont 19- 40-20-P473	SUNDAY LAKE (0801-0195) Fish Consumption KNOWN to be IMPAIRED by Metals (known) from Unknown Source (possible) .	Herkimer	19.0 Acre	Lake	C(T)

In addition to the *Water Quality Problem* segments listed on Table 1, there are over 150 small ponds and lakes affected by atmospheric deposition (acid rain) that are also considered to be *PWL - Water Quality Impacted Segments.* However, because of the large number of these segments and the similarity of the water quality impairment information for these segments, they are listed in a separate section of the report. See page 59.

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Stream Class
Ont 19- 40-P478	MOSHIER RESERVOIR (0801-0194)	Herkimer	284.0 Acre	Lake(R)	C(T)
	Fish Consumption KNOWN to be IMPAIRED by Metals (known) from Unknown Source (possible) .				
Ont 19- 40-P493	STILLWATER RESERVOIR (0801-0184)	Herkimer	6195.0 Acre	Lake(R)	C(T)
	Fish Consumption KNOWN to be IMPAIRED by Metals (known) from Atmosph. Deposition (possible) .				
Ont 19- 51	MILL CREEK (0801-0200)	Lewis	16.8 Mile	River	C
	Fish Propagation KNOWN to be IMPAIRED by Nutrients (known) from Agriculture (known) .				
Ont 19- 57-7-P625	HALFMOON LAKE (0801-0193)	Lewis	17.0 Acre	Lake	C
	Fish Consumption KNOWN to be IMPAIRED by Metals (known) from Unknown Source (possible) .				
Ont 19- 70-4-P689	BRANTINGHAM LAKE (0801-0176)	Lewis	331.0 Acre	Lake	A
	Water Supply SUSPECTED STRESSED by Pathogens (suspected) from Failing On-Site Syst (suspected) .				
Ont 19- 80 (and P695)	UNNAMED TRIB 80, BLACK R (0801-0198)	Lewis	0.5 Mile	River	C
	Aesthetics KNOWN to be IMPAIRED by Aesthetics (known) from Failing On-Site Syst (known) .				
Ont 19- 81-18-17-P752	BIG MOOSE LAKE (0801-0035)	Herkimer	1286.0 Acre	Lake	A(T)
	Fish Consumption KNOWN to be IMPAIRED by Metals (known) from Unknown Source (possible) .				
Ont 19- 81-18-P782d	FOURTH LAKE (0801-0098)	Herkimer	2137.0 Acre	Lake	A
	Fish Consumption KNOWN to be IMPAIRED by Pesticides (known) from Unknown Source (possible) .				
Ont 19- 92	MILL CREEK (0801-0201)	Oneida	4.0 Mile	River	C
	Fish Propagation SUSPECTED STRESSED by Oxygen Demand (suspected) from Comb. Sewer Overflow (known) .				
Ont 19- 94-1-P922-4-P926		OTTER LAKE (0801-0205)	Oneida	134.0 Acre	Lake
	A				
	Public Bathing KNOWN to be STRESSED by Aesthetics (known) from Failing On-Site Syst (possible) .				
Ont 41-P1028	BLACK POND (0303-0008)	Jefferson	19.0 Acre	Lake	C
	Aesthetics SUSPECTED STRESSED by Silt/sediment (possible) from Other Source (suspected) .				
Ont 44	SANDY CREEK (0303-0005)	Jefferson	17.0 Mile	River	C(T)
	Fish Propagation SUSPECTED STRESSED by Nutrients (suspected) from Agriculture (suspected) .				

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Stream Class

No Segments Listed as *Threatened*.

While there are, undoubtedly, other waterbodies whose water uses are "threatened" in some manner or another, these other segments do not meet the *specific* criteria necessary to be listed on the *Threatened Waterbodies List*.

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Stream Class
Ont 19- 40- 3	BLACK CREEK (0801-0171) Fish Propagation POSSIBLY STRESSED by Silt/sediment (possible) from Agriculture (possible) .	Lewis	4.0 Mile	River	C(T)
Ont 19- 40-P434	SOFT MAPLE RESERVOIR (0801-0173) Fish Propagation POSSIBLY STRESSED by Nutrients (possible) from Failing On-Site Syst (possible) .	Lewis	330.0 Acre	Lake	C(T)
Ont 19- 40-P449	BEAVER LAKE (0801-0174) Aesthetics POSSIBLY STRESSED by Nutrients (possible) from Failing On-Site Syst (possible) .	Lewis	285.0 Acre	Lake	C(T)
Ont 19- P984a	KAYUTA LAKE (0801-0204) Aesthetics SUSPECTED STRESSED by Aesthetics (suspected) from Failing On-Site Syst (possible) .	Oneida	474.0 Acre	Lake	C(T)
Ont 40	STONY CREEK (0303-0009) Fish Propagation POSSIBLY STRESSED by Silt/sediment (possible) from Agriculture (possible) .	Jefferson	19.5 Mile	River	C(T)

Waterbodies Affected by Acid Precipitation

Water Index Number	Segment/Watershed	Size	Category
Ont 19-40 Beaver River Watershed			
Ont 19- 40- 3-P409	UNNAMED P #4-409	2.0 A	W.Q. Problem
Ont 19- 40- 7-P417	UPPER WEST POND	3.0 A	W.Q. Problem
Ont 19- 40-10-4-P419	GOOSE POND	7.0 A	W.Q. Problem
Ont 19- 40-13-P431	SOFT MAPLE DAM PD	96.0 A	W.Q. Problem
Ont 19- 40-13-P432	UNNAMED P #4-432	12.0 A	W.Q. Problem
Ont 19- 40-15-4-P436	SAND POND	77.0 A	W.Q. Problem
Ont 19- 40-17-P437	UNNAMED P #4-437	4.0 A	W.Q. Problem
Ont 19- 40-18-2-1-P438	IKEIS POND	8.0 A	W.Q. Problem
Ont 19- 40-18-2-2-P439	UNNAMED P #4-439	3.0 A	W.Q. Problem
Ont 19- 40-18-2-P440	UNNAMED P #4-440	6.0 A	W.Q. Problem
Ont 19- 40-18-3-P441	CROOKED LAKE (SADIE POND)	1.0 A	W.Q. Problem
Ont 19- 40-18-3-P442	MACCABE POND	3.0 A	W.Q. Problem
Ont 19- 40-18-5-P443	PEPPERBOX POND	25.0 A	W.Q. Problem
Ont 19- 40-18-7-P444	LOWER SPRING POND	12.0 A	W.Q. Problem
Ont 19- 40-18-7-P444a	UNNAMED P #4-444A	13.0 A	W.Q. Problem
Ont 19- 40-19-P456	UNNAMED P #4-456	21.0 A	W.Q. Problem
Ont 19- 40-19-P456a	UNNAMED P #4-456A	12.0 A	W.Q. Problem
Ont 19- 40-19-P457	UNNAMED P #4-457	5.0 A	W.Q. Problem
Ont 19- 40-19-P459	BEAR POND	2.0 A	W.Q. Problem
Ont 19- 40-20	SUNDAY CREEK	3.4 Mi	W.Q. Problem
Ont 19- 40-20-P473-1-P474	UNNAMED P #4-474B	5.0 A	W.Q. Problem
Ont 19- 40-20-P473-1-P474-2-P476	UNNAMED P #4-476	4.0 A	W.Q. Problem
Ont 19- 40-22-1-1-P480	CROPSEY POND	6.0 A	W.Q. Problem
Ont 19- 40-22-3-P484a	UNNAMED P #4-484A	7.0 A	W.Q. Problem
Ont 19- 40-22-3-P485	DEER POND	22.0 A	W.Q. Problem
Ont 19- 40-22-3-P487	SUNSHINE POND	77.0 A	W.Q. Problem
Ont 19- 40-22-3-P488	UNNAMED P #4-488	2.0 A	W.Q. Problem
Ont 19- 40-22-P489	LOWER MOSHIER POND	26.0 A	W.Q. Problem
Ont 19- 40-22-P489-1-P490	UNNAMED P #4-490	2.0 A	W.Q. Problem
Ont 19- 40-22-P491	UPPER MOSHIER PD	44.0 A	W.Q. Problem
Ont 19- 40-22-P492	DUCK POND	13.0 A	W.Q. Problem
Ont 19- 40-P449-2-P450-2-P451-P453	MIRROR POND	1.0 A	W.Q. Problem
Ont 19- 40-P493- 2-3-P497	UNNAMED P #4-497	9.0 A	W.Q. Problem
Ont 19- 40-P493- 2-P496	RAVEN LAKE	115.0 A	W.Q. Problem
Ont 19- 40-P493- 2-P498	LYON LAKE	80.0 A	W.Q. Problem
Ont 19- 40-P493- 3-P499	SLIM POND	16.0 A	W.Q. Problem
Ont 19- 40-P493- 4-P500	EVERGREEN LAKE	45.0 A	W.Q. Problem
Ont 19- 40-P493- 4-P500-P501	UNNAMED P #4-501	4.0 A	W.Q. Problem
Ont 19- 40-P493- 5-P502	PEAKED MTN. LAKE	37.0 A	W.Q. Problem
Ont 19- 40-P493- 6-1-P504	HAWK POND	45.0 A	W.Q. Problem
Ont 19- 40-P493- 6-2-P505	HIDDEN LAKE	18.0 A	W.Q. Problem
Ont 19- 40-P493- 6-3-1-P506	UNNAMED P #4-506	2.0 A	W.Q. Problem
Ont 19- 40-P493- 6-3-P508	GINGER POND	15.0 A	W.Q. Problem

Waterbodies Affected by Acid Precipitation

Water Index Number	Segment/Watershed	Size	Category
Ont 19-40 Beaver River Watershed (con't)			
Ont 19- 40-P493- 6-3-P510	UNNAMED P #4-510	9.0 A	W.Q. Problem
Ont 19- 40-P493- 6-3-P511	SODA POND	22.0 A	W.Q. Problem
Ont 19- 40-P493- 6-4-P512	UNNAMED P #4-512	6.0 A	W.Q. Problem
Ont 19- 40-P493- 6-5-P513	UNNAMED P #4-513	22.0 A	W.Q. Problem
Ont 19- 40-P493- 6-P515	DISMAL POND	53.0 A	W.Q. Problem
Ont 19- 40-P493- 6-P516	UNNAMED P #4-516	5.0 A	W.Q. Problem
Ont 19- 40-P493- 7-7-P522	HIGBY TWINS E. PD	16.0 A	W.Q. Problem
Ont 19- 40-P493- 7-7-P523	HIGBY TWINS W. PD	13.0 A	W.Q. Problem
Ont 19- 40-P493- 7-8-P524	MUD POND	3.0 A	W.Q. Problem
Ont 19- 40-P493- 7-8-P525-1-P526	UNNAMED P #4-526	5.0 A	W.Q. Problem
Ont 19- 40-P493- 7-8-P525-2-P527	SUMMIT POND	13.0 A	W.Q. Problem
Ont 19- 40-P493- 7-P517	SALMON LAKE	102.0 A	W.Q. Problem
Ont 19- 40-P493- 7-P528	WITCHOPPLE LAKE	134.0 A	W.Q. Problem
Ont 19- 40-P493- 7-P528-2-P531	WILDER POND	13.0 A	W.Q. Problem
Ont 19- 40-P493-19-P539-5..P558	FLY POND WEST	3.0 A	W.Q. Problem
Ont 19- 40-P493-21-1-4-2-P569	UNNAMED P #4-569	2.0 A	W.Q. Problem
Ont 19- 40-P493-21-1-P570	TERROR LAKE	62.0 A	W.Q. Problem
Ont 19- 40-P493-21-P571	EAST POND	26.0 A	W.Q. Problem
Ont 19- 40-P493-32	TWITCHELL CREEK	8.5 Mi	W.Q. Problem
Ont 19- 40-P493-32-15-P580	SILVER LAKE	52.0 A	W.Q. Problem
Ont 19- 40-P493-32-16-1-2-P581	POCKET POND	5.0 A	W.Q. Problem
Ont 19- 40-P493-32-16-P583	JOCK POND	6.0 A	W.Q. Problem
Ont 19- 40-P493-32-P584	TWITCHELL LAKE	136.0 A	W.Q. Problem
Ont 19- 40-P493-32-P584-1-P585	OSWEGO POND	6.0 A	W.Q. Problem
Ont 19- 40-P493-32-P584-3-P587	LOWER LILYPAD POND	20.0 A	W.Q. Problem
Ont 19-57 Independence River Watershed			
Ont 19- 57- 5-P607	CORK POND	3.0 A	W.Q. Problem
Ont 19- 57- 5-P611	SPECTACLE POND, WEST	2.0 A	W.Q. Problem
Ont 19- 57- 5-P612	SPECTACLE POND, EAST	2.0 A	W.Q. Problem
Ont 19- 57- 5-P613	MAHAN POND	3.0 A	W.Q. Problem
Ont 19- 57- 7-3-P627	STEWART POND	3.0 A	W.Q. Problem
Ont 19- 57- 7-7-P628	TROUT POND	2.0 A	W.Q. Problem
Ont 19- 57- 7-P630	BILL'S POND	18.0 A	W.Q. Problem
Ont 19- 57- 9-2-P632	PANTHER POND	13.0 A	W.Q. Problem
Ont 19- 57- 9-P631	MIKES POND	2.0 A	W.Q. Problem
Ont 19- 57-10-3-P635	FIFTH CREEK POND	26.0 A	W.Q. Problem
Ont 19- 57-10-5-P636	UNNAMED P #4-636	1.0 A	W.Q. Problem
Ont 19- 57-10-5-P638	UNNAMED P #4-638	12.0 A	W.Q. Problem
Ont 19- 57-10...P640	BLUE POND	3.0 A	W.Q. Problem
Ont 19- 57-22-P645	UNNAMED P #4-645	2.0 A	W.Q. Problem
Ont 19- 57-23-P646	UNNAMED P #4-646	17.0 A	W.Q. Problem
Ont 19- 57-P651	LITTLE DIAMOND POND	14.0 A	W.Q. Problem

Waterbodies Affected by Acid Precipitation

Water Index Number	Segment/Watershed	Size	Category
Ont 19-60 Otter Creek Watershed			
Ont 19- 60-15-P675	WEST POND	3.0 A	W.Q. Problem
Ont 19- 60-5-P664-P664a	FLORENCE POND	4.0 A	W.Q. Problem
Ont 19- 60-P676-2-2-P678	EAST POND	13.0 A	W.Q. Problem
Ont 19- 60-P676-2-P679	UNNAMED P #4-679	17.0 A	W.Q. Problem
Ont 19- 60-P676-4-3-P681	BLACK FOOT POND	9.0 A	W.Q. Problem
Ont 19-81 Moose River Watershed			
Ont 19- 81- 3- 8-P880	BEAR POND	27.0 A	W.Q. Problem
Ont 19- 81- 7- 1-P701-1-2-P702	LOST LAKE	6.0 A	W.Q. Problem
Ont 19- 81-18-17	NORTH BRANCH MOOSE RIVER	3.0 Mi	W.Q. Problem
Ont 19- 81-18-17-14-P736-2-4-P737	UNNAMED P #4-737	7.0 A	W.Q. Problem
Ont 19- 81-18-17-P739	LAKE RONDAXE	224.0 A	Need Verific
Ont 19- 81-18-17-P739-3-P743-1	BALD MOUNTAIN BROOK	1.4 Mi	W.Q. Problem
Ont 19- 81-18-17-P752-2-P754	SQUASH POND	8.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-2-P754..P755	SILVER DOLLAR PD.	2.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-4-P756	MERRIAM LAKE	19.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-6-P758	GULL LAKE SOUTH	27.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-7-1-1-P759	UNNAMED P #4-759	10.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-7-1-3-P760	OTTER POND	11.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-7-2-1-P762	NORTH GULL LAKE	26.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-7-2-P765	UNNAMED P #4-765	4.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-7-2-P766	UNNAMED P #4-766	3.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-7-P768	LOWER SISTER LAKE	83.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-7-P769	UPPER SISTER LAKE	83.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-7-P769..P771	UNNAMED P #4-771	1.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-7-P769..P772	SOUTH POND	25.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-7-P769..P772	SOUTH POND	47.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-7-P769..P773	UNNAMED P #4-773	8.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-8-P774	RUSSIAN LAKE	26.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-9	CONSTABLE CREEK	4.0 Mi	W.Q. Problem
Ont 19- 81-18-17-P752-9-1-P775	PUG HOLE POND	12.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-9-P777	CONSTABLE POND	71.0 A	W.Q. Problem
Ont 19- 81-18-17-P752-9-P779	PIGEON LAKE	45.0 A	W.Q. Problem
Ont 19- 81-18-P782d-10-P787a-2	SEVENTH LAKE INLET	2.3 Mi	W.Q. Problem
Ont 19- 81-18-P782d-10-P787a-4	BUCK CREEK	1.3 Mi	W.Q. Problem
Ont 19- 81-18-P782d-10-P787a-6	WHEELER CREEK	2.5 Mi	W.Q. Problem
Ont 19- 81-18-P782d-10-P787a..P788	EAGLES NEST LAKE	12.0 A	W.Q. Problem
Ont 19- 81-18-P782d-10-P787a..P792	UNNAMED P #4-792	2.0 A	W.Q. Problem
Ont 19- 81-51- 2-P837	BALSAM LAKE	19.0 A	W.Q. Problem
Ont 19- 81-52-P840	UNNAMED P #4-840	4.0 A	W.Q. Problem
Ont 19- 81-52-P841	UNNAMED P #4-841	7.0 A	W.Q. Problem
Ont 19- 81-52-P846	UNNAMED P #4-846	4.0 A	W.Q. Problem
Ont 19- 81-58-12-P855	MOUNTAIN LAKE	13.0 A	W.Q. Problem

Waterbodies Affected by Acid Precipitation

Water Index Number	Segment/Watershed	Size	Category
Ont 19-81 Moose River Watershed (con't)			
Ont 19- 81-58-14-P856	UNNAMED P #4-856	2.0 A	W.Q. Problem
Ont 19- 81-58-16-5-5-P858	TWIN LAKE LOWER	3.0 A	W.Q. Problem
Ont 19- 81-58-16-5-5-P860	TWIN LAKE UPPER	6.0 A	W.Q. Problem
Ont 19- 81-58-16-5-P857A	UNNAMED P #4-857A	6.0 A	W.Q. Problem
Ont 19- 81-58-16-5-P858	UNNAMED P #4-858	6.0 A	W.Q. Problem
Ont 19- 81-58-16-5-P861	LITTLE DEER LAKE	5.0 A	W.Q. Problem
Ont 19- 81-58-16-P863	UNNAMED P #4-863	7.0 A	W.Q. Problem
Ont 19- 81-58-22-2-3-P866	DEEP LAKE	29.0 A	W.Q. Problem
Ont 19- 81-58-22-3-P871	UNNAMED P #4-871	2.0 A	W.Q. Problem
Ont 19- 81-58-22-P872	UNNAMED P #4-872	5.0 A	W.Q. Problem
Ont 19- 81-58-22-P873	WOLF LAKE	11.0 A	W.Q. Problem
Ont 19- 81-58-25-P874	BROOK TROUT LAKE	71.0 A	W.Q. Problem
Ont 19- 81-58-5-P852	INDIAN LAKE	90.0 A	W.Q. Problem
Ont 19- 81-58-5-P852-3-P853	MUSKRAT POND	6.0 A	W.Q. Problem
Ont 19- 81-58-P864A	UNNAMED P #4-864A	3.0 A	W.Q. Problem
Ont 19- 81-58-P865-5-2-P851	UNNAMED P #4-851	2.0 A	W.Q. Problem
Ont 19- 81-58-P868	TWIN LAKES WEST	1.0 A	W.Q. Problem
Ont 19- 81-58-P869	TWIN LAKE WEST	19.0 A	W.Q. Problem
Ont 19- 81-58-P870	TWIN LAKE EAST	19.0 A	W.Q. Problem
Ont 19- 81-58-P875	NORTHRUP LAKE	12.0 A	W.Q. Problem
Ont 19- 81-61-14-P886	JIMMY POND	4.0 A	W.Q. Problem
Ont 19- 81-69-P888	SLY POND	26.0 A	W.Q. Problem
Ont 19- 81-71	BRADLEY BROOK	3.0 Mi	W.Q. Problem
Ont 19- 81-71-2-1	CELLAR BROOK	3.2 Mi	W.Q. Problem
Ont 19- 81-71- 2-1-P889	CELLAR POND	6.0 A	W.Q. Problem
Ont 19- (tribs -82 thru -128, and P1007) Black River Tribs, Moose River to North Lake			
Ont 19- 88-P905	BARNES LAKE	7.0 A	W.Q. Problem
Ont 19- 88-P906	UNNAMED P #4-906	2.0 A	W.Q. Problem
Ont 19- 90-5-P909	POPLAR POND	3.0 A	W.Q. Problem
Ont 19- 94-1-P918	DOE POND	3.0 A	W.Q. Problem
Ont 19-104-2-4-P946	UNNAMED P #4-946	2.0 A	W.Q. Problem
Ont 19-104-2-P951-1-P952	LILY LAKE	19.0 A	W.Q. Problem
Ont 19-104-P981-1-P982-2-P984	BLOODSUCKER POND	12.0 A	W.Q. Problem
Ont 19-114-13-P994	COTTON LAKE	3.0 A	W.Q. Problem
Ont 19-114-P996	BURP LAKE	11.0 A	W.Q. Problem
Ont 19-119-P1000	UPPER TWIN LAKE	6.0 A	W.Q. Problem
Ont 19-128-6-P1003	LITTLE SALMON LK.	32.0 A	W.Q. Problem
Ont 19-P1007-10-3-P1010	GOOSENECK LAKE	6.0 A	W.Q. Problem
Ont 19-P1007-10-3-P1011	SNYDER LAKE	18.0 A	W.Q. Problem
Ont 19-P1007-10-3-P1011-1-1-P1012	MONUMENT LAKE	13.0 A	W.Q. Problem
Ont 19-P1007-11-4-P1016	UNNAMED P #3-1016	7.0 A	W.Q. Problem

The Saint Lawrence River Basin

Background

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 more agricultural region along the Saint Lawrence Valley lowlands 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 seventeen major drainage basins in the state, the Saint Lawrence Basin ranks only thirteenth in population with just over 192,000 (1996) residents. The population is mostly rural, with small population centers located along the Saint Lawrence River (Massena and Ogdensburg) and its larger tributaries (Potsdam, Canton, Malone and Gouverneur). Nearly 60% of the population is rural/residential (town), 35% is urban/residential (village), and only 7% is urban (city).

The waters of the Saint Lawrence Drainage Basin originate high in the Adirondack Mountains. The tributary headwaters feature numerous lakes and ponds – some quite large – and falls. As these tributaries flow north to the Saint Lawrence, they slow and meander across the wide river valley. The more significant of these tributaries include the Salmon, Saint Regis, Raquette, Grass, Oswegatchie, and Indian Rivers. All together, approximately 6,940 miles of rivers and streams drain the New York State portion of the Saint Lawrence Drainage Basin. The basin also includes an estimated 650 lakes and ponds covering 115,553 acres.

Water Quality Issues and Concerns

Water quality problems in the Saint Lawrence River Basin are dominated by two primary issues: fish consumption advisories (particularly advisories for the Saint Lawrence River) and atmospheric deposition/acid precipitation. These two problems account for more than 95% of the most severe (*Precluded* and *Impaired*) water use impairments in the basin. Interestingly, the ultimate source of both of these problems lies, in large part, outside the basin.

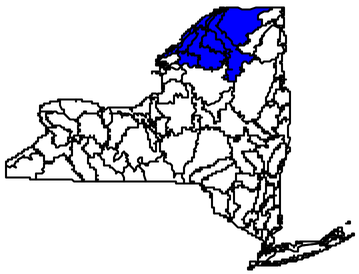
Atmospheric Deposition/Acid Rain

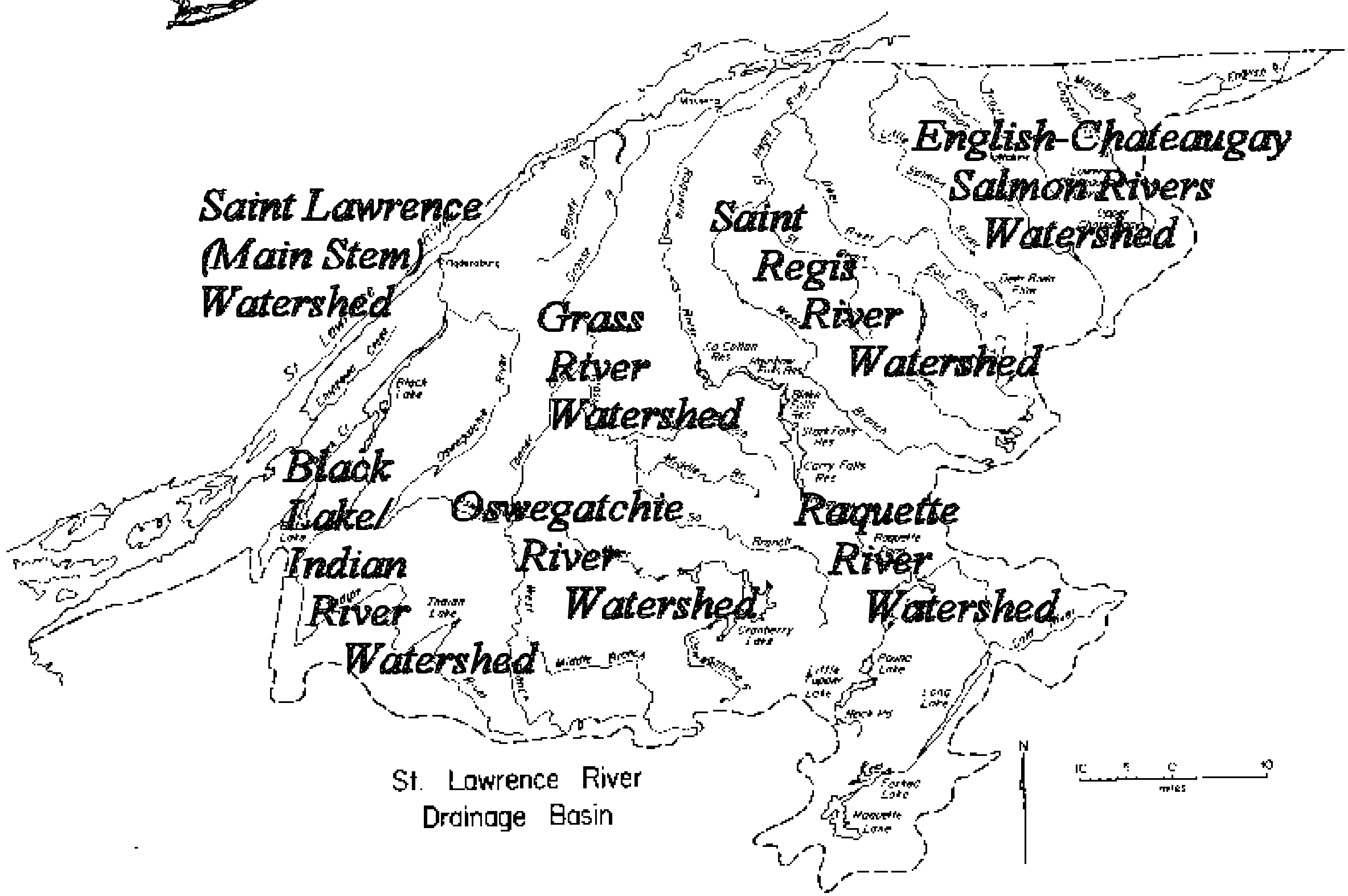
Low pH (frequently < 5) attributed to atmospheric deposition/acid precipitation has been documented in over 150 lakes and pond in the basin. And it is assumed that the problem affects additional lakes that have not been monitored due to access and/or limited resources. Such conditions are known to impair and often preclude aquatic life support in these basin lakes and ponds.

Fish Consumption Advisories

Health advisories restricting the consumption of fish are in effect for a number of river miles and lake acres in the basin. Most significant are the advisories for a number of fish species from the entire Saint Lawrence River and the portion of the Grass River in and below Massena. The source of the contamination for much of the Saint Lawrence is attributed to priority organics (primarily PCBs) from Lake Ontario sediments. A

Saint Lawrence River Drainage Basin Map

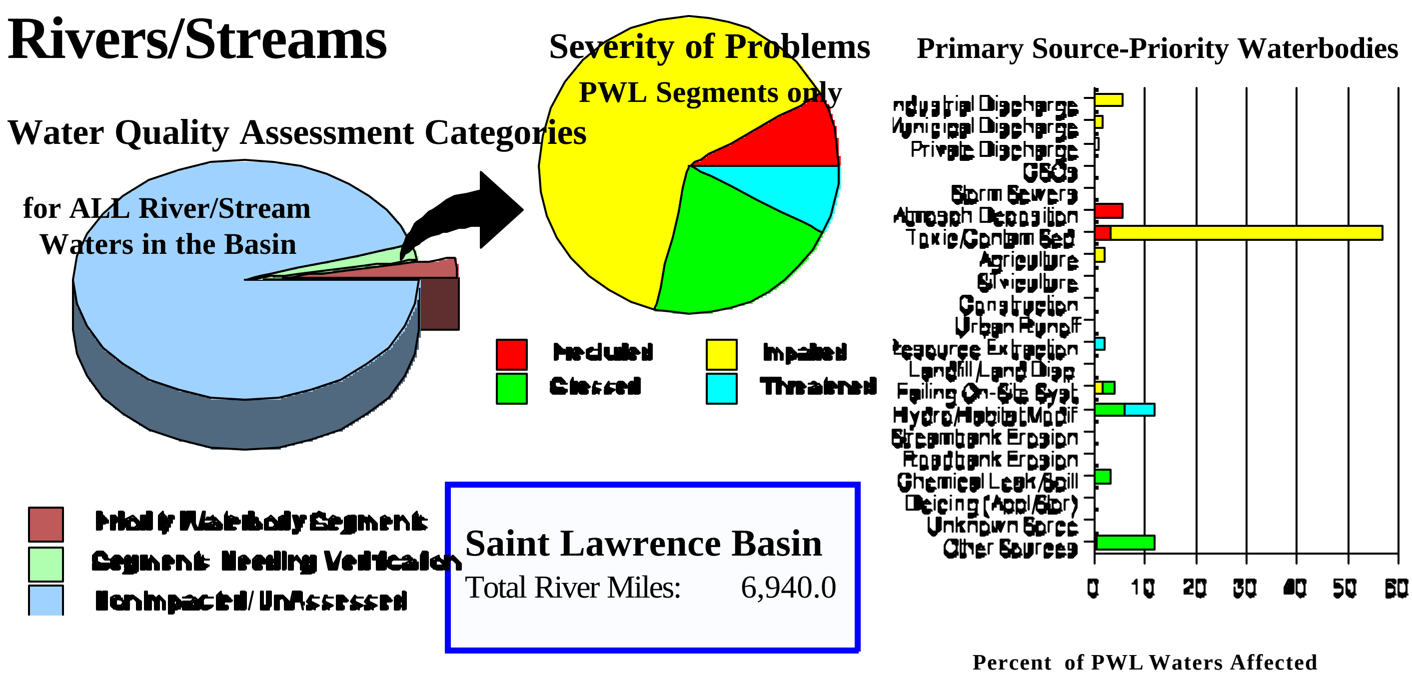


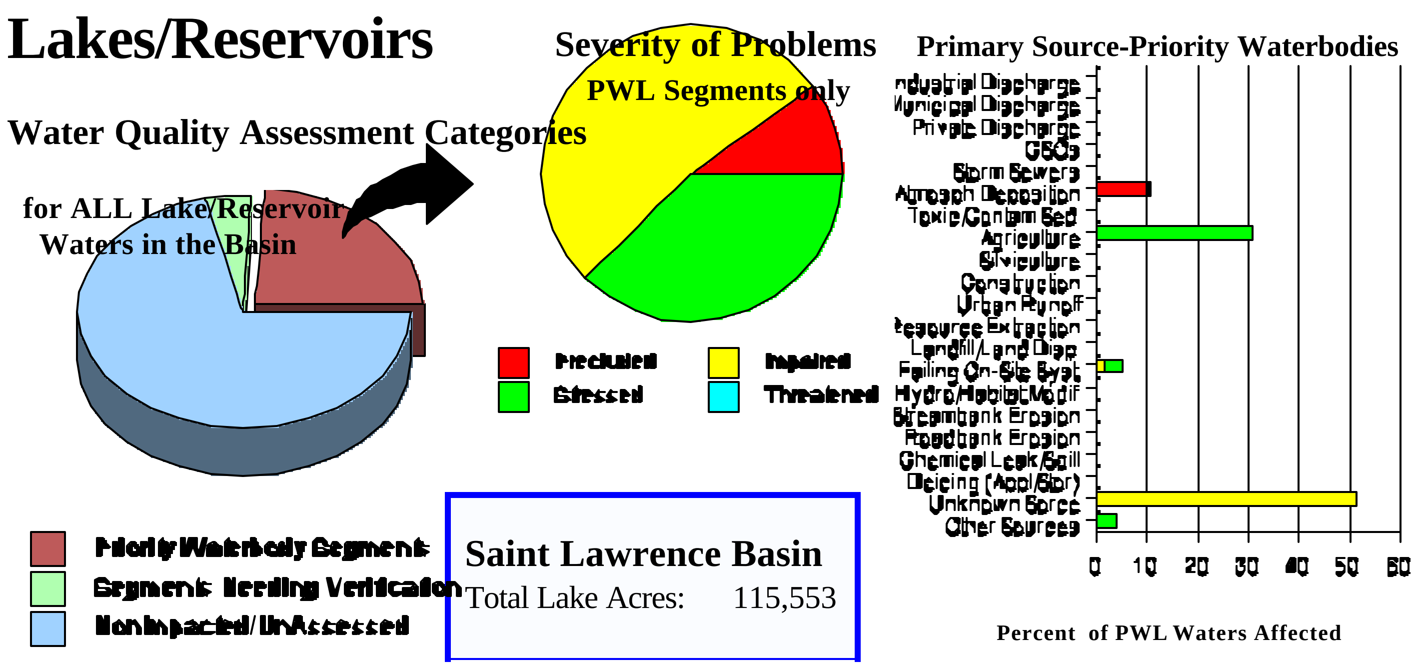


combination of present industrial operations and contaminated sediments from past activities contributes to the impact on the Saint Lawrence below Massena and the Grass River.

There are also fish consumption advisories in effect for a number of larger lakes in the basin because of mercury contamination from unknown sources, possibly from atmospheric deposition. These waterbodies are Indian Lake, Carry Falls Reservoir, Cranberry Lake, Long Pond and Meacham Lake.

Saint Lawrence River/Massena Remedial Action Plan (RAP)
As the lead agency for developing and implementing the Massena Remedial Action Plan (RAP), NYS DEC began RAP development in 1988. This process was assisted by the formation of the Massena Citizen Advisory Committee which consisted of members from industry, local government, environmental groups, sporting interests, academia, and business. The Stage 1 report was completed in 1990 and identifies use impairments, their causes, and sources. The use impairments primarily involve fish and wildlife habitat and consumption restrictions attributed to PCBs from waste sites. The Stage 2 RAP, completed in 1991, includes the development of remedial strategies to restore water quality and beneficial uses of the tributary rivers





and the St. Lawrence River, and to eliminate adverse impacts to the AOC from sources of pollutants at major hazardous waste sites as well as from other sources within the drainage basin and Area of Concern. Following completion of the Stage 2 RAP, a Remedial Advisory Committee (RAC) was appointed to represent all stakeholders and assist NYS DEC in RAP implementation. A comprehensive RAP Update document was published in April 1995, which established a format to identify remedial strategies and track progress. Priority strategies involve completing the land-based and contaminated river sediment remediation, conducting further investigations, and reassessing use impairment status in light of remedial progress and additional study results. The current RAP Status Report, published in May 2000, identifies remedial progress and includes delisting criteria for the Saint Lawrence/Massena Area of Concern (AOC). Significant progress has been made with land-based remediation at the ALCOA and Reynolds Metals sites, as well as with the contaminated sediment removal in the St. Lawrence River at General Motors. Further dredging of the St. Lawrence River and the Raquette River at the Reynolds Metal sites is likely to commence during the 2001 construction season. Cleanup requirements now provide for contaminated dredged materials to be removed from the property instead of receiving on-site treatment and disposal. Because of the international aspect of this RAP, an evaluation of the possible transboundary effects associated with the downstream interests and jurisdictions (Canadian, Provincial, and Mohawk Nation at Akwesasne) is an important consideration for this connecting channel Area of Concern. As New York State has taken the lead to address the Massena area impairments, Canadian jurisdictions have taken responsibility for RAP implementation concerning the Ontario and Quebec side of the river. The Cornwall Stage 2 RAP was published in November 1997. International cooperation has been fostered by the completion of a Stage 1 Binational Summary, a joint monitoring statement, and the current development of delisting criteria by each RAP's advisory committee for the Area of Concern. An annual ecosystem conference is conducted each Spring to maintain information sharing for this important St. Lawrence River area. Funding opportunities are under development for the St. Lawrence River Aquarium and Ecological Center (SLAEC) as well as the Binational St. Lawrence River-Lake Ontario Research Initiative (SLRLO). Both of these initiatives are expected to contribute to and benefit the Remedial Action Plan process.

Additional information on Remedial Action Plans and the RAP process is outlined on Page A-3.

Other Issues

Various recreational uses (swimming and boating) of some waters in the basin are listed as stressed. The most frequently cited sources include agricultural activities and failing on-site septic systems serving lake shore residences.

Water Quality Assessment

The series of charts presented here provide an overall assessment of waterbody impairments in the Saint Lawrence River Basin. For each of the waterbody types in the basin (rivers, lakes/reservoirs, etc.), the first pie chart reveals the percentage of the miles/acres of waters in the basin that fall into each of the four *Water Quality Assessment Categories*. The red slice of the pie indicates the percentage of waters characterized as segments with *Known Water Quality Problems/Impairments* or as *Threatened Segments*. Taken together, these waters represent the ***Priority Waterbodies*** (for that waterbody type) within the basin. The second pie chart shows the severity of the primary use impairment for those *Priority Waterbodies*.

The bar charts indicate the pollutant sources that are most frequently cited as primary contributors to the water quality impairments for *Priority Waterbodies* in the Saint Lawrence River Basin. The charts reflect the percentage of the total waterbody area on the Priority Waterbodies List where the source is listed as the primary contributor to the impairment. For each source, the data are further segregated by the severity of the water use impairment (*precluded*, *impaired*, *stressed*, *threatened*) caused by the source.

More Information

A summary listing of waterbodies included on the NYS-DEC Priority Waterbodies List is included as Tables A.9a-b. Segments with known water quality impacts/impairments or concerns are listed in Table A.9a; Table A.9b lists segments where water quality is threatened by ongoing activities in the watershed. The Threatened Waterbodies list also includes Special Protection waters. These waters experience no use restrictions or immediate threats to water quality, but nonetheless remain highly valued resources deemed worthy of special protection and consideration. A table of waterbodies needing the verification of possible water quality impairment is also included (Table A.9c).

Because there are a large number of waterbodies affected by atmospheric deposition/acid rain, they have been summarized on a separate list rather than included in Table A.9a. However, these atmospheric deposition/acid rain waterbodies are still considered Priority Waterbodies, and this is reflected in the water quality assessment charts.

More complete information about the water quality problems and issues in the basin can be found in the most recent Waterbody Inventory/Priority Waterbodies List Report for the Saint Lawrence River Basin.[27]

Water quality monitoring data from the NYS DEC Rotating Intensive Basin Studies (RIBS) Program are also available. The most recent RIBS effort in the Saint Lawrence River Drainage Basin was conducted in 1997-98; data from this study are available. The most recent available RIBS Report for the basin outlines results from a study conducted in 1991-92.[28]

The next RIBS monitoring effort in the basin is scheduled for 2004-2005, with water quality assessment to be conducted in 2006.

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[27] NYS DEC, 2000. The 1999 Saint Lawrence River Basin Waterbody Inventory and Priority Waterbodies List. NYS DEC Division of Water Technical Report. Albany, NY. July 1999. 1998.

[28] J.A. Myers, R.L. Gabriel and R.M. Garry. The Biennial RIBS Report, 1991-92. NYS DEC Division of Water Technical Report. Albany, NY. February 1994.

Saint Lawrence Basin PWL - Water Quality Impacted Segments Table A.9a

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Stream Class
SL	ST.LAWRENCE RIVER (0901-0001)	St.Lawrence	102.0 Mile	River	A
	Fish Consumption KNOWN to be IMPAIRED by Priority Organics (known) from Tox/Contam. Sediment (known) .				
SL	ST.LAWRENCE RIVER (0901-0002)	St.Lawrence	7.0 Mile	River	A
	Fish Consumption KNOWN to be IMPAIRED by Priority Organics (known) from Industrial (known) .				
SL-	GOOSE BAY (0901-0004)	Jefferson	800.0 Acre	Bay	A
	Bathing/Swimming KNOWN to be STRESSED by Nutrients (known) from Failing On-Site Syst (known) .				
SL-	LAKE OF THE ISLES (0901-0005)	Jefferson	1307.0 Acre	Bay	A
	Bathing/Swimming KNOWN to be STRESSED by Nutrients (known) from Failing On-Site Syst (known) .				
SLC-21-2-2	BOARDMAN BROOK (0902-0025)	Franklin	3.0 Mile	River	C(T)
	Water Supply KNOWN to be IMPAIRED by Aesthetics (known) from Agriculture (known) .				
SLC-29	SALMON RIVER (0902-0031)	Franklin	11.0 Mile	River	C(T)
	Fish Propagation KNOWN to be STRESSED by Silt/sediment (known) from Hydro/Habitat Modif. (known) .				
SLC-29-P050	MOUNTAIN VIEW LAKE (0902-0030)	Franklin	198.0 Acre	Lake	B(T)
	Bathing/Swimming KNOWN to be STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected) .				
SLC-29-P050-1-P051	INDIAN LAKE (0902-0046)	Franklin	307.0 Acre	Lake	B(T)
	Boating KNOWN to be STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected) .				
SLC-29- 6	BRANCH BROOK (L.TITUS CR) (0902-0001)	Franklin	0.5 Mile	River	B,C
	Bathing/Swimming KNOWN to be IMPAIRED by Pathogens (known) from Other Source (known) .				
SLC-29- 6-P028	LAKE TITUS (0902-0036)	Franklin	435.0 Acre	Lake	B(T)
	Bathing/Swimming KNOWN to be STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected) .				
SLC-32-52-12-P179a	MEACHAM LAKE (0902-0039)	Franklin	1203.0 Acre	Lake	FP
	Fish Consumption KNOWN to be IMPAIRED by Metals (known) from Unknown Source (suspected).				
SL- 1	RAQUETTE RIVER (0903-0059)	St.Lawrence	2.8 Mile	River	B
	Bathing/Swimming KNOWN to be IMPAIRED by Pathogens (known) from Failing On-Site Syst (known) .				
SL- 1-P035c	CARRY FALLS RESERVOIR (0903-0055)	St.Lawrence	5753.0 Acre	Lake(R)	B
	Fish Consumption KNOWN to be IMPAIRED by Metals (known) from Unknown Source (possible) .				

In addition to the *Water Quality Problem* segments listed on Table 1, there are over 150 small ponds and lakes affected by atmospheric deposition (acid rain) that are also considered to be *PWL - Water Quality Impacted Segment.* However, because of the large number of these segments and the similarity of the water quality impairment information for these segments, they are listed in a separate section of the report. See page 73.

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Stream Class
SL- 1-P089-1-P095	LITTLE WOLF POND (0903-0044) Bathing/Swimming KNOWN to be IMPAIRED by Pathogens (known) from Failing On-Site Syst (possible) .	Franklin	160.0 Acre	Lake	B
SL- 2	GRASS RIVER (0904-0009) Fish Consumption KNOWN to be PRECLUDED by Priority Organics (known) from Tox/Contam. Sediment (known) .	St.Lawrence	6.0 Mile	River	B
SL- 2- (unoff)	MASSENA POWER CANAL (0904-0012) Fish Consumption KNOWN to be IMPAIRED by Priority Organics (known) from Industrial (known) .	St.Lawrence	2.5 Mile	River	D
SL-25- 16-(P61-) 2-1	GULF CREEK (0905-0103) Aesthetics KNOWN to be IMPAIRED by Other Pollutants (known) from Municipal (known) .	St.Lawrence	2.5 Mile	River	D>C
SL-25- 29	BOLAND CREEK (0905-0098) Aesthetics KNOWN to be STRESSED by Aesthetics (known) from Failing On-Site Syst (known) .	St.Lawrence	3.5 Mile	River	C>D
SL-25- 50-P071	MOON LAKE (0905-0093) Boating KNOWN to be IMPAIRED by Nutrients (suspected) from Failing On-Site Syst (suspected) .	Jefferson	218.0 Acre	Lake	C
SL-25- 73-P237	LONG POND (0905-0058) Fish Consumption KNOWN to be IMPAIRED by Metals (known) from Unknown Source (possible) .	Lewis	154.0 Acre	Lake	C(T)
SL-25	OSWEGATCHIE RIVER (0905-0101) Bathing/Swimming KNOWN to be STRESSED by Pathogens (suspected) from Private System (suspected) .	St.Lawrence	0.5 Mile	River	A(T)
SL-25-101	LITTLE RIVER (0905-0090) Fish Consumption KNOWN to be STRESSED by Oil and Grease (known) from Chemical Leak/Spill (known) .	St.Lawrence	5.0 Mile	River	C
SL-25-P309	CRANBERRY LAKE (0905-0007) Fish Consumption KNOWN to be IMPAIRED by Metals (known) from Unknown Source (possible) .	St.Lawrence	6976.0 Acre	Lake	A(T)
SL-25- 7- P001	BLACK LAKE (0906-0001) Bathing/Swimming KNOWN to be STRESSED by Nutrients (known) from Agriculture (suspected) .	St.Lawrence	8500.0 Acre	Lake	B
SL-25- 7- 3	INDIAN RIVER (0906-0005) Fish Propagation SUSPECTED STRESSED by Silt/sediment (known) from Other Source (known) .	Jefferson	21.0 Mile	River	A,C
SL-25- 7- 3-P038	INDIAN LAKE (0906-0003) Fish Consumption KNOWN to be IMPAIRED by Metals (known) from Unknown Source (possible) .	Lewis	172.0 Acre	Lake	C
SL-25- 7- 8-P054	BUTTERFIELD LAKE (0906-0020) Bathing/Swimming KNOWN to be STRESSED by Aesthetics (known) from Other Source (known) .	Jefferson	1017.0 Acre	Lake	B

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Stream Class
SLC-29	SALMON RIVER (0902-0040) Fish Propagation KNOWN to be THREATENED by Silt/sediment (known) from Hydro/Habitat Modif. (known) .	Franklin	11.0 Mile	River	C(T)
SL-25- 72-2	TURNPIKE CREEK (0905-0100) Fish Propagation SUSPECTED THREATENED by Metals (known) from Resource Extraction (known) .	St.Lawrence	3.0 Mile	River	C

While there are, undoubtedly, other waterbodies whose water uses are "threatened" in some manner or another, these other segments do not meet the *specific* criteria necessary to be listed on the *Threatened Waterbodies List*.

Saint Lawrence Basin Waterbody Impairments Needing Verification Table A.9c

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Stream Class
SL-11	BRANDY BROOK (0901-0013) Fish Propagation POSSIBLY STRESSED by Silt/sediment (suspected) from Agriculture (suspected) .	St.Lawrence	16.0 Mile	River	D>C
SL-13	SUCKER BROOK (0901-0009) Fish Propagation POSSIBLY STRESSED by Silt/sediment (possible) from Agriculture (possible) .	St.Lawrence	14.0 Mile	River	C,D
SLC-21-P006a	CHATEAUGAY NARROWS (0902-0041) Bathing/Swimming POSSIBLY STRESSED by Pathogens (possible) from Failing On-Site Syst (possible) .	Clinton	3.0 Mile	River	B(T)
SLC-21-P002	UPPER CHATEAUGAY LAKE (0902-0034) Bathing/Swimming POSSIBLY STRESSED by Pathogens (possible) from Failing On-Site Syst (possible) .	Clinton	2600.0 Acre	Lake	B(T)
SLC-29	SALMON RIVER (0902-0043) Aesthetics POSSIBLY STRESSED by Nutrients (possible) from Failing On-Site Syst (possible) .	Franklin	1.0 Mile	River	C(T)
SLC-29- 1	LITTLE SALMON RIVER (0902-0044) Fish Propagation POSSIBLY STRESSED by Silt/sediment (possible) from Agriculture (possible) .	Franklin	6.0 Mile	River	B
SLC-31	PIKE CREEK (0902-0037) Fish Propagation POSSIBLY STRESSED by Silt/sediment (possible) from Agriculture (possible) .	Franklin	9.0 Mile	River	C
SLC-32-27	BIG HOLLOW BROOK (0902-0042) Aesthetics POSSIBLY STRESSED by Pathogens (suspected) from Agriculture (suspected) .	St.Lawrence	3.0 Mile	River	C(T)
SL- 1- 20	PARKHURST BROOK (0903-0058) Fish Propagation POSSIBLY STRESSED by Nutrients (possible) from Agriculture (possible) .	St.Lawrence	8.5 Mile	River	C(TS)
SL- 1-P241-26-P248	LAKE EATON (0903-0056) Water Supply POSSIBLY STRESSED by Nutrients (suspected) from Urban Runoff (suspected) .	Hamilton	589.0 Acre	Lake	AA(T)
SL- 2	GRASS RIVER (0904-0008) Bathing/Swimming POSSIBLY STRESSED by Nutrients (suspected) from Agriculture (suspected) .	St.Lawrence	35.0 Mile	River	B
SL-25	OSWEGATCHIE RIVER (0905-0096) Bathing/Swimming POSSIBLY STRESSED by Silt/sediment (suspected) from Agriculture (suspected) .	St.Lawrence	10.0 Mile	River	A
SL-25	OSWEGATCHIE RIVER (0905-0097) Bathing/Swimming POSSIBLY STRESSED by Silt/sediment (suspected) from Agriculture (suspected) .	St.Lawrence	30.0 Mile	River	B
SL-25- 68	MATOON CREEK (0905-0099) Fish Propagation POSSIBLY STRESSED by Silt/sediment (possible) from Agriculture (possible) .	St.Lawrence	15.0 Mile	River	C
SL-25- 7- 3	INDIAN RIVER (0906-0021) Boating SUSPECTED STRESSED by Nutrients (known) from Municipal (known) .	Jefferson	6.0 Mile	River	C
SL-25- 7- 3-55-P024	LAKE BONAPARTE (0906-0016) Bathing/Swimming POSSIBLY STRESSED by Nutrients (possible) from Failing On-Site Syst (possible) .	Lewis	1302.0 Acre	Lake	B

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Stream Class
SL-25- 7- 8-(P054-)P057	MUD LAKE (0906-0007)	Jefferson	224.0 Acre	Lake	C
	Boating POSSIBLY STRESSED by Nutrients (possible) from Failing On-Site Syst (possible) .				
SL-25- 7- 8-(P054-P057-)-P058	CRYSTAL LAKE (0906-0008)	Jefferson	83.0 Acre	Lake	B
	Bathing/Swimming POSSIBLY STRESSED by Nutrients (possible) from Failing On-Site Syst (possible) .				
SL-25- 7- 8-(P054-P057-)P059	CLEAR LAKE (0906-0006)	Jefferson	160.0 Acre	Lake	B
	Bathing/Swimming POSSIBLY STRESSED by Nutrients (possible) from Failing On-Site Syst (possible) .				

Waterbodies Affected by Acid Precipitation

Water Index Number	Segment/Watershed	Size	Category
SL-29 Salmon River Watershed			
SLC-29-18?...P032	CHILDS POND (0902-0013)	2.0 A	W.Q. Problem
SLC-29-21-7-...P040a	RAZORBACK POND (0902-0017)	1.0 A	W.Q. Problem
SLC-29-22-...P045	MIDDLE NOTCH POND (0902-0015)	4.0 A	W.Q. Problem
SLC-29-22-...P046	UPPER NOTCH POND (0902-0014)	3.0 A	W.Q. Problem
SLC-29-22-P047	OWLSHEAD POND (0902-0016)	1.0 A	W.Q. Problem
SLC-29-P050-3-1-P057	SOUTH DUCK POND (0902-0018)	2.0 A	W.Q. Problem
SLC-29-P065	WOLF POND (0902-0006)	51.0 A	W.Q. Problem
SLC-29-P065c	CATAMOUNT POND (0902-0047)	6.0 A	W.Q. Problem
SLC-32 Saint Regis River Watershed			
SLC-32- 6-26-P079	DIAMOND POND (0902-0011)	12.0 A	W.Q. Problem
SLC-32- 6-31-P087	MOUNTAIN POND (0902-0019)	4.0 A	W.Q. Problem
SLC-32-20-41-P101	LOWER TWIN POND (0902-0045)	10.0 A	W.Q. Problem
SLC-32-20-95-P141	LITTLE LONG POND (0902-0004)	38.0 A	W.Q. Problem
SLC-32-20-95-P142	KITFOX POND (0902-0003)	13.0 A	W.Q. Problem
SLC-32-20-96-P148	DOUGLAS POND (0902-0012)	3.0 A	W.Q. Problem
SLC-32-P170	LONG POND(03-170) (0902-0005)	32.0 A	W.Q. Problem
SLC-32-P170a	UNNAMED P #3-170a (0902-0009)	3.0 A	W.Q. Problem
SLC-32-P171	GRASS POND (0902-0002)	2.0 A	W.Q. Problem
SLC-32-52-15-P179a-5-7-P186	WARD POND (0902-0020)	3.0 A	W.Q. Problem
SLC-32-52-15-P179a-5-8-...P189	UNNAMED P #3-189 (0902-0010)	1.0 A	W.Q. Problem
SLC-32-67- 2-P221	BENZ POND (0902-0021)	23.0 A	W.Q. Problem
SLC-32-69- 6-P226	HIDDEN POND (0902-0022)	5.0 A	W.Q. Problem
SLC-32-81-P238-2-P244	TOAD POND (0902-0008)	8.0 A	W.Q. Problem
SLC-32-86-P252	UNNAMED P #3-252 (0902-0023)	2.0 A	W.Q. Problem
SLC-32-P257a-P264-P265-1-P268a	MIKES POND (0902-0024)	1.0 A	W.Q. Problem
SLC-32-P257a-P264-P265-1-P271	BEAR POND (0902-0007)	58.0 A	W.Q. Problem
SL- 1 Raquette River Watershed			
SL- 1- 46-P031	JOE INDIAN LAKE (0903-0060)	320 A	Need Verific
SL- 1- 58-1-P037	UNNAMED P #6-037 (0903-0034)	1.0 A	W.Q. Problem
SL- 1- 65-26-2-P052	SPRING POND (0903-0035)	3.0 A	W.Q. Problem
SL- 1- 65-26-3-P055	UNNAMED P #6-055 (0903-0036)	3.0 A	W.Q. Problem
SL- 1- 65-P060	ROBERTS POND (0903-0030)	1.0 A	W.Q. Problem
SL- 1- 74-1-P063-P064	PRESTON POND (0903-0031)	4.0 A	W.Q. Problem
SL- 1-077-P067	UNNAMED P #6-067 (0903-0026)	1.0 A	W.Q. Problem
SL- 1-P109- 4-1-P80-2-P81	BUCK POND (0903-0037)	2.0 A	W.Q. Problem
SL- 1-P085- 1-P87	GULL POND (0903-0061)	282 A	Need Verific
SL- 1-P089- 1-...P094	UNNAMED P #6-094 (0903-0023)	5.0 A	W.Q. Problem
SL- 1-P089- 1-...P107	UNNAMED P #6-107 (0903-0038)	1.0 A	W.Q. Problem
SL- 1-P109-11-2-4-1-2-P116	LOST POND (0903-0057)	13.0 A	W.Q. Problem
SL- 1-P109-11-2-P118-3-P119	UNNAMED P #6-119 (0903-0021)	2.0 A	W.Q. Problem
SL- 1-P109-11-2-P118...P121	HEDGEHOG POND (0903-0020)	5.0 A	W.Q. Problem

Waterbodies Affected by Acid Precipitation

Water Index Number	Segment/Watershed	Size	Category
SL- 1 Raquette River Watershed (con't)			
SL- 1-P109-11-2-P118...P122	UNNAMED P #6-122 (0903-0039)	2.0 A	W.Q. Problem
SL- 1-P109-11-2-P118...P124	UNNAMED P #6-124 (0903-0019)	1.0 A	W.Q. Problem
SL- 1-P109-11-2-P118...P125a	UNNAMED P #6-125A (0903-0040)	1.0 A	W.Q. Problem
SL- 1-P109-11-2-P118...P129	ROCK POND(06-129) (0903-0003)	294 A	W.Q. Problem
SL- 1-P109-11-2...P141	UNNAMED P #6-141 (0903-0018)	4.0 A	W.Q. Problem
SL- 1-P109-11-P144...P147	HIGH POND (0903-0001)	38.0 A	W.Q. Problem
SL- 1-P109-11-P144...P148	LITTLE PINE POND (0903-0028)	8.0 A	W.Q. Problem
SL- 1-P109-11-P156-4-1-P161	SPRING POND (0903-0041)	29.0 A	W.Q. Problem
SL- 1-P109-11-P170	HALFMOON POND (0903-0032)	7.0 A	W.Q. Problem
SL- 1-P109-11...P172	HIGH POND (0903-0025)	9.0 A	W.Q. Problem
SL- 1-P109-15-P178-1-P179	BLACK POND (0903-0027)	19.0 A	W.Q. Problem
SL- 1-162-28-P231	ROCK POND (0903-0013)	5.0 A	W.Q. Problem
SL- 1-162-P233-01-P234	BLACK POND (0903-0007)	7.0 A	W.Q. Problem
SL- 1-162-P235-01-P237	LOST POND (0903-0009)	5.0 A	W.Q. Problem
SL- 1-162-P235-02-P238-...P240	HUNTER POND (0903-0042)	1.0 A	W.Q. Problem
SL- 1-P241-22-P245	SOUTH POND (0903-0005)	442 A	W.Q. Problem
SL- 1-P241-22-P245-2-P247	SALMON POND (0903-0004)	83.0 A	W.Q. Problem
SL- 1-P276-1-P277...P278	PILGRIM POND (0903-0043)	13.0 A	W.Q. Problem
SL- 1-172-P293...P298	LOWER HELMS POND (0903-0024)	4.0 A	W.Q. Problem
SL- 1-172-P293-04-P304-...P305	POTTER POND (0903-0012)	6.0 A	W.Q. Problem
SL- 1-172-P293-04-P304-...P309	PINE POND (0903-0022)	5.0 A	W.Q. Problem
SL- 1-172-P293...P315	ALUMINUM POND (0903-0006)	8.0 A	W.Q. Problem
SL- 1-172-P293-13-4-P322	UPPER HAYMARSH PD (0903-0017)	9.0 A	W.Q. Problem
SL- 1-172-P293-13-4-P323	UNNAMED P #6-323 (0903-0014)	5.0 A	W.Q. Problem
SL- 1-172-P293-13-4-P325	PELCHER POND (0903-0002)	58.0 A	W.Q. Problem
SL- 1-172-P293-13-8-P326	LOWER CHAIN POND (0903-0010)	6.0 A	W.Q. Problem
SL- 1-172-P293-13-8-P327	MIDDLE CHAIN POND (0903-0011)	10.0 A	W.Q. Problem
SL- 1-172-P293-13-8-P328	UPPER CHAIN POND (0903-0016)	3.0 A	W.Q. Problem
SL- 1-172-P293-13-8-P330	UNNAMED P #6-330 (0903-0015)	9.0 A	W.Q. Problem
SL- 1-172-P293-14-1-P331	LONE POND (0903-0008)	5.0 A	W.Q. Problem
SL- 2 Grass River Watershed			
SL- 2-59-32-1-P353	EGG POND (0904-0003)	1.0 A	W.Q. Problem
SL- 2-59-32-2-1-P355	CARTRIDGE HILLS P (0904-0004)	1.0 A	W.Q. Problem
SL- 2-59-32-6-1-P361	WOLF POND (0904-0002)	22.0 A	W.Q. Problem
SL-25 Oswegatchie River Watershed			
SL-25- 73-19-5-3-P136	DRY TIMBER LAKE (0905-0032)	21.0 A	W.Q. Problem
SL-25- 73-26-37-P179	KELLY POND (0905-00 73)	4.0 A	W.Q. Problem
SL-25- 73-26-38-2-P180	UNNAMED P #4-180 (0905-0075)	3.0 A	W.Q. Problem
SL-25- 73-26-38-5-P184	GREEN POND (0905-0035)	10.0 A	W.Q. Problem
SL-25- 73-26-38-P183-P185	TWIN PONDS (0905-0059)	24.0 A	W.Q. Problem
SL-25- 73-26-40-5-P189	ROCK LAKE (0905-0015)	64.0 A	W.Q. Problem
SL-25- 73-26-40-...P190	EMERALD LAKE (0905-0008)	13.0 A	W.Q. Problem

Waterbodies Affected by Acid Precipitation

Water Index Number	Segment/Watershed	Size	Category
SL-25 Oswegatchie River Watershed (con't)			
SL-25- 73-26-40-P191	SAND LAKE (0905-0016)	58.0 A	W.Q. Problem
SL-25- 73-26-40...P192	SITZ POND (0905-0017)	26.0 A	W.Q. Problem
SL-25- 73-26-P193-...P194	UNNAMED P #4-194 (0905-0060)	8.0 A	W.Q. Problem
SL-25- 73-26-42-1-P195	MUSKRAT POND (0905-0061)	17.0 A	W.Q. Problem
SL-25- 73-26-42-P196	BEAR POND (0905-0062)	78.0 A	W.Q. Problem
SL-25- 73-26-42-P196-1-P197	DIANA POND (0905-0063)	27.0 A	W.Q. Problem
SL-25- 73-26-43-P198	LOWER SOUTH POND (0905-0012)	38.0 A	W.Q. Problem
SL-25- 73-26-43-P199	MIDDLE SOUTH POND (0905-0013)	77.0 A	W.Q. Problem
SL-25- 73-26-43-P200	UPPER SOUTH POND (0905-0057)	14.0 A	W.Q. Problem
SL-25- 73-26-44-P201	UNNAMED P #4-201 (0905-0047)	14.0 A	W.Q. Problem
SL-25- 73-26-45-P202	UNNAMED P #4-202 (0905-0048)	4.0 A	W.Q. Problem
SL-25- 73-26-46-P203	UNNAMED P #4-203 (0905-0049)	23.0 A	W.Q. Problem
SL-25- 73-26-P204	UNNAMED P #4-204 (0905-0050)	10.0 A	W.Q. Problem
SL-25- 73-26-47-P205	UNNAMED P #4-205 (0905-0021)	16.0 A	W.Q. Problem
SL-25- 73-26-P206	UNNAMED P #4-206 (0905-0052)	3.0 A	W.Q. Problem
SL-25- 73-26-47-P207	UNNAMED P #4-207 (0905-0053)	1.0 A	W.Q. Problem
SL-25- 73-26-48-1-P208	UNNAMED P #4-208 (0905-0022)	8.0 A	W.Q. Problem
SL-25- 73-26-48-P209	UNNAMED P #4-209 (0905-0055)	6.0 A	W.Q. Problem
SL-25- 73-26-49-P210	WILLYS LAKE (0905-0026)	50.0 A	W.Q. Problem
SL-25- 73-26-49-P211	UNNAMED P #4-211 (0905-0064)	1.0 A	W.Q. Problem
SL-25- 73-26-51-P212	UNNAMED P #4-212 (0905-0065)	2.0 A	W.Q. Problem
SL-25- 73-26-51-P213	UNNAMED P #4-213 (0905-0066)	5.0 A	W.Q. Problem
SL-25- 73-26-P214	WALKER LAKE (0905-0024)	38.0 A	W.Q. Problem
SL-25- 73-39?...P?	N.BEECHRIDGE POND (0905-0019)	19.0 A	W.Q. Problem
SL-25- 73-39?...P?	E.BEECHRIDGE POND (0905-0020)	22.0 A	W.Q. Problem
SL-25- 73-P228e	UNNAMED P #4-288e (0905-0078)	8.0 A	W.Q. Problem
SL-25- 73-40-P235	UNNAMED P #4-235 (0905-0076)	2.0 A	W.Q. Problem
SL-25- 73-43-P244-P245	JAKES POND (0905-0038)	17.0 A	W.Q. Problem
SL-25- 73	W.BR.OSWEGATCHIE (0905-0003)	10.0-	W.Q. Problem
SL-25-101-P279	READWAY POND (0905-0043)	2.0 A	W.Q. Problem
SL-25-101-24-P282	UNNAMED P #4-282 (0905-0077)	1.0 A	W.Q. Problem
SL-25-101-24-8-P289	CRYSTAL LAKE (0905-0030)	14.0 A	W.Q. Problem
SL-25-101-34-2-P297	UNNAMED P #4-297 (0905-0079)	3.0 A	W.Q. Problem
SL-25-115-P307	LOST POND (0905-0040)	6.0 A	W.Q. Problem
SL-25-P309- 9-2-P313	CURTIS POND (0905-0004)	18.0 A	W.Q. Problem
SL-25-P309- 9-5-P314	UNNAMED P #4-314 (0905-0080)	13.0 A	W.Q. Problem
SL-25-P309- 9-5-P315	DONUT POND (0905-0081)	11.0 A	W.Q. Problem
SL-25-P309- 9-P316	DOG POND (0905-0031)	18.0 A	W.Q. Problem
SL-25-P309- 9-P317	LITTLE DOG POND (0905-0039)	6.0 A	W.Q. Problem
SL-25-P309-11-P319-P320	LITTLE FISH POND (0905-0082)	5.0 A	W.Q. Problem
SL-25-P309-11...P320a	UNNAMED P #4-320a (0905-0083)	4.0 A	W.Q. Problem
SL-25-P309-11...P320b	UNNAMED P #4-320b (0905-0084)	6.0 A	W.Q. Problem
SL-25-P309-11...P321a	UNNAMED P #4-321a (0905-0085)	2.0 A	W.Q. Problem
SL-25-P309-11...P322b	UNNAMED P #4-322b (0905-0086)	5.0 A	W.Q. Problem

Waterbodies Affected by Acid Precipitation

Water Index Number	Segment/Watershed	Size	Category
SL-25 Oswegatchie River Watershed (con't)			
SL-25-P309-11...P324	UNNAMED P #4-324 (0905-0070)	4.0 A	W.Q. Problem
SL-25-P309-12-1-2-P325	INDIAN MOUNTAIN P (0905-0037)	12.0 A	W.Q. Problem
SL-25-P309-12-12-P326	ASH POND (0905-0028)	5.0 A	W.Q. Problem
SL-25-P309-12-3-P329	CAT MOUNTAIN POND (0905-0002)	13.0 A	W.Q. Problem
SL-25-124-1-P343	BUCK POND (0905-0001)	13.0 A	W.Q. Problem
SL-25-126...P346	WASHBOWL POND (0905-0087)	4.0 A	W.Q. Problem
SL-25-126-4-P350	LONE DUCK POND (0905-0088)	6.4 A	W.Q. Problem
SL-25-126-5-P351	MUIR POND (0905-0041)	12.0 A	W.Q. Problem
SL-25-126-P352	WOLF POND (0905-0027)	70.0 A	W.Q. Problem
SL-25-126-P352-1-P353	STREETER FISHPOND (0905-0067)	13.0 A	W.Q. Problem
SL-25-126-7-P354	LOWER RILEY POND (0905-0011)	19.0 A	W.Q. Problem
SL-25-126-7-P355	UPPER RILEY POND (0905-0023)	13.0 A	W.Q. Problem
SL-25-128-1-P356	UNNAMED P #4-356 (0905-0068)	4.0 A	W.Q. Problem
SL-25-133-P375	CRACKER POND (0905-0005)	19.0 A	W.Q. Problem
SL-25-131-P362	GRASSY POND (0905-0033)	3.0 A	W.Q. Problem
SL-25-131-P363	SLENDER POND (0905-0074)	13.0 A	W.Q. Problem
SL-25-132-1-P364	WEST POND (0905-0025)	6.0 A	W.Q. Problem
SL-25-132-1-P365	OVEN LAKE (0905-0042)	52.0 A	W.Q. Problem
SL-25-132-1-P366	GRASSY POND (0905-0034)	29.0 A	W.Q. Problem
SL-25-132-1-P366-P367	HYDE POND (0905-0071)	8.0 A	W.Q. Problem
SL-25-132-P366-P368	HITCHENS POND (0905-0036)	11.0 A	W.Q. Problem
SL-25-132-P369	TOAD POND (0905-0046)	24.0 A	W.Q. Problem
SL-25-132-5-P370	UNNAMED P #4-370 (0905-0104)	2.0 A	W.Q. Problem
SL-25-132-6-P371	UNNAMED P #4-371 (0905-0056)	11.0 A	W.Q. Problem
SL-25-132-7-P372	LITTLE CROOKED LK (0905-0010)	13.0 A	W.Q. Problem
SL-25-132-P373	CROOKED LAKE (0905-0006)	122 A	W.Q. Problem
SL-25-132-P373...P374	COVEY POND (0905-0029)	4.0 A	W.Q. Problem
SL-25-133-1-P376	GAL POND (0905-0009)	13.0 A	W.Q. Problem
SL-25-140-1-P377	GULL LAKE (0905-0072)	75.0 A	W.Q. Problem
SL-25-140-2-P378	LITTLE DUCK POND (0905-0089)	2.0 A	W.Q. Problem
SL-25-143-P381	JENKINS POND (0905-0069)	2.0 A	W.Q. Problem

The Lake Champlain Basin

Background

The character of the Lake Champlain Basin ranges from the wilderness high peaks area of the Adirondack Mountains, to recreational lakes and rural-agricultural lowlands. The basin drains a total area of about 3,000 square miles and is populated by approximately 140,000 persons. Most of the population lives either in developed areas on Lake Champlain itself or near mountain lakes where the major economic activity is centered around recreational activities and forestry. Agriculture is predominant in the lowlands along Lake Champlain. There are about 1,800 miles of rivers and streams and 212 significant lakes, ponds and reservoirs in the basin.

Water Quality Issues and Concerns

With some exceptions, water quality is good throughout the basin. Lake Champlain itself is large and deep and is generally of excellent water quality. However, some shallow bays are subject to nutrient enrichment and eutrophic conditions that are primarily attributable to nonpoint source activities, including leaching from on-site disposal systems and contaminated storm runoff. The waters of the southern portion of Lake Champlain are highly turbid. Rapid erosion, which is occurring on the lake's shoreline, contributes to the turbidity, among other possible causes.

Lake Champlain and the Lake Champlain Basin Program

In 1991, a Lake Champlain Management Conference was convened by the US Environmental Protection Agency (USEPA) pursuant to the federal Lake Champlain Designation Act which was signed into law in 1990. The act requires the development of a pollution prevention, control, and restoration plan for the lake which was released in October 1996. The document is titled *Opportunities for Action - an Evolving Plan for the Future of the Lake Champlain Basin* and was prepared by the Lake Champlain Management Conference. The planning process which emerged from the conference is called the Lake Champlain Basin Program. Key elements of the program include research and monitoring, project administration, project planning and demonstration. Research and monitoring projects which are underway will focus primarily on nutrients and toxics. The three pollutants of major concern and their impacts on the lake are phosphorus which causes eutrophication and PCB and mercury which bioaccumulate in fish and wildlife.[29]

An advisory limiting consumption of larger lake trout and walleye is currently in place for the entire lake. Analysis of a large number of lake trout samples collected by NYS DEC and the Vermont Agency of Natural Resources has shown that fish less than 25 inches long have an average PCB level considerably below FDA's 2 ppm limit, whereas the average for larger fish exceeds that limit. This led the NYS Department of Health to limit the advisory to only larger fish.

Beyond Lake Champlain proper, several other smaller lakes in the basin have substantial numbers of year-round and seasonal homes and other development around their shorelines which affect water quality. The southern portion of Lake George is an example of an area where intense commercial and recreational development has a noticeable effect on water quality relative to the northern portion of the lake, which is less developed.

Atmospheric Deposition/Acid Rain

Other small lakes and ponds situated at high elevations and having low buffering capacity are susceptible to low pH levels attributable to the acid precipitation phenomenon. Over forty such lakes in this drainage basin have been identified with this problem. The low pH and extremely low alkalinity observed during routine monitoring of the Bouquet River at Keene also shows evidence that this problem may adversely affect some streams as well.

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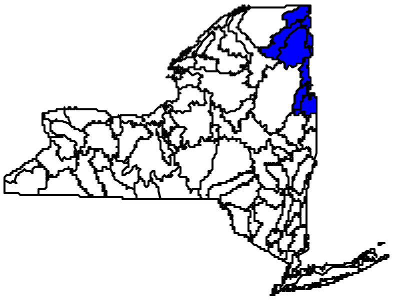
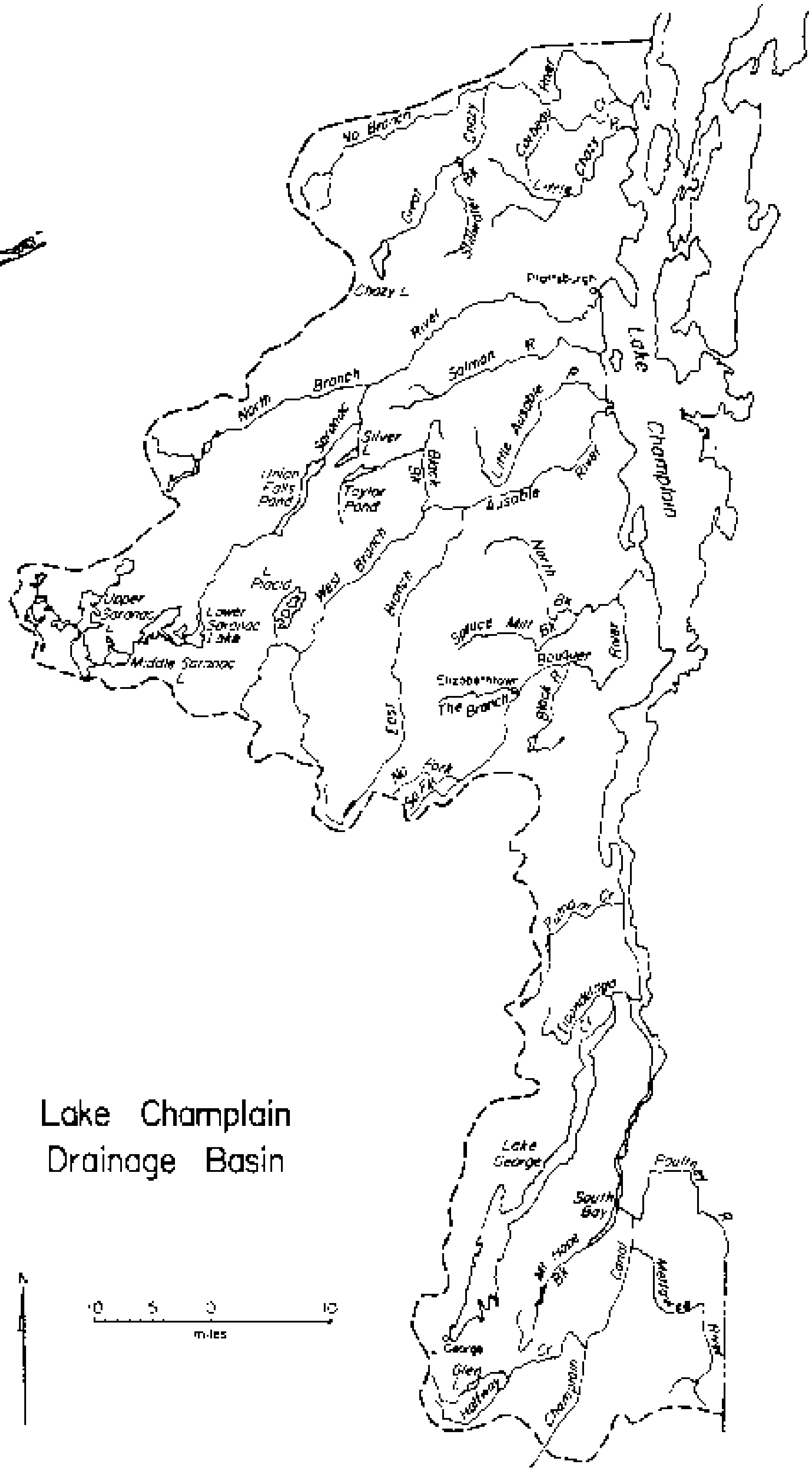
[29] Opportunities for Action: An Evolving Plan for the Future of the Lake Champlain Basin. Lake Champlain Management Conference. October 1996.

Lake Champlain Drainage Basin Map





Other Issues

Cumberland Bay on the lake near Plattsburgh also has some water quality concerns. Although suspended and floating solids from city and industrial discharges are no longer evident in the bay, a fish consumption advisory is in effect which limits consumption of brown bullhead, yellow perch and American eel because of PCB contamination.

Agricultural run-off continues to cause water quality concerns in the Great Chazy and Little Chazy Rivers. Additionally, Regional Fisheries Staff are investigating the causes for a suppressed walleye fishery in the Great Chazy River.

The impairment of aquatic life in varying degrees due to stream embeddedness has been noted in the basin. A number of streams in the Ausable-Bouquet Rivers, Saranac River and Lake George sub-basins have been so identified. While most of the embeddedness is a result of the geology of the region (sandy soils), the practice of road sanding to improve vehicle traction in the winter has also been cited. In July 1989, a biological survey of the West Branch of the Ausable River from below Lake Placid to below Wilmington was conducted in an effort to determine the effects of road sanding on the macroinvertebrate communities in the stream. In all, eight sites in this 14-mile reach were sampled. No macroinvertebrate community impairment was found at any site, although sand was noted throughout the reach.

More Information

A summary listing of waterbodies included on the NYS-DEC Priority Waterbodies List is included as Table A.10. A list of waterbodies that may have been previously listed on theWI/PWL but have since been determined to need verification of possible water quality impairment is also included. More complete information about the water quality problems and issues in the basin can be found in the most recent (1996) series of Priority Waterbodies List Drainage Basin Reports.[30]

Water quality monitoring and assessment results from the NYS DEC Division of Water ambient surface water monitoring activities are summarized in the continuing series of Rotating Intensive Basin Studies (RIBS) Drainage Basin Reports. The most recent RIBS Report for the Lake Champlain Drainage Basin outlines results from monitoring conducted in 1993-94.[31]

A 1998-1999 RIBS monitoring effort in the basin was recently completed. A comprehensive water quality assessment is currently underway.

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30 NYS DEC, 1996. The 1996 Priority Waterbodies List for the Lake Champlain Basin. NYS DEC Division of Water Technical Report. Albany, NY. September 1996.

31 J.A. Myers, R.L. Gabriel and B.Andrews. The Lake Champlain RIBS Report, 1993-94 . DEC Division of Water Technical Report. Albany, NY. April 1996.

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[31] J.A. Myers, R.L. Gabriel and B.Andrews. The Lake Champlain RIBS Report, 1993-94. DEC Division of Water Technical Report. Albany, NY. April 1996.

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
DRAINAGE BASIN: Lake Champlain										
Lake Champlain	1000-0001	multiple	Lake	96640.0 Acres	A	Fish Consumption	Impaired	Known	Priority Organics	Unknown Source
DRAINAGE BASIN: Lake Champlain										
SubBasin: Lake Champlain Proper										
Cumberland Bay	1001-0001	Clinton	Bay	100.0 Acres	B	Public Bathing	Precluded	Known	Aesthetics	Unknown Source
Mill Brook	1001-0017	Essex	River	6.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Northwest Bay	1001-0016	Essex	Lake	30.0 Acres	A	Public Bathing	Precluded	Known	Pathogens	Failing On-Site Syst
Salmon River	1001-0010	Clinton	River	9.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Whallons Bay	1001-0013	Essex	Bay	15.0 Acres	A	Public Bathing	Stressed	Susp	Pathogens	Other Source
DRAINAGE BASIN: Lake Champlain										
SubBasin: Great Chazy River										
Great Chazy River	1002-0001	Clinton	River	13.0 Miles	A	Water Supply	Impaired	Known	Pathogens	Agriculture
Great Chazy River	1002-0010	Clinton	River	7.0 Miles	C	Aquatic Life	Impaired	Susp	Silt/sediment	Agriculture
Little Chazy River	1002-0003	Clinton	River	5.0 Miles	C	Aquatic Life	Impaired	Susp	Unknown Toxicity	Agriculture
DRAINAGE BASIN: Lake Champlain										
SubBasin: Saranac River										
Amphith.P#2-131	1003-0018	Franklin	Lake	3.0 Acres	?	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Bartlett Pond	1003-0012	Essex	Lake	3.0 Acres	FP	Aquatic Life	Impaired	Known	Acid/Base (pH)	Atmosph. Deposition
Bartlett Pond	1003-0030	Essex	Lake	1.0 Acres	AA	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Bass Lake	1003-0011	Franklin	Lake	6.0 Acres	B	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Conley Line Pond	1003-0003	Franklin	Lake	1.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Dow Pond	1003-0022	Franklin	Lake	1.0 Acres	C(T)	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
East Copperas Pond	1003-0004	Essex	Lake	10.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Lake Flower	1003-0046	Essex	Lake	20.0 Acres	A	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Lindsey Pond	1003-0036	Essex	Lake	6.0 Acres	AA	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Line Pond	1003-0025	Essex	Lake	5.0 Acres	C(T)	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Little Echo Pond	1003-0006	Franklin	Lake	2.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Little Egg Pond	1003-0031	Essex	Lake	1.0 Acres	AA	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Little North Whey	1003-0007	Franklin	Lake	3.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Marsh Pond	1003-0020	Franklin	Lake	4.0 Acres	AA	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Marsh Pond	1003-0029	Essex	Lake	4.0 Acres	C(T)	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Mccaffery Pond	1003-0034	Essex	Lake	2.0 Acres	AA	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Mountain Pond	1003-0024	Essex	Lake	5.0 Acres	C(T)	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
North Branch Saranac	1003-0038	Franklin	River	4.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Construction
North Branch Saranac	1003-0041	Clinton	River	6.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
North Whey Pond	1003-0013	Franklin	Lake	3.0 Acres	AA	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source

DRAINAGE BASIN: Lake Champlain
SubBasin: Saranac River (con't)

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
Saranac River	1003-0001	Clinton	River	2.0 Miles	A	Water Supply	Impaired	Known	Pathogens	Failing On-Site Syst
Saranac River	1003-0021	Clinton	River	1.2 Miles	C(T)	Aquatic Life	Impaired	Susp	Water Level/Flow	Hydro/Habitat Modif.
Saranac River	1003-0040	Clinton	River	20.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Saranac River	1003-0044	Essex	River	6.0 Miles	C	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Saranac River	1003-0045	Essex	River	5.0 Miles	C	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Sochia Pond	1003-0014	Franklin	Lake	4.0 Acres	AA(T)	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
St Germain Pond	1003-0009	Franklin	Lake	13.0 Acres	AA	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Sw Amphitheatre P	1003-0015	Franklin	Lake	1.0 Acres	AA	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Twelfth Tee Pond	1003-0010	Franklin	Lake	5.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Unnamed P #2-036	1003-0023	Franklin	Lake	3.0 Acres	C(T)	Aquatic Life	Impaired	Susp	Acid/Base (pH)	Atmosph. Deposition
Unnamed P #2-067	1003-0026	Essex	Lake	2.0 Acres	B(T)	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Unnamed P #2-068	1003-0017	Franklin	Lake	3.0 Acres	B(T)	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Unnamed P #2-079	1003-0027	Essex	Lake	1.0 Acres	C(T)	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Unnamed P #2-080	1003-0028	Essex	Lake	2.5 Acres	C(T)	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Unnamed P #2-133	1003-0019	Franklin	Lake	2.0 Acres	?	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Unnamed P #2-166	1003-0032	Essex	Lake	2.0 Acres	AA	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Unnamed P #2-189	1003-0033	Essex	Lake	3.0 Acres	AA	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Unnamed P #2-196	1003-0035	Essex	Lake	1.0 Acres	AA	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Upper Saranac Lake	1003-0048	Franklin	Lake	5056.0 Acres	AA	Aquatic Life	Stressed	Susp	Oxygen Demand	Unknown Source
West Polliwog Pd	1003-0016	Franklin	Lake	3.0 Acres	AA	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition

DRAINAGE BASIN: Lake Champlain
SubBasin: Ausable/Bouquet Rivers

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
Ausable River	1004-0022	Clinton	River	6.0 Miles	C	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Bouquet River	1004-0037	Essex	River	1.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Bouquet River	1004-0039	Essex	River	4.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Bouquet River	1004-0046	Essex	River	7.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Bullet Pond	1004-0017	Essex	Lake	1.0 Acres	C(T)	Aquatic Life	Impaired	Susp	Acid/Base (pH)	Atmosph. Deposition
Cascade Brook	1004-0035	Essex	River	5.0 Miles	AA(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Chapel Pond Trib	1004-0012	Essex	River	0.3 Miles	FP	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Chubb River	1004-0028	Essex	River	1.0 Miles	C,C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Other Source
Cranberry Pond	1004-0006	Essex	Lake	2.0 Acres	D	Aquatic Life	Impaired	Susp	Acid/Base (pH)	Atmosph. Deposition
Little Ausable River	1004-0021	Clinton	River	9.0 Miles	A(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Lost Pond	1004-0007	Essex	Lake	3.0 Acres	AA(T)	Aquatic Life	Impaired	Susp	Acid/Base (pH)	Atmosph. Deposition
Lower Wallface Pd	1004-0004	Essex	Lake	6.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Mud Pond	1004-0016	Essex	Lake	3.0 Acres	AA	Aquatic Life	Impaired	Susp	Acid/Base (pH)	Atmosph. Deposition
North Branch Boquet	1004-0036	Essex	River	5.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Scott Pond	1004-0008	Essex	Lake	3.0 Acres	C(T)	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
The Branch (boquet)	1004-0040	Essex	River	7.0 Miles	AA(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)

(con't)

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source

DRAINAGE BASIN: Lake Champlain
SubBasin: Ausable/Bouquet Rivers (con't)

Unnamed P #2-223	1004-0011	Essex	Lake	5.0 Acres	C(T)	Aquatic Life	Impaired	Susp	Acid/Base (pH)	Atmosph. Deposition
Unnamed P #2-263	1004-0009	Essex	Lake	2.0 Acres	C(T)	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Unnamed P #2-269	1004-0010	Essex	Lake	2.0 Acres	AA(T)	Aquatic Life	Impaired	Susp	Acid/Base (pH)	Atmosph. Deposition

DRAINAGE BASIN: Lake Champlain
SubBasin: Lake Champlain South

Glen Lake	1005-0009	Warren	Lake	325.0 Acres	B(T)	Public Bathing	Stressed	Known	Nutrients	Failing On-Site Syst
Halfway Creek	1005-0013	Washington	River	9.0 Miles	AA(T)	Aquatic Life	Stressed	Susp	Thermal Changes	Urban Runoff
Indian River	1005-0002	Washington	River	3.0 Miles	C(T)	Aquatic Life	Impaired	Susp	Thermal Changes	Agriculture
Mettawee River	1005-0003	Washington	River	14.0 Miles	C(T)	Aquatic Life	Impaired	Susp	Thermal Changes	Agriculture
Putnam Creek	1005-0011	Essex	River	4.5 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Snake Pond	1005-0001	Essex	Lake	4.0 Acres	C(T)	Aquatic Life	Impaired	Susp	Acid/Base (pH)	Atmosph. Deposition

DRAINAGE BASIN: Lake Champlain
SubBasin: Lake George

Halfway Brook	1006-0001	Warren	River	3.0 Miles	C(TS)	Aquatic Life	Impaired	Susp	Silt/sediment	Deicing (stor/appl)
Lake George	1006-0016	Warren	Lake	14000.0 Acres	A	Public Bathing	Stressed	Known	Nutrients	Urban Runoff
West Brook	1006-0008	Warren	River	2.0 Miles	AA	Aquatic Life	Impaired	Susp	Silt/sediment	Deicing (stor/appl)

Waterbody Inventory - Waters Needing Verification of Impairment

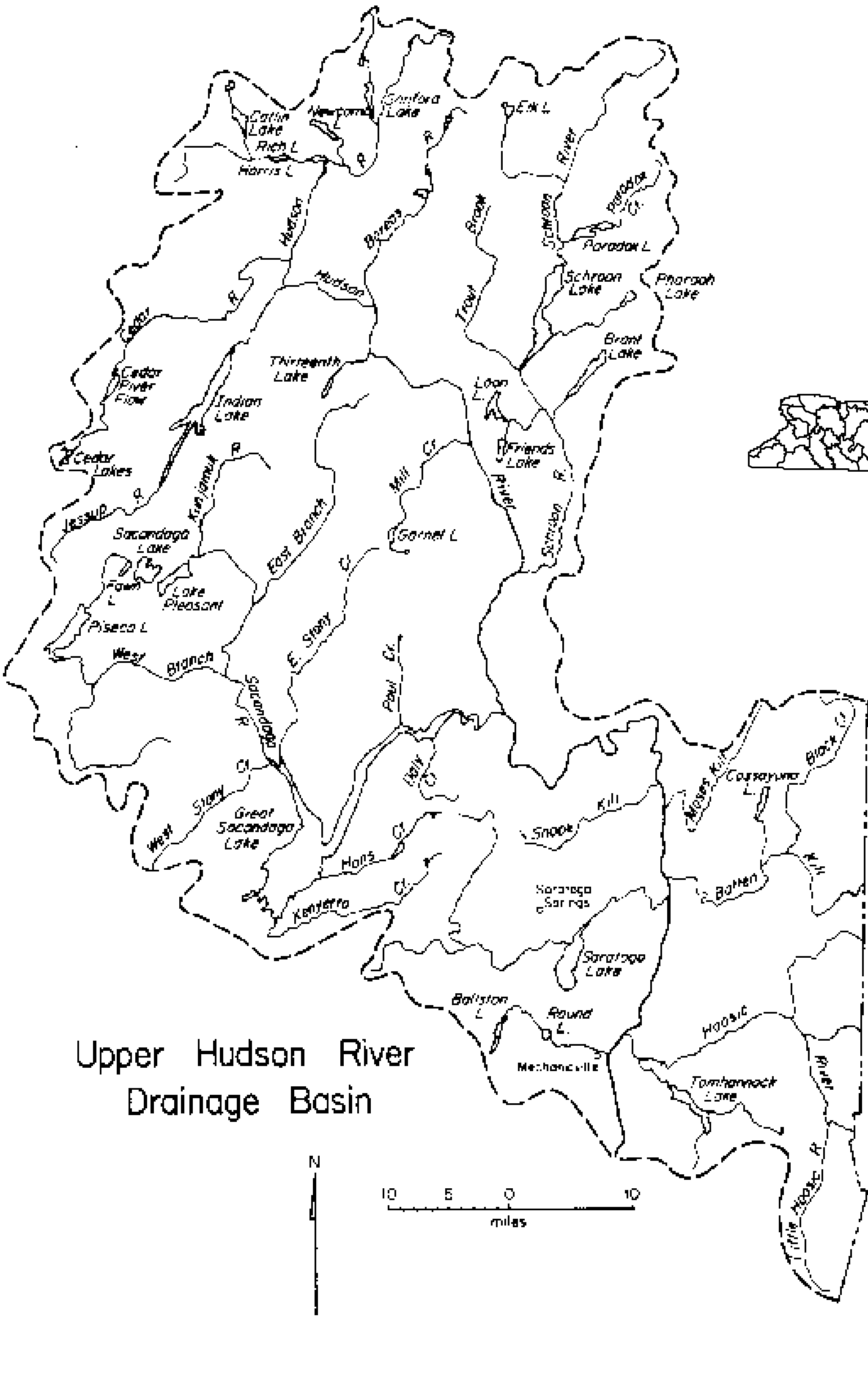
Segment Name	Segment ID	County

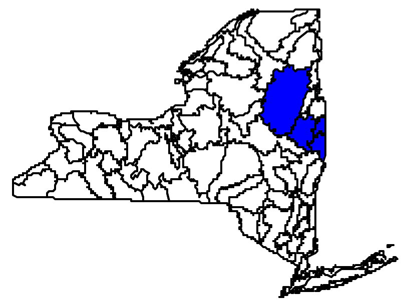
Lake Champlain Basin

Segment Name	Segment ID	County
Lake Champlain Proper		
Allens Bay	1001-0007	Clinton
Cliffhaven Beach	1001-0009	Clinton
Comfort Bay	1001-0018	Clinton
Kings Bay	1001-0006	Clinton
Willsboro Bay	1001-0015	Essex
Great Chazy River SubBasin		
Chazy Lake	1002-0009	Clinton
Farrel Brook	1002-0008	Clinton
Great Chazy River	1002-0004	Clinton
Monty Bay	1002-0007	Clinton
Ausable/Bouquet Rivers SubBasin		
Ausable River	1004-0015	Clinton
Ausable River	1004-0020	Clinton
Cold Brook	1004-0026	Essex
East Branch Ausable	1004-0014	Essex
Little Ausable River	1004-0018	Clinton
Paradox Bay	1004-0027	Essex
Phelps Brook	1004-0030	Essex
Silver Stream	1004-0019	Clinton
West Branch Ausable	1004-0013	Essex
West Branch Ausable	1004-0042	Essex
Lake Champlain South SubBasin		
Big Creek	1005-0004	Washington
Cemetery Brook	1005-0008	Warren
Lake George SubBasin		
English Brook	1006-0007	Warren
Finkle Brook	1006-0005	Warren
Hague Brook	1006-0006	Warren
Huddle Brook	1006-0003	Warren
Indian Brook	1006-0002	Warren
Smith Brook	1006-0004	Warren

Many of the waterbody segments included on previous editions of the Priority Waterbodies List have limited recent documentation of specific water quality impairment. In an effort to improve the quality of information in theWI/PWL, these waterbody segments Needing Verification of an Impairment are tracked on a list separate from the Priority Waterbodies List.

Upper Hudson River Drainage Basin Map





The Upper Hudson River Basin

Background

The Upper Hudson River Drainage Basin covers an area of 4,000 square miles and is populated by approximately 260,000 people, a majority of whom live in either the Glens Falls or just to the north of the Albany-Schenectady-Troy Metropolitan Areas. The Hudson River originates in the wilderness of the Adirondack Mountains at Lake Tear of the Clouds at the base of Mt. Marcy. The large portion of this basin upstream of Corinth is sparsely populated and lies within the Adirondack Park where boating, fishing, and other recreational activities are popular. The most industrialized areas of the drainage basin are located along the main stem of the Upper Hudson downstream from Corinth. There are approximately 4,800 miles of rivers and streams and 500 lakes and ponds in the basin.

Water Quality Issues and Concerns

Although there are a few significant water quality problems in the basin, generally water quality is relatively good.

PCB Contamination

The most serious water quality problem in the main stem of the Upper Hudson is the PCB contamination of river bottom sediment below Hudson Falls and Fort Edward from electrical capacitor manufacturing plants located there. The effects of this contamination extend beyond the Upper Hudson Basin, down the entire length of the Hudson estuary to its mouth at New York Harbor and into the marine waters of Western Long Island Sound. The river has been designated a federal Superfund site by the US Environmental Protection Agency (USEPA). Data collected over a period of years prior to 1992 had shown that PCB levels in the biota and water column were declining, but PCB levels in many fish species remained above the 2.0 mg/l FDA limit. Fish samples collected in 1992 showed a significant increase in PCB levels. Recent data submitted to the Department by the General Electric Company indicate that seeps and sediments adjacent to their Hudson Falls site are highly contaminated with PCBs. The company has entered into a consent agreement with the Department to remediate the plant site.

In 1995, the DEC lifted the nineteen-year ban on recreational fishing in the Hudson River between Troy and Hudson Falls (NYS DEC, 1995). With the Department of Health's approval, catch-and-release fishing is now permitted between the Troy Dam and Bakers Falls. All fish caught in this section of the river and the lower reaches of its tributaries must be returned immediately to the water. Catch-and-release forbids the possession of any fish, including bait and trophy fish. During the time the Upper Hudson was closed to fishing, game fish increased in number and size: large fish are now common. Catch-and-release will maintain a high-quality fishery for walleye, northern pike, tiger muskellunge, and largemouth and smallmouth bass. Anglers, local officials and business people wanted the ban lifted to spur sportfishing and related businesses in riverside communities. Along with opening the fishery, DEC will educate the public through posters, brochures and public service announcements not to eat the fish from this section of the river. There are essentially no health risks from simply handling the fish. Anglers will have to comply with the catch-and-release regulations for the fishing to continue.

Another reach of the Upper Hudson also has a fish consumption advisory in place. The river from between Sherman Island Dam downstream to the Glens Falls Feeder Dam was added to the listing of fish consumption advisories in 1995 because of PCB contamination associated with a hazardous waste disposal site. The advisory limits consumption of carp taken from this reach.

Two other waterbodies in the basin are also adversely affected by PCB contamination. There is a fish consumption advisory for Schroon Lake to eat no more than one meal per month of larger lake trout due to an unknown source of PCBs. There is also an advisory limiting consumption of brown and rainbow trout

taken from the Hoosic River. The PCB source is believed to be a closed electrical capacitor manufacturing facility in North Adams, Massachusetts.

Atmospheric Deposition/Acid Rain

As with other waters in the Adirondack region, a significant water quality concern in the headwaters of the basin is acid precipitation. The surface waters in the higher elevations of the basin have naturally deficient buffering capacities and are particularly vulnerable to acid rain.

Other Issues

Two major recreational lakes in the basin have other problems that impair uses. Fishing and boating in Saratoga Lake are impaired by an infestation of Eurasian water milfoil. Aquatic life support is impaired in Great Sacandaga Lake, a flood control reservoir used for recreation. The water level fluctuations necessary to operate the reservoir for its intended purpose sometimes vary 20 feet or more. These water level variations have virtually eliminated macrophytes, reduced invertebrate forage activity in shallow areas and possibly expose fish eggs to desiccation. Production of northern pike seems to have been particularly affected.

Sediment runoff from wintertime road sanding is also frequently cited in theWI/PWL as a problem in the headwaters area. This problem also affects aquatic life by filling in spawning areas in the stream beds and by smothering eggs.

Construction and land disposal are the most frequently cited sources of pollutants causing water quality problems in the more densely developed areas tributary to the portion of the basin downstream of the Hadley-Luzerne area.

More Information

A summary listing of waterbodies included on the NYS-DEC Priority Waterbodies List is included as Table A.11. A list of waterbodies that may have been previously listed on theWI/PWL but have since been determined to need verification of possible water quality impairment is also included. More complete information about the water quality problems and issues in the basin can be found in the most recent (1996) series of Priority Waterbodies List Drainage Basin Reports.[32]

Water quality monitoring and assessment results from the NYS DEC Division of Water ambient surface water monitoring activities are summarized in the continuing series of Rotating Intensive Basin Studies (RIBS) Drainage Basin Reports. The most recent RIBS Report for the Upper Hudson River Drainage Basin outlines results from monitoring conducted in 1993-94.[33]

The next RIBS monitoring effort in the basin is scheduled for 2001-2002, with water quality assessment to be conducted in 2003.

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32 NYS DEC, 1996. The 1996 Priority Waterbodies List for the Upper Hudson River Basin. NYS DEC Division of Water Technical Report. Albany, NY. September 1996.

33 J.A. Myers, R.L. Gabriel and B.Andrews. The Upper Hudson River Basin RIBS Report, 1993-94 . DEC Division of Water Technical Report. Albany, NY. June 1996.

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
DRAINAGE BASIN: Upper Hudson River										
SubBasin: Upper Hudson Main Stem										
Ballston Lake	1101-0036	Saratoga	Lake	235.0 Acres	A	Water Supply	Stressed	Susp	Nutrients	Hydro/Habitat Modif.
Bullhead Pond	1101-0033	Saratoga	Lake	6.0 Acres	C	Aquatic Life	Stressed	Known	Acid/Base (pH)	Atmosph. Deposition
Clover Mill Brook	1101-0004	Saratoga	River	1.5 Miles	C(T)	Aquatic Life	Precluded	Known	Unknown Toxicity	Landfill/Land Disp.
Cole Brook & Trib	1101-0035	Saratoga	River	1.0 Miles	C(T)	Aquatic Life	Precluded	Known	Silt/sediment	Streambank Erosion
Dwaas Kill Tribs.	1101-0008	Saratoga	River	5.0 Miles	C(T)	Aquatic Life	Impaired	Susp	Silt/sediment	Construction
Hudson River	1101-0002	Saratoga	River	40.1 Miles	C	Fish Consumption	Precluded	Known	Priority Organics	Tox/Contam. Sediment
Hudson River	1101-0005	Saratoga	River	0.8 Miles	B	Aquatic Life	Precluded	Known	Water Level/Flow	Hydro/Habitat Modif.
Hudson River	1101-0040	Saratoga	River	4.0 Miles	A	Fish Consumption	Precluded	Known	Priority Organics	Landfill/Land Disp.
Hudson River	1101-0041	Saratoga	River	6.0 Miles	B	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Kayaderosseras Ck	1101-0014	Saratoga	River	0.1 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Streambank Erosion
Lake Lonely	1101-0034	Saratoga	Lake	117.0 Acres	B	Aquatic Life	Stressed	Susp	Nutrients	Urban Runoff
Long Kill	1101-0021	Saratoga	River	4.0 Miles	C(TS)	Aquatic Life	Impaired	Susp	Silt/sediment	Construction
Round Lake	1101-0037	Saratoga	Lake	330.0 Acres	B	Public Bathing	Impaired	Susp	Nutrients	Hydro/Habitat Modif.
Round Lake Reserv	1101-0038	Saratoga	Lake(R)	3.0 Acres	A	Water Supply	Stressed	Known	Silt/sediment	Streambank Erosion
Saratoga Lake	1101-0012	Saratoga	Lake	4000.0 Acres	A	Recreation	Impaired	Known	Nutrients	Agriculture
Snook Kill Tribs	1101-0026	Saratoga	River	3.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Construction
Spring Run	1101-0001	Saratoga	River	3.0 Miles	D	Aquatic Life	Stressed	Susp	Aesthetics	Landfill/Land Disp.
Spring Run Trib.	1101-0017	Saratoga	River	0.2 Miles	C	Aquatic Life	Stressed	Known	Silt/sediment	Construction
Yaddo Lakes	1101-0039	Saratoga	Lake	16.0 Acres	C	Aquatic Life	Impaired	Known	Silt/sediment	Storm Sewers
DRAINAGE BASIN: Upper Hudson River										
SubBasin: Hoosic River										
Babcock Lake	1102-0014	Rensselaer	Lake	45.0 Acres	A	Public Bathing	Stressed	Known	Silt/sediment	Roadbank Erosion
Hoosic River	1102-0002	Rensselaer	River	17.0 Miles	C	Fish Consumption	Impaired	Known	Priority Organics	Unknown Source
Johnsonville Res.	1102-0003	Rensselaer	Lake(R)	269.0 Acres	B	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Little Hoosic Riv	1102-0007	Rensselaer	River	18.5 Miles	C(TS)	Aquatic Life	Stressed	Susp	Silt/sediment	Streambank Erosion
Owl Kill	1102-0005	Washington	River	1.0 Miles	C(T)	Aesthetics	Impaired	Susp	Aesthetics	Failing On-Site Syst
Walloomsac River	1102-0001	Rensselaer	River	7.0 Miles	C(T)	Aquatic Life	Impaired	Susp	Metals	Tox/Contam. Sediment
Whipple Brook	1102-0004	Washington	River	1.5 Miles	C(T)	Aquatic Life	Impaired	Susp	Oxygen Demand	Agriculture
DRAINAGE BASIN: Upper Hudson River										
SubBasin: Battenkill River										
Cossayuna Lake	1103-0002	Washington	Lake	667.0 Acres	A	Recreation	Impaired	Known	Nutrients	Failing On-Site Syst

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
DRAINAGE BASIN: Upper Hudson River										
SubBasin: Hudson Headwaters										
Carry Pond	1104-0003	Hamilton	Lake	6.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Cedar River	1104-0064	Hamilton	River	11.0 Miles	AAT,CT	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Chub Lake	1104-0004	Hamilton	Lake	19.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Clockmill Pond	1104-0005	Hamilton	Lake	38.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
East Stony Creek	1104-0058	Hamilton	River	10.0 Miles	C	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Great Sacandaga L	1104-0024	Fulton	Lake	26804.0 Acres	B	Aquatic Life	Impaired	Susp	Water Level/Flow	Hydro/Habitat Modif.
Holmes Lake	1104-0006	Fulton	Lake	19.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Kennyetto Creek	1104-0039	Fulton	River	3.0 Miles	C	Aquatic Life	Stressed	Susp	Silt/sediment	Agriculture
Kennyetto Creek	1104-0040	Fulton	River	4.0 Miles	C	Aquatic Life	Impaired	Susp	Oxygen Demand	Failing On-Site Syst
Kettle Creek	1104-0048	Hamilton	River	2.0 Miles	B	Aquatic Life	Stressed	Susp	Salts	Deicing (stor/appl)
Lake Adirondack	1104-0074	Hamilton	Lake	220.0 Acres	B	Public Bathing	Impaired	Known	Nutrients	Other Source
Lake Colden	1104-0007	Essex	Lake	38.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Lake Durant	1104-0059	Hamilton	Lake	50.0 Acres	C	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Lake Luzerne	1104-0075	Warren	Lake	96.0 Acres	B	Public Bathing	Stressed	Susp	Aesthetics	Other Source
Lake Pleasant	1104-0051	Hamilton	Lake	1457.0 Acres	AA(T)	Public Bathing	Stressed	Known	Pathogens	Other Source
Lewey Lake	1104-0061	Hamilton	Lake	92.0 Acres	B	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Little Moose Pond	1104-0008	Hamilton	Lake	26.0 Acres	C(T)	Aquatic Life	Impaired	Susp	Acid/Base (pH)	Atmosph. Deposition
Loon Lake	1104-0031	Warren	Lake	610.0 Acres	A	Public Bathing	Stressed	Susp	Pathogens	Other Source
Lower Loomis Pond	1104-0010	Hamilton	Lake	6.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Marion Pond	1104-0020	Essex	Lake	6.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Mayfield Lake	1104-0042	Fulton	Lake	14.0 Acres	B	Public Bathing	Impaired	Susp	Pathogens	Failing On-Site Syst
Meco Lake	1104-0011	Hamilton	Lake	13.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Miami River	1104-0060	Hamilton	River	0.3 Miles	FP	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Middle Loomis Pd.	1104-0012	Hamilton	Lake	6.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Minerva Lake	1104-0043	Essex	Lake	30.0 Acres	B	Public Bathing	Stressed	Susp	Nutrients	Failing On-Site Syst
Oxbow Lake	1104-0049	Hamilton	Lake	285.0 Acres	B	Public Bathing	Stressed	Known	Nutrients	Failing On-Site Syst
Rock Lake(05-229)	1104-0013	Hamilton	Lake	26.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Rock Lake(05-275)	1104-0014	Hamilton	Lake	6.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Rogers Brook	1104-0044	Essex	River	2.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Round Pond	1104-0073	Hamilton	Lake	224.0 Acres	FP	Fish Consumption	Impaired	Known	Metals	Atmosph. Deposition
Sacandaga River	1104-0025	Saratoga	River	3.0 Miles	C	Aquatic Life	Impaired	Susp	Water Level/Flow	Hydro/Habitat Modif.
Sacandaga River	1104-0062	Hamilton	River	30.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Sacandaga Rvr, Wb	1104-0063	Hamilton	River	5.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Sand Lake	1104-0015	Hamilton	Lake	115.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Schroon Lake	1104-0002	Essex	Lake	4128.0 Acres	AA	Fish Consumption	Impaired	Known	Priority Organics	Unknown Source
Silver Lake	1104-0016	Hamilton	Lake	64.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
South Pine Lake	1104-0017	Hamilton	Lake	13.0 Acres	C(T)	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Stoney Pond	1104-0018	Essex	Lake	64.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
The Branch (schr)	1104-0045	Essex	River	3.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Deicing (stor/appl)
Trout Lake	1104-0019	Hamilton	Lake	13.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Upper Wallface Pd	1104-0076	Essex	Lake	13.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition

Waterbody Inventory - Waters Needing Verification of Impairment

Segment Name	Segment ID	County
Upper Hudson River Basin		
Upper Hudson Main Stem		
Anthony Kill #7	1101-0025	Saratoga
Dwaas Kill	1101-0007	Saratoga
Dwaass Kill-trib2	1101-0024	Saratoga
Hudson River	1101-0027	Saratoga
Kayaderosseras Ck	1101-0013	Saratoga
Rice Brook	1101-0018	Saratoga
Sturdevant Creek	1101-0019	Saratoga
Summit Lake	1101-0009	Washington
Wheeler Ck Trib	1101-0015	Saratoga
Hoosic River SubBasin		
Lake Lauderdale	1102-0011	Washington
Tomhannock Reserv	1102-0006	Rensselaer
Battenkill SubBasin		
White Creek	1103-0004	Washington
Upper Hudson Headwaters		
Brant Lake	1104-0037	Warren
East Stony Creek	1104-0038	Warren
Indian Lake	1104-0021	Hamilton
Indian River	1104-0022	Hamilton
Lake Abenakee	1104-0027	Hamilton
Mill Creek	1104-0032	Warren
Piseco Lake	1104-0047	Hamilton
Sacandaga Lake	1104-0050	Hamilton
Sacandaga Rvr-E.B	1104-0057	Hamilton
Schroon River	1104-0023	Warren
Stewart Bdg. Rsv.	1104-0026	Saratoga
Stony Creek	1104-0036	Warren
Thirteenth Brook	1104-0030	Warren

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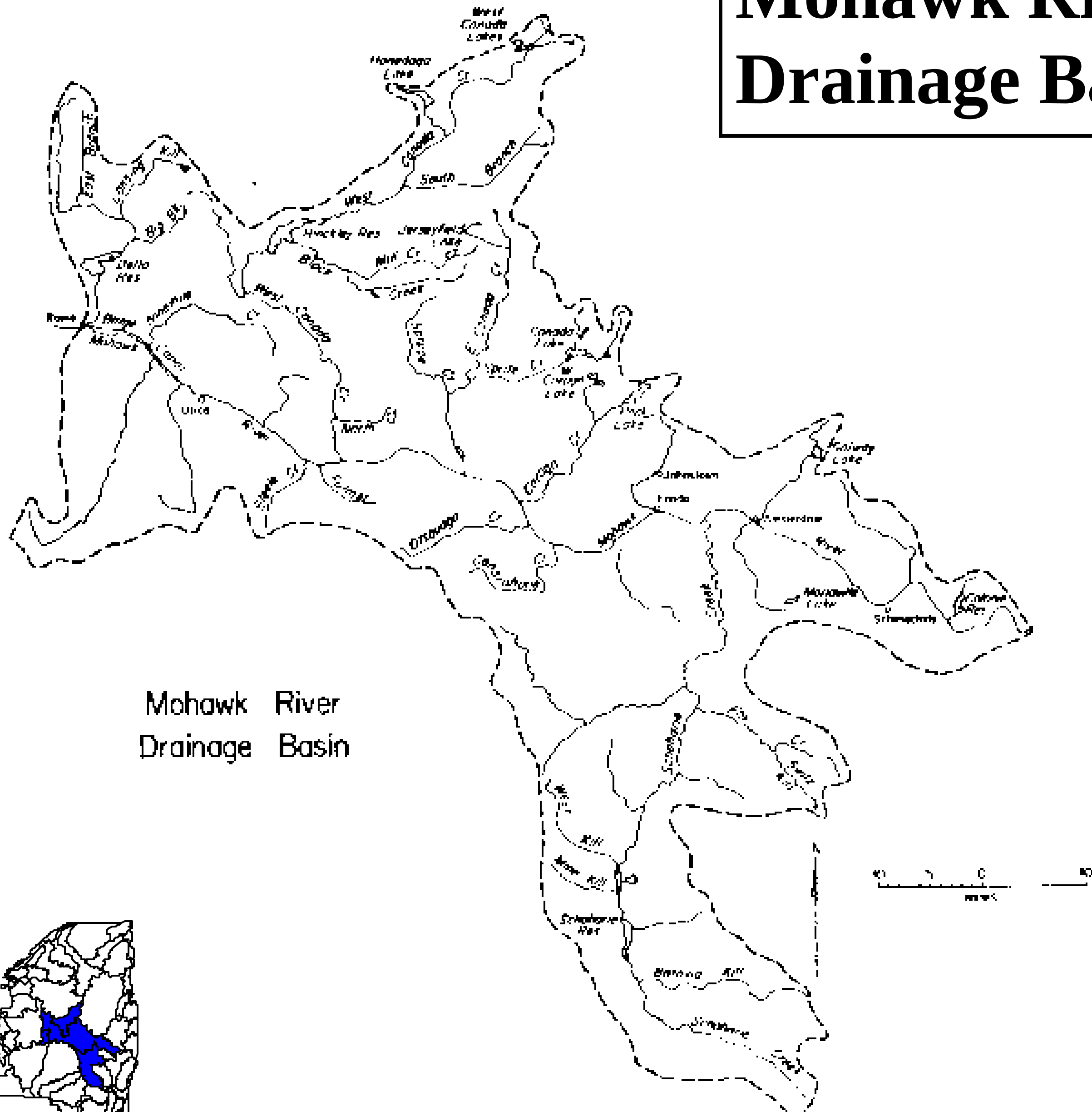
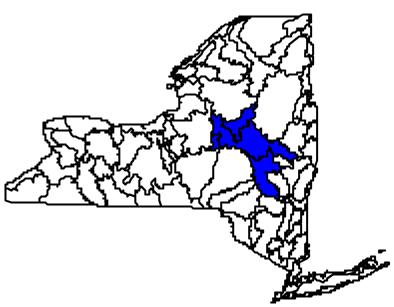
Mohawk River Drainage Basin Map



Mohawk River
Drainage Basin



The Mohawk River Basin

Background

The Mohawk River drainage basin consists of about 3,500 square miles of land area in east-central New York with an estimated population of 640,000. The entire basin is predominately rural and agricultural with a majority of the basin's population living in the Mohawk Valley in its two major Metropolitan Statistical Areas, Utica-Rome at the western end, and the Albany-Schenectady-Troy area at the eastern end. There are three major sub-basins, Oriskany Creek, West Canada Creek, and Schoharie Creek. Water is diverted from the Schoharie by New York City as part of its municipal water supply system. There are approximately 4,300 miles of rivers and streams and over 300 lakes and large ponds in the basin.

Water Quality Issues and Concerns

The waters of the Mohawk River Basin drain a mix of forested, agricultural, suburban residential, and urban lands. As a result, a variety of water quality problems and issues affect the basin.

Fish Consumption Advisories

Priority organics have been cited as the cause of impairment in portions of the Mohawk River and in tributaries in and around the urban areas of Schenectady, Utica and Rome. Sources include industrial activity, urban runoff and landfills/land disposal. There are several areas affected by toxics, although they are not a basinwide problem. Fish consumption advisories to eat no carp and restricting other species are in place for the Mohawk River in the Utica area due to PCB contamination. Other PCB-related advisories are in effect for Sauquoit Creek and Threemile Creek also in the Utica area. Mercury levels in excess of the FDA allowance have been observed in yellow perch in Ferris Lake, Hamilton County, resulting in an advisory limiting consumption of this species.

Agricultural/Nonpoint Sources

Agricultural activities and streambank erosion are listed as sources of other impairments to the waters of the basin. These sources contribute silt, sediment and nutrients that affect fishing, bathing uses and aesthetics. Failing or inadequate on-site septic systems in rural residential areas are noted as contributing nutrients and pathogens. Hydromodification is identified as a source of various use impairment in the basin as well.

Atmospheric Deposition/Acid Rain

In numerous small lakes and ponds in the basin, aquatic life support is precluded by the effects of acid precipitation. Most of these waters are located in the West Canada Creek Sub-basin which drains the southern Adirondack Mountains. The Mohawk basin is much less affected by this problem than the adjacent Black River basin.

Other Issues

Discharges from tannery industries in the Johnstown-Gloversville area have long impacted Cayadutta Creek. However, following the upgrade of the area wastewater treatment plant in 1991, significant improvements have been recorded in the water quality of the creek. While not pristine, the Cayadutta Creek has been cited as a water quality "success story." [34]

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[34] R.W. Bode, M.A. Novak and L.E. Abele. Twenty Year Trends in Water Quality of Rivers and Streams in New York State Based on Macroinvertebrate Data. NYS DEC Division of Water Technical Report. Albany, NY. 1993.

More Information

A summary listing of waterbodies included on the NYS-DEC Priority Waterbodies List is included as Table A.12. A list of waterbodies that may have been previously listed on theWI/PWL but have since been determined to need verification of possible water quality impairment is also included. More complete information about the water quality problems and issues in the basin can be found in the most recent (1996) series of Priority Waterbodies List Drainage Basin Reports.[35]

Water quality monitoring data from the NYS DEC Rotating Intensive Basin Studies (RIBS) Program is also available. The most recent RIBS effort in the Mohawk River Drainage Basin was conducted in 1995-96; data for this study are available. The most recent available RIBS Report for the basin outlines results from a study conducted in 1989-90.[36]

The next RIBS monitoring effort in the basin is scheduled for 2000-2001, with water quality assessment to be conducted in 2002.

[35] NYS DEC, 1996. The 1996 Priority Waterbodies List for the Mohawk River Basin. NYS DEC Division of Water Technical Report. Albany, NY. September 1996.

[36] J.A. Myers, R.L. Gabriel and R.M. Garry. The Biennial RIBS Report, 1989-90. DEC Division of Water Technical Report. Albany, NY. May 1992.

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
DRAINAGE BASIN: Mohawk River										
SubBasin: Mohawk River Main Stem										
Ann Lee Pond	1201-0083	Albany	Lake	7.0 Acres	C	Aesthetics	Impaired	Susp	Nutrients	Urban Runoff
Big Alderbed Pond	1201-0002	Hamilton	Lake	70.0 Acres	C(T)	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Caroga Creek	1201-0076	Montgomery	River	4.0 Miles	C	Aquatic Life	Stressed	Susp	Water Level/Flow	Hydro/Habitat Modif.
Cayadutta Creek	1201-0001	Fulton	River	7.0 Miles	D	Aquatic Life	Precluded	Known	Oxygen Demand	Municipal
Collins Lake	1201-0077	Schenectady	Lake	52.0 Acres	B	Public Bathing	Stressed	Known	Nutrients	Urban Runoff
Delta Lake	1201-0019	Oneida	Lake	2700.0 Acres	A	Aquatic Life	Impaired	Known	Water Level/Flow	Hydro/Habitat Modif.
East Canada Cr	1201-0081	Herkimer	River	4.0 Miles	C(T)	Aquatic Life	Stressed	Known	Water Level/Flow	Hydro/Habitat Modif.
East Caroga Lake	1201-0046	Fulton	Lake	346.0 Acres	B	Public Bathing	Stressed	Susp	Nutrients	Failing On-Site Syst
Ferris Lake	1201-0003	Hamilton	Lake	122.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Fulmer Creek	1201-0012	Herkimer	River	5.0 Miles	C(T)	Aquatic Life	Impaired	Known	Water Level/Flow	Hydro/Habitat Modif.
Hales Creek	1201-0044	Fulton	River	5.5 Miles	C(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Agriculture
Irving Pond	1201-0004	Fulton	Lake	134.0 Acres	B	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Long Pond(07-755)	1201-0007	Fulton	Lake	19.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Mathew Creek	1201-0018	Fulton	River	0.1 Miles	C(T)	Aquatic Life	Impaired	Susp	Unknown Toxicity	Unknown Source
Mohawk River	1201-0010	Oneida	River	29.0 Miles	B	Fish Consumption	Impaired	Known	Priority Organics	Unknown Source
Mohawk River	1201-0068	Oneida	River	3.4 Miles	A(T)	Aquatic Life	Stressed	Susp	Silt/sediment	Agriculture
Mohawk River	1201-0006	Montgomery	River	29.5 Miles	C	Aesthetics	Stressed	Susp	Priority Organics	Industrial
Mohawk River	1201-0042	Albany	River	13.0 Miles	A	Water Supply	Stressed	Known	Nonpriority Organics	Deicing (stor/appl)
Mohawk Tribs.	1201-0056	Herkimer	River	12.0 Miles	C	Aquatic Life	Stressed	Susp	Silt/sediment	Agriculture
Morehouse Lake	1201-0080	Hamilton	Lake	122.0 Acres	B(T)	Aquatic Life	Stressed	Susp	Acid/Base (pH)	Atmosph. Deposition
Mud Creek	1201-0062	Oneida	River	2.0 Miles	C	Aquatic Life	Stressed	Susp	Priority Organics	Chemical Leak/Spill
Nine Mile Creek	1201-0014	Oneida	River	12.0 Miles	B(T)	Aquatic Life	Impaired	Susp	Thermal Changes	Agriculture
North Creek	1201-0047	Fulton	River	4.8 Miles	AA(T)	Water Supply	Stressed	Susp	Pathogens	Agriculture
Otsquago Creek	1201-0078	Herkimer	River	1.0 Miles	C(T)	Aquatic Life	Stressed	Susp	Aesthetics	Private System
Poentic Kill	1201-0005	Schenectady	River	1.5 Miles	B	Aquatic Life	Impaired	Susp	Priority Organics	Landfill/Land Disp.
Redhouse Lake	1201-0008	Hamilton	Lake	13.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Sauquoit Creek	1201-0069	Oneida	River	12.0 Miles	C(T)	Aquatic Life	Stressed	Known	Priority Organics	Chemical Leak/Spill
Schemerhorn Creek	1201-0040	Schenectady	River	1.0 Miles	C	Aquatic Life	Impaired	Susp	Nutrients	Urban Runoff
Starch Factory Ck	1201-0067	Oneida	River	5.0 Miles	B	Aquatic Life	Impaired	Susp	Oxygen Demand	Urban Runoff
Sterling Creek	1201-0013	Herkimer	River	2.0 Miles	D	Aquatic Life	Precluded	Known	Water Level/Flow	Hydro/Habitat Modif.
Stewart Lake	1201-0009	Fulton	Lake	26.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Three Mile Creek	1201-0025	Oneida	River	3.0 Miles	C	Fish Consumption	Impaired	Known	Priority Organics	Unknown Source
Vly Brook	1201-0072	Hamilton	River	1.0 Miles	D	Aquatic Life	Stressed	Susp	Salts	Deicing (stor/appl)
Zimmerman Creek	1201-0029	Montgomery	River	6.0 Miles	A	Water Supply	Impaired	Known	Silt/sediment	Streambank Erosion
DRAINAGE BASIN: Mohawk River										
SubBasin: Schoharie Creek										
Batavia Kill	1202-0001	Greene	River	20.0 Miles	A(Ts)	Aquatic Life	Impaired	Susp	Silt/sediment	Streambank Erosion
Onderdonk Lake	1202-0005	Albany	Lake	64.0 Acres	B	Public Bathing	Stressed	Susp	Nutrients	Failing On-Site Syst

(con't)

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
DRAINAGE BASIN: Mohawk River										
SubBasin: Schoharie Creek (con't)										
Schoharie Creek	1202-0021	Greene	River	16.5 Miles	A,CT	Water Supply	Stressed	Susp	Silt/sediment	Streambank Erosion
Schoharie Reservr	1202-0012	Schoharie	Lake(R)	1146.0 Acres	AA(TS)	Water Supply	Stressed	Susp	Silt/sediment	Construction
DRAINAGE BASIN: Mohawk River										
SubBasin: West Canada Creek										
Balsam Lake	1203-0007	Hamilton	Lake	38.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Buck Pond	1203-0001	Hamilton	Lake	6.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Diamond Lake	1203-0002	Hamilton	Lake	26.0 Acres	C(T)	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Hinkley Reservoir	1203-0022	Herkimer	Lake(R)	2784.0 Acres	A	Aquatic Life	Impaired	Susp	Water Level/Flow	Hydro/Habitat Modif.
Little Metcalf Lk	1203-0009	Herkimer	Lake	6.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Poor Lake	1203-0003	Hamilton	Lake	19.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Steuben Creek	1203-0013	Oneida	River	4.0 Miles	C	Aquatic Life	Impaired	Susp	Thermal Changes	Agriculture
T Lake	1203-0004	Hamilton	Lake	51.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
Twin Lake (south)	1203-0005	Hamilton	Lake	13.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
West Canada Creek	1203-0008	Herkimer	River	10.0 Miles	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
White Birch Lake	1203-0006	Hamilton	Lake	6.0 Acres	FP	Aquatic Life	Precluded	Known	Acid/Base (pH)	Atmosph. Deposition
White Creek	1203-0015	Herkimer	River	10.0 Miles	C(T)	Aquatic Life	Stressed	Known	Silt/sediment	Agriculture
DRAINAGE BASIN: Mohawk River										
SubBasin: Oriskany Creek										
Big Creek	1204-0005	Oneida	River	4.0 Miles	C	Aquatic Life	Threatened	Known	Silt/sediment	Streambank Erosion
Deans Creek	1204-0001	Oneida	River	3.0 Miles	C	Aquatic Life	Impaired	Susp	Silt/sediment	Agriculture
Leland Pond	1204-0007	Madison	Lake	50.0 Acres	C	Aquatic Life	Stressed	Susp	Nutrients	Failing On-Site Syst
Oriskany Creek	1204-0008	Oneida	River	20.0 Miles	C(T)	Aquatic Life	Threatened	Known	Silt/sediment	Agriculture

Waterbody Inventory - Waters Needing Verification of Impairment

Segment Name	Segment ID	County

Mohawk River Basin

Mohawk River Main Stem

Segment Name	Segment ID	County
Canada Lake	1201-0050	Fulton
Canajoharie Creek	1201-0027	Montgomery
College Creek	1201-0022	Schenectady
Cowhorn Creek	1201-0021	Schenectady
Danascara Creek	1201-0030	Montgomery
Flat Creek	1201-0026	Montgomery
Lisha Kill	1201-0034	Schenectady
Lisha Kill	1201-0074	Albany
Mariaville Lake	1201-0084	Schenectady
Mohawk River	1201-0070	Oneida
Mohawk River	1201-0073	Schenectady
Mohawk River Trib	1201-0052	Saratoga
Moyer Creek	1201-0057	Herkimer
No.Chuctanunda Ck	1201-0031	Montgomery
NYS Barge Canal	1201-0064	Oneida
Otsquago Creek	1201-0028	Montgomery
Peck Lake	1201-0016	Fulton
S. Chuctanunda Ck	1201-0082	Montgomery
Shaker Creek	1201-0079	Albany
Spinnerville Pond	1201-0053	Herkimer
Steele Creek	1201-0011	Herkimer
Stoney Ck Tribs	1201-0051	Saratoga
Vale Cemetery Pd	1201-0041	Schenectady

Schoharie Creek SubBasin

Segment Name	Segment ID	County
Blenheim/Gilboa R	1202-0011	Schoharie
Central Bridge Rs	1202-0016	Schoharie
Cobleskill Creek	1202-0019	Schoharie
Cobleskill Res.	1202-0015	Schoharie
Engleville Pond	1202-0009	Schoharie
Fox Creek	1202-0004	Albany
Fox Creek	1202-0008	Schoharie
Huntersland Creek	1202-0013	Schoharie
Manor Kill	1202-0017	Schoharie
Schoharie Creek	1202-0003	Montgomery
Schoharie Creek	1202-0010	Schoharie
Schoharie Creek	1202-0023	Greene
Summit Lake	1202-0014	Schoharie
Switzkill	1202-0007	Albany
West Creek	1202-0018	Schoharie

Many of the waterbody segments included on previous editions of the Priority Waterbodies List have limited recent documentation of specific water quality impairment. In an effort to improve the quality of information in theWI/PWL, these waterbody segments Needing Verification of an Impairment are tracked on a list separate from the Priority Waterbodies List.

Waterbody Inventory - Waters Needing Verification of Impairment

Segment Name	Segment ID	County
West Canada Creek SubBasin		
Cincinnati Creek	1203-0010	Oneida
Maltanner Creek	1203-0016	Herkimer
West Canada Creek	1203-0011	Herkimer
Oriskany Creek SubBasin		
Madison Lake	1204-0006	Madison

The Lower Hudson River Basin

Background

The Hudson River Basin -- which includes the Upper Hudson and Mohawk River watersheds as well as the Lower Hudson -- is one of the largest drainage basins on the eastern seaboard. Together, the three watersheds drain 13,300 square miles that include much of the eastern 25% of New York State and small portions of Connecticut, Massachusetts, Vermont and New Jersey. The Lower Hudson Drainage Basin includes the waters of and tributary to the Hudson River between its mouth at the Battery in New York Harbor and the Federal Dam in Troy. The drainage area of the Lower Hudson covers 5276 square miles in New York State including most of Westchester, Putnam, Dutchess, Orange, Ulster and Columbia Counties, large parts of Rockland, Greene, Albany and Rensselaer Counties, and borders New York (Manhattan) and Bronx Counties in New York City.

The population of the Lower Hudson River Basin totals about 1,694,000[37] (1990). It is a very diverse region with natural forests, lightly populated rural and agricultural areas, intensively developed suburban residential communities and a number of highly urbanized cities, including a portion of the New York City metropolitan area. The majority of the basin population is located in its southern (New York City) and northern (Capital District) regions, and in larger cities along the Hudson (Poughkeepsie, Kingston and Newburgh).

For its entire 150 mile length, the Lower Hudson River is a tidal estuary. The river, tidal shoreline areas and the lower tidal portions of some tributaries cover 73,720 acres. Approximately 3,200 miles of rivers and streams tributary to the Hudson lie within New York State. Lakes within the New York State portion of the basin number more than 750, with a total lake surface area exceeding 39,000 acres.

Hackensack-Ramapo Watershed

The Hackensack and Ramapo Rivers drain about 265 square miles of Rockland and Orange Counties before flowing south into New Jersey. The character of the region ranges from highly developed to fairly rural residential, with a New York State population of 223,400 (1990). Within New York State, this watershed includes an additional 230 miles of rivers/streams and 1,265 lake acres.

> For logistical reasons, the smaller *Hackensack-Ramapo Rivers* and *Housatonic River* Watersheds are monitored and assessed in conjunction with the Lower Hudson River Basin. Water quality information for these drainage areas are incorporated in the Lower Hudson River Basin portion of this report.

Housatonic River Watershed

The Housatonic River flows along the eastern New York State border draining about 165 square miles of rural Putnam, Dutchess and Columbia Counties. The New York State population within the watershed totals 19,960 (1990). This portion of the watershed includes about 230 miles of rivers/streams and approximately 65 lake acres.

Water Quality Issues and Concerns

As noted previously, the Lower Hudson River Basin is quite diverse in character and land use. Undisturbed forests, thriving agricultural areas, busy and growing residential suburbs and some of the most densely populated areas of the country can all be found within the boundaries of the basin. Consequently, water quality issues and problems in the basin are also quite varied.

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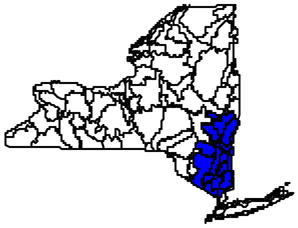
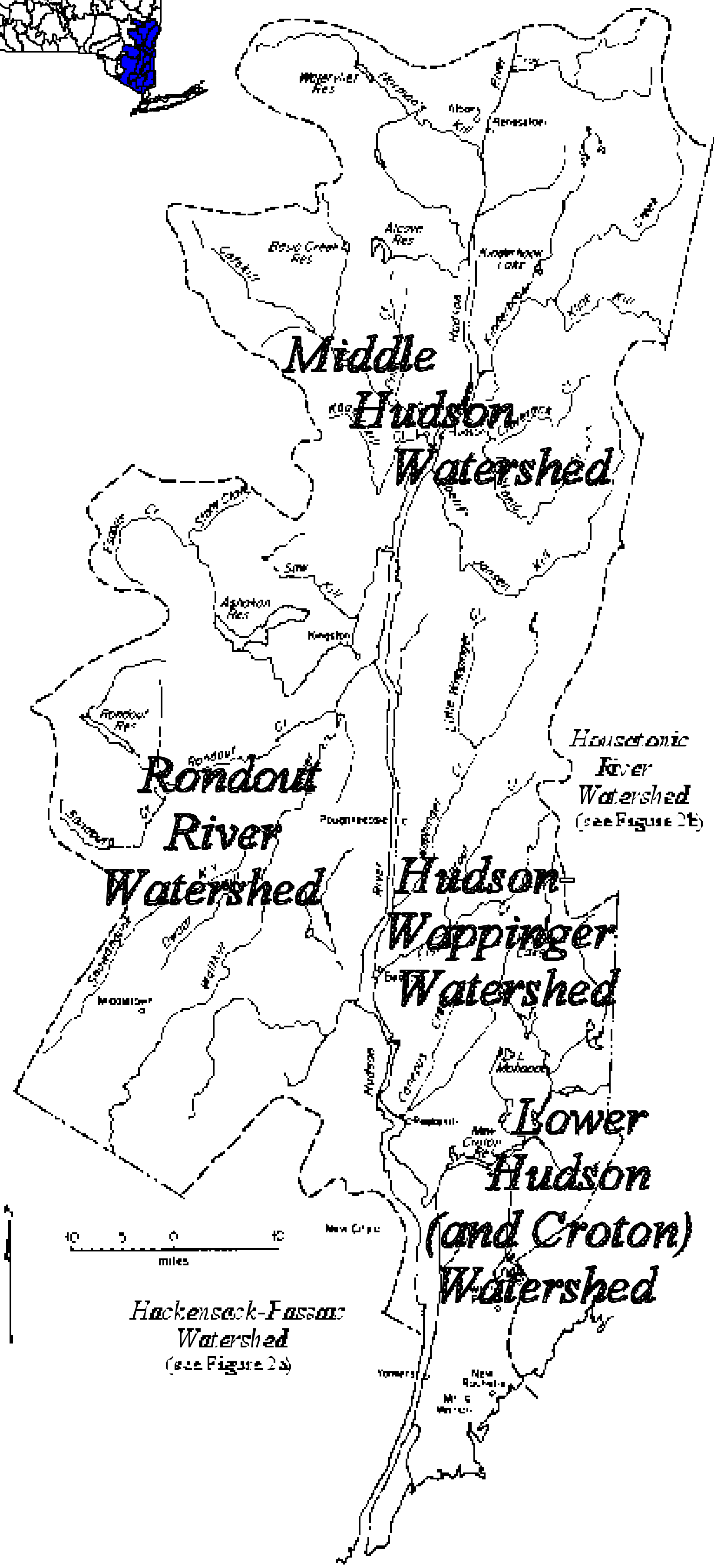
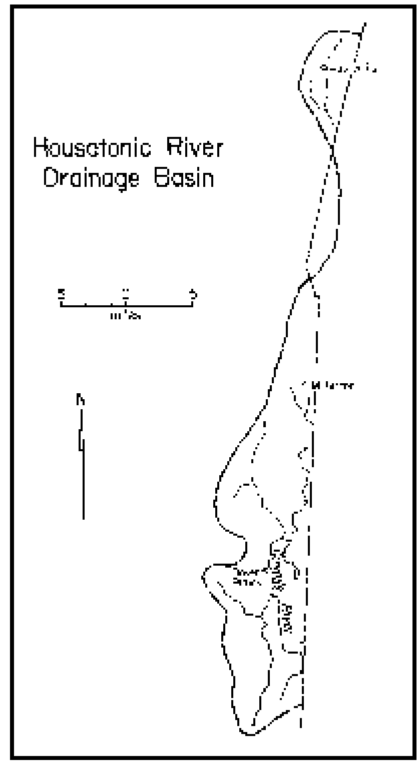
[1] Population estimate does not include populations of New York and Bronx Counties. The populations of these areas are included in the Atlantic Ocean/Long Island Sound Basin assessment.

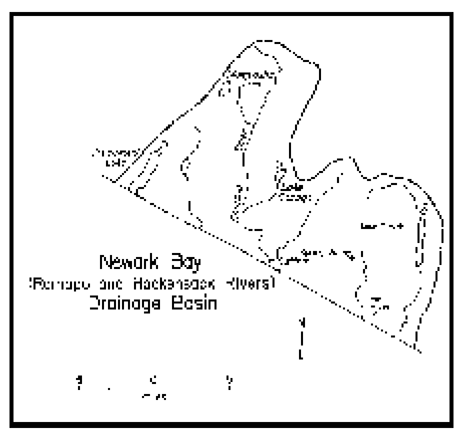
Lower Hudson River Drainage Basin Map







Housatonic River Watershed



Hackensack-Ramapo Watershed

Hudson River PCBs

One of the most notable water quality problems in the Lower Hudson Basin is the effect of toxic/contaminated sediment in the estuary of the Hudson River main stem. This contamination is primarily the result of historic PCB discharges in the Upper Hudson and has resulted in extensive fish consumption advisories, including a prohibition on the commercial harvesting of striped bass. Restrictions on the consumption of blue crabs are also in place. The entire main stem of the Lower Hudson River – representing 100% of the estuary waters in the basin – are listed as having use (fish consumption) impairments due to toxic/contaminated sediment.

Urban/Suburban Development

The Hudson and its tributary waters in the southern portion of the basin are significantly affected by runoff from urban and extensively developed suburban areas. One third of the rivers and lakes on the basinWI/PWL cite urban runoff as the primary source of impairment. Rapid population growth in the Lower Hudson has also caused many wastewater treatment plants to reach their design capacities sooner than originally expected. This growth is reflected in the frequent listing of occurrences of streambank erosion, failing and/or inadequate on-site septic systems, and municipal discharges as primary sources of water quality impairments. Continuing development and the resulting impact on water quality is likely to remain a concern into the future as well.

More than 60% of the lake and reservoir acres in the basin are listed as having a use impairment. Generally, these impairments involve limitations on recreational uses, such as swimming, boating and fishing. However, a number of drinking water supply reservoirs, including portions of the extensive New York City drinking water supply system, are also restricted or threatened. The primary threat to these reservoirs is residential/commercial development and associated urban/suburban runoff of sediment and nutrient loads that promote eutrophication, and silt/sediment attributed to streambank erosion.

> Due to their primary use as a drinking water supply, all public water supply reservoirs (including New York City Watershed reservoirs) are considered *Priority Waterbodies*. In some instances these waterbodies are listed because of existing impairments to water quality. But even where current water quality is satisfactory drinking water reservoirs are designated as *Special Protection* waters, indicating a highly valued resource worthy of additional protection and consideration.

Once-Through Cooling Impacts on Fishery Resources

The use of the Hudson River to provide once-through cooling water, primarily at stream-electric generating facilities, also impacts fishery resources. Cooling water intake structures often kill fish by impingement on debris screens. But of even greater significance is the entrainment mortality as the water passes through the plant screens, pumps, heat exchanger, and discharge structure. Tens- to hundreds-of-millions of eggs, larvae, and juvenile fishes of several species are killed per year for the large volume, once-through users. The cumulative impact of multiple facilities substantially reduces the young-of-year (YOY) population for the entire river. For example, based on 24 years of study, the September 1 YOY fish populations have been reduced by as much as 25-79% for spottail shiner (1977), 27-63% for striped bass (1986), 52-60% for American Shad (1992), 44-53% for Atlantic tomcod (1985), 39-45% for alewife and blueback herring combined (1992), 30-44% for white perch (1983), and 33% for bay anchovy (1990). (The higher percentage assumes no through-plant survival; the lower number incorporates power company estimate of through-plant survival.)

Agricultural Activities

In other primarily rural areas of the basin, various agricultural activities have been cited as significant sources of pollutants (primary source for 25% of affected river miles). Although frequently cited, the severity of the water quality impacts from agriculture is somewhat less than other sources. These agricultural sources contribute silt, sediments, nutrients, oxygen demanding organic wastes and some pesticides to the waters.

Hudson River Estuary Program

In an effort to more effectively resolve these water quality issues, NYS initiated a comprehensive management planning process for the Hudson River Estuary in 1987. This initiative was a response to the passage of Section 11-0306 of the Environmental Conservation Law, the Hudson River Estuary Management Act. Development of a Hudson River Estuary Management Plan is currently underway and combines the goals and objectives of the Department's Divisions of Water, Natural Resources, Marine Resources and Lands and Forest into one ecosystem-oriented planning program. Water quality and water quantity are major topics of concern in the plan. The plan incorporates the many ongoing programs of the Division of Water and identifies specific target areas that need improvement in the Hudson estuary, including: sediment contamination remediation, municipal wastewater treatment and management of CSOs, toxic waste site clean up, nonpoint source pollution management, stream remediation, and further enhancement of antidegradation policies under SPDES. The Plan has a 15-year planning window and will be updated periodically.

New York City Watershed

About 90% of the drinking water for New York City is provided by a series of reservoirs located upstate and connected to the city by an elaborate system of aqueducts. Within the Lower Hudson Basin the New York City Watershed includes the Croton System, a cascading series of twelve reservoirs and three controlled lakes, in Northern Westchester and Putnam Counties, as well as the Rondout and Ashokan Reservoirs in the Catskill System to the west. The Croton Watershed has experienced significant urban sprawl from the New York City metropolitan area for many years, and continues to experience the effects of urban land uses. Urban runoff related to this growth is the primary source of nonpoint pollutants (particularly nutrients) into these waters. Area wastewater treatment plant discharges have also been identified as sources of phosphorus throughout the system. The Catskill System reservoirs are threatened by silt and sediment runoff from streambank erosion within their watersheds.

> The development of a phosphorus Total Maximum Daily Load (TMDL) program to address eutrophication in the Croton System

Current efforts to decrease threats to the New York City water supply center around the development and implementation of a long-range watershed protection program. This program includes a 1997 Watershed Agreement between New York City and the Croton Watershed communities which sets forth funding for watershed protection activities. Another component of the program is the construction of a water filtration plant for the Croton System. Additionally, the City and NYS DEC are currently developing a phosphorus Total Maximum Daily Load (TMDL) program to address eutrophication the Croton System Watershed.

Water Quality Assessment

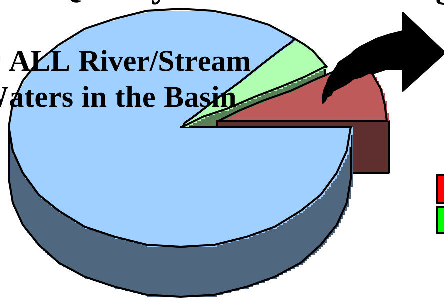
The series of charts presented here provide an overall assessment of waterbody impairments in the Lower Hudson Basin. For each of the waterbody types in the basin (rivers/streams, lakes/reservoirs and estuary waters) the first pie chart reveals the percentage of the miles/acres of waters in the basin that fall into various *Water Quality Assessment Categories*. The red slice of the pie indicates the percentage of waters characterized as segments with *Known Water Quality Problems/Impairments* or as *Threatened Segments*. Taken together, these waters represent the ***Priority Waterbodies*** (for that waterbody type) within the basin. The second pie chart shows the severity of the primary use impairment for those *Priority Waterbodies*.

The bar charts indicate the pollutant sources that are most frequently cited as primary contributors to the water quality impairments for *Priority Waterbodies* in the Lower Hudson Basin. The charts reflect the percentage of the total waterbody area on the Priority Waterbodies List where the source is listed as the

Rivers/Streams

Water Quality Assessment Categories

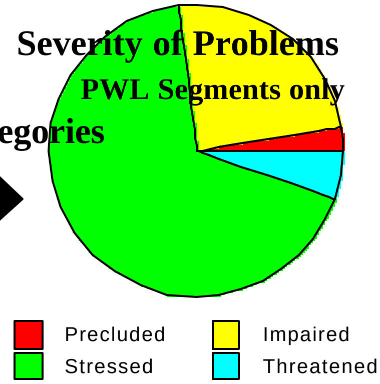
for ALL River/Stream Waters in the Basin



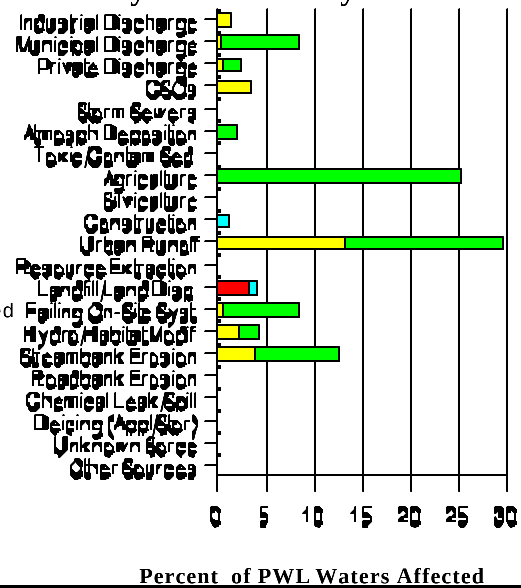
Priority Waterbody Segments
Segments Needing Verification
NonImpacted/UnAssessed

Severity of Problems

PWL Segments only



Primary Source-Priority Waterbodies



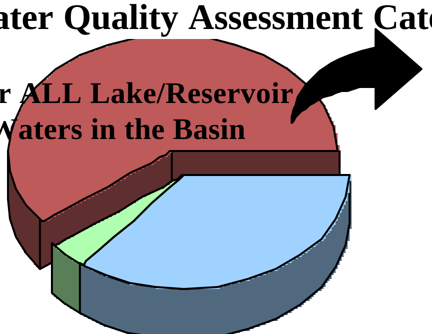
Lower Hudson Basin

Total River Miles: 3666

Lakes/Reservoirs

Water Quality Assessment Categories

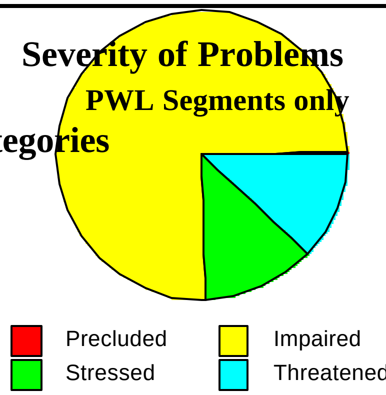
for ALL Lake/Reservoir Waters in the Basin



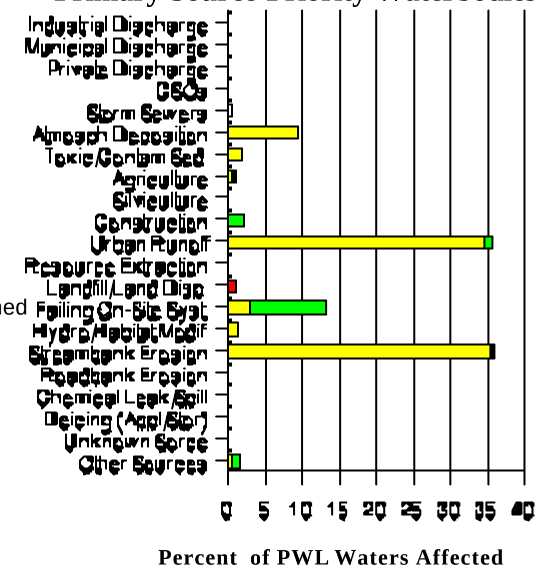
Priority Waterbody Segments
Segments Needing Verification
NonImpacted/UnAssessed

Severity of Problems

PWL Segments only



Primary Source-Priority Waterbodies



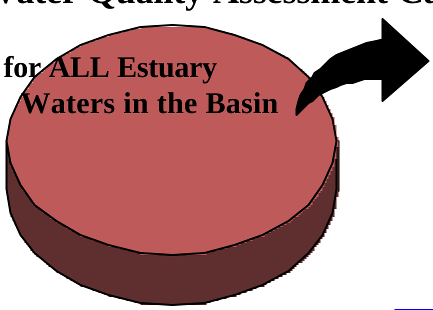
Lower Hudson Basin

Total Lake Acres: 44,078

Estuary Waters

Water Quality Assessment Categories

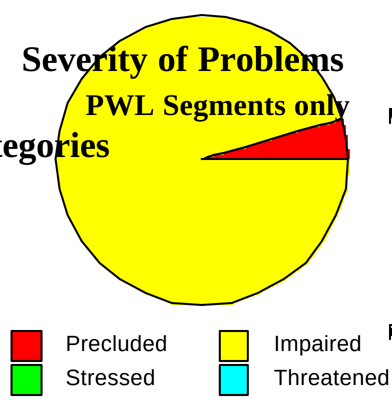
for ALL Estuary Waters in the Basin



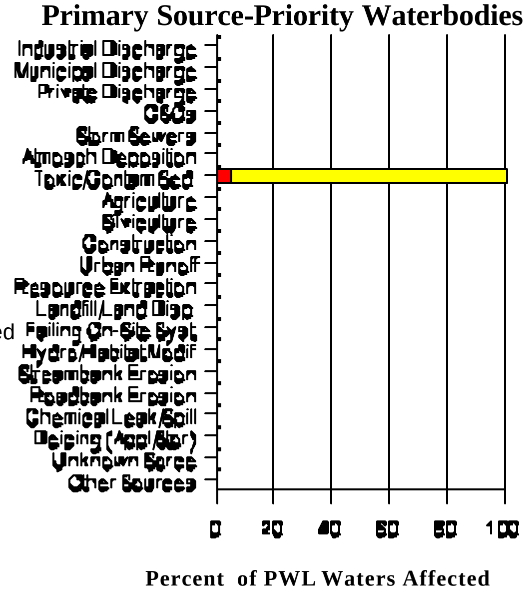
Priority Waterbody Segments
Segments Needing Verification
NonImpacted/UnAssessed

Severity of Problems

PWL Segments only



Primary Source-Priority Waterbodies



Lower Hudson Basin

Total Estuary Acres 73,720

primary contributor to the impairment. For each source, the data are further segregated by the severity of the water use impairment (*precluded, impaired, stressed, threatened*) caused by the source.

Waterbody Inventory/Priority Waterbodies List and the RIBS Monitoring Program

A summary listing of waterbodies included on the NYS-DEC Priority Waterbodies List is included as Tables A.13a-b. Segments with known water quality impacts/impairments or concerns are listed in Table A.13a; Table A.13b lists segments where water quality is threatened by ongoing activities in the watershed. The Threatened Waterbodies list also includes Special Protection waters. These waters experience no use restrictions or immediate threats to water quality, but nonetheless remain highly valued resources deemed worthy of special protection and consideration. A table of waterbodies needing the verification of possible water quality impairment is also included (Table A.13c).

More complete information about the water quality problems and issues in the basin can be found in the most recent Waterbody Inventory/Priority Waterbodies List Report for the Lower Hudson River Basin.[38]

Water quality monitoring data from the NYS DEC Rotating Intensive Basin Studies (RIBS) Program is also available. The most recent RIBS effort in the Lower Hudson River Drainage Basin was conducted in 1997-98; data for this study are available. The most recent available RIBS Report for the basin outlines results for a study conducted in 1991-92.[39]

The next RIBS monitoring effort in the basin is scheduled for 2002-2003, with water quality assessment to be conducted in 2004.

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38 NYS DEC, 2000. The 1999 Lower Hudson River Basin Waterbodi Inventory and Priority Waterbodies List (DRAFT). NYS DEC Division of Water Technical Report. Albany, NY. May 2000.

39 J.A. Myers, R.L. Gabriel and R.M. Garry. The Biennial RIBS Report, 1991-92. NYS DEC Division of Water Technical Report. Albany, NY. February 1994.

Lower Hudson Basin PWL - Water Quality Impacted Segments Table A.13a

Water Index Number	Waterbody/Segment Name (ID)	County	Seg Size	Type	Str Class	W.B.Category
	Use Impairment/Pollutant/Cause Information					
H (portion 1)	Hudson River (Class I) (1301-0006)	New York	3330.0 Acre	Estuary	I	W.Q. Problem
	Fish Consumption KNOWN to be IMPAIRED by Priority Organics (known) from Tox/Contam. Sediment (known).					
H (portion 2a)	Hudson River (Class SB) (1301-0005)	Bronx	790.0 Acre	Estuary	SB	W.Q. Problem
	Fish Consumption KNOWN to be IMPAIRED by Priority Organics (known) from Tox/Contam. Sediment (known).					
H (portion 2b)	Hudson River (Class SB) (1301-0094)	Westchester	30180.0 Acre	Estuary	SB	W.Q. Problem
	Fish Consumption KNOWN to be IMPAIRED by Priority Organics (known) from Tox/Contam. Sediment (known).					
H (portion 3)	Hudson River (Class B) (1301-0003)	Orange	9080.0 Acre	Estuary	B	W.Q. Problem
	Fish Consumption KNOWN to be IMPAIRED by Priority Organics (known) from Tox/Contam. Sediment (known).					
H (portion 4)	Hudson River (Class A) (1301-0001)	Ulster	26720.0 Acre	Estuary	A	W.Q. Problem
	Fish Consumption KNOWN to be IMPAIRED by Priority Organics (known) from Tox/Contam. Sediment (known).					
H (portion 5)	Hudson River (Class C) (1301-0002)	Albany	3620.0 Acre	Estuary	C	W.Q.Problem
	Fish Consumption KNOWN to be PRECLUDED by Priority Org (known) from Tox/Contam. Sediment (known).					
H- 4	Saw Mill River (1301-0007)	Westchester	20.0 Mile	River	SeeBlw	W.Q.Problem
	Public Bathing KNOWN to be IMPAIRED by Aesthetics (known) from Urban Runoff (known).					
H- 31-P44 (portion)	New Croton Reservoir (1302-0010)	Westchester	2182.4 Acre	Lake(R)	AA	W.Q.Problem
	Water Supply KNOWN to be IMPAIRED by Nutrients (known) from Urban Runoff (known).					
H- 31-P44 (portion)	Muscoot Reservoir (1302-0042)	Westchester	1011.1 Acre	Lake(R)	A	W.Q.Problem
	Water Supply KNOWN to be IMPAIRED by Nutrients (known) from Urban Runoff (known).					
H- 31-P44- 2	Hunter Brook (portion 1) (1302-0047)	Westchester	2.0 Mile	River	B(T)	W.Q.Problem
	Aquatic Life SUSPECTED STRESSED by Nutrients (suspected) from Urban Runoff (suspected).					
H- 31-P44- 2	Hunter Brook (portion 2) (1302-0048)	Westchester	2.5 Mile	River	C(T)	W.Q.Problem
	Aquatic Life SUSPECTED STRESSED by Nutrients (suspected) from Urban Runoff (suspected).					
H- 31-P44-14	Muscoot River, Lower (1302-0049)	Westchester	2.8 Mile	River	A(TS)	W.Q.Problem
	Public Bathing KNOWN to be IMPAIRED by Pathogens (known) from Urban Runoff (suspected).					
H- 31-P44-14	Muscoot River, Upper (1302-0050)	Westchester	2.0 Mile	River	A(T)	W.Q.Problem
	Public Bathing KNOWN to be IMPAIRED by Pathogens (known) from Urban Runoff (suspected).					
H- 31-P44-14- 1	Hallocks Mill Br, Lower (1302-0051)	Westchester	1.4 Mile	River	A(T)	W.Q.Problem
	Water Supply KNOWN to be IMPAIRED by Nutrients (known) from Municipal (known).					

Lower Hudson Basin PWL - Water Quality Impacted Segments Table A.13a

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Str Class	W.B.Category
H- 31-P44-14- 1	Hallocks Mill Brook (1302-0052) Aquatic Life SUSPECTED STRESSED by Nutrients (suspected) from Urban Runoff (suspected).	Westchester	1.7 Mile	River	C(T)	W.Q.Problem
H- 31-P44-14-P50	Amawalk Reservoir (1302-0044) Water Supply KNOWN to be IMPAIRED by Nutrients (known) from Urban Runoff (known).	Westchester	608.1 Acre	Lake(R)	A	W.Q.Problem
H- 31-P44-14-P53	Lake Mahopac (1302-0007) Public Bathing KNOWN to be STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected).	Putnam	582.4 Acre	Lake	A	W.Q.Problem
H- 31-P44-23-P59	Croton Falls Reservoir (1302-0026) Water Supply KNOWN to be IMPAIRED by Nutrients (known) from Urban Runoff (known).	Putnam	1024.0 Acre	Lake(R)	AA(T)	W.Q.Problem
H- 31-P44-23-P59- 6-P62	Middle Branch Reservoir (1302-0009) Water Supply KNOWN to be IMPAIRED by Nutrients (known) from Urban Runoff (known).	Putnam	396.8 Acre	Lake(R)	A	W.Q.Problem
H- 31-P44-23-P59- 6-P62a	Lake Carmel (1302-0006) Public Bathing KNOWN to be STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected).	Putnam	192.0 Acre	Lake	B	W.Q.Problem
H- 31-P44-24	East Branch Croton River (1302-0056) Aquatic Life SUSPECTED STRESSED by Nutrients (suspected) from Urban Runoff (suspected).	Putnam	3.5 Mile	River	A(T)	W.Q.Problem
H- 31-P44-24	East Branch Croton River (1302-0057) Aquatic Life SUSPECTED STRESSED by Nutrients (known) from Urban Runoff (suspected).	Putnam	5.0 Mile	River	C(T)	W.Q.Problem
H- 31-P44-24- 3-P85	Lake Tonetta (1302-0014) Public Bathing SUSPECTED IMPAIRED by Pathogens (suspected) from Failing On-Site Syst (suspected).	Putnam	70.4 Acre	Lake	B	W.Q.Problem
H- 31-P44-24-17a-P93b	Putnam Lake (1302-0053) Public Bathing KNOWN to be STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected).	Putnam	211.3 Acre	Lake	B	W.Q.Problem
H- 31-P44-24-25	Muddy Brook (1302-0011) Aquatic Life SUSPECTED STRESSED by Nutrients (known) from Urban Runoff (suspected).	Putnam	2.3 Mile	River	D	W.Q.Problem
H- 31-P44-24-32	Brady Brook (1302-0058) Aquatic Life SUSPECTED STRESSED by Nutrients (suspected) from Urban Runoff (suspected).	Dutchess	2.0 Mile	River	C(T)	W.Q.Problem
H- 31-P44-24-P83	Diverting Reservoir (1302-0046) Water Supply KNOWN to be IMPAIRED by Nutrients (known) from Urban Runoff (known).	Putnam	121.6 Acre	Lake(R)	AA	W.Q.Problem
H- 31-P44-24-P89	East Branch Reservoir (1302-0040) Water Supply KNOWN to be IMPAIRED by Nutrients (known) from Urban Runoff (known).	Putnam	512.0 Acre	Lake(R)	AA	W.Q.Problem

Lower Hudson Basin — PWL - Water Quality Impacted Segments — Table A.13a

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Str Class	W.B.Category
H- 31-P44-24-P89-10-P93	Peach Lake (1302-0004)	Westchester	249.6 Acre	Lake	B	W.Q.Problem
	Public Bathing KNOWN to be IMPAIRED by Pathogens (known) from Failing On-Site Syst (suspected).					
H- 31-P44-26	Titicus River (1302-0034)	Westchester	3.5 Mile	River	C(T)	W.Q.Problem
	Aquatic Life SUSPECTED STRESSED by Nutrients (suspected) from Urban Runoff (suspected).					
H- 31-P44-26-P103	Titicus Reservoir (1302-0035)	Westchester	665.7 Acre	Lake(R)	AA	W.Q.Problem
	Water Supply KNOWN to be IMPAIRED by Nutrients (known) from Urban Runoff (known).					
H- 31-P44-35-P109...P115a	Truesdale Lake (1302-0054)	Westchester	83.3 Acre	Lake	B	W.Q.Problem
	Public Bathing SUSPECTED STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected).					
H- 31-P44-35-P109- 7-P114	Lake Kitchawan (1302-0002)	Westchester	89.7 Acre	Lake	B	W.Q.Problem
	Public Bathing SUSPECTED STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected).					
H- 31-P44-36	Stone Hill River (1302-0059)	Westchester	3.0 Mile	River	C(T)	W.Q.Problem
	Aquatic Life SUSPECTED STRESSED by Nutrients (suspected) from Urban Runoff (suspected).					
H- 31-P44-43	Kisco River, Lower (1302-0060)	Westchester	1.0 Mile	River	B(T)	W.Q.Problem
	Aquatic Life SUSPECTED STRESSED by Nutrients (suspected) from Urban Runoff (suspected).					
H- 31-P44-43	Kisco River (1302-0061)	Westchester	3.0 Mile	River	C(T)	W.Q.Problem
	Aquatic Life SUSPECTED IMPAIRED by Nutrients (known) from Urban Runoff (suspected).					
H- 31-P44-43-10	Kisco River Trib -10 (1302-0062)	Westchester	1.3 Mile	River	D	W.Q.Problem
	Aquatic Life SUSPECTED STRESSED by Nutrients (known) from Urban Runoff (suspected).					
H- 43-P150e/150f	Stony Point Reservoir (1301-0065)	Rockland	2.0 Acre	Lake(R)	A	W.Q.Problem
	Water Supply KNOWN to be STRESSED by Silt/sediment (known) from Construction (suspected).					
H- 49a-P160	Lake Meahagh (1301-0053)	Westchester	120.0 Acre	Lake	C	W.Q. Problem
	Recreation KNOWN to be STRESSED by Nutrients (suspected) from Failing On-Site Syst (possible).					
H- 55- 8-P175	Oscawana Lake (1301-0035)	Putnam	371.1 Acre	Lake	A	W.Q. Problem
	Public Bathing KNOWN to be IMPAIRED by Nutrients (known) from Urban Runoff (known).					
H- 55-12- 4-P181	Barger Pond (1301-0091)	Putnam	32.1 Acre	Lake	B	W.Q.Problem
	Public Bathing SUSPECTED STRESSED by Oxygen Demand (known) from Urban Runoff (suspected).					
H- 55-18-P183b	Roaring Brook Lake (1301-0037)	Putnam	115.1 Acre	Lake	B	W.Q.Problem
	Public Bathing SUSPECTED STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected).					

Lower Hudson Basin — PWL - Water Quality Impacted Segments — Table A.13a

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Str Class	W.B.Category
H- 94	Quassaic Creek (1301-0079)	Orange	6.0 Mile	River	D	W.Q.Problem
	Aquatic Life KNOWN to be IMPAIRED by Unknown Toxicity (suspected) from Urban Runoff (suspected).					
H- 94- 6-P340	Orange Lake (1301-0008)	Orange	409.7 Acre	Lake	B	W.Q.Problem
	Public Bathing KNOWN to be STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected).					
H- 95-10-P345g	Hillside Lake (1304-0001)	Dutchess	25.7 Acre	Lake	B	W.Q.Problem
	Public Bathing KNOWN to be IMPAIRED by Nutrients (suspected) from Failing On-Site Syst (suspected).					
H-101-P365	Wappingers Lake (1305-0001)	Dutchess	102.3 Acre	Lake	B	W.Q.Problem
	Public Bathing KNOWN to be IMPAIRED by Silt/sediment (suspected) from Urban Runoff (suspected).					
H-114	Fallkill Creek (1301-0087)	Dutchess	8.2 Mile	River	C	W.Q.Problem
	Aquatic Life KNOWN to be IMPAIRED by Nutrients (suspected) from Urban Runoff (known).					
H-139-13	Wallkill River, Upper (1306-0017)	Orange	13.0 Mile	River	C	W.Q.Problem
	Aquatic Life KNOWN to be STRESSED by Silt/sediment (known) from Agriculture (known).					
H-139-13	Wallkill River, Lower (1306-0027)	Ulster	50.0 Mile	River	B	W.Q.Problem
	Fish Consumption SUSPECTED STRESSED by Pesticides (known) from Agriculture (known).					
H-139-13-59	Quaker Creek (1306-0025)	Orange	6.0 Mile	River	D>C	W.Q.Problem
	Aquatic Life SUSPECTED STRESSED by Silt/sediment (suspected) from Agriculture (possible).					
H-139-14 (portion)	Rondout Creek, Upper (1306-0026)	Sullivan	1.5 Mile	River	A(TS)	W.Q.Problem
	Water Supply SUSPECTED STRESSED by Acid/Base (pH) (known) from Atmosph. Deposition (known).					
H-139-14-44	Trout Creek (1306-0014)	Ulster	4.0 Mile	River	A(TS)	W.Q.Problem
	Water Supply SUSPECTED STRESSED by Acid/Base (pH) (known) from Atmosph. Deposition (known).					
H-139-14-48	Chestnut Creek (1306-0009)	Sullivan	5.0 Mile	River	A(T)	W.Q.Problem
	Aquatic Life SUSPECTED STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected).					
H-139-14-P815a	Rondout Reservoir (1306-0003)	Ulster	2099.1 Acre	Lake(R)	AA	W.Q.Problem
	Fish Consumption KNOWN to be IMPAIRED by Metals (known) from Atmosph. Deposition (known).					
H-171	Esopus Creek (1307-0003)	Ulster	25.0 Mile	River	B	W.Q.Problem
	Public Bathing SUSPECTED STRESSED by Nutrients (suspected) from Municipal (suspected).					
H-171-45	Stony Clove Brook (1307-0008)	Greene	9.0 Mile	River	B(T)	W.Q. Problem
	Public Bathing KNOWN to be STRESSED by Silt/sediment (known) from Streambank Erosion (known).					

Lower Hudson Basin PWL - Water Quality Impacted Segments Table A.13a

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Str Class	W.B.Category
H-171-47	Broadstreet Hollow Brook (1307-0009)	Greene	4.0 Mile	River	C(T)	W.Q. Problem
	Recreation KNOWN to be STRESSED by Silt/sediment (known) from Streambank Erosion (known).					
H-171-P848	Ashokan Reservoir (1307-0004)	Ulster	7923.0 Acre	Lake(R)	AA(T)	W.Q.Problem
	Water Supply KNOWN to be IMPAIRED by Silt/sediment (known) from Streambank Erosion (known).					
H-171-P848-	Esopus Creek, Upper (1307-0007)	Ulster	12.5 Mile	River	A(T)	W.Q.Problem
	Water Supply KNOWN to be IMPAIRED by Silt/sediment (known) from Streambank Erosion (known).					
H-171-P848-10 (portion)	Ashokan Brook, Lower (1307-0005)	Ulster	1.0 Mile	River	A(T)	W.Q.Problem
	Water Supply SUSPECTED IMPAIRED by Nutrients (suspected) from Failing On-Site Syst (suspected).					
H-171-P848-10 (portion)	Ashokan Brook (1307-0006)	Ulster	1.0 Mile	River	B(T)	W.Q.Problem
	Public Bathing SUSPECTED IMPAIRED by Nutrients (suspected) from Failing On-Site Syst (suspected).					
H-188	Roeliff Jansen Kill (1308-0002)	Columbia	5.0 Mile	River	C(TS)	W.Q. Problem
	Aquatic Life SUSPECTED STRESSED by Oxygen Demand (suspected) from Failing On-Site Syst (known).					
H-188-P902	Robinson Pond (1308-0003)	Columbia	115.1 Acre	Lake	B(T)	W.Q.Problem
	Public Bathing SUSPECTED IMPAIRED by Nutrients (suspected) from Agriculture (suspected).					
H-193- 1-P913	Hollister Lake (1309-0007)	Greene	51.1 Acre	Lake(R)	A	W.Q. Problem
	Water Supply SUSPECTED STRESSED by Silt/sediment (known) from Streambank Erosion (possible).					
H-193- 2	Kaaterskill Creek (1309-0006)	Greene	14.0 Mile	River	B	W.Q. Problem
	Public Bathing SUSPECTED STRESSED by Silt/sediment (known) from Streambank Erosion (known).					
H-193-20	Shingle Kill (1309-0008)	Greene	1.5 Mile	River	C(TS)	W.Q. Problem
	Recreation KNOWN to be IMPAIRED by Pathogens (known) from Private System (known).					
H-193-29-P950a	Basic Creek Reservoir (1309-0001)	Albany	243.1 Acre	Lake(R)	A	W.Q.Problem
	Water Supply KNOWN to be IMPAIRED by Aesthetics (known) from Hydro/Habitat Modif. (known).					
H-202-P8f	Sleepy Hollow Lake (1301-0059)	Greene	325.9 Acre	Lake	A	W.Q. Problem
	Public Bathing KNOWN to be IMPAIRED by Silt/sediment (known) from Streambank Erosion (suspected).					
H-204- 2- 7	Valatie Kill (1310-0003)	Rensselaer	10.0 Mile	River	C(T)	W.Q.Problem
	Fish Consumption KNOWN to be PRECLUDED by Priority Organics (known) from Landfill/Land Disp. (known).					
H-204- 2- 7-P24	Kinderhook Lake (1310-0002)	Columbia	345.7 Acre	Lake	B	W.Q.Problem
	Fish Consumption KNOWN to be IMPAIRED by Priority Organics (known) from Tox/Contam. Sediment (suspected).					

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Str Class	W.B.Category
H-204- 2- 7-P34	Nassau Lake (1310-0001) Fish Consumption KNOWN to be PRECLUDED by Priority Organics (known) from Landfill/Land Disp. (known).	Rensselaer	172.7 Acre	Lake	B	W.Q.Problem
H-204- 2-10-P42	Smith Pond (1310-0009) Aesthetics SUSPECTED STRESSED by Aesthetics (suspected) from Storm Sewers (suspected).	Columbia	25.7 Acre	Lake	C	W.Q.Problem
H-204- 3- 8	Taghkanic Creek (1310-0015) Aquatic Life SUSPECTED STRESSED by Water Level/Flow (suspected) from Hydro/Habitat Modif. (suspected).	Columbia	6.0 Mile	River	C(T)	W.Q. Problem
H-204- 3- 8-32-P108	Copake Lake (1310-0014) Public Bathing SUSPECTED STRESSED by Aesthetics (known) from Failing On-Site Syst (suspected).	Columbia	416.1 Acre	Lake	B	W.Q. Problem
H-208	Coxsackie Creek (1301-0092) Aesthetics SUSPECTED STRESSED by Aesthetics (known) from Private System (known).	Greene	5.0 Mile	River	C	W.Q. Problem
H-208- 6-P153	Unnamed Reservoir (1301-0060) Water Supply SUSPECTED STRESSED by Nutrients (suspected) from Agriculture (suspected).	Greene	20.0 Acre	Lake	A	W.Q. Problem
H-209	Mill Creek (1301-0093) Aesthetics KNOWN to be STRESSED by Nutrients (known) from Agriculture (known).	Columbia	3.0 Mile	River	C(T)	W.Q. Problem
H-212	Hanacrois Creek (1301-0020) Aquatic Life KNOWN to be IMPAIRED by Water Level/Flow (known) from Hydro/Habitat Modif. (known).	Albany	2.0 Mile	River	A(TS)	W.Q.Problem
H-214	Coeymans Creek (1301-0095) Aquatic Life SUSPECTED STRESSED by Nutrients (suspected) from Agriculture (suspected).	Albany	8.0 Mile	River	C	W.Q. Problem
H-221- 4 (portion 2)	Normans Kill, portion (1311-0002) Aquatic Life KNOWN to be IMPAIRED by Water Level/Flow (known) from Hydro/Habitat Modif. (known).	Albany	5.0 Mile	River	B	W.Q.Problem
H-221- 4 (portion 4)	Normans Kill, portion(1311-0005) Aesthetics KNOWN to be STRESSED by Aesthetics (known) from Failing On-Site Syst (known).	Schenectady	14.0 Mile	River	C	W.Q.Problem
H-221- 4- 3	Krumkill Creek (1311-0004) Aquatic Life KNOWN to be IMPAIRED by Unknown Toxicity (suspected) from Comb. Sewer Overflow (suspected).	Albany	4.0 Mile	River	C(T)	W.Q.Problem
H-221- 4-P270	Watervliet Reservoir (1311-0001) Water Supply SUSPECTED STRESSED by Aesthetics (known) from Construction (suspected).	Albany	403.3 Acre	Lake(R)	A	W.Q.Problem
H-221- 4-P270- 1- 9-P276a	Duane Lake (1311-0006) Public Bathing KNOWN to be STRESSED by Aesthetics (suspected) from Failing On-Site Syst (suspected).	Schenectady	117.0 Acre	Lake	B	W.Q. Problem

Lower Hudson Basin PWL - Water Quality Impacted Segments Table A.13a

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Str Class	W.B.Category
H-221- 8-P266	Glass Pond (1311-0003) Aquatic Life SUSPECTED STRESSED by Silt/sediment (known) from Construction (suspected).	Albany	19.3 Acre	Lake	C(T)	W.Q.Problem
H-222-P297	Hampton Manor Lake (1301-0077) Recreation KNOWN to be STRESSED by Aesthetics (known) from Urban Runoff (suspected).	Rensselaer	12.8 Acre	Lake	C	W.Q.Problem
H-226	Patroon Creek (1301-0030) Aquatic Life KNOWN to be IMPAIRED by Oxygen Demand (known) from Comb. Sewer Overflow (known).	Albany	6.0 Mile	River	C	W.Q.Problem
H-234	Kromma Kill (1301-0027) Aquatic Life KNOWN to be IMPAIRED by Unknown Toxicity (suspected) from Industrial (suspected).	Albany	4.0 Mile	River	D>C	W.Q.Problem
H-235-11-P377	Snyders Lake (1301-0043) Public Bathing KNOWN to be IMPAIRED by Aesthetics (known) from Other Source (suspected).	Rensselaer	108.7 Acre	Lake	B	W.Q. Problem
H-235-P386	Burden Lake (1301-0025) Public Bathing KNOWN to be IMPAIRED by Nutrients (known) from Failing On-Site Syst (suspected).	Rensselaer	364.7 Acre	Lake	B	W.Q. Problem
H-235-P386- 1- 1-P391	Crystal Lake (1301-0041) Public Bathing KNOWN to be STRESSED by Aesthetics (known) from Other Source (known).	Rensselaer	57.6 Acre	Lake	B(T)	W.Q. Problem
H-235-P386- 1-P394	Glass Lake (1301-0042) Public Bathing KNOWN to be STRESSED by Aesthetics (known) from Other Source (known).	Rensselaer	121.6 Acre	Lake	B(T)	W.Q.Problem

Hackensack/Ramapo River Watersheds

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Str Class	W.B.Category
NJ- 1-13-P984	Congers Lake (1501-0019) Public Bathing SUSPECTED STRESSED by Aesthetics (known) from Urban Runoff (suspected).	Rockland	108.7 Acre	Lake	B	W.Q.Problem
NJ- 1-13-P984a	Swartout Lake (1501-0006) Public Bathing SUSPECTED STRESSED by Aesthetics (known) from Urban Runoff (suspected).	Rockland	32.1 Acre	Lake	B	W.Q.Problem
NJ- 5	Pascack Brook (1501-0015) Aquatic Life SUSPECTED STRESSED by Silt/sediment (suspected) from Urban Runoff (suspected).	Rockland	8.0 Mile	River	C	W.Q.Problem
NJ-12	Ramapo River (1501-0012) Aquatic Life SUSPECTED STRESSED by Silt/sediment (suspected) from Urban Runoff (suspected).	Orange	16.0 Mile	River	A(T)	W.Q.Problem
NJ-P1026	Greenwood Lake (1501-0001) Public Bathing KNOWN to be IMPAIRED by Nutrients (suspected) from Urban Runoff (suspected).	Orange	1068.7 Acre	Lake	B	W.Q.Problem

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Str Class	W.B.Category
H- 31-P44-23-P67	West Branch Reservoir (1302-0022)	Putnam	1036.8 Acre	Lake(R)	AA	Spcl.Prot.
	Water Supply POSSIBLY THREATENED by Nutrients (suspected) from Urban Runoff (suspected).					
H- 31-P44-23-P76	Boyd Corners Reservoir (1302-0045)	Putnam	211.3 Acre	Lake(R)	AA	Spcl.Prot.
	Water Supply POSSIBLY THREATENED by Nutrients (suspected) from Urban Runoff (suspected).					
H- 31-P44-24	East Branch Croton River (1302-0055)	Putnam	2.5 Mile	River	AA(T)	Threatened
	Water Supply KNOWN to be THREATENED by Priority Organics (known) from Landfill/Land Disp. (known).					
H- 31-P44-24-P86	Bog Brook Reservoir (1302-0041)	Putnam	390.4 Acre	Lake(R)	AA	Spcl.Prot.
	Water Supply POSSIBLY THREATENED by Nutrients (suspected) from Urban Runoff (suspected).					
H- 31-P44-35-P109	Cross River Reservoir (1302-0005)	Westchester	915.3 Acre	Lake(R)	AA(T)	Spcl.Prot.
	Water Supply POSSIBLY THREATENED by Nutrients (suspected) from Urban Runoff (suspected).					
Hackensack/Ramapo River Watersheds						
NJ- 1- 4	Nauraushaun Brook (1501-0010)	Rockland	2.0 Mile	River	A	Spcl.Prot.
	Water Supply POSSIBLY THREATENED by Silt/sediment (suspected) from Urban Runoff (suspected).					
NJ- 1-P977a	Lake DeForest Reservoir (1501-0007)	Rockland	691.1 Acre	Lake	A	Spcl.Prot.
	Water Supply POSSIBLY THREATENED by Nutrients (suspected) from Urban Runoff (suspected).					
NJ-11	Mahwah River (1501-0011)	Rockland	10.0 Mile	River	A	Spcl.Prot.
	Water Supply POSSIBLY THREATENED by Silt/sediment (suspected) from Urban Runoff (suspected).					
NJ-12- 3	Torne Brook (1501-0020)	Rockland	3.0 Mile	River	B	Threatened
	Aquatic Life KNOWN to be THREATENED by Silt/sediment (suspected) from Construction (suspected).					

While there are, undoubtedly, other waterbodies whose water uses are “threatened” in some manner or another, these other segments do not meet the *specific* criteria necessary to be listed on the *Threatened Waterbodies List*.

Lower Hudson Basin — Waterbody Impairments Needing Verification — Table A.13c

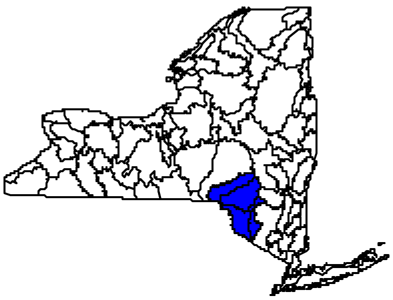
Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Str Class	W.B.Category
H- 13	Sparkill Creek (1301-0088)	Rockland	7.1 Mile	River	SeeBlw	Need Verific
	Aquatic Life POSSIBLY STRESSED by Silt/sediment (suspected) from Construction (suspected).					
H- 31-P44-23-P59- 3-P61	Lake Gilead (1302-0024)	Putnam	108.7 Acre	Lake(R)	A(T)	Need Verific
	Aquatic Life POSSIBLY STRESSED by Nutrients (suspected) from Urban Runoff (suspected).					
H- 31-P44-23-P59- 5	Michaels Brook (1302-0001)	Putnam	1.0 Mile	River	B	Need Verific
	Aquatic Life POSSIBLY STRESSED by Ammonia (possible) from Municipal (possible).					
H- 31-P44-23-P67-10-P74	Lake Gleneida (1302-0025)	Putnam	179.1 Acre	Lake(R)	AA(T)	Need Verific
	Aquatic Life POSSIBLY STRESSED by Nutrients (suspected) from Urban Runoff (suspected).					
H- 43	Lake Tiorati Brook (1301-0062)	Rockland	5.0 Mile	River	SeeBlw	Need Verific
	Aquatic Life POSSIBLY STRESSED by Silt/sediment (suspected) from Construction (suspected).					
H- 43- 1	Minisceongo Creek (1301-0089)	Rockland	4.0 Mile	River	SeeBlw	Need Verific
	Aquatic Life POSSIBLY STRESSED by Silt/sediment (suspected) from Construction (suspected).					
H- 43- 1-10	Minisceongo Creek, S.Br (1301-0090)	Rockland	2.5 Mile	River	D	Need Verific
	Aquatic Life POSSIBLY STRESSED by Silt/sediment (suspected) from Urban Runoff (suspected).					
H- 55	Peekskill Hollow Creek (1301-0049)	Westchester	14.0 Mile	River	SeeBlw	Need Verific
	Water Supply POSSIBLY STRESSED by Silt/sediment (suspected) from Urban Runoff (suspected).					
H- 55-P183e	Lake Tibet (1301-0034)	Putnam	38.3 Acre	Lake	B	Need Verific
	Public Bathing POSSIBLY STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected).					
H- 61...P184b,P190,P193	Palisades Pk Pond (1301-0056)	Orange	108.9 Acre	Lake	A	Need Verific
	Aquatic Life POSSIBLY STRESSED by Acid/Base (pH) (suspected) from Atmosph. Deposition (suspected).					
H- 89-19-P257	Walton Lake (1303-0004)	Orange	115.1 Acre	Lake	A	Need Verific
	Public Bathing POSSIBLY STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected).					
H- 95	Fishkill Creek (1304-0003)	Dutchess	5.0 Mile	River	C	Need Verific
	Aquatic Life POSSIBLY STRESSED by Nutrients (suspected) from Urban Runoff (suspected).					
H-101-18-11-P375	Long Pond (1305-0003)	Dutchess	83.3 Acre	Lake	AA	Need Verific
	Public Bathing POSSIBLY STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected).					
H-101-18-13-P378	Silver Lake (1305-0002)	Dutchess	102.3 Acre	Lake	AA(T)	Need Verific
	Public Bathing POSSIBLY STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected).					

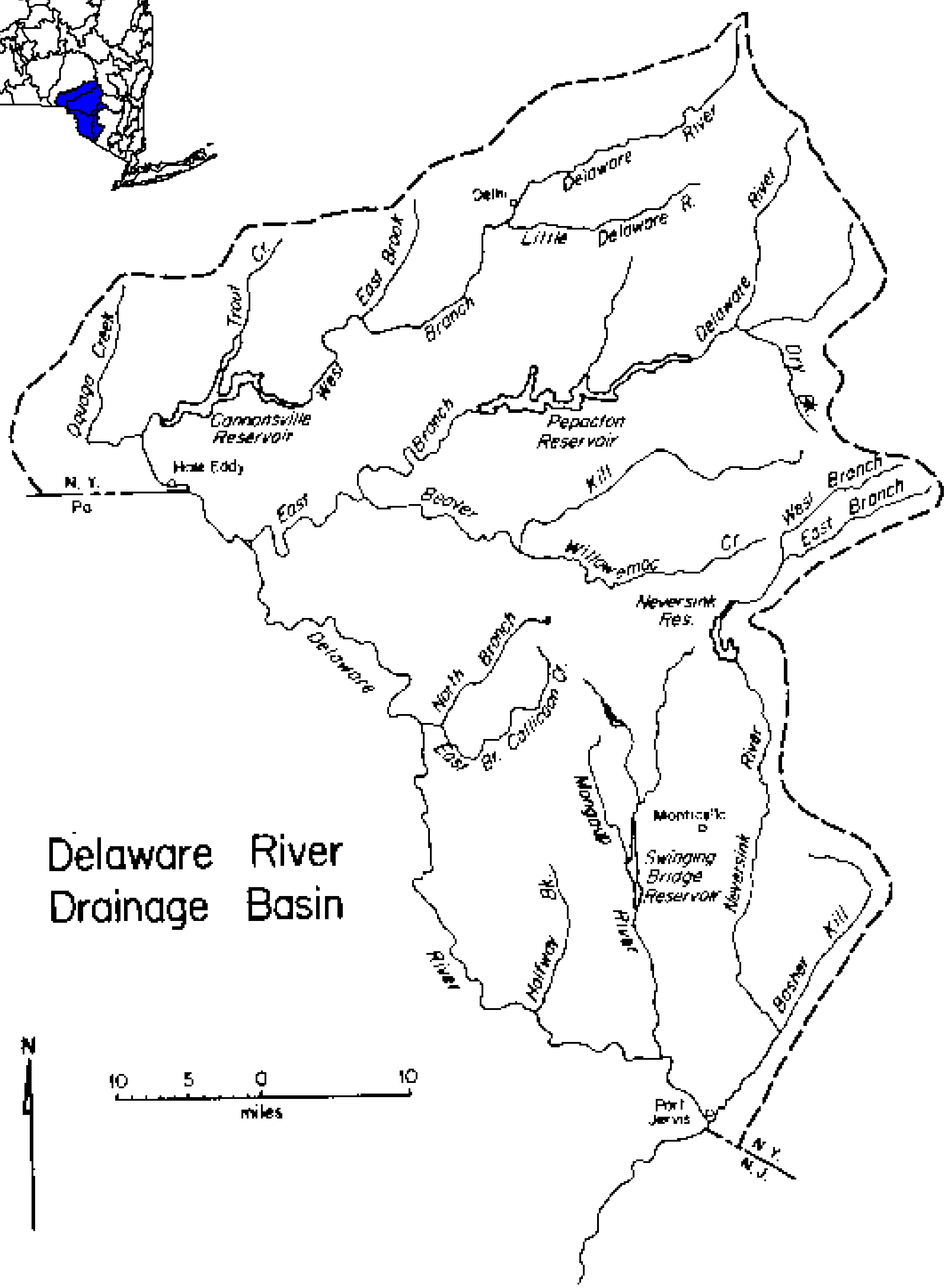
Lower Hudson Basin Waterbody Impairments Needing Verification Table A.13c

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Str Class	W.B.Category
H-101-20-P384	Upton Lake (1305-0005)	Dutchess	44.7 Acre	Lake	B	Need Verific
	Public Bathing POSSIBLY STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected).					
H-101-30	Hunns Lake Creek (1305-0011)	Dutchess	3.0 Mile	River	B	Need Verific
	Public Bathing POSSIBLY STRESSED by Pathogens (suspected) from Agriculture (suspected).					
H-101-30-P403	Hunns Lake (1305-0004)	Dutchess	70.4 Acre	Lake	B	Need Verific
	Public Bathing POSSIBLY STRESSED by Nutrients (suspected) from Failing On-Site Syst (suspected).					
H-101-P410	Twin Island Pond (1305-0010)	Dutchess	51.1 Acre	Lake	B	Need Verific
	Public Bathing POSSIBLY STRESSED by Nutrients (suspected) from Other Source (suspected).					
H-139-13-61- 9	Wawayanda Creek (1306-0015)	Orange	5.0 Mile	River	C(T)	Need Verific
	Aquatic Life POSSIBLY STRESSED by Nutrients (suspected) from Municipal (suspected).					
H-139-13-62	Rutgers Creek (1306-0006)	Orange	9.0 Mile	River	C	Need Verific
	Aquatic Life POSSIBLY STRESSED by Silt/sediment (suspected) from Agriculture (suspected).					
H-139-14-48- 2	Red Brook (1306-0010)	Sullivan	0.5 Mile	River	A(T)	Need Verific
	Water Supply POSSIBLY STRESSED by Pathogens (suspected) from Failing On-Site Syst (suspected).					
H-158	Saw Kill Creek (1301-0085)	Dutchess	4.0 Mile	River	B(T)	Need Verific
	Public Bathing POSSIBLY STRESSED by Nutrients (possible) from Failing On-Site Syst (suspected).					
H-193	Catskill Creek (1309-0004)	Greene	10.0 Mile	River	B(T)	Need Verific
	Public Bathing POSSIBLY STRESSED by Pathogens (suspected) from Failing On-Site Syst (suspected).					
H-204- 2	Kinderhook Creek (1310-0017)	Columbia	18.0 Mile	River	C(T)	Need Verific
	Aquatic Life POSSIBLY STRESSED by Silt/sediment (possible) from Agriculture (suspected).					
H-214-10-P207a	Helderberg Lake (1301-0029)	Albany	25.7 Acre	Lake	B	Need Verific
	Public Bathing POSSIBLY STRESSED by Aesthetics (suspected) from Agriculture (possible).					
H-221- 4 (portion 1)	Normans Kill, portion (1311-0010)	Albany	12.0 Mile	River	SeeBlw	Need Verific
	Aquatic Life POSSIBLY STRESSED by Silt/sediment (suspected) from Urban Runoff (suspected).					
H-221- 4 (portion 3)	Normans Kill, portion (1311-0018)	Schenectady	4.0 Mile	River	A	Need Verific
	Water Supply POSSIBLY STRESSED by Pathogens (suspected) from Agriculture (suspected).					
H-221- 4-P270- 1	Bozen Kill (1311-0017)	Albany	2.0 Mile	River	C	Need Verific
	Aquatic Life POSSIBLY STRESSED by Nutrients (possible) from Municipal (possible).					

Water Index Number	Waterbody/Segment Name (ID) Use Impairment/Pollutant/Cause Information	County	Seg Size	Type	Str Class	W.B.Category
H-221- 4-P270- 1-P274	Thompsons Lake (1311-0007)	Albany	128.0 Acre	Lake	B(T)	Need Verific
	Public Bathing POSSIBLY STRESSED by Aesthetics (suspected) from Failing On-Site Syst (possible).					
H-235	Wynants Kill (1301-0066)	Rensselaer	11.0 Mile	River	C	Need Verific
	Aquatic Life POSSIBLY STRESSED by Silt/sediment (suspected) from Resource Extraction (suspected).					
H-236	Poesten Kill (1301-0068)	Rensselaer	23.0 Mile	River	C,C(T)	Need Verific
	Aquatic Life POSSIBLY STRESSED by Silt/sediment (suspected) from Streambank Erosion (suspected).					
Hackensack/Ramapo River Watersheds						
NJ- 1	Hackensack R/L Tappan (1501-0008)	Rockland	6.0 Mile	River	A	Need Verific
	Aquatic Life POSSIBLY STRESSED by Silt/sediment (suspected) from Construction (suspected).					
NJ- 1-12	West Branch Hackensack (1501-0009)	Rockland	4.0 Mile	River	SeeBlw	Need Verific
	Aquatic Life POSSIBLY STRESSED by Silt/sediment (suspected) from Construction (suspected).					
NJ- 1-12- 3	Demarest Kill (1501-0013)	Rockland	6.0 Mile	River	C(T)	Need Verific
	Aquatic Life POSSIBLY STRESSED by Silt/sediment (suspected) from Construction (suspected).					
NJ- 1-12-P982b	Lake Lucille (1501-0017)	Rockland	12.8 Acre	Lake	B	Need Verific
	Public Bathing POSSIBLY STRESSED by Aesthetics (suspected) from Failing On-Site Syst (suspected).					
NJ- 4	Muddy Creek (1501-0014)	Rockland	3.0 Mile	River	C	Need Verific
	Aquatic Life POSSIBLY STRESSED by Silt/sediment (suspected) from Urban Runoff (suspected).					
NJ-12- 5 (and -5-1a)	Nakoma Brook (and Trib) (1501-0016)	Rockland	2.0 Mile	River	B	Need Verific
	Aquatic Life POSSIBLY STRESSED by Silt/sediment (suspected) from Construction (suspected).					
NJ-12-17-P1008-P1010	Mombasha Lake (1501-0002)	Orange	300.7 Acre	Lake(R)	A	Need Verific
	Water Supply POSSIBLY STRESSED by Pathogens (suspected) from Failing On-Site Syst (suspected).					
NJ-12...P1003-P1016	Palisades Park Lake (1501-0005)	Orange	403.1 Acre	Lake	SeeBlw	Need Verific
	Aquatic Life POSSIBLY STRESSED by Acid/Base (pH) (suspected) from Atmosph. Deposition (suspected).					

Delaware River Drainage Basin Map





The Delaware River Basin

Background

The New York State portion of the Delaware River comprises the headwaters of this major interstate river system. In New York, the basin drains an area of about 2,360 square miles with an estimated population of 138,000 persons (1990). The area is largely forested and/or rural-agricultural and is lightly populated. The headwaters are within the Catskill State Park and are subject to heavy recreational use and population influx during the summer months. The basin consists of four major subbasins: the East Branch, the West Branch, the main stem and the Neversink River. There are approximately 1,900 miles of rivers and streams, and 400 lakes and ponds in the basin.

Water Quality Issues and Concerns

The waters of the Delaware River Basin are of generally good to excellent quality. Most of the water quality issues in the basin reflect a desire to protect the high quality of these waters and the valuable resources they provide. These include prized fisheries and New York City drinking water reservoirs.

New York City Drinking Water Supplies

In an effort to avoid the need for filtration, and to maintain the high quality of water from its Catskills reservoir systems, the City of New York has begun two new pollution prevention programs. Whole Farm Planning works with farmers to improve waste management, chemical use, and soil tillage practices to reduce runoff of manure, fertilizer, pesticide, and soil into the city's reservoir system. The other program, Whole Community Planning, emphasizes local services: subdivision regulations, site plan review, residential septic system permits, educational programs, promoting voluntary conservation, encouraging land conservation, collecting household hazardous waste, expanding sewage treatment plants, and maintaining stream corridors.

Reservoir Releases/Protection of Fisheries

Inadequate releases from Cannonsville and Pepacton reservoirs in some years have had a limiting effect on fish populations in the West and East Branches, respectively. This effect also carries over into the Upper Delaware below their confluence. Fish kills occurred in the West Branch and the Upper Delaware in 1981 and 1985. Eutrophication in the Cannonsville Reservoir has resulted in low dissolved oxygen conditions which may be presently limiting trout production in the reservoir. This eutrophication is caused by excess nutrients from agricultural runoff and point sources in the basin. Water quality impacts in the Pepacton Reservoir are less severe, in part because the East Branch headwaters are less populous, and agricultural activity has declined. Increased second home development and failing on-site disposal systems are, however, a threat to the Pepacton's water quality.

Fish populations downstream of the Neversink Reservoir are limited by inadequate reservoir releases in some years. Hypolimnion releases from the reservoir cause a moderate impact on the Neversink downstream of the dam. The stream recovers by the time it reaches Woodbourne and Fallsburgh. Eutrophication has affected Morningside Lake, where recreation and aquatic life have been impaired by algal blooms and weed growths.

Atmospheric Deposition/Acid Rain

Low pH waters resulting from acid precipitation have also been documented in the Delaware River watershed. The streams most significantly affected are the East and West Branch headwaters of the Neversink River. The Upper Neversink was the subject of a 1987 NYS DEC macroinvertebrate study that found a direct correlation between species richness and pH; species richness was lowest at the most acidic sites.[40] The US Geological Survey is also conducting a water quality study of the Upper Neversink that is focused on effects of natural processes and acid deposition. Data collected to date indicate that the impact appears to be most significant on the East Branch of the Neversink.

Other Issues

Eutrophication is a water quality concern in several tributary lakes, including Swinging Bridge Reservoir where bathing and fishing are impaired due to excessive weed and algal growths. Phosphorus removal has been installed at the municipal WWTPs that are tributary to the reservoir, and it is expected that an improvement in water quality will occur. The other affected lakes, to a lesser extent, are White Lake, Mohican Lake, Kiamesha Lake, Lake Huntington, Evens Lake and Briscoe Lake. A water quantity problem has been identified in the Lower Mongaup River below the Rio Dam, where the stream bed occasionally has no flow due to impounding of water for electricity generation. This causes an obvious impairment to fish survival.

More Information

A summary listing of waterbodies included on the NYS-DEC Priority Waterbodies List is included as Table A.14. A list of waterbodies that may have been previously listed on theWI/PWL but have since been determined to need verification of possible water quality impairment is also included. More complete information about the water quality problems and issues in the basin can be found in the most recent (1996) series of Priority Waterbodies List Drainage Basin Reports.[41]

Water quality monitoring and assessment results from the NYS DEC Division of Water ambient surface water monitoring activities are summarized in the continuing series of Rotating Intensive Basin Studies (RIBS) Drainage Basin Reports. The most recent RIBS Report for the Delaware River Drainage Basin outlines results from monitoring conducted in 1993-94.[42]

The next RIBS monitoring effort in the basin is currently underway (1999-2000), with water quality assessment to be conducted in 2001.

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40 R.W. Bode, M.A. Novak and L.E. Abele. Twenty Year Trends in Water Quality of Rivers and Streams in New York State Based on Macroinvertebrate Data. NYS DEC Division of Water Technical Report. Albany, NY. 1993.

41 NYS DEC, 1996. The 1996 Priority Waterbodies List for the Delaware River Basin. NYS DEC Division of Water Technical Report. Albany, NY. September 1996.

42 J.A. Myers, R.L. Gabriel and R.M. Garry. The Delaware River Basin RIBS Report, 1993-94. NYS DEC Division of Water Technical Report. Albany, NY. January 1996.

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source

DRAINAGE BASIN: Delaware River
SubBasin: Delaware River Main Stem

Briscoe Lake	1401-0014	Sullivan	Lake	63.0 Acres	B	Public Bathing	Stressed	Susp	Nutrients	Other Source
Delaware R./main	1401-0001	Delaware	River	25.5 Miles	C(T)	Aquatic Life	Impaired	Known	Thermal Changes	Hydro/Habitat Modif.
Kramer Brook	1401-0011	Sullivan	River	0.3 Miles	A(T)	Water Supply	Stressed	Known	Pathogens	Failing On-Site Syst
Lake Huntington	1401-0008	Sullivan	Lake	82.0 Acres	B(T)	Public Bathing	Stressed	Susp	Nutrients	Unknown Source
Lower Mongaup Riv	1401-0003	Sullivan	River	4.0 Miles	B(T)	Aquatic Life	Impaired	Known	Water Level/Flow	Hydro/Habitat Modif.
Swinging Bridge R	1401-0002	Sullivan	Lake(R)	868.0 Acres	B	Public Bathing	Impaired	Known	Nutrients	Municipal

DRAINAGE BASIN: Delaware River
SubBasin: Neversink River

Evens Lake	1402-0004	Sullivan	Lake	31.0 Acres	B	Public Bathing	Stressed	Susp	Nutrients	Municipal
Kiamesha Lake	1402-0003	Sullivan	Lake(R)	160.0 Acres	A	Water Supply	Stressed	Known	Nutrients	Other Source
Neversink River	1402-0006	Sullivan	River	44.0 Miles	B(T)	Aquatic Life	Stressed	Known	Silt/sediment	Resource Extraction

DRAINAGE BASIN: Delaware River
SubBasin: East Branch Delaware

Delaware R. E.Br.	1403-0001	Delaware	River	33.6 Miles	C(T)	Aquatic Life	Impaired	Known	Thermal Changes	Hydro/Habitat Modif.

DRAINAGE BASIN: Delaware River
SubBasin: West Branch Delaware

Cannonsville Res.	1404-0001	Delaware	Lake(R)	4856.0 Acres	AA(T)	Water Supply	Stressed	Known	Nutrients	Agriculture
Delaware R. W.Br.	1404-0002	Delaware	River	16.7 Miles	C(T)	Aquatic Life	Impaired	Known	Thermal Changes	Hydro/Habitat Modif.
Halfway Brook	1401-0006	Sullivan	River	0.1 Miles	B(T)	Public Bathing	Threatened	Known	Pathogens	Failing On-Site Syst
Upper West Br Delaware	1404-0003	Delaware	River	23.0 Miles	C(T)	Aquatic Life	Stressed	Known	Nutrients	Municipal

Waterbody Inventory - Waters Needing Verification of Impairment

Segment Name	Segment ID	County

Delaware River Basin

Segment Name	Segment ID	County
Delaware River Main Stem SubBasin		
Callicoon Creek	1401-0004	Sullivan
Delaware River	1401-0019	Sullivan
Mohican Lake	1401-0007	Sullivan
White Lake	1401-0018	Sullivan
Neversink River SubBasin		
Morningside Lake	1402-0001	Sullivan
Neversink Res	1402-0009	Sullivan
Neversink-east Br	1402-0007	Ulster
Neversink-west Br	1402-0008	Ulster
Tannery Brook	1402-0005	Sullivan
East Branch Delaware SubBasin		
Cadosia Creek	1403-0003	Delaware
Pepacton Reservr	1403-0002	Delaware
West Branch Delaware SubBasin		
Coulter Brook	1404-0006	Delaware

Many of the waterbody segments included on previous editions of the Priority Waterbodies List have limited recent documentation of specific water quality impairment. In an effort to improve the quality of information in theWI/PWL, these waterbody segments Needing Verification of an Impairment are tracked on a list separate from the Priority Waterbodies List.

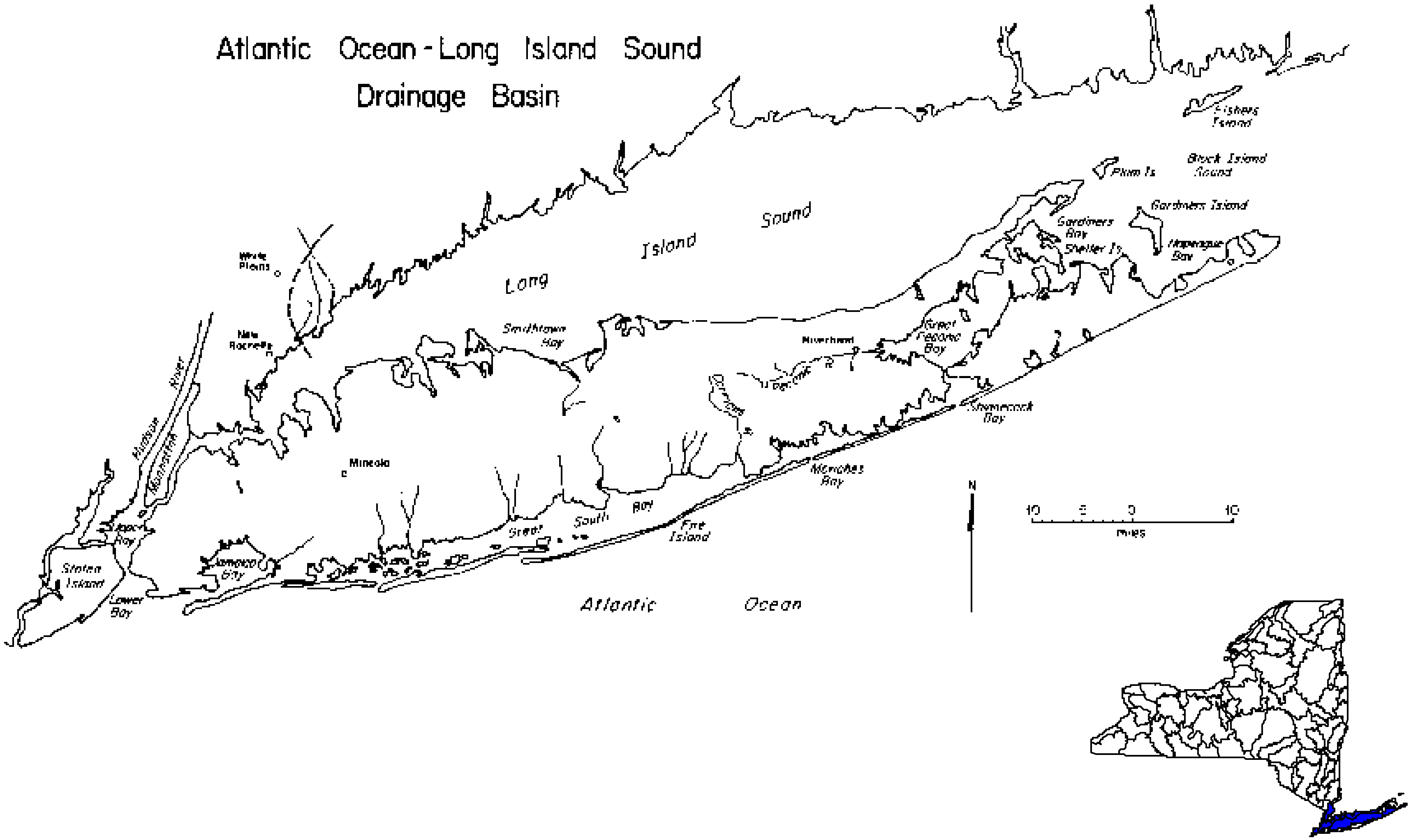
The Hackensack-Ramapo Rivers Basin

and

The Housatonic River Basin

For logistical reasons, the smaller *Hackensack-Ramapo Rivers* and *Housatonic River* Watersheds are monitored and assessed in conjunction with the Lower Hudson River Basin. Water quality information for these drainage areas is incorporated in the Lower Hudson River Basin portion of this report.

Atlantic Ocean/Long Island Sound Drainage Basin Map



The Atlantic Ocean/Long Island Sound Basin

Background

The New York State land area draining directly to the Atlantic Ocean, Long Island Sound and New York Harbor is approximately 1,500 square miles in size (3% of the state), and is inhabited by some nine million people (more than half the state population). Including the area beyond the New York State border, approximately 16 million people reside within the New York metropolitan area, making it the most densely populated region in the United States, and one of the most densely populated places in the world.

Water Quality Issues and Concerns

Not surprisingly – given the basin's population density, urban setting, early settlement and resulting aging infrastructure – the waters of the basin experience considerable stress. However, in spite of numerous water quality issues, the waters of the basin also remain a rich and valuable (economic and ecological) resource. The basin supports bathing, boating and other recreational activities, commercial fishing and shellfishing, and world class port operations. These coastal waters also support unique and potentially threatened habitats. For example, the Hudson River Estuary stock of striped bass contribute substantially to the entire coastal stock of the species.

Numerous sources contribute to water quality problems in the basin. These include municipal and industrial discharges, urban storm runoff, combined and separate sewer overflows, contaminated sediments, oil and hazardous material spills, nonpoint source runoff from a variety of activities, landfill leachate, dredge spoil disposal, ground/surface/saltwater intrusion, and thermal discharges.

Low Dissolved Oxygen in Long Island Sound

Seasonal low dissolved oxygen (DO) in Long Island Sound has been the focus of considerable study. Hypoxia in the bottom waters of the western Long Island Sound have caused fish and crustacean kills and induce finfish to avoid the area. The Long Island Sound Study has determined the DO problem is primarily due to algal die-off. Excessive algal blooms in the sound have been attributed to nitrogen loads from wastewater treatment plant discharges, Combined Sewer Overflows (CSOs) and stormwater and urban runoff. The most significant pollutant loadings to western Long Island Sound are the New York City treatment plants on the Upper East River. Other significant pollution sources to the Sound include other municipal discharges to the basin, stormwater runoff, combined sewage overflows, and atmospheric deposition. Concern about the total nitrogen load being discharged to the Sound has led to enhanced nitrogen removal at many of the area WWTPs and commitment to further reduce nitrogen loads by nearly 60%. Recently, New York State and Connecticut released a draft Total Maximum Daily Load (TMDL) Report outlining 5, 10 and 15 year nitrogen reduction requirements. This plan is currently under review by USEPA.

Fish Consumption Advisories

A number of freshwater ponds and streams in this drainage basin have fish consumption advisories, primarily due to PCB and/or pesticide contamination, in particular, chlordane. This is presumably due to the extensive use of chlordane as an insecticide. An advisory in Lake Capri in Suffolk County is in response to elevated cadmium levels. NYS DOH has also issued specific advisories limiting the consumption of striped bass, bluefish and American eels taken from marine waters (Long Island Sound, Block Island Sound, Peconic/Gardiners Bays, Lower New York Harbor, Jamaica Bay and the south shore of Long Island).

Shellfishing Restrictions

In addition to advisories due to PCBs, pesticides and other toxics, bacteriological contamination from urban runoff, CSOs, storm sewer and other discharges results in prohibitions against shellfishing in some of the marine waters around New York City and Long Island. The NYSDEC Bureau of Marine Resources conducts a USFDA-approved Shellfish Land Certification Program, the objective of which is to safeguard public health by determining those waters that are safe for shellfishing and closing areas deemed unsafe. Certification is based on actual bacteriological sampling results and evaluation of potential pollution sources along the shore.

Estuary Programs

Three major estuary studies are underway to evaluate water quality issues and remediation actions within the basin. They are the previously mentioned Long Island Sound Study, the New York-New Jersey Harbor Estuary Program, and the Peconic Estuary Program. All three programs have completed Comprehensive Conservation and Management Plans (CCMPs). The CCMPs describe the major problems facing the estuaries and outline management actions to be taken to preserve and restore the water quality, habitat and living resources of the estuaries. (Summaries of these programs are outlined on pages 23-24 of the main report.)

Other Issues

Numerous public beaches and marinas in New York City and Nassau, Suffolk and Westchester Counties attract bathers and boaters from throughout the area and beyond. However, public health warnings and occasional beach closures result from raw sewage bypasses, combined sewer, separate sewer and stormwater overflows, municipal discharges and urban runoff. New York City, Nassau, Suffolk and Westchester Counties, New Jersey and Connecticut all conduct beach water quality monitoring programs. The region has also developed a sophisticated water quality model and communication network to monitor and assess impacts and notify resource managers.

Long Island Sound receives nonpoint source runoff and the discharge of treated wastewater from Westchester County, Metropolitan New York, northern Long Island and a major portion of western New England. Water quality in the north shore bays of Long Island is strongly influenced by sources surrounding the bays.

More Information

A summary listing of waterbodies included on the NYS DEC Priority Waterbodies List is included as Table A.17. A list of waterbodies that may have been previously listed on theWI/PWL but have since been determined to need verification of possible water quality impairment is also included. More complete information about the water quality problems and issues in the basin can be found in the most recent (1996) series of Priority Waterbodies List Drainage Basin Reports.[43]

A 1998-1999 RIBS monitoring effort in the basin was recently completed. A comprehensive water quality assessment is currently underway.

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[43] NYS DEC, 1996. The 1996 Priority Waterbodies List for the Atlantic Ocean/Long Island Sound Drainage Basin. NYS DEC Division of Water Technical Report. Albany, NY. September 1996.

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
DRAINAGE BASIN: Atlantic Ocean/Long Island Sound										
SubBasin: Atlantic Ocean										
Acabonack Harbor	1701-0047	Suffolk	Estuary	112.0 Acres	SA	Shellfishing	Impaired	Known	Pathogens	Urban Runoff
Amityville Creek	1701-0087	Suffolk	River	2.5 Miles	C(T)	Aquatic Life	Impaired	Susp	Water Level/Flow	Hydro/Habitat Modif.
Arthur Kill	1701-0010	Richmond	Estuary	2300.0 Acres	SD/I	Aquatic Life	Impaired	Known	Oxygen Demand	Municipal
Atlantic Ocean	1701-0014	Kings	Ocean	3.0ShrMi	SA	Shellfishing	Precluded	Known	Pathogens	Comb. Sewer Overflow
Belmont Lake	1701-0021	Suffolk	Lake	26.0 Acres	C	Fish Consumption	Impaired	Known	Pesticides	Urban Runoff
Canaan Lake	1701-0018	Suffolk	Lake	26.0 Acres	B(T)	Public Bathing	Precluded	Known	Nutrients	Urban Runoff
Champlins Creek	1701-0019	Suffolk	River	2.5 Miles	C(TS)	Aquatic Life	Impaired	Known	Thermal Changes	Hydro/Habitat Modif.
Coecles Inlet	1701-0163	Suffolk	Estuary	2.0 Acres	SA	Shellfishing	Impaired	Known	Pathogens	Other Source
Cold Spring Pond	1701-0127	Suffolk	Estuary	5.0 Acres	SA	Shellfishing	Impaired	Known	Pathogens	Other Source
Cutchogue Harbor	1701-0045	Suffolk	Estuary	70.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Other Source
Dering Harbor	1701-0050	Suffolk	Estuary	100.0 Acres	SA	Shellfishing	Impaired	Known	Pathogens	Urban Runoff
Flanders Bay	1701-0030	Suffolk	Estuary	1493.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Freeport Reservoir	1701-0025	Nassau	Lake(R)	17.0 Acres	A	Aquatic Life	Impaired	Known	Nutrients	Urban Runoff
Gardiners Bay	1701-0164	Suffolk	Estuary	219.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Georgica Pond	1701-0145	Suffolk	Estuary	350.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Gowanus Canal	1701-0011	Kings	Estuary	128.0 Acres	SD	Aquatic Life	Precluded	Known	Oxygen Demand	Comb. Sewer Overflow
Grant Park Pond	1701-0054	Nassau	Lake	6.0 Acres	C	Fish Consumption	Impaired	Known	Priority Organics	Urban Runoff
Great Peconic Bay	1701-0165	Suffolk	Estuary	87.0 Acres	SA	Shellfishing	Impaired	Known	Pathogens	Storm Sewers
Great South Bay ©	1701-0040	Suffolk	Estuary	4643.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Great South Bay (E)	1701-0039	Suffolk	Estuary	4423.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Great South Bay (W)	1701-0173	Suffolk	Estuary	3820.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Halls Pond	1701-0027	Nassau	Lake	2.0 Acres	C	Fish Consumption	Impaired	Known	Priority Organics	Urban Runoff
Hashamomuck Pond	1701-0162	Suffolk	Estuary	170.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Hempstead Bay	1701-0032	Nassau	Estuary	11445.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Hempstead Lake	1701-0015	Nassau	Lake	237.0 Acres	C	Aquatic Life	Impaired	Known	Nutrients	Urban Runoff
Jamaica Bay	1701-0005	Kings	Estuary	12235.0 Acres	SB	Public Bathing	Impaired	Susp	Pathogens	Comb. Sewer Overflow
Lake Capri	1701-0175	Suffolk	Lake	6.5 Acres	C	Fish Consumption	Impaired	Known	Metals	Landfill/Land Disp.
Lake Montauk	1701-0031	Suffolk	Estuary	280.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Other Source
Lake Ronkonkoma	1701-0020	Suffolk	Lake	243.0 Acres	B	Public Bathing	Impaired	Known	Pathogens	Urban Runoff
Lemon Creek	1701-0149	Richmond	River	2.0 Miles	SC	Aquatic Life	Stressed	Susp	Oxygen Demand	Failing On-Site Syst
Little Peconic Bay	1701-0172	Suffolk	Estuary	68.0 Acres	SA	Shellfishing	Impaired	Known	Pathogens	Urban Runoff
Lofts Pond	1701-0029	Nassau	Lake	4.0 Acres	C	Fish Consumption	Impaired	Known	Priority Organics	Urban Runoff
Lower NY Bay (N)	1701-0004	Richmond	Estuary	31400.0 Acres	SB	Public Bathing	Impaired	Known	Pathogens	Comb. Sewer Overflow
Massapequa Creek	1701-0174	Nassau	River	2.0 Miles	C	Aquatic Life	Precluded	Known	Water Level/Flow	Urban Runoff
Massapequa Lake	1701-0156	Nassau	Lake	40.0 Acres	C	Aquatic Life	Impaired	Susp	Nutrients	Urban Runoff
Massapequa Reserv	1701-0157	Nassau	Lake(R)	20.0 Acres	A	Fish Consumption	Impaired	Known	Priority Organics	Urban Runoff
Mecox Bay	1701-0034	Suffolk	Estuary	1045.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Storm Sewers
Milburn Pond	1701-0053	Nassau	Lake	5.0 Acres	C	Aquatic Life	Precluded	Known	Nutrients	Urban Runoff
Mill Basin	1701-0178	Kings	Estuary	186.0 Acres	SB	Public Bathing	Impaired	Known	Oxygen Demand	Private System
Moriches Bay	1701-0038	Suffolk	Estuary	5142.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Storm Sewers

DRAINAGE BASIN: Atlantic Ocean/Long Island Sound
SubBasin: Atlantic Ocean (con't)

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
Napeague Harbor	1701-0166	Suffolk	Estuary	15.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Other Source
North Sea Harbor	1701-0037	Suffolk	Estuary	59.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Storm Sewers
Northwest Creek	1701-0046	Suffolk	Estuary	169.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Noyack Bay	1701-0167	Suffolk	Estuary	243.0 Acres	SA	Shellfishing	Impaired	Known	Pathogens	Other Source
Orient Harbor	1701-0168	Suffolk	Estuary	73.0 Acres	SA	Shellfishing	Impaired	Known	Pathogens	Urban Runoff
Orowoc Creek	1701-0094	Suffolk	River	6.0 Miles	C(T)	Aquatic Life	Precluded	Known	Silt/sediment	Urban Runoff
Oyster Pond	1701-0169	Suffolk	Estuary	115.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Other Source
Patchogue Lake	1701-0055	Suffolk	Lake	50.0 Acres	B	Public Bathing	Precluded	Known	Silt/sediment	Storm Sewers
Quantuck Bay	1701-0042	Suffolk	Estuary	730.0 Acres	SA	Shellfishing	Impaired	Susp	Pathogens	Storm Sewers
Raritan Bay	1701-0002	Richmond	Estuary	12410.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Failing On-Site Syst
Ridders Pond	1701-0176	Nassau	Lake	1.0 Acres	C	Fish Consumption	Impaired	Known	Pesticides	Urban Runoff
Sag Harbor & coves	1701-0035	Suffolk	Estuary	224.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Storm Sewers
Sagaponack Pond	1701-0146	Suffolk	Estuary	160.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Storm Sewers
Sampawams Creek	1701-0090	Suffolk	River	5.0 Miles	C(T)	Aquatic Life	Precluded	Known	Silt/sediment	Urban Runoff
Santapogue Creek	1701-0016	Suffolk	River	2.0 Miles	C(T)	Aquatic Life	Impaired	Susp	Unknown Toxicity	Unknown Source
Sebonac Creek	1701-0051	Suffolk	Estuary	430.0 Acres	SA	Shellfishing	Impaired	Known	Pathogens	Urban Runoff
Sheepshead Bay	1701-0148	Kings	Estuary	91.0 Acres	I	Aesthetics	Stressed	Susp	Aesthetics	Private System
Shellbank Basin	1701-0001	Queens	Estuary	24.0 Acres	I	Aquatic Life	Impaired	Susp	Oxygen Demand	Comb. Sewer Overflow
Shelter Island Sound	1701-0170	Suffolk	Estuary	238.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Municipal
Shinnecock Bay	1701-0033	Suffolk	Estuary	298.0 Acres	SA	Shellfishing	Impaired	Susp	Pathogens	Storm Sewers
Smith Pd (rsevlt)	1701-0136	Nassau	Lake	6.0 Acres	C	Fish Consumption	Impaired	Known	Priority Organics	Urban Runoff
South Oyster Bay	1701-0041	Nassau	Estuary	4130.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Southold Bay	1701-0044	Suffolk	Estuary	180.0 Acres	SA	Shellfishing	Impaired	Known	Pathogens	Urban Runoff
Spring Lake	1701-0022	Suffolk	Lake	2.0 Acres	B	Fish Consumption	Impaired	Known	Pesticides	Urban Runoff
Stirling Basin	1701-0049	Suffolk	Estuary	55.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Three Mile Harbor	1701-0036	Suffolk	Estuary	362.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Storm Sewers
Thurston Basin	1701-0152	Queens	Estuary	38.0 Acres	I	Aesthetics	Stressed	Susp	Aesthetics	Comb. Sewer Overflow
Tiana Bay	1701-0112	Suffolk	Estuary	12.0 Acres	SA	Shellfishing	Impaired	Susp	Pathogens	Urban Runoff
Weesuck Creek	1701-0111	Suffolk	Estuary	20.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
West Neck Harbor	1701-0132	Suffolk	Estuary	2.0 Acres	SA	Shellfishing	Impaired	Known	Pathogens	Other Source
Wooley Pond	1701-0048	Suffolk	Estuary	10.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff

DRAINAGE BASIN: Atlantic Ocean/Long Island Sound
SubBasin: Long Island Sound

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
Cold Spring Harbor	1702-0018	Suffolk	Estuary	190.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Dosoris Pond	1702-0024	Nassau	Estuary	105.0 Acres	SA	Shellfishing	Impaired	Susp	Pathogens	Urban Runoff
East River -lower	1702-0011	New York	Estuary	3520.0 Acres	I	Aquatic Life	Impaired	Known	Oxygen Demand	Comb. Sewer Overflow
East River-upper1	1702-0010	Queens	Estuary	3200.0 Acres	I	Aquatic Life	Impaired	Known	Oxygen Demand	Comb. Sewer Overflow
East River-upper2	1702-0032	Queens	Estuary	1280.0 Acres	SB	Public Bathing	Impaired	Known	Pathogens	Comb. Sewer Overflow

(con't)

DRAINAGE BASIN: Atlantic Ocean/Long Island Sound
SubBasin: Long Island Sound (con't)

Segment Name	Segment ID	County	Segment Type	Segment Size	Stream Class	Primary Use Affected	Problem Severity	Dcmt	Primary Pollutant/Cause	Primary Source
Eastchester Bay	1702-0007	Bronx	Estuary	3.0 Acres	SB	Public Bathing	Impaired	Susp	Pathogens	Comb. Sewer Overflow
Fishers Island Sound	1702-0100	Suffolk	Estuary	99.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Goldsmith Inlet	1702-0026	Suffolk	Estuary	20.0 Acres	SA	Shellfishing	Impaired	Known	Pathogens	Urban Runoff
Harlem River	1702-0004	New York	Estuary	360.0 Acres	I	Fish Consumption	Impaired	Susp	Aesthetics	Comb. Sewer Overflow
Hempstead Harbor	1702-0022	Nassau	Estuary	3465.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Huntington Bay	1702-0014	Suffolk	Estuary	1309.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Lake Isle (Reservoir No 1)	1702-0075	Westchester	Lake	58.0 Acres	B	Public Bathing	Impaired	Susp	Nutrients	Urban Runoff
Leeds Pond	1702-0048	Nassau	Estuary	20.0 Acres	I	Aquatic Life	Impaired	Susp	Silt/sediment	Storm Sewers
Little Neck Harbor	1702-0029	Queens	Estuary	1600.0 Acres	SB	Public Bathing	Precluded	Known	Pathogens	Failing On-Site Syst
Long Island Sound	1702-0001	Westchester	Estuary	15520.0 Acres	SB	Public Bathing	Impaired	Susp	Pathogens	Municipal
Long Island Sound (E)	1702-0098	Suffolk	Estuary	300.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Municipal
Long Island Sound (W)	1702-0028	Nassau	Estuary	26650.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Long Island Sound NYC	1702-0027	Bronx	Estuary	11960.0 Acres	SB	Shellfishing	Precluded	Known	Pathogens	Comb. Sewer Overflow
Manhasset Bay	1702-0021	Nassau	Estuary	2725.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Mattituck Inlet	1702-0020	Suffolk	Estuary	125.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Millers Pond	1702-0013	Suffolk	Lake	35.0 Acres	C	Aquatic Life	Stressed	Susp	Oxygen Demand	Urban Runoff
Milton Harbor	1702-0063	Westchester	Estuary	40.0 Acres	B	Recreation	Impaired	Known	Silt/sediment	Construction
Mt Sinai Harbor	1702-0019	Suffolk	Estuary	70.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Other Source
Newtown Creek	1702-0002	Queens	Estuary	154.0 Acres	SD	Aquatic Life	Precluded	Known	Oxygen Demand	Comb. Sewer Overflow
Nissequogue River	1702-0025	Suffolk	Estuary	555.0 Acres	SA	Shellfishing	Impaired	Susp	Pathogens	Storm Sewers
Oyster Bay Harbor	1702-0016	Nassau	Estuary	785.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Port Jefferson Harbor	1702-0015	Suffolk	Estuary	1374.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Sheldrake L/Larchmnt Res	1702-0067	Westchester	Lake	26.0 Acres	A	Water Supply	Stressed	Susp	Nutrients	Urban Runoff
Sheldrake River	1702-0069	Westchester	River	2.0 Miles	C	Fish Consumption	Impaired	Known	Priority Organics	Tox/Contam. Sediment
Silver Lake	1702-0040	Westchester	Lake	38.0 Acres	B	Public Bathing	Stressed	Susp	Nutrients	Urban Runoff
Smithtown Bay	1702-0023	Suffolk	Estuary	909.0 Acres	SA	Shellfishing	Impaired	Susp	Pathogens	Urban Runoff
St James Pond	1702-0049	Suffolk	Lake	0.2 Acres	C	Fish Consumption	Impaired	Known	Pesticides	Urban Runoff
Stony Brook Harbr	1702-0047	Suffolk	Estuary	120.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Upper Ny Bay	1702-0095	Kings	Estuary	6740.0 Acres	I	Aesthetics	Stressed	Susp	Priority Organics	Tox/Contam. Sediment
Van Cortlandt Lake	1702-0008	Bronx	Lake	13.0 Acres	B	Public Bathing	Precluded	Known	Nutrients	Urban Runoff
Wading River	1702-0099	Suffolk	Estuary	50.0 Acres	SC	Shellfishing	Precluded	Known	Pathogens	Storm Sewers
Wampus Lake	1702-0056	Westchester	Lake	2.0 Acres	B	Public Bathing	Stressed	Susp	Silt/sediment	Construction
West Harbor	1702-0046	Suffolk	Estuary	150.0 Acres	SA	Shellfishing	Precluded	Known	Pathogens	Urban Runoff
Whitney Lake	1702-0101	Nassau	Lake	6.0 Acres	C	Fish Consumption	Impaired	Known	Pesticides	Urban Runoff

Waterbody Inventory - Waters Needing Verification of Impairment

Segment Name	Segment ID	County

Atlantic Ocean/Long Island Sound Basin

Atlantic Ocean SubBasin

Agawam Lake	1701-0117	Suffolk
Artist Lake	1701-0135	Suffolk
Aspatuck Creek	1701-0114	Suffolk
Awixa Creek	1701-0093	Suffolk
Beaverdam Creek	1701-0104	Suffolk
Bergen Basin	1701-0009	Queens
Big Fresh Pond	1701-0125	Suffolk
Brightwaters Pond	1701-0023	Suffolk
Brown Creek	1701-0097	Suffolk
Camaans Pond	1701-0052	Nassau
Carlls River	1701-0089	Suffolk
Carmans River	1701-0102	Suffolk
Coney Island Creek	1701-0008	Kings
Connetquot Creek	1701-0095	Suffolk
Coopers Neck Pond	1701-0116	Suffolk
Fort Pond	1701-0122	Suffolk
Fresh Creek	1701-0013	Kings
Fresh Kills	1701-0012	Richmond
Green Creek	1701-0096	Suffolk
Hawtree Basin	1701-0007	Queens
Hendrix Creek	1701-0006	Kings
Hook Pond	1701-0131	Suffolk
Hubbard Creek	1701-0105	Suffolk
Jule Pond	1701-0121	Suffolk
Laurel Pond	1701-0128	Suffolk
Little Fresh Pond	1701-0126	Suffolk
Little River	1701-0107	Suffolk
Long Pond (L Panamoka)	1701-0134	Suffolk
Mattituck (Marratooka) Pd	1701-0129	Suffolk
Mill Creek	1701-0106	Suffolk
Mill Pond	1701-0113	Suffolk
Mud Creek	1701-0101	Suffolk
Neguntatogue Cr	1701-0088	Suffolk
Old Town Pond	1701-0118	Suffolk
Paerdegat Basin	1701-0003	Kings
Patchogue River	1701-0099	Suffolk
Peconic River	1701-0108	Suffolk

Many of the waterbody segments included on previous editions of the Priority Waterbodies List have limited recent documentation of specific water quality impairment. In an effort to improve the quality of information in theWI/PWL, these waterbody segments Needing Verification of an Impairment are tracked on a list separate from the Priority Waterbodies List.

Waterbody Inventory - Waters Needing Verification of Impairment

Segment Name	Segment ID	County
Atlantic Ocean SubBasin (con't)		
Penataquit Creek	1701-0092	Suffolk
Phillips Pond	1701-0120	Suffolk
Quantuck Creek	1701-0115	Suffolk
Richmond Creek	1701-0043	Richmond
Richmond Creek	1701-0150	Richmond
Sawmill Creek	1701-0109	Suffolk
Smith Pond	1701-0028	Nassau
Swan River	1701-0100	Suffolk
Terrell River	1701-0103	Suffolk
Terry Creek	1701-0110	Suffolk
Tuthills Creek	1701-0098	Suffolk
Wainscott Pond	1701-0144	Suffolk
Wantagh Pond	1701-0159	Nassau
West Mill Pond	1701-0026	Suffolk
Wickapogue Pond	1701-0119	Suffolk
Willets Creek	1701-0091	Suffolk
Long Island Sound SubBasin		
Alley Creek	1702-0009	Queens
Beaver Swamp Brk	1702-0090	Westchester
Blind Brook	1702-0062	Westchester
Bronx River	1702-0006	Bronx
Byram River	1702-0055	Westchester
East Creek	1702-0042	Westchester
Flushing Creek/Bay	1702-0005	Queens
Goodliffe Pond	1702-0065	Westchester
Guion Creek	1702-0073	Westchester
Hutchinson River	1702-0003	Bronx
Hutchinson River	1702-0074	Westchester
Kensico Reservoir	1702-0059	Westchester
Mamaroneck River	1702-0071	Westchester
Meadow Lake	1702-0030	Queens
Port Jefferson Cr	1702-0091	Suffolk
Sheldrake River	1702-0066	Westchester
Tibbetts Brook	1702-0061	Westchester
Wampus River	1702-0057	Westchester
Westchester Creek	1702-0012	Bronx
Willow Lake	1702-0031	Queens

Appendix B

The Waterbody Inventory and Priority Waterbodies List

In order to fulfill certain requirements of the Federal Clean Water Act, the New York State Department of Environmental Conservation (NYSDEC) must provide periodic assessments of the quality of the water resources in the state. These assessments reflect monitoring and water quality information drawn from a number of programs and sources, both within and outside the NYSDEC. This information has been compiled by the NYSDEC Division of Water into an inventory database of waterbodies in New York State that characterizes known and/or suspected water quality problems and issues, and tracks progress toward their resolution. This inventory of water quality information is the basis for the division's Priority Waterbodies List (PWL).

The Priority Waterbodies List serves as a base resource for Division of Water program management. The PWL provides:

Baseline Assessments of Water Quality
Periodic assessments evaluate whether the waters of the state support their designated uses. Such assessments are both general (cumulative statewide evaluation of all waters) and specific (evaluation of individual waterbodies) in nature.

A Focus for Division Program Activities
Because of limited resources, various division programs should address those specific water quality issues--both statewide problems (e.g., stormwater, toxic/contaminated sediment) and site/waterbody-specific concerns--where efforts will have the greatest impact.

A Consistent and Objective Inventory
The PWL evaluation of water quality problems/issues is used in the development of program-specific priority ranking/scoring systems and efforts.

A Record of Water Quality History
The PWL provides information for specific waterbodies so that the division can easily respond to questions--from both inside and outside the division (including the public)--concerning what is known about the water quality of specific rivers, lakes and watersheds.

A Measure of Progress
The PWL tracks the progress of division programs and efforts toward improving the water resources of the state.

Comprehensive Assessment Strategy

The Priority Waterbodies List is a key component of the Division of Water's larger *Comprehensive Assessment Strategy*. This strategy is designed to integrate a variety of division activities into a more coordinated and comprehensive water quality program. The specific goals of the *Comprehensive Assessment Strategy* are to provide:

- a complete and thorough evaluation of all available monitoring data,
- a comprehensive assessment of the quality of all waters in the state, and
- a coordinated approach to improving and protecting these water resources.

The *Comprehensive Assessment Strategy* relies on a rotating drainage basin approach. This approach focuses water quality monitoring and assessment activities on a portion of the state for a designated period of time, and then turns attention to other parts of the state. The New York State strategy enables multiple programs to conduct coordinated monitoring and assessment efforts–culminating in an update of PWL information–in two or three targeted basins (about 20% of the state) each year. This schedule allows for a comprehensive re-assessment of the entire state over a five-year cycle.

Recent PWL Modifications

Since its inception in 1983, the PWL–then known as the Priority Water Problems (PWP) List–has served as a tool to manage the flow of water quality information generated by the division, as well as from sources outside the division. However, its effectiveness at providing an appraisal of water quality problems and issues has been limited by inconsistent and subjective water quality information and inadequate review and verification of that information. Review of the PWL by the division concluded that while the PWL generally provides an adequate framework for managing this information, the quality of current PWL information needs to be improved. Improvements currently being made to the system involve:

- *More Detailed Descriptive Information* that allows for the easy location of waterbodies and identification of the extent of the water quality impairment;

- *Water Use Impairment, Severity, Cause/Source and Documentation Information* that is specifically defined and consistently applied;

- *Tracking of the Resolution and Status of Water Quality Problems* along a spectrum that includes the verification of a problem, verification of causes and sources, development of corrective strategies, and the implementation of such strategies;

- *Extensive Narrative Discussion* of the details of the water quality problem, causes, sources, history and monitoring/documentation related to the segment, including the source(s) of information;

- *Prioritization of the PWL Segments* that have the "highest potential for resolution," thereby providing a means to allocate limited resources;

- *Regular Review and Update of PWL Segments* in all drainage basins (two or three basins each year) over a five-year cycle that includes a complete and thorough review of all segment information and integrates the PWL update with the results from the *Rotating Intensive Basin Studies (RIBS)* Monitoring Program;

- A *Comprehensive and Inclusive Update Process* that solicits and incorporates water quality information from all Division programs, as well as the other quality divisions in the department, other state and federal agencies, local agencies and citizen/volunteer groups.

An Expanded *Waterbody Inventory*

Recent efforts to update PWL information have been accompanied by considerable discussion concerning what segments should be on the PWL and what segments–because of either the lack of a significant problem or limited problem documentation–should be excluded from the list. At the same time, the Division of Water has recognized a growing need to monitor and report on *"good"* water quality segments, in addition to thosesegments with problems. In response to both of these issues, the division has decided to (gradually) expand the inventory database of waterbodies to include water quality information for **all** waters in the state (not just those waterbodies with problems).

However, while this expanded waterbodies database will provide more complete water quality information, for program management purposes the division must also be able to cull from this expanded comprehensive list of waterbody segments a smaller number of "*priority*" segments on which the division can and should spend resources. In other words, there is a need to recognize and identify both a comprehensive ***Waterbody Inventory*** of water quality information for all waters in the state, and a subset of this list that is limited to segments with well documented, potentially resolvable, higher priority problems and issues. This subset of the Waterbody Inventory is the ***PRIORITY Waterbodies List***.

In order to achieve these multiple objectives, segments in the larger comprehensive Waterbody Inventory are segregated into one of four (4) *Water Quality Assessment Categories*. The first two of these categories include:

> **Water Quality Impacted Segments:** These are segments with documented (verified) water quality impact and/or use impairment with a problem severity of *precluded*, *impaired* or *stressed* (*threatened* uses are not included in this category). This category includes both *High/Medium Resolvability* segments, where the division considers the expenditure of additional resources to improve water quality to be worthwhile given public interest and/or the expectation that a measurable improvement can be achieved; and *Low Resolvability* segments, with persistent/intractable problems on which the division is not likely to spend any significant resources (e.g., atmospheric deposition, etc.).

> **Threatened Waterbody Segments:** These are segments for which uses are not restricted and no water quality problems exist, but where specific land use or other changes in the surrounding watershed are known or strongly suspected of threatening water quality. Also included in this category are waterbodies designated by the division as *Special Protection* waters. Special Protection Waters experience no use restrictions or immediate threats to water quality but nonetheless remain highly valued resources deemed worthy of special protection and consideration.

Taken together, the *Water Quality Impacted Segments* and *Threatened Waterbody Segments* comprise the Division of Water Priority Waterbodies List (PWL). These segments are the focus of remedial/corrective and resource protection activities by the division and its watershed partners. The other two *Water Quality Assessment Categories* are:

> **Waterbody Impairments Needing Verification:** These are segments that are thought to have a use impairment, but for which there is not sufficient or definitive documentation of a problem. These segments will be designated to be verified by the division (generally, this will be done during the *Comprehensive Assessment Strategy* rotating basin schedule) or other watershed partners.

> **Waterbodies Having No Known Impairment:** These segments include those waterbodies where monitoring efforts indicate that there are no use impairments or other water quality impacts/issues.

Waterbody Impairments Needing Verification **and** ***Waterbodies Having No Known Impairment*** **are tracked on the comprehensive Waterbody Inventory, but are not considered to be "on the Priority Waterbodies List."** For these waters, additional monitoring and assessment activities to document use impairments, causes and sources are more appropriate than remedial/corrective or resource protection efforts.

The remaining waters of the state are recorded in the Waterbody Inventory as *UnAssessed*. Maintaining a list of unassessed waters also provides useful information for the planning and conduct of future RIBS and other water quality studies.

Maintaining a comprehensive Waterbody Inventory allows division staff to easily respond to questions–from both inside and outside the department–concerning the water quality of specific rivers, lakes and watersheds. And by segregating the database in the manner described above, the division can also identify specific priorities where the coordination of limited resources can most effectively address water quality problems.

NYSDEC
DIVISION OF WATER
PRIORITY WATERBODIES LIST (PWL) WORKSHEET

____
Date

WATERBODY LOCATION INFORMATION

Segment ID______________________

1. **Waterbody Name** ____
2. **Waterbody Type** ____
3. **Water Index Number (WIN)** _______________________________
4. **Drainage Basin and Sub-basin** ____
5. **Hydrologic (Watershed) Unit Code** __ __ __ __ __ __ __ __/__ __ __
6. **Flow Category** (if river segment) ____________________________
7. **Affected Length/Area** ________________ **Units** (mi, acres) ______
8. **Describe Waterbody Segment** ____

____

9. **Waterbody Classification**___________
10. **County** (primary) __________________
10a. **Additional Counties** _______________
11. **NYSDEC Region** _________________
12. **Quad Map** ________________________
12a. **Quad Num** __ **-** ___ **-** __ **More Quads?** __

WATER QUALITY PROBLEM INFORMATION

13. Use Impairment/Severity of Water Quality Problem *Select all that apply*

Waterbody Uses Indicate precluded, impaired, stressed or threatened (P,I,S,T)		**Problem Documentation** Known	Suspected	Possible
Water Supply (Class A, AA, GA)	_____	_____	_____	_____
Shellfishing (Class SA)	_____	_____	_____	_____
Public Bathing (Class B, SB or above)	_____	_____	_____	_____
Fishing Consumption	_____	_____	_____	_____
Aquatic Life (Class C, SC or above)	_____	_____	_____	_____
Recreation	_____	_____	_____	_____
Aesthetics	_____	_____	_____	_____

14. **Type of Pollutant(s)** Select all that apply. Indicate as *known* (K), *suspected* (S), or *possible* (P). **Circle the one primary pollutant type.**

CHEMICAL CAUSES

_____ Nutrients
_____ Ammonia
_____ Chlorine
_____ Unknown Toxic
_____ Metals
_____ Acid/Base (pH)
_____ Salts
_____ Other Inorganics
_____ Pesticides
_____ Priority Organics
_____ Non-Priority Organics
_____ Oil and Grease

BIOLOGICAL CAUSES

_____ Pathogens
_____ Problem Species
_____ Species Alteration

PHYSICAL CAUSES

_____ D.O./Oxygen Demand
_____ Siltation/Sediment
_____ Thermal Changes
_____ Water Level/Flow
_____ Restricted Passage
_____ Aesthetics (float, odor, etc)

_____ **OTHER CAUSES** ____

15. Source(s) of Pollutant(s) Select all that apply. Indicate as *known* (K), *suspected* (S), or *possible* (P). **Circle the one primary source type.**

POINT SOURCES

_____ Industrial
_____ Municipal
_____ Private System
_____ Private/Commercial/Institution
_____ Power Generating Facilities
_____Comb Sewer Overflows (CSOs)
_____ Storm Sewer Discharges

NONPOINT SOURCES

_____ Agriculture
_____ Urban Runoff
_____ Failing On-site Septics
_____ Silviculture
_____ Construction
_____ Habitat Modification
_____ Hydrologic Modification
_____ Streambank Erosion
_____ Roadbank Erosion
_____ De-Icing (Storage/Application)
_____ Atmospheric Deposition
_____ Contaminated/Toxic Sediments
_____ Chemical (Petroleum) Leaks/Spills
_____ Landfills/Land Disposal
_____ Resource Extraction(Drilling/Mining)

OTHER SOURCES

_____ Unknown Source
_____ Other Source ____

16. Waterbody Problem Description/Documentation/History/Notes Attach additional pages as necessary.

The narrative description should contain any and all information about the waterbody segment and its water quality problem/impairment including 1) a detailed description of the waterbody and surrounding area, 2) examples/ instances of *specific* water use impairments, 3) details regarding the specific pollutant/source of pollutant and relationship to the impairment, 4) any activities currently underway or planned, and 5) references for specific reports, studies, monitoring data and/or other documentation. (see worksheet instructions for further guidance)

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____ **Next Update:** ______________

17. Waterbody Nominated/Form Completed By:

Name: ____

Affiliation: ____

Address: ____

____

Phone: ____

RESOLUTION/MANAGEMENT INFORMATION Private citizens need not complete.

18. Resolvability Select one

_____ Needs Verification/Study (see *Status of Problem Verification/Study*)
_____ Strategy Exists, Funding/Resources Needed
_____ Strategy Being Implemented
_____ Problem Not Resolvable (technical/economic)
_____ Problem Not Resolvable (natural condition)
_____ Problem Thought to be Abated
_____ Problem Abated, Waterbody Deleted from PWL
_____ No Known Use Impairment

19. Status of Problem Verification/Study Select one

_____ Waterbody Nominated, but Problem Not Verified
_____ Problem Verified/Documented, Cause Unknown
_____ Cause of Problem Identified, Source Unknown
_____ Source of Problem Identified, Management Strategy Needed
_____ Management Strategy has been Developed

20. Lead Agency/Office: __________________________ **21. Resolution Potential** (High, Med, Low): ____________

22. TMDL Note

_____ Problem Identified, But Insufficient Pollutant/Source Data for TMDL Development.

TMDL Development is Unlikely Because:
_____ Problem Appears to be Due Primarily to Natural Condition
_____ Technical and/or Resource Limitations Preclude TMDL Development
_____ Other Control Actions are More Appropriate than TMDL.

TMDL Strategy is/may be Appropriate and Development is:
_____ Being Considered or is Currently Underway
_____ Completed and Strategy is being Implemented
_____ Completed and Strategy has been Implemented

New York State Department of Environmental Conservation
Division of Water

WATERBODY INVENTORY and PRIORITY WATERBODIES LIST WORKSHEET INSTRUCTIONS

Waterbody Location Information

1. Waterbody Name: Full name of waterbody.

2. Waterbody Type: Waterbody type (*River*, *Lake*, *Lake(Reservoir)*, *Estuary*, *Ocean Coastline*, *Great Lake Shoreline*) NOTE: *Freshwater Bay* should be used to designate a portion of a larger river or Great Lake. Saltwater bays and tidal waters should be designated *Estuary*.

3. Water Index Number (WIN): The stream identification number used in the Stream Classification Regulations (Title 6 - Conservation, Vols. B-F of the Official Compilation of Codes, Rules and Regulations for the State of New York). Private citizens need not complete.

4. Drainage Basin and Sub-Basin: One of 17 major hydrologic basins in New York and the associated sub-basin. Private citizens need not complete.

5. Hydrologic (Watershed) Unit Code: Eleven digit code found on USDA-SCS (NRCS) *Hydrologic Watershed Unit Map - 1980 State of New York*. Private citizens need not complete.

6. Flow Category: Minimum Average Seven Consecutive Day Flow-10 year recurrence (MA7CD/10) flow range, from table. Private citizens need not complete.

Category	MA7CD/10 Range
H (for high)	Streams/Rivers over 150 cfs
M (for medium)	Stream/Rivers between 20-150 cfs
L (for Low)	Streams/Rivers under 20 cfs
0	Not Applicable (lake, estuary, shore/coastline)

Note: If not confident in the knowledge of this information, leave blank for NYSDEC Division of Water staff to provide.

7. Affected Length/Area: The estimated length of segment with the noted impairment in miles (rivers), shore/coastal miles (great lakes, ocean) or acres (lakes, reservoirs, estuaries).

8. Describe Waterbody Segment: Narrative description locating the beginning and endpoint (from upstream to downstream) of the segment. Use readily identified physical features, or changes in stream classification (e.g., "From Route 43 bridge downstream to first waterfall in Falls Creek Village"). It may be helpful to attach a copy of (a portion of) a topo map showing the segment.

9. Waterbody Classification: Current classification of the waterbody as specified in the Stream

Classification Regulations (Title 6 - Conservation, Vols. B-F of the Official Compilation of Codes, Rules and Regulations for the State of New York). If a current Compilation is not available for reference, leave blank.

10. County: Primary county of waterbody location.

10a. Additional Counties: If waterbody segment falls in more than one county or forms the county border, indicate the additional counties as well.

11. Region: NYSDEC Region in which the waterbody is located.

12. Quad Map: The name of the primary topographic quadrangle map on which the segment appears. Private citizens need not complete.

12a. Quad Number: The NYSDEC Quad Number for the primary topographic quadrangle map. Private citizens need not complete.

12b. More Quads: Indicate (Y or N) whether the segment falls in more than one topographic quadrangle. It is not necessary to list additional Quads, as additional quad information will not be stored in PWL database. Private citizens need not complete.

Water Quality Problem Information

13. Severity of Problem: For each use appropriate for the classification of the waterbody, indicate the degree of severity of water quality problem/diminished use (i.e., use precluded, impaired, stressed, or threatened), using the following criteria. Note: Documentation of problem severity must be provided in the problem description (item 16).

PRECLUDED (P):
Frequent/persistent water quality, or quantity, conditions and/or associated habitat degradation prevent all aspects of the waterbody use (e.g., the Health Department does not allow swimming at the Onondaga Lake Outlet public park beach -*bathing precluded*; consumption advisory recommends eating no fish from Upper Hudson due to PCB contamination - *fish consumption precluded*; Sacandaga River below the dam is periodically dry and devoid of benthic organisms due to flow extremes from power dam releases - *aquatic life precluded*)

IMPAIRED (I):
Occasional water quality, or quantity, conditions and/or habitat characteristics periodically prevent the use of the waterbody (e.g., beaches in marine waters are closed after storm events due to high coliform levels from CSOs's and stormwater runoff - *public bathing impaired*) or;

Waterbody uses are not precluded, but some aspects of the use are limited or restricted

(e.g., a fish consumption advisory for lake trout from Canandaigua Lake recommends eating no more than one meal per month - *fish consumption impaired*) or;
Waterbody uses are not precluded, but frequent/persistent water quality, or quantity, conditions and/or associated habitat degradation discourage the use of the waterbody (algal blooms and heavily rooted aquatic vegetation deter swimming in Oneida Lake - *public bathing, recreation impaired*) or;

Support of the waterbody use requires additional/advanced measures or treatment (e.g., the City of Rochester is to build a filtration plant due to high turbidity in the Hemlock Lake water supply - *water supply impaired*, aquatic vegetation control--mechanical harvesting, herbicides--are required in Upper Cassadaga Lake to allow swimming and boating - *public bathing, recreation impaired*).

<u>STRESSED (S)</u>:
Waterbody uses are not significantly limited or restricted, but occasional water quality, or quantity, conditions and/or associated habitat degradation periodically discourage the use of the waterbody (e.g., high turbidity that occurs after rain reduces clarity and deters swimmers in Babcock Lake - *public bathing stressed;* ambient water column analyses indicate occasional aquatic standard violations but impaired use not evident - *aquatic life stressed*; localized areas of debris along the shore - *aesthetics stressed).*

<u>THREATENED (T)</u>:
Water quality currently supports waterbody uses and the ecosystem exhibits no obvious signs of stress, however existing or changing land use patterns may result in restricted use or ecosystem disruption (e.g., numerous proposals for residential development in the Schoharie Creek headwaters create a concern - *aquatic life, aesthetics threatened*) or,

Water quality currently supports waterbody uses and the ecosystem exhibits no obvious signs of stress, however monitoring data reveals a declining trend in water quality which, if it continues, would result in a use impairment, or

Waterbody uses are not restricted and no water quality problems exists, but the waterbody is a highly valued resource deemed worthy of special protection and consideration. Note: Such *special protection* situations are the only instances where a threatened use can have a documentation level of *possible*, other threatened waterbodies (i.e., those related to changing land use activities) must correspond to *known* or *suspected* (planned) land use changes.

<u>Problem Documentation</u>: For each diminished/impacted use note the corresponding level of documentation using the following criteria. Provide copies of documentation, where possible.

<u>Known (K)</u>: Water quality monitoring data and/or studies (biologic macro-invertebrate surveys, fishery studies, water column chemistry, beach closures, fish consumption

advisories or shellfishing restrictions) have been completed and conclude that the use of the waterbody is restricted to the degree indicated by the listed *severity*.
Suspected (S): Anecdotal evidence, public perception and/or specific citizen complaints indicate that the use of the waterbody may be restricted. However, water quality data/studies that establish an impairment have not been completed or there is conflicting information.

Possible (P): Land use or other activities in the watershed are such that the use of the waterbody could be affected. However, there is currently very little, if any, documentation of an actual water quality problem.

14. Type of Pollutant: For each pollutant contributing to the water quality problem, indicate if it is a *known*, *suspected*, or *possible* pollutant, using K, S, or P (see definitions above). Circle the one most significant, or primary, pollutant.

15. Source(s) of Pollutant: For each source contributing to the water quality problem, indicate if it is a *known*, *suspected*, or *possible* source, using K, S, or P (see definitions above). Circle the one most significant, or primary, source.

16. Waterbody Problem Description/Documentation/History/Notes: This narrative description should contain any and all information about the waterbody segment and its water quality problem/impairment. This section should include:

    1) a detailed description of the waterbody and surrounding area,
    2) specific examples/instances of water use impairments, e.g., what water supply is affected? how often are beaches closed? what species of fish are restricted for consumption?
    3) details regarding the specific pollutant and source of the impairment, and
    4) references for specific reports, studies, monitoring data and/or other documentation that support the impairment, pollutant and source information.

For some segments, a brief history outlining water quality changes/trends would also be useful information. Also note any activities to address the situation that are currently underway or planned. If there is an expected date of completion for a sampling effort, report, facility or other activity that will affect the segment or provide additional segment information, the date should be noted in the **Next Update** field. The **Next Update** information will help ensure the segment information is kept up-to-date.

In order to keep an accurate historical record of water quality in the segment, new/updated information should for the most part be added to – rather than replace – the existing information. Therefore it is critical that comments include a notation of sources (names, agencies) and the date the information was appended to the PWL record.

Assume that the users of this information know virtually nothing about the issue/situation.

Therefore, report as clearly and specifically as possible, all the information that should be known. This may include political, social and economic considerations. Although such considerations are more subjective and will be reviewed in that light, personal/professional opinions can be helpful. The narrative should also incorporate multiple views/opinions regarding water quality where appropriate.

Examples:

Use Precluded: Do not say "Nutrients prevent bathing." Several such scenarios could exist, only one of which is right. Rather, say:

> *Nutrient runoff from surrounding dairy farm due to improper manure storage causes emergent weed growth in this lake that extends 30 to 40 feet from shore. This makes swimming virtually impossible. (DEC/Reg4, Sep 95)*

Use Impaired: Do not say "City sewer system discharge sometimes causes the Health Department to close the beach." Rather say:

> *Hexville's North Pump Station sometimes fails in the summer, causing an overflow of raw sewage to Dirty Creek. This creek enters Pristine Lake near Nice Town's Beach. County Health Department monitoring (1995-) show excess bacteria for a week or two after these occasional (about 3 per summer) events so the beach is closed much of the 12 week season. (DOH/Co, Aug 96)*

Use Stressed: Do not simply say "Infrequent oil spills bother fishermen." Rather, say:

> *At least once per season, an oily sheen is reported on the river that causes no obvious environmental harm, but discourages fishing downstream when the sheen passes. Some fishermen say they will never return because if there is oil, they wonder what else can be in the water. Occasional minor spills at Ajax Oil Company are considered to be the source of the sheen (DEC/Reg 3-Spills, Oct 95). However, Ajax Oil representatives suggest Slick's Marina in Fishtown could be the source of the problem. (I.M. Fibber, Ajax, June 96)*

Threatened: Do not say "There are developers making all sorts of offers to local landowners." Rather, say:

> *Dinky stream runs through Pretty Valley and developers (Pave-way, TreeWackers Inc, others) have discovered it. So far, three farmers (Kant, Maka, Buck) have sold out; their lots include about 50% of the stream frontage. Several more are under heavy pressure. The local planning board has approved two 49 lot subdivisions already and three are pending. Soils are not fit for septic tanks (DOH/Co) so treatment and discharge to this small stream will be needed. (ext/WQCC, Apr 94)*

17. Waterbody Nominated/Form Completed By: In order to document the source of the information and to allow for follow-up, please provide name and complete affiliation, address and phone information.

Resolution/Management Information

The information in this section (items 18 thru 22) is to be completed by NYSDEC staff.

18. Resolvability: Note with an "X" the one most appropriate *resolvability* class for the segment from the list below.

    1. Needs Verification/Study (see *Status*): The confirmation of a use impairment, the evaluation of possible solutions and/or the development of management action (tailored specifically to the segment) need to be completed. See also *Status of Problem Verification/Study*.

    2. Strategy Exists, Funding/Resources Needed: Study of the problem is complete, but funding or other resources are needed to implement the management strategy.

    3. Strategy Being Implemented: The recommended strategy for the remediation of the segment is currently underway.

    4. Problem Not Resolvable (technical/economic limitations): Technical, legal, social, or political concerns preclude resolution of the impairment for the foreseeable future (e.g., low pH in lakes due to acid rain).

    5. Problem Not Resolvable (natural condition): Limitations to use of a waterbody is attributed to naturally occurring characteristics of the water/watershed (e.g., high sediment load in the Genesee River).

    6. Problem Thought to be Abated, Needs Verification: The prime cause of the use impairment to the waterbody has been brought under control but the expected improvement to the waterbody needs to be confirmed.

    7. Problem Abated, Waterbody Deleted: The waterbody use has been restored and the segment has been marked as *deleted*. Although deleted and not included in the list, the segment and information will remain in the PWL database.

    8. No Known Use Impairment: Monitoring data indicate that the waterbody supports all uses appropriate to its classification. This category will allow the WI/PWL to track "good" waters, as well as "bad" waters.

19. Status of Problem Verification/Study: Note with an "X" the one most appropriate *status* class for the segment from the list below.

    1. Waterbody Nominated, but Problem Not Verified: It has been suggested that a waterbody use impairment exists for the segment, however there is insufficient (or no) available information to confirm that the use is being affected to the degree indicated.

    2. Problem Verified/Documented, Cause Unknown: The waterbody use impairment

(and severity) is sufficiently documented, however identification of the cause (pollutant) requires more study.

3. Cause of Problem Identified, Source Unknown: The specific pollutant(s) causing the use impairment has been sufficiently documented, however the source of the pollutant requires more study.

4. Source of Problem Identified, Management Strategy Needed: Most details about the problem (use impairment, cause, source) are known/sufficiently documented. A management strategy to address the situation and restore the designated use of the waterbody needs to be developed.

5. Management Strategy has been Developed: Necessary study of the situation is complete.

20. Lead Agency/Office: Indicate the primary party, either within DEC (division and bureau or office) or outside/external to DEC, responsible for the next steps in the study/strategy implementation concerning the segment. (e.g., DOW/BWAR, DOW/Reg6, DEC/FWMR, DOH/PWS, ext/WQCC, ext/SWCD, etc.)

21. Resolution Potential: Indicate as *High*, *Medium*, or *Low*, using the following criteria.

High: The waterbody or water quality issue has been deemed to be worthy of the expenditure of available resources (time and dollar) because of the level of public interest and the expectation that the commitment of these resources will result in either a measurable improvement in the situation or additional information necessary for the management of the water resource.

Medium: The resources necessary to address the problem are beyond what are *currently* available. With additional resources, these segments could become High *resolution potential* segments.

Low: Segments with water quality problems so persistent/intractable that improvements are expected to require an unrealistically high commitment of resources, not likely to become available (e.g., acid rain lakes).

NOTE: This field may be left blank if further verification/study of the impairment, pollutant and/or source is necessary to determine the *Resolution Potential* of the segment.

22. Total Maximum Daily Load (TMDL) Note: Note with an "X" the most appropriate *TMDL* note (or notes) for the segment from the list below.

1. Problem Identified, But Insufficient Pollutant/Source Data for TMDL Development.
2. TMDL Development is Unlikely Because:
   a) Problem appears to be primarily due to natural conditions;
   b) Technical and/or resource limitations preclude development;
   c) Other control actions are more appropriate than TMDL.
3. TMDL Strategy is or may be Appropriate and Development is:
   a) Being considered or is currently underway;
   b) Completed and strategy is being implemented;
   c) Completed and strategy has been implemented.

Appendix C
New York State Water Quality Classifications

Fresh Surface Waters

Class N fresh surface waters.

(a) The best usages of Class N waters are the enjoyment of water in its natural condition and, where compatible, as a source of water for drinking or culinary purposes, bathing, fishing, fish propagation, and recreation.

(b) There shall be no discharge of sewage, industrial wastes, or other wastes, waste effluents or any sewage effluents not having had filtration resulting from at least 200 feet of lateral travel through unconsolidated earth. A greater distance may be required if inspection shows that, due to peculiar geologic conditions, this distance is inadequate to protect the water from pollution.

(c) These waters shall contain no deleterious substances, hydrocarbons or substances that would contribute to eutrophication, nor shall they receive surface runoff containing any such substance.

Class AA-Special (AA-S) fresh surface waters.

(a) The best usages of Class AA-S waters are: a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The waters shall be suitable for fish propagation and survival.

(b) These waters shall contain no floating solids, settleable solids, oil, sludge deposits, toxic wastes, deleterious substances, colored or other wastes or heated liquids attributable to sewage, industrial wastes or other wastes.

(c) There shall be no discharge or disposal of sewage, industrial wastes or other wastes into these waters.

(d) These waters shall contain no phosphorus and nitrogen in amounts that will result in growths of algae, weeds and slimes that will impair the waters for their best usages.

Class A-Special (A-S) fresh surface waters.

(a) The best usages of Class A-S waters are: a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The waters shall be suitable for fish propagation and survival.

(b) This classification may be given to those international boundary waters that, if subjected to approved treatment, equal to coagulation, sedimentation, filtration and disinfection with additional treatment, if necessary, to reduce naturally present impurities, meet or will meet New York State Department of Health drinking water standards and are or will be considered safe and satisfactory for drinking water purposes.

Class AA fresh surface waters.

See also *Water Quality Regulations: Surface Water and Groundwater Classifications and Standards*, 6NYCRR Parts 700-706, effective August 4, 1999, NYSDEC, Albany, New York.

(a) The best usages of Class AA waters are: a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The waters shall be suitable for fish propagation and survival.

(b) This classification may be given to those waters that, if subjected to approved disinfection treatment, with additional treatment if necessary to remove naturally present impurities, meet or will meet New York State Department of Health drinking water standards and are or will be considered safe and satisfactory for drinking water purposes.

Class A fresh surface waters.

(a) The best usages of Class A waters are: a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The waters shall be suitable for fish propagation and survival.

(b) This classification may be given to those waters that, if subjected to approved treatment equal to coagulation, sedimentation, filtration and disinfection, with additional treatment if necessary to reduce naturally present impurities, meet or will meet New York State Department of Health drinking water standards and are or will be considered safe and satisfactory for drinking water purposes.

Class B fresh surface waters.

The best usages of Class B waters are primary and secondary contact recreation and fishing. These waters shall be suitable for fish propagation and survival.

Class C fresh surface waters.

The best usage of Class C waters is fishing. These waters shall be suitable for fish propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.

Class D fresh surface waters.

The best usage of Class D waters is fishing. Due to such natural conditions as intermittency of flow, water conditions not conducive to propagation of game fishery, or stream bed conditions, the waters will not support fish propagation. These waters shall be suitable for fish survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.

Saline (Marine) Surface Waters

Class SA saline surface waters.

The best usages of Class SA waters are shellfishing for market purposes, primary and secondary contact recreation and fishing. These waters shall be suitable for fish propagation and survival.

Class SB saline surface waters.

The best usages of Class SB waters are primary and secondary contact recreation and fishing. These waters shall be suitable for fish propagation and survival.

Class SC saline surface waters.

The best usage of Class SC waters is fishing. These waters shall be suitable for fish propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.

Class I saline surface waters.
The best usages of Class I waters are secondary contact recreation and fishing. These waters shall be suitable for fish propagation and survival.

Class SD saline surface waters.
The best usage of Class SD waters is fishing. These waters shall be suitable for fish survival. This classification may be given to those waters that, because of natural or man-made conditions, cannot meet the requirements for primary and secondary contact recreation and fish propagation.

Groundwaters

Class GA fresh groundwaters.
The best usage of Class GA waters is as a source of potable water supply. Class GA waters are fresh groundwaters.

Class GSA saline groundwaters.
The best usages of Class GSA waters are as a source of potable mineral waters, or conversion to fresh potable waters, or as raw material for the manufacture of sodium chloride or its derivatives or similar products. Class GSA waters are saline groundwaters.

Class GSB saline groundwaters.
The best usage of Class GSB waters is as a receiving water for disposal of wastes. Class GSB waters are saline groundwaters that have a chloride concentration in excess of 1,000 milligrams per liter or a total dissolved solids concentration in excess of 2,000 milligrams per liter.

Assignment of groundwater classifications.
(a) The groundwater classifications defined above are assigned to all the groundwaters of New York State.
(b) The Class GSB shall not be assigned to any groundwaters of the state, unless the commissioner finds that adjacent and tributary groundwaters and the best usages thereof will not be impaired by such classification.

Appendix D

Volunteer River Monitoring Program

New York City Watershed/HBRW Volunteer Monitoring Pilot Project *

Background

NYSDEC Division of Water was awarded a $75,000 grant through the New York City Watershed/Safe Drinking Water Act to support development and implementation of a statewide volunteer monitoring program for tributary streams. The program would be developed and piloted in the New York City Watershed. Activities would include designing protocols, identification of interested volunteer groups in the watershed, and the arrangement (through contract) of training sessions for volunteers.

Because of the strong public support for a statewide volunteer monitoring program, NYS DEC envisioned that the coordinator of such a program be a NYS DEC Division of Water employee. However, the division was unable to identify or secure a person with available time to take on this assignment.

Because of these staff limitations, the division proposed a revised course of action. NYS DEC would contract with *Hudson Basin River Watch* (HBRW) to complete the development (with DEC-DOW input) of volunteer monitoring protocols; and designate a NYC Watershed Volunteer Coordinator to identify appropriate volunteer monitoring groups in (a portion of) the NYC Watershed and oversee the application and implementation of these protocols in the Watershed.

The stated mission of the HBRW is the improvement of water quality of all Hudson Basin streams through education, community involvement and stewardship. The Department has already entered into a contract with HBRW in support of this mission. This contract addendum modifies the original agreement to provide an additional $35,000 to allow for a more detailed volunteer monitoring pilot program that would focus on the New York City Watershed portion of the Hudson Basin.

Related Work

Concurrent with this effort, NYS DEC has proposed to conduct an independent review and evaluation of the quality of the volunteer monitoring data produced by the pilot program and assess its usefulness in supporting Watershed (and ultimately, statewide) monitoring goals and objectives.

Overall Goal

This project will result in the establishment of a volunteer monitoring network in a portion of the New York City Watershed. Other components of the project allow for the refinement and evaluation of the pilot volunteer monitoring program. If successful, the pilot could be expanded to other portions of the NYC Watershed, other areas of the state, and perhaps become a statewide program.

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* This is the Scope of Work for a contract with Hudson Basin RiverWatch to pilot a volunteer monitoring project in the Lower Hudson River portion of the New York City Watershed. The pilot began in January 2000.

Objectives/Tasks

1. Develop Guidance Document HBRW, with assistance from RiverWatch Network and in consultation with NYS DEC and NYC DEP, will complete a Guidance Document outlining study design concepts, multiple levels (3 tiers) of volunteer monitoring (across a wide spectrum of interest and capability), and appropriate quality assurance (QA) components. At the lower end of the spectrum, the primary objectives of the program would emphasize education; at the upper end, the program will include QA components sufficient for the data to be used by NYC DEP, NYS DEC, and others to assess water quality and upon which to base management decisions.
2. Identify Volunteer Groups HBRW will identify three to five volunteer groups within the Watershed (ideally, each with different levels of expertise/experience) with whom the protocols could be tested.
3. Secure Equipment HBRW will assist groups with securing necessary equipment.
4. Conduct Training Sessions HBRW will provide four (4) training sessions for the identified volunteer monitoring groups, in the areas of *Study Design*, *Quality Assurance Plans*, *Water Quality Sampling Methods*, and *Data Analysis*. Additionally, HBRW/NYC Watershed coordinators will assist volunteer monitoring groups in the field and lab, and with incorporation of their efforts into the larger HBRW Network through a *Watershed Symposium.*
5. Program Evaluation and Revision of Guidance Document HBRW will assist the independent investigator with the evaluation of issues/problems encountered by the pilot groups during implementation of the monitoring program and by regulatory agencies in using the program results/data and propose/evaluate possible resolutions to problems encountered. HBRW will revise the Guidance Document accordingly.

Key Personnel

Doug Reed, Hudson Basin River Watch,
Program Coordinator

Martha Cheo, Hudson Basin River Watch,
New York City Watershed Coordinator - Catskills Region

Natara Feller, Hudson Basin River Watch,
New York City Watershed Coordinator - Westchester Region

Jeff Myers, NYS - Environmental Conservation,
NYS DEC Monitoring and Assessment Coordinator

TBA, New York City - Environmental Protection
NYC DEP Monitoring and Assesment Coordinator

Outline for Volunteer River and Stream Monitoring Program

Goal

to provide a monitoring framework that channels volunteer activities toward producing information useful for NYSDEC program management.

What Is Involved or, so you want to be a part of the NYSDEC *WaterWatch* Network...

Step 1: Training

- o Initial/introductory training (required for program coordinators and open to all) conducted by RiverWatch Network will focus on an overview of water quality monitoring and study design, more detailed introductions to streamwalk, biological and chemical monitoring approaches, and specifics about NYSDEC water quality monitoring programs (RIBS, PWL) and requirements of the volunteer monitoring program (and QAP).
- o DEC-DOW will sponsor training sessions at a minimum of 4 locations (downstate, Capital Region, central, and western) annually.
- o DEC-DOW and RiverWatch to host annual conference for program coordinators to share results and discuss monitoring topics of interest.
- o RiverWatch Network has other training modules available.

Step 2: Planning

- o Discuss with DEC-DOW the waters to be monitored.
- o Determine level of monitoring, i.e. tier (see below)
- o Secure equipment (DEC-DOW will provide list of necessary equipment)
  - - equipment loan programs (possible)
  - - includes appropriate manuals/reference materials
- o Complete/submit the program QAP to DEC-DOW ("registration").
- o Develop plan for managing data.
- o Prepare monitoring schedule and paperwork, supplies, etc.

Step 3: Monitoring

- o Conduct monitoring according to QAP.
- o Conduct associated QA/QC monitoring and activities.
- o Perform necessary data management activities.

Step 4: Reporting

- o Distribute assessment sheets/data to DEC-DOW and watershed partners.
- o Participate in WQCC activities and PWL/305(b) Update Process.

DEC-DOW *WaterWatch* Coordinator

It would be nice to have a DEC-DOW staff person available to assist groups with "registering," completing QAP, answering (infrequent) questions, coordinating training and annual conference, distributing materials, receiving data/reports, etc.

Monitoring Framework

Volunteer monitoring options fall into one of three levels:

Preliminary Waterbody/Watershed Assessment (Tier I)

This assessment is an observational *streamwalk* where land use impacts, water resources uses, and other visual characteristics are recorded.

Purpose: to gain familiarity with the waterbody/watershed; to identify existing water uses (recreational, other) and to determine the need for additional monitoring.

Waterbody/Watershed Screening and Use Assessment (Tier II)

This assessment uses the collection of primarily qualitative data to determine general water quality and evaluate if specific water uses are impaired. There are two (2) program levels: a *Basic* program uses on-site/field sampling techniques (macro sampling, Secchi disk, Hach kits, field probes, etc.) and evaluation; an *Intensive* program uses certified lab analyses and includes a QA/QC component.

Purpose: to provide initial assessment of water quality and identify non-impacted waters; and to determine appropriate sampling sites for further monitoring.

Waterbody/Watershed Pollutant/Source Assessment (Tier III)

This assessment uses more quantitative chemical monitoring and analyses to establish specific pollutant levels/loadings to a waterbody and may attempt to identify sources. There are two (2) program levels: a *Basic* program uses on-site/field sampling techniques and evaluation; an *Intensive* program uses certified lab analyses and includes a QA/QC component.

Purposes: 1) to record and track water quality trends, 2) to evaluate effectiveness of improvement efforts, and 3) to identify causes and sources of water use impairments.

Specific Outputs

- Completed assessment field reports (appropriate to monitoring level)
- Raw data (*Intensive* efforts)
- Comprehensive Water Quality Summaries (annual)

Information Uses

- Incorporation of monitoring information/data into NYSDEC Priority Waterbodies List (PWL) and 305(b) efforts, with level of documentation reflecting the level of monitoring program.
- Storage of water quality data in the USEPA national water quality database (*Intensive* programs only).

Scope

Program to be piloted with the HBRW, but eventually expanded to entire state. The rate of expansion depends on DEC-DOW commitment and level of volunteer interest.

Appendix E

1998 New York State Section 303(d) List

This appendix contains the 1998 New York State Section 303(d) List of waters for which required technology-based pollution controls are not sufficiently stringent to attain or maintain compliance with applicable water quality standards.

The specific waterbodies contained in the 303(d) List have been assigned to one of six categories. These waterbody categories are outlined below.

A.Waters Designated as Priority for TMDL Development (over the next 2 years)
B.Waterbodies Impacted by Atmospheric Deposition
C.Waterbodies with Fish Consumption Advisories
D.Waterbodies Closed to Shellfish Harvesting
E.Waterbodies with Documented Exceedences of Water Quality Standards
F.Waterbodies with Problems Requiring Verification

Modifications to Section 303(d) Listing and TMDLs
The USEPA recently issued a final rule to significantly revise the Section 303(d) Water Quality Planning and Management Regulation and Total Maximum Daily Load (TMDL) Regulations. The new rule expands the scope of previous 303(d) Lists to include waters impaired by nonpoint as well as point sources, and requires more detailed implementation plans for the restoration of these waters.

NYS DEC has followed the development of the new rule very closely, paying particular attention to the likely impacts of the changes on current monitoring, assessment and management programs. Because of its call to provide a comprehensive listing of polluted and impaired waters, the new rule will have several impacts on future Section 305(b) reporting; a fact recognized by USEPA in their recent call for the development of a Consolidated Assessment and Listing Methodology. The development of this methodology is designed to integrate, enhance and streamline the water quality reporting requirements in both Sections 305(b) and 303(d).

As the implementation of these modifications to the 303(d) and TMDL process move forward, and their impacts on 305(b) reporting become more clear, NYS DEC will work with USEPA to identify and secure the additional resources needed to successfully implement this program expansion and see that the new rules achieve, in practice, their intended goals.

A separate table outlining the waterbody segments in each of these categories has been compiled. Taken together, these tables comprise the 1998 303(d) List.

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
DRAINAGE BASIN: Oswego-Seneca-Oneida											
GEDDES BROOK	0702-0007	River	Onondaga	0.5	Mi.	C	Fish Propaga	Precluded	Ammonia	Runoff	A.5
HARBOR BROOK	0702-0002	River	Onondaga	1.5	Mi.	B,C	Fish Propaga	Precluded	Nutrients	CSO's	A.5
LEY CREEK & TRIBS	0702-0001	River	Onondaga	3.0	Mi.	B	Fish Propaga	Precluded	Nutrients	CSO's	A.5
NINEMILE CREEK	0702-0005	River	Onondaga	1.0	Mi.	C	Fish Propaga	Precluded	Nutrients	Runoff	A.5
ONONDAGA CREEK	0702-0004	River	Onondaga	17.0	Mi.	B,C(T)	Fish Propaga	Precluded	Nutrients	CSO's, Agriculture	A.5
ONONDAGA L.& OUT.	0702-0003	Lake	Onondaga	2944.0	A	B	Bathing	Precluded	Nutrients	CSO's, Munincipal, Urb.Runoff, Agriculture	A.5,C
SENECA RIVER	0701-0001	River	Onondaga	15.6	Mi.	B	Fish Propaga	Impaired	Oxygen Demand	ZebraMussels, Stratification	A.5
DRAINAGE BASIN: Lake Champlain											
LAKE CHAMPLAIN		Lake	multiple	96640.0	A	A	(Phosphorus loadings are focus of management plan)				A.4,C
DRAINAGE BASIN: Mohawk River											
SCHOHARIE RESERVR	1202-0012	Lake(R)	Schoharie	1146.0	A	AA(TS)	Water Supply	Threatened	Silt, Phosphorus	Streambank Erosion, Municipal	A.3
DRAINAGE BASIN: Lower Hudson River											
AMAWALK RESERVOIR	1302-0044	Lake(R)	Westchester	608.0	A	A	Water Supply	Stressed	Phosphorus	Urban Runoff	A.3
ASHOKAN RESERVOIR	1307-0004	Lake(R)	Ulster	7923.0	A	AA(T)	Water Supply	Threatened	Phosphorus	Urban Runoff	A.3
BOG BROOK RESERV.	1302-0041	Lake(R)	Putnam	390.0	A	AA	Water Supply	Threatened	Phosphorus	Urban Runoff	A.3
BOYD'S CORNERS	1302-0045	Lake(R)	Putnam	214.0	A	AA	Water Supply	Threatened	Phosphorus	Urban Runoff	A.3
CROSS RIVER RESER	1302-0005	Lake(R)	Westchester	943.0	A	A(T)	Water Supply	Threatened	Phosphorus	Urban Runoff	A.3

TMDL/303(d) Notes:

A.x - Waterbodies designated as ***priority*** for TMDL Development over the next two (2) years. Suffix indicates the specific priority watershed: (1) New York Harbor, (2) Long Island Sound, (3) New York City Water Supply Watershed, (4) Lake Champlain, (5) Onondaga Lake.

C - Waterbodies with NYS-DOH advisories limiting consumption of fish. These waterbodies are also listed on **Table C - *Waterbodies with Fish Consumption Advisories.***

D - Waterbodies designated for, but closed to, shellfish harvesting. These waterbodies are also listed on **Table D - *Waterbodies Closed to Shellfish.***

Segment Name	Segment ID	Segment Type	County	Segment Size	Class	Use Affected	Severity	Pollutant	Source	TMDL Note
DRAINAGE BASIN: Lower Hudson River (con't)										
CROTON FALLS RES	1302-0026	Lake(R)	Putnam	1024.0 A	A/AA(T)	Water Supply	Stressed	Phosphorus	Municipal	A.3
DIVERTING RESERVR	1302-0046	Lake(R)	Putnam	518.0 A	AA	Water Supply	Stressed	Phosphorus	Urban Runoff	A.3
EAST BRANCH RES.	1302-0040	Lake(R)	Putnam	512.0 A	AA	Water Supply	Stressed	Phosphorus	Urban Runoff	A.3
ESOPUS CREEK	1307-0002	River	Ulster	15.0 Mi.	A(T)	Water Supply	Stressed	Silt (Sediment)	Streambank Erosion	A.3
HUDSON RIVER	1301-0005	Estuary	Bronx	1600.0 A	SB	Bathing	Precluded	Pathogens	CSO's	A.1,C
LAKE CARMEL	1302-0006	Lake	Putnam	200.0 A	B	Bathing	Stressed	Phosphorus	On-site Systems	A.3
LAKE GILEAD	1302-0024	Lake(R)	Putnam	109.0 A	A(T)	Water Supply	Stressed	Phosphorus	Urban Runoff	A.3
LAKE KITCHAWAN	1302-0002	Lake	Westchester	36.0 A	B	Bathing	Stressed	Phosphorus	On-site Systems	A.3
LAKE MAHOPAC	1302-0007	Lake	Putnam	560.0 A	A	Bathing	Stressed	Phosphorus	On-site Systems	A.3
MIDDLE BRANCH RES	1302-0009	Lake(R)	Putnam	400.0 A	A	Water Supply	Stresed	Phosphorus	Urban Runoff	A.3
MUSCOOT RESERVOIR	1302-0042	Lake(R)	Westchester	1011.0 A	A	Water Supply	Stressed	Phosphorus	Urban Runoff	A.3
NEW CROTON RESER	1302-0010	Lake(R)	Westchester	2182.0 A	A/AA	Water Supply	Impaired	Phosphorus	Urban Runoff	A.3
PEACH LAKE	1302-0016	Lake	Putnam	125.0 A	B	Bathing	Impaired	Phosphorus	On-site Systems	A.3
RONDOUT RESERVOIR	1306-0003	Lake(R)	Ulster	525.0 A	AA	Water Supply	Threatened	Phosphorus	Urban Runoff	A.3
TITICUS RESERVOIR	1302-0035	Lake(R)	Westchester	72.0 A	AA	Water Supply	Threatened	Phosphorus	Urban Runoff	A.3
TITICUS RIVER	1302-0034	River	Westchester	3.0 Mi.	A	Water Supply	Stressed	Phosphorus	Agric,Urb.Runoff	A.3
WEST BRANCH RES.	1302-0022	Lake(R)	Putnam	1040.0 A	AA	Water Supply	Threatened	Phosphorus	Urban Runoff	A.3
DRAINAGE BASIN: Delaware River										
CANNONSVILLE RES.	1404-0001	Lake(R)	Delaware	4856.0 A	AA(T)	Water Supply	Impaired	Phosphorus	Agriculture	A.3
NEVERSINK RES	1402-0009	Lake(R)	Sullivan	1472.0 A	AA(T)	Water Supply	Threatened	Phosphorus	Urban Runoff	A.3
PEPACTON RESERVR	1403-0002	Lake(R)	Delaware	5696.0 A	AA(T)	Water Supply	Threatened	Pathogens, Phosphorus	On-site Systems, Streambank Erosion	A.3
UP.W.BR.DELAWARE	1404-0003	River	Delaware	23.0 Mi.	C(T)	Fish Propaga	Stressed	Phosphorus	Municipal, Agriculture	A.3
DRAINAGE BASIN: Atlantic-Long Island Sound										
ALLEY CREEK	1702-0009	Estuary	Queens	58.0 A	I>SC	Fish Propaga	Impaired	Floatables	CSO's	A.1
ARTHUR KILL/ KILL VAN KULL	1701-0010	Estuary	Richmond	2300.0 A	SD/I	Fish Survival	Impaired	Oxygen Demand	Municipal, CSO's	A.1
BERGEN BASIN	1701-0009	Estuary	Queens	72.0 A	I	Fish Propaga	Impaired	Oxygen Demand	CSO's	A.1

DRAINAGE BASIN: Atlantic-Long Island Sound (con't)

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
BRONX RIVER	1702-0006	River	Bronx	8.0	Mi.	B/I	Bathing	Impaired	Pathogens	CSO's	A.1
CONEY ISLAND CR.	1701-0008	Estuary	Kings	38.0	A	I	Fish Propaga	Precluded	Oxygen Demand	CSO's	A.1
EAST RIVER -LOWER	1702-0011	Estuary	New York	3520.0	A	I	Fish Propaga	Impaired	Oxygen Demand	CSO's	A.1,C
EAST RIVER-UPPER1	1702-0010	Estuary	Queens	3200.0	A	I	Fish Propaga	Impaired	Oxygen Demand	CSO's	A.1,C
EAST RIVER-UPPER2	1702-0032	Estuary	Queens	1280.0	A	SB	Bathing	Impaired	Pathogens	CSO's	A.1,C
EASTCHESTER BAY	1702-0007	Bay	Bronx	3.0	A	SB	Bathing	Impaired	Pathogens	CSO's	A.1
FLUSHING CR./BAY	1702-0005	Estuary	Queens	2048.0	A	I	Fish Propaga	Impaired	Oxygen Demand	CSO's	A.1
FRESH KILLS	1701-0012	Estuary	Richmond	144.0	A	SC	Fish Propaga	Precluded	Floatables	Land Disposal	A.1
GOWANUS CANAL	1701-0011	Estuary	Kings	128.0	A	SD	Fish Survival	Precluded	Oxygen Demand	CSO's	A.1
HARLEM RIVER	1702-0004	Estuary	New York	360.0	A	I	Fish Propaga	Impaired	Pathogens, Floatables	CSO's	A.1,C
HENDRIX CREEK	1701-0006	Estuary	Kings	72.0	A	I	Fish Propaga	Impaired	Pathogens	CSO's	A.1
HUTCHINSON RIVER	1702-0003	Estuary	Bronx	160.0	A	SB	Fish Propaga	Precluded	Pathogens	CSO's	A.1
JAMAICA BAY	1701-0005	Bay	Kings	12235.0	A	SB	Bathing	Precluded	Pathogens	CSO's	A.1
KENSICO RESERVOIR	1702-0059	Lake(R)	Westchester	177.0	A	A	Water Supply	Threatened	Nutrients	Urban Runoff	A.3
LITTLE NECK BAY	1702-0029	Bay	Queens	1600.0	A	SB	Bathing	Precluded	Pathogens	CSO's	A.1
LONG IS.SOUND NYC	1702-0027	Estuary	Bronx	11960.0	A	SB	Shellfishing	Precluded	Pathogens	CSO's	A.2,D
LOWER NY BAY (N)	1701-0004	Bay	Richmond	31400.0	A	SB	Bathing	Impaired	Pathogens	CSO's	A.1,C
MILL BASIN	1701-0178	Estuary	Kings	186.0	A	SB	Bathing	Impaired	Oxygen Demand	Storm Sewers	A.1
NEWTOWN CREEK	1702-0002	Estuary	Queens	154.0	A	SD	Fish Survival	Precluded	Oxygen Demand	CSO's	A.1
PAERDEGAT BASIN	1701-0003	Bay	Kings	68.0	A	I	Fish Propaga	Precluded	Oxygen Demand	CSO's	A.1
SHELLBANK BASIN	1701-0001	Estuary	Queens	24.0	A	I	Fish Propaga	Precluded	Oxygen Demand	CSO's	A.1
WESTCHESTER CREEK	1702-0012	Estuary	Bronx	128.0	A	I	Fish Propaga	Impaired	Sludge/Sediment	CSO's	A.1

DRAINAGE BASIN: Black River

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
BALSAM LAKE	0801-0034	Lake	Herkimer	19.0	A	C(T)	Fishing	Precluded	pH	Acid Rain	B
BARNES LAKE	0801-0134	Lake	Lewis	7.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
BEAR POND	0801-0029	Lake	Hamilton	27.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
BEAR POND	0801-0105	Lake	Herkimer	2.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
BILL'S POND	0801-0128	Lake	Lewis	18.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
BLACK FOOT POND	0801-0064	Lake	Herkimer	9.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
BLOODSUCKER POND	0801-0135	Lake	Herkimer	12.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
BLUE POND	0801-0151	Lake	Hamilton	3.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
BROOK TROUT LAKE	0801-0009	Lake	Hamilton	71.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
BURP LAKE	0801-0139	Lake	Herkimer	11.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
CAT POND	0801-0036	Lake	Herkimer	15.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
CELLAR POND	0801-0001	Lake	Hamilton	6.0	A	C(T)	Fishing	Precluded	pH	Acid Rain	B
CORK POND	0801-0119	Lake	Lewis	3.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
COTTON LAKE	0801-0138	Lake	Herkimer	3.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
CROPSEY POND	0801-0039	Lake	Herkimer	6.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
DEEP LAKE	0801-0010	Lake	Hamilton	29.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
DEER POND	0801-0148	Lake	Hamilton	22.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
DISMAL POND	0801-0065	Lake	Herkimer	53.0	A	D	Fish Propaga	Precluded	pH	Acid Rain	B
DOE POND	0801-0161	Lake	Herkimer	3.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
DUCK POND	0801-0040	Lake	Herkimer	13.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
EAGLES NEST LAKE	0801-0011	Lake	Hamilton	12.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
EAST POND	0801-0041	Lake	Herkimer	13.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
EAST POND	0801-0066	Lake	Herkimer	26.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
EVERGREEN LAKE	0801-0110	Lake	Herkimer	45.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
FIFTH CREEK POND	0801-0042	Lake	Herkimer	26.0	A	FP	Fish Survival	Precluded	pH	Acid Rain	B
FLORENCE POND	0801-0067	Lake	Lewis	4.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
FLY POND WEST	0801-0149	Lake	Hamilton	3.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B

TMDL/303(d) Notes:

B - Waterbodies with fish survival/propagation impairments due to low pH from atmospheric deposition (acid rain).

DRAINAGE BASIN: Black River (con't)

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
GINGER POND	0801-0126	Lake	Herkimer	15.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
GOOSE POND	0801-0099	Lake	Lewis	7.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
GOOSENECK LAKE	0801-0043	Lake	Herkimer	6.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
GULL LAKE SOUTH	0801-0013	Lake	Hamilton	27.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
HAWK POND	0801-0044	Lake	Herkimer	45.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
HIDDEN LAKE	0801-0114	Lake	Herkimer	18.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
HIGBY TWINS E. PD	0801-0068	Lake	Herkimer	16.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
HIGBY TWINS W. PD	0801-0069	Lake	Herkimer	13.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
IKEIS POND	0801-0101	Lake	Herkimer	8.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
INDEPENDENCE RIV.	0801-0037	River	Herkimer	20.0	Mi.	C	Fishing	Precluded	pH	Acid Rain	B
INDIAN LAKE	0801-0002	Lake	Hamilton	90.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
JIMMY POND	0801-0014	Lake	Hamilton	4.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
JOCK POND	0801-0045	Lake	Herkimer	6.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
LILY LAKE	0801-0070	Lake	Herkimer	19.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
LITTLE DEER LAKE	0801-0071	Lake	Herkimer	5.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
LITTLE DIAMOND P.	0801-0153	Lake	Hamilton	14.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
LITTLE SALMON LK.	0801-0140	Lake	Herkimer	32.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
LOON HOLLOW POND	0801-0047	Lake	Herkimer	19.0	A	C(T)	Fishing	Precluded	pH	Acid Rain	B
LOST LAKE	0801-0072	Lake	Lewis	6.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
LOWER LILYPAD PD.	0801-0048	Lake	Herkimer	20.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
LOWER MOSHIER PD.	0801-0049	Lake	Herkimer	26.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
LOWER SISTER LAKE	0801-0004	Lake	Hamilton	83.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
LYON LAKE	0801-0109	Lake	Herkimer	80.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
MACCABE POND	0801-0102	Lake	Lewis	3.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
MAHAN POND	0801-0073	Lake	Lewis	3.0	A	C	Fish Propaga	Precluded	pH	Acid Rain	B
MERRIAM LAKE	0801-0050	Lake	Herkimer	19.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
MIKES POND	0801-0120	Lake	Lewis	2.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
MIRROR POND	0801-0146	Lake	Jefferson	1.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
MONUMENT LAKE	0801-0051	Lake	Herkimer	13.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
MOUNTAIN LAKE	0801-0052	Lake	Herkimer	13.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
MUD POND	0801-0074	Lake	Herkimer	3.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B

DRAINAGE BASIN: Black River (con't)

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
MUSKRAT POND	0801-0015	Lake	Hamilton	6.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
NORTH GULL LAKE	0801-0005	Lake	Hamilton	26.0	A	C	Fish Propaga	Precluded	pH	Acid Rain	B
NORTHRUP LAKE	0801-0160	Lake	Hamilton	12.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
OSWEGO POND	0801-0053	Lake	Herkimer	6.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
OTTER POND	0801-0016	Lake	Hamilton	11.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
PANTHER POND	0801-0075	Lake	Lewis	13.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
PEAKED MTN. LAKE	0801-0111	Lake	Herkimer	37.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
PEPPERBOX POND	0801-0076	Lake	Herkimer	25.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
PIGEON LAKE	0801-0017	Lake	Hamilton	45.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
POCKET POND	0801-0077	Lake	Herkimer	5.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
POPLAR POND	0801-0078	Lake	Herkimer	3.0	A	C	Fish Propaga	Precluded	pH	Acid Rain	B
PUG HOLE POND	0801-0033	Lake	Hamilton	12.0	A	?	Fish Survival	Precluded	pH	Acid Rain	B
RAVEN LAKE	0801-0107	Lake	Herkimer	115.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
RUSSIAN LAKE	0801-0006	Lake	Hamilton	26.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
SADIE POND	0801-0144	Lake	Jefferson	1.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
SALMON LAKE	0801-0054	Lake	Herkimer	102.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
SAND POND	0801-0055	Lake	Lewis	77.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
SILVER DOLLAR PD.	0801-0079	Lake	Herkimer	2.0	A	AA	Fish Propaga	Precluded	pH	Acid Rain	B
SILVER LAKE	0801-0150	Lake	Hamilton	52.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
SLIM POND	0801-0125	Lake	Herkimer	16.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
SLY POND	0801-0007	Lake	Hamilton	26.0	A	C	Fishing	Precluded	pH	Acid Rain	B
SNYDER LAKE	0801-0080	Lake	Herkimer	18.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
SODA POND	0801-0113	Lake	Herkimer	22.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
SOFT MAPLE DAM PD	0801-0056	Lake	Lewis	96.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
SOUTH POND	0801-0057	Lake	Herkimer	25.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
SOUTH POND	0801-0157	Lake	Hamilton	47.0	A	C(T)	Fish Survival	Impaired	pH	Acid Rain	B
SPECTACLE PD. EA.	0801-0081	Lake	Lewis	2.0	A	C	Fish Propaga	Precluded	pH	Acid Rain	B
SPECTACLE PD. W.	0801-0082	Lake	Lewis	2.0	A	C	Fish Propaga	Precluded	pH	Acid Rain	B
SQUASH POND	0801-0155	Lake	Hamilton	8.0	A	AA	Fish Survival	Precluded	pH	Acid Rain	B
STEWART POND	0801-0083	Lake	Lewis	3.0	A	C	Fish Propaga	Precluded	pH	Acid Rain	B
SUMMIT POND	0801-0084	Lake	Herkimer	13.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
DRAINAGE BASIN: Black River	(con't)										
SUNSHINE POND	0801-0058	Lake	Herkimer	77.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
TERROR LAKE	0801-0018	Lake	Hamilton	62.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
TROUT POND	0801-0127	Lake	Lewis	2.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
TWIN LAKE EAST	0801-0019	Lake	Hamilton	19.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
TWIN LAKE LOWER	0801-0133	Lake	Herkimer	3.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
TWIN LAKE UPPER	0801-0085	Lake	Herkimer	6.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
TWIN LAKE WEST	0801-0020	Lake	Hamilton	19.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
TWIN LAKES WEST	0801-0030	Lake	Hamilton	1.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
TWITCHELL LAKE	0801-0165	Lake	Herkimer	136.0	A	A(T)	Fish Survival	Impaired	pH	Acid Rain	B
UNNAMED P #3-1016	0801-0129	Lake	Herkimer	7.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-409	0801-0142	Lake	Lewis	2.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-432	0801-0100	Lake	Lewis	12.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-437	0801-0143	Lake	Jefferson	4.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-439	0801-0086	Lake	Herkimer	3.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-440	0801-0087	Lake	Herkimer	6.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-444	0801-0145	Lake	Hamilton	12.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-444A	0801-0103	Lake	Herkimer	13.0	A	?	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-456	0801-0088	Lake	Herkimer	21.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-456A	0801-0089	Lake	Herkimer	12.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-457	0801-0104	Lake	Herkimer	5.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-474B	0801-0147	Lake	Hamilton	5.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-476	0801-0090	Lake	Herkimer	4.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-484A	0801-0091	Lake	Herkimer	7.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-488	0801-0106	Lake	Herkimer	2.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-490	0801-0092	Lake	Herkimer	2.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-497	0801-0108	Lake	Herkimer	9.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-501	0801-0124	Lake	Herkimer	4.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-506	0801-0112	Lake	Herkimer	2.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-510	0801-0115	Lake	Herkimer	9.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-512	0801-0093	Lake	Herkimer	6.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-513	0801-0116	Lake	Herkimer	22.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B

DRAINAGE BASIN: Black River (con't)

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
UNNAMED P #4-516	0801-0117	Lake	Herkimer	5.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-526	0801-0118	Lake	Herkimer	5.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-569	0801-0021	Lake	Hamilton	2.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-636	0801-0121	Lake	Herkimer	1.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-638	0801-0094	Lake	Herkimer	12.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-645	0801-0152	Lake	Hamilton	2.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-646	0801-0122	Lake	Herkimer	17.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-679	0801-0123	Lake	Herkimer	17.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-737	0801-0154	Lake	Hamilton	7.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-759	0801-0022	Lake	Hamilton	10.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-765	0801-0023	Lake	Hamilton	4.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-766	0801-0024	Lake	Hamilton	3.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-771	0801-0156	Lake	Hamilton	1.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-773	0801-0032	Lake	Hamilton	8.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-792	0801-0031	Lake	Hamilton	2.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-840	0801-0130	Lake	Herkimer	4.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-841	0801-0131	Lake	Herkimer	7.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-846	0801-0095	Lake	Herkimer	4.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-851	0801-0141	Lake	Hamilton	2.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-856	0801-0026	Lake	Hamilton	2.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-857A	0801-0132	Lake	Herkimer	6.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-858	0801-0096	Lake	Herkimer	6.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-863	0801-0158	Lake	Hamilton	7.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-864A	0801-0027	Lake	Hamilton	3.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-871	0801-0159	Lake	Hamilton	2.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-872	0801-0028	Lake	Hamilton	5.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-906	0801-0137	Lake	Herkimer	2.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-946	0801-0162	Lake	Herkimer	2.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
UPPER MOSHIER PD	0801-0097	Lake	Herkimer	44.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
UPPER SISTER LAKE	0801-0008	Lake	Hamilton	83.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UPPER TWIN LAKE	0801-0060	Lake	Herkimer	6.0	A	FP	Fishing	Precluded	pH	Acid Rain	B

DRAINAGE BASIN: Black River (con't)

Segment Name	Segment ID	Segment Type	County	Segment Size	Class	Use Affected	Severity	Pollutant	Source	TMDL Note
UPPER WEST POND	0801-0163	Lake	Jefferson	3.0 A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
WEST POND	0801-0136	Lake	Herkimer	3.0 A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
WILDER POND	0801-0061	Lake	Herkimer	13.0 A	FP	Fishing	Precluded	pH	Acid Rain	B
WITCHOPPLE LAKE	0801-0062	Lake	Herkimer	134.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
WOLF LAKE	0801-0025	Lake	Hamilton	11.0 A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B

DRAINAGE BASIN: Saint Lawrence River

Segment Name	Segment ID	Segment Type	County	Segment Size	Class	Use Affected	Severity	Pollutant	Source	TMDL Note
ALUMINUM POND	0903-0006	Lake	Hamilton	8.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
ASH POND	0905-0028	Lake	St.Lawrence	5.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
BEAR POND	0905-0062	Lake	Herkimer	78.0 A	D	Fish Survival	Precluded	pH	Acid Rain	B
BEAR POND	0902-0007	Lake	Franklin	58.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
BENZ POND	0902-0021	Lake	Essex	23.0 A	D	Fish Survival	Precluded	pH	Acid Rain	B
BLACK POND	0903-0027	Lake	St.Lawrence	19.0 A	FP	Fish Survival	Precluded	pH	Acid Rain	B
BLACK POND	0903-0007	Lake	Essex	7.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
BUCK POND	0905-0001	Lake	St.Lawrence	13.0 A	FP	Fishing	Precluded	pH	Acid Rain	B
BUCK POND	0903-0037	Lake	St.Lawrence	2.0 A	D	Fish Survival	Precluded	pH	Acid Rain	B
CARTRIDGE HILLS P	0904-0004	Lake	St.Lawrence	1.0 A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
CHILDS POND	0902-0013	Lake	Franklin	2.0 A	?	Fish Survival	Precluded	pH	Acid Rain	B
COVEY POND	0905-0029	Lake	Herkimer	4.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
CRACKER POND	0905-0005	Lake	Herkimer	19.0 A	FP	Fishing	Precluded	pH	Acid Rain	B
CRANBERRY LAKE	0905-0007	Lake	St.Lawrence	6976.0 A	A(T)	Fish Consump	Impaired	pH, Mercury	Acid Rain	B,C
CROOKED LAKE	0905-0006	Lake	Herkimer	122.0 A	FP	Fishing	Precluded	pH	Acid Rain	B
CRYSTAL LAKE	0905-0030	Lake	St.Lawrence	14.0 A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
CURTIS POND	0905-0004	Lake	St.Lawrence	18.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
DIAMOND POND	0902-0011	Lake	Franklin	12.0 A	D	Fish Survival	Precluded	pH	Acid Rain	B
DIANA POND	0905-0063	Lake	Herkimer	27.0 A	D	Fish Survival	Precluded	pH	Acid Rain	B
DOG POND	0905-0031	Lake	St.Lawrence	18.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
DONUT POND	0905-0081	Lake	St.Lawrence	11.0 A	FP	Fish Survival	Precluded	pH	Acid Rain	B
DOUGLAS POND	0902-0012	Lake	Franklin	3.0 A	FP	Fish Survival	Precluded	pH	Acid Rain	B
DRY TIMBER LAKE	0905-0032	Lake	St.Lawrence	21.0 A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
DRAINAGE BASIN: Saint Lawrence River (con't)											
E.BEECHRIDGE POND	0905-0020	Lake	Herkimer	22.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
EGG POND	0904-0003	Lake	St.Lawrence	1.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
EMERALD LAKE	0905-0008	Lake	Herkimer	13.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
GAL POND	0905-0009	Lake	Herkimer	13.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
GRASS POND	0902-0002	Lake	Franklin	2.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
GRASSY POND	0905-0033	Lake	St.Lawrence	3.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
GRASSY POND	0905-0034	Lake	Herkimer	29.0	A	C	Fish Propaga	Precluded	pH	Acid Rain	B
GREEN POND	0905-0035	Lake	Herkimer	10.0	A	D	Fish Propaga	Precluded	pH	Acid Rain	B
GULL LAKE	0905-0072	Lake	Herkimer	75.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
HALFMOON POND	0903-0032	Lake	St.Lawrence	7.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
HEDGEHOG POND	0903-0020	Lake	Hamilton	5.0	A	?	Fish Survival	Precluded	pH	Acid Rain	B
HIDDEN POND	0902-0022	Lake	Essex	5.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
HIGH POND	0903-0025	Lake	St.Lawrence	9.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
HIGH POND	0903-0001	Lake	Hamilton	38.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
HITCHENS POND	0905-0036	Lake	Herkimer	11.0	A	C	Fish Propaga	Precluded	pH	Acid Rain	B
HUNTER POND	0903-0042	Lake	Essex	1.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
HYDE POND	0905-0071	Lake	Herkimer	8.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
INDIAN MOUNTAIN P	0905-0037	Lake	St.Lawrence	12.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
JAKES POND	0905-0038	Lake	Herkimer	17.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
JENKINS POND	0905-0069	Lake	Herkimer	2.0	A	C	Fish Survival	Precluded	pH	Acid Rain	B
KELLY POND	0905-0073	Lake	Herkimer	4.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
KITFOX POND	0902-0003	Lake	Franklin	13.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
LITTLE CROOKED LK	0905-0010	Lake	Herkimer	13.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
LITTLE DOG POND	0905-0039	Lake	St.Lawrence	6.0	A	C	Fish Propaga	Precluded	pH	Acid Rain	B
LITTLE DUCK POND	0905-0089	Lake	Hamilton	2.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
LITTLE FISH POND	0905-0082	Lake	St.Lawrence	5.0	A	FP	Fish Survival	Precluded	pH	Acid Rain	B
LITTLE LONG POND	0902-0004	Lake	Franklin	38.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
LITTLE PINE POND	0903-0028	Lake	St.Lawrence	8.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
LONE DUCK POND	0905-0088	Lake	Hamilton	6.4	A	FP	Fish Survival	Precluded	pH	Acid Rain	B
LONE POND	0903-0008	Lake	Hamilton	5.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
LONG POND(03-170)	0902-0005	Lake	Franklin	32.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B

DRAINAGE BASIN: Saint Lawrence River (con't)

Segment Name	Segment ID	Segment Type	County	Segment Size	Class	Use Affected	Severity	Pollutant	Source	TMDL Note
LOST POND	0905-0040	Lake	St.Lawrence	6.0 A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
LOST POND	0903-0009	Lake	Essex	5.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
LOST POND	0903-0057	Lake	Hamilton	13.0 A	D	Fish Propaga	Precluded	pH	Acid Rain	B
LOWER CHAIN POND	0903-0010	Lake	Hamilton	6.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
LOWER HELMS POND	0903-0024	Lake	Hamilton	4.0 A	FP	Fish Survival	Precluded	pH	Acid Rain	B
LOWER RILEY POND	0905-0011	Lake	Herkimer	19.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
LOWER SOUTH POND	0905-0012	Lake	Herkimer	38.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
LOWER TWIN POND	0903-0033	Lake	Essex	10.0 A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
MIDDLE CHAIN POND	0903-0011	Lake	Hamilton	10.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
MIDDLE NOTCH POND	0902-0015	Lake	Franklin	4.0 A	?	Fish Survival	Precluded	pH	Acid Rain	B
MIDDLE SOUTH POND	0905-0013	Lake	Herkimer	77.0 A	FP	Fishing	Precluded	pH	Acid Rain	B
MIKES POND	0902-0024	Lake	Essex	1.0 A	D	Fish Survival	Precluded	pH	Acid Rain	B
MOUNTAIN POND	0902-0019	Lake	Essex	4.0 A	B	Fish Survival	Precluded	pH	Acid Rain	B
MUIR POND	0905-0041	Lake	Herkimer	12.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
MUSKRAT POND	0905-0061	Lake	Herkimer	17.0 A	D	Fish Survival	Precluded	pH	Acid Rain	B
N.BEECHRIDGE POND	0905-0019	Lake	Herkimer	19.0 A	FP	Fishing	Precluded	pH	Acid Rain	B
OTTER POND	0905-0014	Lake	St.Lawrence	26.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
OVEN LAKE	0905-0042	Lake	Herkimer	52.0 A	D	Fish Survival	Precluded	pH	Acid Rain	B
OWLSHEAD POND	0902-0016	Lake	Essex	1.0 A	AA	Fish Survival	Precluded	pH	Acid Rain	B
PELCHER POND	0903-0002	Lake	Hamilton	58.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
PILGRIM POND	0903-0043	Lake	Hamilton	13.0 A	D	Fish Survival	Precluded	pH	Acid Rain	B
PINE POND	0903-0022	Lake	Hamilton	5.0 A	FP	Fish Survival	Precluded	pH	Acid Rain	B
POTTER POND	0903-0012	Lake	Hamilton	6.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
PRESTON POND	0903-0031	Lake	St.Lawrence	4.0 A	D	Fish Survival	Precluded	pH	Acid Rain	B
RAZORBACK POND	0902-0017	Lake	Essex	1.0 A	D	Fish Survival	Precluded	pH	Acid Rain	B
READWAY POND	0905-0043	Lake	St.Lawrence	2.0 A	D	Fish Survival	Precluded	pH	Acid Rain	B
RILEY POND LOWER	0905-0044	Lake	Herkimer	12.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
RILEY POND UPPER	0905-0045	Lake	Herkimer	14.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
ROBERTS POND	0903-0030	Lake	St.Lawrence	1.0 A	D	Fish Survival	Precluded	pH	Acid Rain	B
ROCK LAKE	0905-0015	Lake	Herkimer	64.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
ROCK POND	0903-0013	Lake	Essex	5.0 A	C	Fish Propaga	Precluded	pH	Acid Rain	B

DRAINAGE BASIN: Saint Lawrence River (con't)

Segment Name	Segment ID	Segment Type	County	Segment Size	Class	Use Affected	Severity	Pollutant	Source	TMDL Note
ROCK POND(06-129)	0903-0003	Lake	Hamilton	294.0 A	B(T)	Fish Propaga	Precluded	pH	Acid Rain	B
SALMON POND	0903-0004	Lake	Hamilton	83.0 A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
SAND LAKE	0905-0016	Lake	Herkimer	58.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
SITZ POND	0905-0017	Lake	Herkimer	26.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
SLENDER POND	0905-0074	Lake	St.Lawrence	13.0 A	?	Fish Survival	Precluded	pH	Acid Rain	B
SOUTH DUCK POND	0902-0018	Lake	Essex	2.0 A	D	Fish Survival	Precluded	pH	Acid Rain	B
SOUTH POND	0903-0005	Lake	Hamilton	442.0 A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
SPRING POND	0903-0041	Lake	St.Lawrence	29.0 A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
SPRING POND	0903-0035	Lake	Essex	3.0 A	D	Fish Survival	Precluded	pH	Acid Rain	B
STREETER FISHPOND	0905-0067	Lake	Herkimer	13.0 A	FP	Fish Survival	Precluded	pH	Acid Rain	B
TOAD POND	0905-0046	Lake	Herkimer	24.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
TOAD POND	0902-0008	Lake	Franklin	8.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
TWIN PONDS	0905-0059	Lake	Herkimer	24.0 A	FP	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #3-170	0902-0009	Lake	Franklin	3.0 A	AA(T)	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #3-189	0902-0010	Lake	Franklin	1.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #3-252	0902-0023	Lake	Essex	2.0 A	C	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-180	0905-0075	Lake	Hamilton	3.0 A	D	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-194	0905-0060	Lake	Herkimer	8.0 A	?	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-201	0905-0047	Lake	Herkimer	14.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-202	0905-0048	Lake	Herkimer	4.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-203	0905-0049	Lake	Herkimer	23.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-204	0905-0050	Lake	Herkimer	10.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-205	0905-0021	Lake	Herkimer	16.0 A	FP	Fishing	Precluded	pH	Acid Rain	B
UNNAMED P #4-206	0905-0052	Lake	Herkimer	3.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-207	0905-0053	Lake	Herkimer	1.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-208	0905-0022	Lake	Herkimer	8.0 A	FP	Fishing	Precluded	pH	Acid Rain	B
UNNAMED P #4-209	0905-0055	Lake	Herkimer	6.0 A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #4-211	0905-0064	Lake	Herkimer	1.0 A	?	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-212	0905-0065	Lake	Herkimer	2.0 A	?	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-213	0905-0066	Lake	Herkimer	5.0 A	?	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-235	0905-0076	Lake	Jefferson	2.0 A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B

DRAINAGE BASIN: Saint Lawrence River (con't)

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
UNNAMED P #4-282	0905-0077	Lake	St.Lawrence	1.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-288E	0905-0078	Lake	St.Lawrence	8.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-297	0905-0079	Lake	St.Lawrence	3.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-314	0905-0080	Lake	St.Lawrence	13.0	A	FP	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-320A	0905-0083	Lake	St.Lawrence	4.0	A	FP	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-320B	0905-0084	Lake	St.Lawrence	6.0	A	FP	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-321A	0905-0085	Lake	St.Lawrence	2.0	A	FP	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-322B	0905-0086	Lake	St.Lawrence	5.0	A	FP	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-324	0905-0070	Lake	St.Lawrence	4.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-356	0905-0068	Lake	St.Lawrence	4.0	A	FP	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-370	0906-0004	Lake	Herkimer	2.0	A	FP	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #4-371	0905-0056	Lake	St.Lawrence	11.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #6-037	0903-0034	Lake	St.Lawrence	1.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #6-055	0903-0036	Lake	Essex	3.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #6-060	0903-0029	Lake	St.Lawrence	4.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #6-067	0903-0026	Lake	St.Lawrence	1.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #6-094	0903-0023	Lake	Franklin	5.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #6-107	0903-0038	Lake	Essex	1.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #6-119	0903-0021	Lake	Hamilton	2.0	A	?	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #6-122	0903-0039	Lake	Hamilton	2.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #6-124	0903-0019	Lake	Hamilton	1.0	A	?	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #6-125A	0903-0040	Lake	Hamilton	1.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #6-141	0903-0018	Lake	Hamilton	4.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #6-323	0903-0014	Lake	Hamilton	5.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #6-330	0903-0015	Lake	Hamilton	9.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UPPER CHAIN POND	0903-0016	Lake	Hamilton	3.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UPPER HAYMARSH PD	0903-0017	Lake	Hamilton	9.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UPPER NOTCH POND	0902-0014	Lake	Franklin	3.0	A	?	Fish Survival	Precluded	pH	Acid Rain	B
UPPER RILEY POND	0905-0023	Lake	Herkimer	13.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UPPER SOUTH POND	0905-0057	Lake	Herkimer	14.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
WALKER LAKE	0905-0024	Lake	Herkimer	38.0	A	FP	Fishing	Precluded	pH	Acid Rain	B

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
DRAINAGE BASIN: Saint Lawrence River (con't)											
WARD POND	0902-0020	Lake	Essex	3.0	A	D	Fish Survival	Precluded	pH	Acid Rain	B
WASHBOWL POND	0905-0087	Lake	Hamilton	4.0	A	FP	Fish Survival	Precluded	pH	Acid Rain	B
WEST POND	0905-0025	Lake	Herkimer	6.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
WILLYS LAKE	0905-0026	Lake	Herkimer	50.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
WOLF POND	0905-0027	Lake	Herkimer	70.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
WOLF POND	0904-0002	Lake	St.Lawrence	22.0	A	?	Fish Survival	Precluded	pH	Acid Rain	B
WOLF POND	0902-0006	Lake	Franklin	51.0	A	B	Fish Survival	Precluded	pH	Acid Rain	B
DRAINAGE BASIN: Lake Champlain											
AMPHITH.P#2-131	1003-0018	Lake	Franklin	3.0	A	?	Fish Survival	Precluded	pH	Acid Rain	B
BARTLETT POND	1003-0012	Lake	Essex	3.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
BARTLETT POND	1003-0030	Lake	Essex	1.0	A	AA	Fish Survival	Precluded	pH	Acid Rain	B
BASS LAKE	1003-0011	Lake	Franklin	6.0	A	B	Fish Survival	Precluded	pH	Acid Rain	B
BULLET POND	1004-0017	Lake	Essex	1.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
CATAMOUNT POND	1003-0002	Lake	Franklin	6.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
CONLEY LINE POND	1003-0003	Lake	Franklin	1.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
CRANBERRY POND	1004-0006	Lake	Essex	2.0	A	D	Fish Propaga	Precluded	pH	Acid Rain	B
DOW POND	1003-0022	Lake	Franklin	1.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
E. COPPERAS POND	1003-0004	Lake	Essex	10.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
LINDSEY POND	1003-0036	Lake	Essex	6.0	A	AA	Fish Survival	Precluded	pH	Acid Rain	B
LINE POND	1003-0025	Lake	Essex	5.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
LITTLE ECHO POND	1003-0006	Lake	Franklin	2.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
LITTLE EGG POND	1003-0031	Lake	Essex	1.0	A	AA	Fish Survival	Precluded	pH	Acid Rain	B
LITTLE NORTH WHEY	1003-0007	Lake	Franklin	3.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
LOST POND	1004-0007	Lake	Essex	3.0	A	AA(T)	Fish Propaga	Precluded	pH	Acid Rain	B
LOWER WALLFACE PD	1004-0004	Lake	Essex	6.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
MARSH POND	1003-0020	Lake	Franklin	4.0	A	AA	Fish Survival	Precluded	pH	Acid Rain	B
MARSH POND	1003-0029	Lake	Essex	4.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
MCCAFFERY POND	1003-0034	Lake	Essex	2.0	A	AA	Fish Survival	Precluded	pH	Acid Rain	B
MOUNTAIN POND	1003-0024	Lake	Essex	5.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
DRAINAGE BASIN: Lake Champlain (con't)											
MUD POND	1004-0016	Lake	Essex	3.0	A	AA	Fish Survival	Precluded	pH	Acid Rain	B
NORTH WHEY POND	1003-0013	Lake	Franklin	3.0	A	AA	Fish Propaga	Precluded	pH	Acid Rain	B
SCOTT POND	1004-0008	Lake	Essex	3.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
SNAKE POND	1005-0001	Lake	Essex	4.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
SOCHIA POND	1003-0014	Lake	Franklin	4.0	A	AA(T)	Fish Propaga	Precluded	pH	Acid Rain	B
ST. GERMAIN POND	1003-0009	Lake	Franklin	13.0	A	AA	Fish Propaga	Precluded	pH	Acid Rain	B
SW AMPHITHEATRE P	1003-0015	Lake	Franklin	1.0	A	AA	Fish Propaga	Precluded	pH	Acid Rain	B
TWELFTH TEE POND	1003-0010	Lake	Franklin	5.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #2-036	1003-0023	Lake	Franklin	3.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #2-067	1003-0026	Lake	Essex	2.0	A	B(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #2-068	1003-0017	Lake	Franklin	3.0	A	B(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #2-079	1003-0027	Lake	Essex	1.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #2-080	1003-0028	Lake	Essex	2.5	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #2-133	1003-0019	Lake	Franklin	2.0	A	?	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #2-166	1003-0032	Lake	Essex	2.0	A	AA	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #2-189	1003-0033	Lake	Essex	3.0	A	AA	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #2-196	1003-0035	Lake	Essex	1.0	A	AA	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #2-223	1004-0011	Lake	Essex	5.0	A	C(T)	Fish Survival	Precluded	pH	Acid Rain	B
UNNAMED P #2-263	1004-0009	Lake	Essex	2.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
UNNAMED P #2-269	1004-0010	Lake	Essex	2.0	A	AA(T)	Fish Propaga	Precluded	pH	Acid Rain	B
UPPER WALLFACE PD	1004-0005	Lake	Essex	13.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
WEST POLLIWOG PD	1003-0016	Lake	Franklin	3.0	A	AA	Fish Propaga	Precluded	pH	Acid Rain	B
DRAINAGE BASIN: Upper Hudson River											
BULLHEAD POND	1101-0033	Lake	Saratoga	6.0	A	C	Fish Propaga	Stressed	pH	Acid Rain	B
CARRY POND	1104-0003	Lake	Hamilton	6.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
CHUB LAKE	1104-0004	Lake	Hamilton	19.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
CLOCKMILL POND	1104-0005	Lake	Hamilton	38.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
HOLMES LAKE	1104-0006	Lake	Fulton	19.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
LAKE COLDEN	1104-0007	Lake	Essex	38.0	A	FP	Fishing	Precluded	pH	Acid Rain	B

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
DRAINAGE BASIN: Upper Hudson River (con't)											
LITTLE MOOSE POND	1104-0008	Lake	Hamilton	26.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
LOWER LOOMIS POND	1104-0010	Lake	Hamilton	6.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
MARION POND	1104-0020	Lake	Essex	6.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
MECO LAKE	1104-0011	Lake	Hamilton	13.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
MIDDLE LOOMIS PD.	1104-0012	Lake	Hamilton	6.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
ROCK LAKE(05-229)	1104-0013	Lake	Hamilton	26.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
ROCK LAKE(05-275)	1104-0014	Lake	Hamilton	6.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
ROUND POND	1104-0073	Lake	Hamilton	224.0	A	FP	Fish Consump	Impaired	pH, Mercury	Acid Rain	B,C
SAND LAKE	1104-0015	Lake	Hamilton	115.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
SILVER LAKE	1104-0016	Lake	Hamilton	64.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
SOUTH PINE LAKE	1104-0017	Lake	Hamilton	13.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
STONEY POND	1104-0018	Lake	Essex	64.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
TROUT LAKE	1104-0019	Lake	Hamilton	13.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
DRAINAGE BASIN: Mohawk River											
BALSAM LAKE	1203-0007	Lake	Hamilton	38.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
BIG ALDERBED POND	1201-0002	Lake	Hamilton	70.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
BUCK POND	1203-0001	Lake	Hamilton	6.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
DIAMOND LAKE	1203-0002	Lake	Hamilton	26.0	A	C(T)	Fish Propaga	Precluded	pH	Acid Rain	B
FERRIS LAKE	1201-0003	Lake	Hamilton	122.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
IRVING POND	1201-0004	Lake	Fulton	134.0	A	B	Fish Propaga	Precluded	pH	Acid Rain	B
LITTLE METCALF LK	1203-0009	Lake	Herkimer	6.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
LONG POND(07-755)	1201-0007	Lake	Fulton	19.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
POOR LAKE	1203-0003	Lake	Hamilton	19.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
REDHOUSE LAKE	1201-0008	Lake	Hamilton	13.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
STEWART LAKE	1201-0009	Lake	Fulton	26.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
T LAKE	1203-0004	Lake	Hamilton	51.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
TWIN LAKE (SOUTH)	1203-0005	Lake	Hamilton	13.0	A	FP	Fish Propaga	Precluded	pH	Acid Rain	B
WEST CANADA CREEK	1203-0008	River	Herkimer	10.0	Mi.	FP	Fish Propaga	Precluded	pH	Acid Rain	B
WHITE BIRCH LAKE	1203-0006	Lake	Hamilton	6.0	A	FP	Fishing	Precluded	pH	Acid Rain	B
DRAINAGE BASIN: Lower Hudson River											
DYKEN POND	1301-0082	Lake	Rensselaer	179.0	A	B	Fishing	Stressed	pH	Acid Rain	B

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
DRAINAGE BASIN: Lake Erie-Niagara River											
BARGE CANAL/TON C	0102-0022	River	Niagara	18.0	Mi.	C	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
BUFFALO RIVER	0103-0001	River	Erie	8.0	Mi.	C	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
CAYUGA CREEK	0101-0001	River	Niagara	1.5	Mi.	C	Fish Consump	Precluded	Priority Organics	Contaminated Sed.	C
CAYUGA CREEK	0101-0024	River	Niagara	2.7	Mi.	C	Fish Consump	Precluded	Priority Organics	Contaminated Sed.	C
DELAWARE PARK LKE	0101-0026	Lake	Erie	33.0	A	B	Fish Consump	Impaired	Priority Organics	Urban Runoff	C
GILL CREEK	0101-0002	River	Niagara	2.5	Mi.	C	Fish Consump	Precluded	Priority Organics	Contaminated Sed.	C
NIAGARA RIVER	0101-0006	River	Erie	38.0	Mi.	A(S)	Fish Consump	Impaired	Priority Organics	Land Disposal	C
DRAINAGE BASIN: Lake Ontario											
EIGHTEENMILE CK	0301-0002	River	Niagara	14.7	Mi.	B,C,D	Fish Consump	Precluded	Priority Organics	Contaminated Sed.	C
IRONDEQUOIT BAY	0302-0001	G. Lake	Monroe	14.0	Mi.	B	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
LAKE ONTARIO	0300-0001	G. Lake	multiple	373.9	Mi.	A(S)	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
SALMON RIVER	0303-0016	River	Oswego	2.0	Mi.	C(T)	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
DRAINAGE BASIN: Genesee River											
CANADICE LAKE	0402-0002	Lake(R)	Ontario	672.0	A	AA	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
ROCH. EMBAYMENT	0302-0002	G. Lake	Monroe	21.0	Mi.	A	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
DRAINAGE BASIN: Chemung River											
KOPPERS POND	0501-0012	Lake	Chemung	15.0	A	C	Fish Consump	Impaired	Priority Organics	Industrial	C

TMDL/303(d) Notes:

A - Waterbodies designated as priority for TMDL development over the next two (2) years.

B - Waterbodies with fish survival/propagation impairments due to low pH from atmospheric deposition (acid rain).

C - Waterbodies with NYS-DOH advisories limiting human consumption of fish. Contaminants are suspected to originate from historic discharges of pollutants that have accumulated in the sediment and are recycling through the food chain and/or from atmospheric deposition.

Segment Name	Segment ID	Segment Type	County	Segment Size	Class	Use Affected	Severity	Pollutant	Source	TMDL Note
DRAINAGE BASIN: Owsego-Seneca-Oneida										
CANANDAIGUA LAKE	0704-0001	Lake	Ontario	10730.0 A	AA(T)	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
ONONDAGA L.& OUT.	0702-0003	Lake	Onondaga	2944.0 A	B	Fish Consump	Impaired	Priority Organics	Industrial	A.5,C
OSWEGO RIVER	0701-0006	River	Oswego	11.4 Mi.	B	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
KEUKA LAKE	0705-0003	Lake	Yates	11849.0 A	AA(TS)	Fish Consump	Impaired	Pesticides	Contaminated Sed.	C
SKANEATELES CREEK	0707-0003	River	Onondaga	14.0 Mi.	C(T)	Fish Consump	Impaired	Priority Organics	Source Unknown	C
DRAINAGE BASIN: Black River										
BIG MOOSE LAKE	0801-0035	Lake	Herkimer	1286.0 A	A(T)	Fish Consump	Impaired	Metals	Source Unknown	C
FOURTH LAKE	0801-0098	Lake	Herkimer	2137.0 A	A	Fish Consump	Impaired	Priority Organics	Other Source	C
FRANCIS LAKE	0801-0192	Lake	Lewis	136.0 A	C(T)	Fish Consump	Impaired	Metals	Source Unknown	C
HALFMOON LAKE	0801-0193	Lake	Lewis	17.0 A	C	Fish Consump	Impaired	Metals	Source Unknown	C
MOSHIER RESERVOIR	0801-0194	Lake(R)	Herkimer	284.0 A	C(T)	Fish Consump	Impaired	Metals	Source Unknown	C
STILLWATER RESERV	0801-0184	Lake(R)	Herkimer	6195.0 A	C(T)	Fish Consump	Impaired	Metals	Contaminated Sed.	C
SUNDAY LAKE	0801-0195	Lake	Herkimer	19.0 A	C(T)	Fish Consump	Impaired	Metals	Source Unknown	C
DRAINAGE BASIN: Saint Lawrence River										
CARRY FALLS RES.	0903-0055	Lake(R)	St.Lawrence	5753.0 A	B	Fish Consump	Impaired	Metals	Source Unknown	C
CRANBERRY LAKE	0905-0007	Lake	St.Lawrence	6976.0 A	A(T)	Fish Consump	Impaired	Metals	Acid Rain	B,C
GRASS RIVER	0904-0009	River	St.Lawrence	6.0 Mi.	B	Fish Consump	Precluded	Priority Organics	Industrial	C
INDIAN LAKE	0906-0003	Lake	Lewis	172.0 A	C	Fish Consump	Impaired	Metals	Source Unknown	C
LONG POND	0905-0058	Lake	Lewis	154.0 A	C(T)	Fish Consump	Impaired	Metals	Other Source	C
MASSENA POWER CAN	0904-0012	River	St.Lawrence	2.5 Mi.	D	Fish Consump	Impaired	Priority Organics	Industrial	C
MEACHAM LAKE	0902-0039	Lake	Franklin	1203.0 A	FP	Fish Consump	Impaired	Metals	Contaminated Sed.	C
ST.LAWRENCE RIVER	0901-0001	River	St.Lawrence	109.0 Mi.	A	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
ST.LAWRENCE RIVER	0901-0002	River	St.Lawrence	4.0 Mi.	A	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
DRAINAGE BASIN: Lake Champlain										
LAKE CHAMPLAIN	1000-0001	Lake	multiple	96640.0 A	A	Fish Consump	Impaired	Priority Organics	Source Unknown	A.4,C

DRAINAGE BASIN: Upper Hudson River

Segment Name	Segment ID	Segment Type	County	Segment Size	Class	Use Affected	Severity	Pollutant	Source	TMDL Note
HOOSIC RIVER	1102-0002	River	Rensselaer	17.0 Mi.	C	Fish Consump	Impaired	Priority Organics	Source Unknown	C
HUDSON RIVER	1101-0002	River	Saratoga	40.1 Mi.	C	Fish Consump	Precluded	Priority Organics	Contaminated Sed.	C
HUDSON RIVER	1101-0040	River	Saratoga	4.0 Mi.	A	Fish Consump	Precluded	Priority Organics	Land Disposal	C
HUDSON RIVER	1101-0041	River	Saratoga	6.0 Mi.	B	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
JOHNSONVILLE RES.	1102-0003	Lake(R)	Rensselaer	269.0 A	B	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
ROUND POND	1104-0073	Lake	Hamilton	224.0 A	FP	Fish Consump	Impaired	Metals	Acid Rain	B , C
SCHROON LAKE	1104-0002	Lake	Essex	4128.0 A	AA	Fish Consump	Impaired	Priority Organics	Source Unknown	C

DRAINAGE BASIN: Mohawk River

Segment Name	Segment ID	Segment Type	County	Segment Size	Class	Use Affected	Severity	Pollutant	Source	TMDL Note
FERRIS LAKE	1201-0003	Lake	Hamilton	122.0 A	FP	Fish Consump	Impaired	Metals	Acid Rain	B , C
MOHAWK RIVER	1201-0010	River	Oneida	29.0 Mi.	B	Fish Consump	Impaired	Priority Organics	Source Unknown	C
THREE MILE CREEK	1201-0025	River	Oneida	3.0 Mi.	C	Fish Consump	Impaired	Priority Organics	Source Unknown	C

DRAINAGE BASIN: Lower Hudson River

Segment Name	Segment ID	Segment Type	County	Segment Size	Class	Use Affected	Severity	Pollutant	Source	TMDL Note
HUDSON RIVER	1301-0002	Estuary	Albany	10368.0 A	C	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
HUDSON RIVER	1301-0003	Estuary	Dutchess	59574.0 A	A	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
HUDSON RIVER	1301-0005	Estuary	Bronx	1600.0 A	SB	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	A.1,C
HUDSON RIVER	1301-0006	Estuary	New York	4800.0 A	I	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
KINDERHOOK LAKE	1310-0002	Lake	Columbia	346.0 A	B	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
NASSAU LAKE	1310-0001	Lake	Rensselaer	175.0 A	B	Fish Consump	Precluded	Priority Organics	Contaminated Sed.	C
SAW MILL RIVER	1301-0007	River	Westchester	9.0 Mi.	A	Fish Consump	Impaired	Priority Organics	Urban Runoff	C
VALATIE KILL	1310-0003	River	Rensselaer	10.0 Mi.	C	Fish Consump	Precluded	Priority Organics	Contaminated Sed.	C
VALATIE KILL	1310-0016	River	Columbia	8.0 Mi.	C(T)	Fish Consump	Impaired	Priority Organics	Land Disposal	C

DRAINAGE BASIN: Atlantic-Long Island Sound

Segment Name	Segment ID	Segment Type	County	Segment Size	Class	Use Affected	Severity	Pollutant	Source	TMDL Note
ARTHUR KILL	1701-0010	Estuary	Richmond	2300.0 A	SD/I	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
BELMONT LAKE	1701-0021	Lake	Suffolk	26.0 A	C	Fish Consump	Impaired	Pesticides	Urban Runoff	C
EAST RIVER -LOWER	1702-0011	Estuary	New York	3520.0 A	I	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	A.1,C

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note

DRAINAGE BASIN: Atlantic-Long Island Sound (con't)

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
EAST RIVER-UPPER1	1702-0010	Estuary	Queens	3200.0	A	I	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	A.1,C
EAST RIVER-UPPER2	1702-0032	Estuary	Queens	1280.0	A	SB	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	A.1,C
GRANT PARK POND	1701-0054	Lake	Nassau	6.0	A	C	Fish Consump	Impaired	Priority Organics	Urban Runoff	C
HALLS POND	1701-0027	Lake	Nassau	2.0	A	C	Fish Consump	Impaired	Priority Organics	Urban Runoff	C
HARLEM RIVER	1702-0004	Estuary	New York	360.0	A	I	Fish Consump	Impaired	Aesthetics	CSO's	A.1,C
LAKE CAPRI	1701-0175	Lake	Suffolk	6.5	A	C	Fish Consump	Impaired	Metals	Land Disposal	C
LOFTS POND	1701-0029	Lake	Nassau	4.0	A	C	Fish Consump	Impaired	Priority Organics	Urban Runoff	C
LOWER NY BAY (N)	1701-0004	Bay	Richmond	31400.0	A	SB	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	A.1,C
MASSAPEQUA RESERV	1701-0157	Lake(R)	Nassau	20.0	A	A	Fish Consump	Impaired	Priority Organics	Urban Runoff	C
RIDDERS POND	1701-0176	Lake	Nassau	1.0	A	C	Fish Consump	Impaired	Pesticides	Urban Runoff	C
ST. JAMES POND	1702-0049	Lake	Suffolk	0.2	A	C	Fish Consump	Impaired	Pesticides	Urban Runoff	C
SHELDRAKE RIVER	1702-0069	River	Westchester	2.0	Mi.	C	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
SHELDRAKE RIVER	1702-0069	River	Westchester	2.0	Mi.	C	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
SMITH PD (RSEVLT)	1701-0136	Lake	Nassau	6.0	A	C	Fish Consump	Impaired	Priority Organics	Urban Runoff	C
SPRING LAKE	1701-0022	Lake	Suffolk	2.0	A	B	Fish Consump	Impaired	Pesticides	Urban Runoff	C
UPPER NY BAY	1702-0095	Bay	Kings	6740.0	A	I	Fish Consump	Impaired	Priority Organics	Contaminated Sed.	C
WHITNEY LAKE	1702-0101	Lake	Nassau	6.0	A	C	Fish Consump	Impaired	Pesticides	Urban Runoff	C

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
DRAINAGE BASIN: Atlantic-Long Island Sound											
ACABONACK HARBOR	1701-0047	Bay	Suffolk	112.0	A	SA	Shellfishing	Impaired	Pathogens	Urban Runoff	D
ATLANTIC OCEAN	1701-0014	Ocean	Kings	3.0	Mi.	SA	Shellfishing	Precluded	Pathogens	CSO's	D
COECLES HARBOR	1701-0163	Bay	Suffolk	2.0	A	SA	Shellfishing	Impaired	Pathogens	Other Source	D
COLD SPRING HAR.	1702-0018	Bay	Suffolk	190.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
COLD SPRING POND	1701-0127	Bay	Suffolk	5.0	A	SA	Shellfishing	Impaired	Pathogens	Other Source	D
CUTCHOGUE HARBOR	1701-0045	Bay	Suffolk	70.0	A	SA	Shellfishing	Precluded	Pathogens	Other Source	D
DERING HARBOR	1701-0050	Bay	Suffolk	100.0	A	SA	Shellfishing	Impaired	Pathogens	Urban Runoff	D
FISHERS IS. SOUND	1702-0100	Bay	Suffolk	99.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
FLANDERS BAY	1701-0030	Bay	Suffolk	1493.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D,PES
GARDINERS BAY	1701-0164	Bay	Suffolk	219.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
GEORGICA POND	1701-0145	Bay	Suffolk	350.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
GOLDSMITH INLET	1702-0026	Bay	Suffolk	20.0	A	SA	Shellfishing	Impaired	Pathogens	Urban Runoff	D
GR. SOUTH BAY (C)	1701-0040	Bay	Suffolk	4643.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
GR. SOUTH BAY (E)	1701-0039	Bay	Suffolk	4423.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
GR. SOUTH BAY (W)	1701-0173	Bay	Suffolk	3820.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
GREAT PECONIC BAY	1701-0165	Bay	Suffolk	87.0	A	SA	Shellfishing	Impaired	Pathogens	Storm Sewers	D,PES
HASHAMOMUCK POND	1701-0162	Bay	Suffolk	170.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
HEMPSTEAD BAY	1701-0032	Bay	Nassau	11445.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
HEMPSTEAD HARBOR	1702-0022	Bay	Nassau	3465.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
HUNTINGTON BAY	1702-0014	Bay	Suffolk	1309.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
LAKE MONTAUK	1701-0031	Bay	Suffolk	280.0	A	SA	Shellfishing	Precluded	Pathogens	Other Source	D
LITTLE PECONICBAY	1701-0172	Bay	Suffolk	68.0	A	SA	Shellfishing	Impaired	Pathogens	Urban Runoff	D,PES
LONG IS.SOUND (E)	1702-0098	Bay	Suffolk	300.0	A	SA	Shellfishing	Precluded	Pathogens	Municipal	D
LONG IS.SOUND (W)	1702-0028	Bay	Nassau	26650.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
LONG IS.SOUND NYC	1702-0027	Estuary	Bronx	11960.0	A	SB	Shellfishing	Precluded	Pathogens	CSO's	A.2,D

TMDL/303(d) Notes:

A - Waterbodies designated as priority for TMDL development over the next two (2) years.

D - Waterbodies designated for, but closed to, shellfish harvesting. Coliform contamination originating primarily from urban runoff is the suspected cause.

PES - Waterbodies included in the *Peconic Estuary Study*.

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
DRAINAGE BASIN: Atlantic-Long Island Sound (con't)											
MANHASSET BAY	1702-0021	Bay	Nassau	2725.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
MATTITUCK INLET	1702-0020	Bay	Suffolk	125.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
MECOX BAY	1701-0034	Bay	Suffolk	1045.0	A	SA	Shellfishing	Precluded	Pathogens	Storm Sewers	D
MORICHES BAY	1701-0038	Bay	Suffolk	5142.0	A	SA	Shellfishing	Precluded	Pathogens	Storm Sewers	D
MT. SINAI HARBOR	1702-0019	Bay	Suffolk	70.0	A	SA	Shellfishing	Precluded	Pathogens	Other Source	D
NAPEAGUE BAY	1701-0166	Bay	Suffolk	15.0	A	SA	Shellfishing	Precluded	Pathogens	Other Source	D
NORTH SEA HARBOR	1701-0037	Bay	Suffolk	59.0	A	SA	Shellfishing	Precluded	Pathogens	Storm Sewers	D
NORTHWEST CREEK	1701-0046	Bay	Suffolk	169.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
NOYACK BAY	1701-0167	Bay	Suffolk	243.0	A	SA	Shellfishing	Impaired	Pathogens	Other Source	D
ORIENT HARBOR	1701-0168	Bay	Suffolk	73.0	A	SA	Shellfishing	Impaired	Pathogens	Urban Runoff	D
OYSTER BAY HARBOR	1702-0016	Bay	Nassau	785.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
OYSTER POND	1701-0169	Bay	Suffolk	115.0	A	SA	Shellfishing	Precluded	Pathogens	Other Source	D
PORT JEFFERSON H.	1702-0015	Bay	Suffolk	1374.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
RARITAN BAY	1701-0002	Bay	Richmond	12410.0	A	SA	Shellfishing	Precluded	Pathogens	On-site Systems	D
SAG HARBOR &COVES	1701-0035	Bay	Suffolk	224.0	A	SA	Shellfishing	Precluded	Pathogens	Storm Sewers	D
SAGAPONACK POND	1701-0146	Bay	Suffolk	160.0	A	SA	Shellfishing	Precluded	Pathogens	Storm Sewers	D
SEBONAC CREEK	1701-0051	Bay	Suffolk	430.0	A	SA	Shellfishing	Impaired	Pathogens	Urban Runoff	D
SHELTER IS. SOUND	1701-0170	Bay	Suffolk	238.0	A	SA	Shellfishing	Precluded	Pathogens	Municipal	D,PES
SOUTH OYSTER BAY	1701-0041	Bay	Nassau	4130.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
SOUTHOLD BAY	1701-0044	Bay	Suffolk	180.0	A	SA	Shellfishing	Impaired	Pathogens	Urban Runoff	D,PES
STIRLING BASIN	1701-0049	Bay	Suffolk	55.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
STONY BROOK HARBR	1702-0047	Bay	Suffolk	120.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
THREE MILE HARBOR	1701-0036	Bay	Suffolk	362.0	A	SA	Shellfishing	Precluded	Pathogens	Storm Sewers	D
WADING RIVER	1702-0099	Bay	Suffolk	50.0	A	SC	Shellfishing	Precluded	Pathogens	Storm Sewers	D
WEESUCK CREEK	1701-0111	Estuary	Suffolk	20.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
WEST HARBOR	1702-0046	Bay	Suffolk	150.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D
WEST NECK HARBOR	1701-0132	Bay	Suffolk	2.0	A	SA	Shellfishing	Impaired	Pathogens	Other Source	D
WOOLEY POND	1701-0048	Bay	Suffolk	10.0	A	SA	Shellfishing	Precluded	Pathogens	Urban Runoff	D

Drainage Basin/Watershed Name	Discussion
Iron	
All Freshwater Watersheds in New York State	Background levels exceed the current standard in many waters. The scientific basis of the standard is under review.
Lead	
Allegheny River Drainage Basin Black River Drainage Basin Saint Lawrence River Drainage Basin Lake Champlain Drainage Basin Upper Hudson River Drainage Basin Delaware River Drainage Basin	In low hardness waters, the standard is in the single digit µg/l range. Detection levels are not low enough to confidently quantify these low levels. The dissolved form is the more appropriate standard and the standards revision process is underway. Additional total and dissolved data are required.
Phenolic Compounds	
Chemung River Drainage Basin Hudson River Drainage Basin (Entire Watershed) Finger Lakes Watershed Onondaga Lake Watershed	Background levels occasionally exceed the current standards (which are based on aesthetics, not toxicity). Analytical procedures are of questionable reliability for measuring some individual phenol compounds and total phenols in discharge loads and in ambient waters. Analytical procedures must be improved.

Segment Name	Segment ID	Segment Type	County	Segment Size		Class	Use Affected	Severity	Pollutant	Source	TMDL Note
DRAINAGE BASIN: Allegheny River											
BEAR LAKE	0201-0003	Lake	Chautauqua	110.0	A	B	Bathing	Impaired	Nutrients	Agriculture	5
FINDLEY LAKE	0202-0004	Lake	Chautauqua	311.0	A	B	Fishing	Impaired	Nutrients	Agriculture	7
LOWER CASSADAGA L	0202-0003	Lake	Chautauqua	83.0	A	B	Bathing	Impaired	Nutrients	Agriculture	5
MID. CASSADAGA L.	0202-0002	Lake	Chautauqua	25.0	A	C	Fishing	Impaired	Nutrients	Agriculture	5
DRAINAGE BASIN: Lake Ontario											
OAK ORCHARD CREEK	0301-0014	River	Genesee	14.7	Mi.	C	Fishing	Precluded	Nutrients	Agriculture	5
DRAINAGE BASIN: Genesee River											
LAKE LAGRANGE	0402-0008	Lake	Wyoming	64.0	A	A	Water Supply	Threatened	Nutrients	Agriculture	2
LE ROY RESERVOIR	0402-0003	Lake(R)	Genesee	51.0	A	A	Water Supply	Impaired	Nutrients	Agriculture	2
SILVER LAKE	0403-0002	Lake	Wyoming	102.0	A	A	Bathing	Threatened	Nutrients	Agriculture	2
TRIB4 EAST KOY CK	0403-0005	River	Wyoming	0.1	Mi.	C	Fish Survival	Impaired	Oxygen Demand	Agriculture	3
DRAINAGE BASIN: Susquehanna River											
EAST SIDNEY LAKE	0601-0001	Lake	Delaware	1114.0	A	C(T)	Aesthetics	Stressed	Nutrients	Agriculture	5
LITTLE CHOCONUT C	0603-0001	River	Broome	3.0	Mi.	C	Fishing	Precluded	Thermal Changes	Industrial	5
PAGE BROOK	0602-0029	River	Broome	5.0	Mi.	C	Fish Propaga	Impaired	Nutrients	Agriculture	7
SONG LAKE	0602-0019	Lake	Cortland	109.0	A	B	Bathing	Impaired	Nutrients	Agriculture	1

TMDL/303(d) Notes:
1. There is insufficient data to verify either the source, pollutant or impairment of problem.
2. The water quality problem is addressed by another control action, such as a RAP, LaMP, hazardous waste site remediation, etc.
3. A solution has been identified or is being implemented.
4. The suspected water quality problem has been resolved.
5. The water quality problem has been attributed to a single identifiable source or category of sources for which the solution is known.
6. The problem has been addressed by a watershed toxics TMDL which has been already developed.
7. The water quality problem is due to natural conditions.

Segment Name	Segment ID	Segment Type	County	Segment Size	Class	Use Affected	Severity	Pollutant	Source	TMDL Note
DRAINAGE BASIN: Susquehanna River (con't)										
TULLY LAKE	0602-0018	Lake	Cortland	115.0 A	B	Bathing	Impaired	Nutrients	Municipal	1
UPPER LIT.YORK LK	0602-0017	Lake	Cortland	102.0 A	B	Bathing	Impaired	Nutrients	Agriculture	1
WHITNEY PT. RES.	0602-0004	Lake	Broome	1200.0 A	C	Fish Propaga	Impaired	Nutrients	Agriculture	5
DRAINAGE BASIN: Oswego-Seneca-Oneida										
CAYUGA LAKE	0705-0040	Lake	Tompkins	5000.0 A	AA(T)	Water Supply	Threatened	Silt, Nutrients	Erosion, Urb Runoff, Agriculture	1
CHITTENANGO CREEK	0703-0005	River	Onondaga	3.0 Mi.	C	Fish Propaga	Precluded	Nutrients	Agriculture	1
DERUYTER RES.	0703-0004	Lake	Madison	600.0 A	B	Fishing	Impaired	Nutrients	Agriculture	5
DUBLIN BROOK	0704-0004	River	Seneca	3.0 Mi.	C	Fish Survival	Precluded	Oxygen Demand	Agriculture	5
LAKE NEATAHWANTA	0701-0018	Lake	Oswego	750.0 A	B	Bathing	Precluded	Nutrients	Storm Sewers	1
MARBLETOWN CREEK	0704-0003	River	Wayne	0.5 Mi.	C	Fish Survival	Precluded	Pesticides	Agriculture	5
ONEIDA LAKE	0703-0001	Lake	Oswego	51090.0 A	B	Bathing	Impaired	Nutrients	Agriculture	5,7
OWASCO LAKE	0706-0009	Lake	Cayuga	6784.0 A	AA(T)	Bathing	Impaired	Pathogens	On-site Systems	1
SENECA RIVER	0701-0008	River	Onondaga	1.5 Mi.	B	Bathing	Precluded	Pathogens	On-site Systems	1
DRAINAGE BASIN: Black River										
KELSEY CREEK	0801-0191	River	Jefferson	1.0 Mi.	C	Fish Survival	Precluded	Priority Organics	Industrial	6
DRAINAGE BASIN: Saint Lawrence River										
BLACK LAKE	0906-0001	Lake	St.Lawrence	8500.0 A	B	Bathing	Impaired	Nutrients	Municipal	1
DRAINAGE BASIN: Upper Hudson River										
WHIPPLE BROOK	1102-0004	River	Washington	1.5 Mi.	C(T)	Fish Survival	Impaired	Oxygen Demand	Agriculture	5
DRAINAGE BASIN: Mohawk River										
SCHEMERHORN CREEK	1201-0040	River	Schenectady	1.0 Mi.	C	Fish Survival	Impaired	Nutrients	Urban Runoff	5
STARCH FACTORY CK	1201-0067	River	Oneida	5.0 Mi.	B	Fish Propaga	Impaired	Oxygen Demand	Urban Runoff	5

Segment Name	Segment ID	Segment Type	County	Segment Size	Class	Use Affected	Severity	Pollutant	Source	TMDL Note
DRAINAGE BASIN: Lower Hudson River										
ANN LEE POND	1301-0001	Lake	Albany	7.0 A	C	Fishing	Impaired	Nutrients	Urban Runoff	2,5
CENTRAL PARK LAKE	1301-0013	Lake	New York	18.0 A	B	Aesthetics	Precluded	Nutrients	Urban Runoff	5
PEEKSKILL HOLLOW	1301-0049	River	Westchester	3.5 Mi.	A	Water Supply	Stressed	Pathogens	On-site Systems	1
ROBINSON POND	1308-0003	Lake	Columbia	115.0 A	B(T)	Bathing	Impaired	Nutrients	Agriculture	5
ROCKLAND LAKE	1301-0004	Lake	Rockland	285.0 A	B	Aesthetics	Stressed	Nutrients	Urban Runoff	5
THE MEER	1301-0011	Lake	New York	11.0 A	B	Aesthetics	Precluded	Nutrients	Urban Runoff	2
THE POND	1301-0010	Lake	New York	4.0 A	B	Aesthetics	Precluded	Nutrients	Urban Runoff	5
THE POOL	1301-0012	Lake	New York	2.0 A	B	Aesthetics	Precluded	Nutrients	Urban Runoff	5
TURTLE POND	1301-0009	Lake	New York	3.0 A	B	Aesthetics	Precluded	Nutrients	Urban Runoff	5
WAPPINGERS LAKE	1305-0001	Lake	Dutchess	104.0 A	B	Bathing	Impaired	Nutrients	Urban Runoff	5
WAWAYANDA CREEK	1306-0015	River	Orange	5.0 Mi.	C(T)	Aesthetics	Threatened	Aesthetics	Urban Runoff	3
DRAINAGE BASIN: Delaware River										
SWINGING BRIDGE R	1401-0002	Lake(R)	Sullivan	868.0 A	B	Bathing	Impaired	Nutrients	Municipal	2
DRAINAGE BASIN: Housatonic River										
RUDD POND	1601-0001	Lake	Dutchess	65.0 A	C	Fishing	Impaired	Nutrients	Agriculture	1
DRAINAGE BASIN: Atlantic-Long Island Sound										
CAMAANS POND	1701-0052	Lake	Nassau	10.0 A	C	Fishing	Impaired	Nutrients	Urban Runoff	2
FREEPORT RESERV.	1701-0025	Lake(R)	Nassau	17.0 A	A	Fish Survival	Impaired	Nutrients	Urban Runoff	2
HEMPSTEAD LAKE	1701-0015	Lake	Nassau	237.0 A	C	Fish Propaga	Impaired	Nutrients	Urban Runoff	2
LAKE ISLE	1702-0075	Lake	Westchester	58.0 A	B	Bathing	Impaired	Nutrients	Urban Runoff	5
MEAD POND	1702-0064	Lake	Westchester	4.0 A	C	Fishing	Impaired	Nutrients	Urban Runoff	1
MILBURN POND	1701-0053	Lake	Nassau	5.0 A	C	Fish Propaga	Precluded	Nutrients	Urban Runoff	2
MILLERS POND	1702-0013	Lake	Suffolk	35.0 A	C	Fishing	Impaired	Oxygen Demand	Urban Runoff	5
RICHMOND CREEK	1701-0043	River	Richmond	1.0 Mi.	B	Aesthetics	Impaired	Aesthetics	On-site Systems	2
SMITH POND	1701-0028	Lake	Nassau	20.0 A	C	Fishing	Impaired	Nutrients	Urban Runoff	2
VAN CORTLANDT LK.	1702-0008	Lake	Bronx	13.0 A	B	Bathing	Precluded	Nutrients	Urban Runoff	3

314 Lake diagnostic study completed (1987); raw sewage discharge eliminated; other remedial measures identified require verification.

2000-2001 Health Advisories: Chemicals in Sportfish and Game

The New York State Department of Health issues advisories on eating sportfish and game because some of these foods contain chemicals at levels that may be harmful to your health. ***These advisories are for sportfish and game that people take and are not for fish and game sold in markets.*** The health advisories are:

(1) general advice on sportfish taken from waters in New York State
(2) advice on ***sportfish*** from specific waterbodies
(3) advice on eating ***game***

The advisory explains how to minimize your exposure to contaminants in ***sportfish*** and ***game*** and reduce whatever health risks are associated with them. The advisories are updated yearly.

These advisories are available from the New York State Department of Health Web site:

http://www.health.state.ny.us/nysdoh/environ/fish.htm