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New York State Department of
Environmental Conservation

Draft Consolidated Assessment and Listing Methodology

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Division of Water

Methodology Links

Monitoring Strategy Overview of the NYSDEC's water quality monitoring program.(33 kB pdf)

Assessment Methodology Details the evaluation of monitoring data and other information used to determine levels of water quality and use support. (91 kB pdf)

Listing Methodology Outlines the identification and prioritization of waters that do not meet water quality standards or support designated uses.(89 kB pdf)

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Draft Consolidated Assessment and Listing Methodology

The Clean Water Act requires states to assess and periodically (every two years) report on the quality of their waters. The NYSDEC Division of Water is developing a Consolidated Assessment and Listing Methodology to outline in considerable detail the process the department follows in monitoring and assessing the quality of New York State waters. Section 303(d) of the Clean Water Act also requires states to identify a list of Impaired Waters, where specific designated uses are not fully supported. For these Section 303(d) Listed Waters, states must consider development of a Total Maximum Daily Load (TMDL) or other strategy to reduce the input of the specific pollutants that restrict waterbody uses, in order to restore such use. Additional objectives of the Methodology are to clarify the water quality assessment and Section 303(d) listing process and improve the consistency of assessment and listing decisions.

The Methodology consists of three (3) separate parts.

- The Monitoring Strategy provides an overview of the NYSDEC water quality monitoring program. (33kb pdf)
- The Assessment Methodology details the evaluation of monitoring data and information to determine levels of water quality and use support. (91kB pdf file)
- The Listing Methodology outlines the identification and prioritization of waters that do not meet water quality standards or support designated uses. (89kb pdf)

Public comments regarding the methodology should be mailed to: NYSDEC Bureau of Watershed Assessment and Research 625 Broadway, 4th Floor Albany, NY 12233-3502 If you would like hard copies of the DRAFT Consolidated Assessment and Listing Methodology, have additional questions or need further information, please do not hesitate to contact the Bureau of Watershed Assessment and Research at the above address, or by phone at 518-402-8179. Public comment on this document will be accepted for 45 days, through August 17, 2001.

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New York State
Water Quality Monitoring Strategy

May 2002

The Federal Clean Water Act provides the regulatory context and mandate for state water quality monitoring and assessment programs. The overall objectives of the Act include the protection and propagation of balanced fish, shellfish, other aquatic life and wildlife populations as well as the support of human uses of water resources (drinking water supply and recreation). Various subsections within the Act call on the states to conduct specific activities to monitor and protect their waters. These activities include:

- the development and adoption of water quality standards designed to protect these uses (Section 303),
- establishing of monitoring programs to collect and analyze data regarding water quality (Section 106),
- reporting on the status of waters and the degree to which designated uses are supported (Section 305(b)), and
- identification and prioritizing of waters that are not meeting water quality standards (Section 303(d)).

This strategy outlines the New York State approach to water quality monitoring and its relationship to the state's assessment program and the determination of water quality standards attainment and designated use support. It provides:

- an overview of New York State's overall monitoring strategy,
- a discussion of the state's water classification and standards system,
- an inventory of NYS DEC component water quality monitoring programs, and
- an outline of the specific water quality monitoring activities within the strategy.

Water Quality Monitoring and Assessment

In order to monitor and protect the water resources of the state, the NYS DEC Division of Water 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:

- a complete and thorough evaluation of all available 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

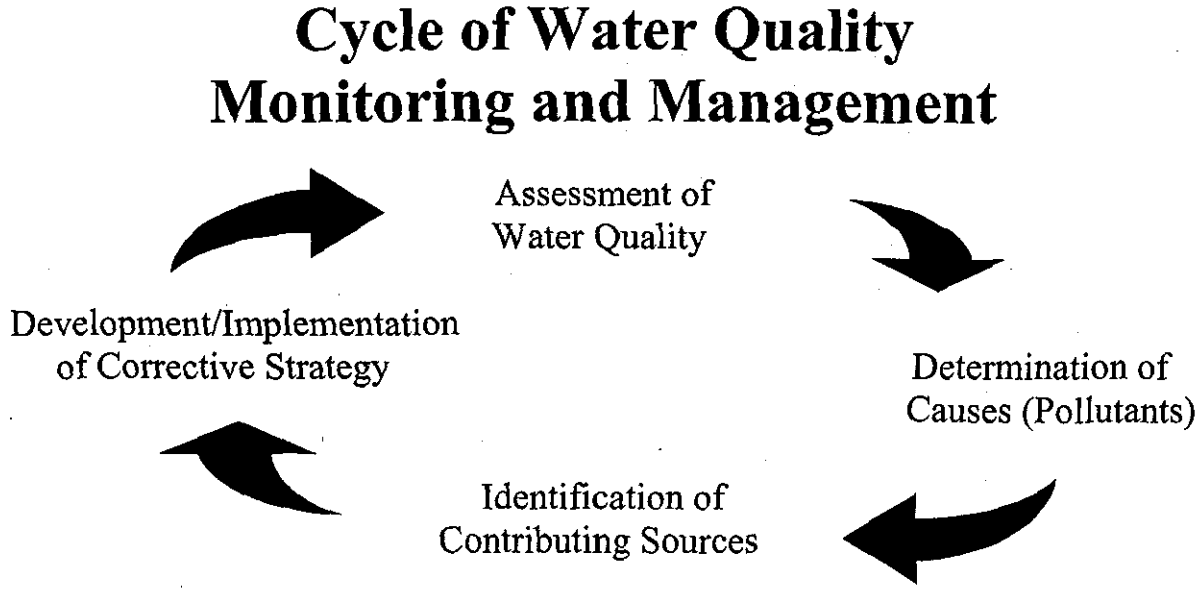
Such a comprehensive plan requires a unifying framework or approach – a brief statement outlining how various component programs fit together and contribute to the achievement of the division's larger vision of protected and enhanced water resources. Such a framework, which represents how water quality 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 1) 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 restored or threat to be addressed?*), 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 separate component programs and the possible integration and coordination of these programs becomes clearer.

Figure 1



Water Classification and Standards System

The basis for water quality management is the Water Classification System. All surface waters (fresh and saline) and groundwaters in the state are classified based on a determination of their best usages, such as source of drinking water, primary/secondary contact recreation, fish propagation and/or 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 evaluating the uses of the specific waterbody, assessing its physical, chemical and biological characteristics, and taking into account economic and social considerations, the Division of Water – 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 A. The assigned Water Quality Classifications for specific waters of the state are contained in *Official Compilation of Codes, Rules and Regulations of the State of New York, Title 6* (6 NYCRR, Parts 800-941).

Classification of a waterbody consistent with its best usage, results in the application of corresponding water quality standards to protect this usage. Water quality standards are descriptive limits, generally expressed in numeric concentration, for quantities of certain chemical, biological and physical constituents in the water. The standards identify acceptable amounts of substances that can be present in a water and still protect best usages. After reviewing studies on the nature and effects of the substance, DOW proposes specific standards to protect human health, aquatic life, wildlife and aesthetic quality. The standards are then evaluated through the regulatory process, which includes a public review component. If approved, the standards are adopted as state regulations. In the absence of a standard in regulation, the DOW can establish (with opportunity for public review) an ambient water quality guidance value to protect the best usages of the waters. All guidance values are compiled in DOW Technical and Operational Guidance Series (TOGS) No. 1.1.1.

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 intention to institute stream classification upgrades so that all waters in the state support the federal fishable/swimmable goal - 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 environmentally significant substances are promulgated/adopted in order to protect specific uses of the waters. As discussed above, the standards for many substances take the form of numeric concentrations. For other substances, 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. A complete listing of water quality standards for specific substances is contained in New York State Water Quality Regulations (Title 6 NYCRR, Parts 700-706).

Water Quality Monitoring

Monitoring can be viewed as both the beginning and end point of water quality management efforts. Data are collected on present conditions to compare with those in the past and in the future. The results mark the progress of division efforts and help identify future program goals.

Division of Water 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 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 longer period of time.

In addition to the measurement of chemical and physical constituents in the waters, monitoring includes biological indicators as well. While biological data (benthic macroinvertebrate and fish community assessments) present a greater challenge to interpret, this information provides a more direct 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 an 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.

Statewide Waters Monitoring Program

The division incorporates all of these (and other) monitoring tools in its Statewide Waters Monitoring Program (SWMP). The SWMP is actually a conglomeration of various component monitoring programs within the division. These component programs include the division's long-running statewide ambient water quality monitoring programs for rivers (the Rotating Intensive Basin Studies RIBS Sampling Program) and for lakes (the Lake Classification and Inventory), the Citizens Statewide Lake Assessment Program (CSLAP) which uses volunteers to conduct additional lake monitoring, the Stream Biomonitoring Program and Toxicity Testing Program which provide biological monitoring components, a Regulatory Sampling Program to monitor point source compliance, and other efforts. Monitoring activities by other divisions of NYS DEC, as well as in other agencies and groups outside the department also contribute information to the evaluation and assessment of rivers, lakes, groundwater, marine waters and estuaries, and wetlands in New York State. But the foundation of the department's ambient water quality monitoring and assessment effort remains the Statewide Waters Monitoring Program.

While monitoring activities by other divisions of NYS DEC, as well as in other agencies and groups outside the department contribute information to the evaluation and assessment of New York State waters, the foundation of the department's ambient water quality monitoring and assessment effort remains the *Statewide Waters Monitoring Program*.

The SWMP represents the latest iteration of a state water quality monitoring program that was established in the 1960s. The stated objectives of the program are numerous and varied. These objectives include: the comprehensive assessment of water quality of all waters of the state, including the documentation of *good* quality waters; analysis of long-term water quality trends; comprehensive and integrated multi-media sampling; the characterization of naturally occurring or background conditions; and the establishment of baseline conditions for measuring the effectiveness of site-specific restoration and protection activities.

In order to address the number and variety of monitoring objectives, component programs within the Statewide Waters Monitoring Program are designed around three (3) separate types of monitoring networks and activities. Each of these operates concurrently, yet somewhat independently, and focuses on distinctly different objectives.

Water Quality Screening is conducted to provide a *qualitative* assessment of water quality at a large number of sampling sites with minimal resource (staff and analytic) expense. On-site biological (macroinvertebrate) sampling and visual lake surveys are examples of screening efforts.

Intensive Basin Monitoring employs more frequent as well as more comprehensive and integrated multi-media sampling (water chemistry, bottom sediment chemistry, toxicity testing, macroinvertebrates, fish, habitat assessments) to provide more detailed water quality information for a smaller number waterbodies in selected drainage basins.

Routine Trend Monitoring provides continuous (annual) sampling of water quality and conditions at fixed sites across the state. This effort is designed to monitor basic water quality characteristics, establish baseline conditions and evaluate long-term trends.

The water quality data and information currently generated by the SWMP are used to support many water quality monitoring and assessment functions within the NYS DEC Division of Water. Specifically, SWMP data/information is used in the compiling of the Waterbody Inventory/Priority Waterbody List (WI/PWL), the compilation of New York State's Clean Water Act Section 305(b) Water Quality Report and Section 303(d) Impaired Waters List, and the selection of locations for intensive surveys and special water quality monitoring projects. The monitoring data are also used to support USEPA's Index of Watershed Indicators (IDI), the Unified Watershed Assessment (UWA) and other federal water quality initiatives.

For further details regarding Statewide Waters Monitoring Program (SWMP) activities, see *Quality Assurance Plan for the Statewide Waters Monitoring Program*, NYS DEC, 2001.

Traditionally, Division monitoring goals have emphasized the assessment of water quality over the support of water quality management functions. However with increasing national interest in Total Maximum Daily Load (TMDL) development as well as NYS DEC's implementation of the Watershed Restoration and Protection Strategies initiative (described below), the future direction of the Division monitoring program will have to better balance both needs. This may result in additional SWMP components to address pollutant fate and transport (loadings), standards development, model verification, and other water quality management issues.

Comprehensive Assessment Strategy

Once collected, monitoring data is reviewed to determine water quality conditions and the degree to which various waterbody uses are supported. The Clean Water Act directs states to consider not only state-generated data, but all existing and readily available water quality data and information (including source water assessments, dilution calculations, predictive models, etc.) in conducting their assessments. Given the public interest in environmental issues and the wide range of water quality monitoring activities currently being conducted at a variety of levels, consideration of such a volume of information could be an overwhelming task. In response, the NYS DEC Division of Water has adopted a continuous water quality assessment process that accommodates a wide range of participants, and various levels of water quality data and information. This process is the division's *Comprehensive Assessment Strategy*. Three (3) cornerstones of the Comprehensive Assessment Strategy – rotating basin schedules, enhanced communication and information sharing, and the Waterbodies Inventory/Priority Waterbodies List (WI/PWL) – are outlined below.

Rotating Drainage Basin Schedules

A rotating drainage basin strategy focuses monitoring and assessment activities on smaller portions of the state for a period of time and then turns attention to other parts of the state. The rotating schedule adopted by New York State calls for the initiation of coordinated efforts in two or three drainage basins each year, resulting in an assessment of the entire state within a five-year cycle. The rotating basin schedule was first used by division monitoring programs in response to diminishing resources which prevented sampling the whole state at one time. But due to the success of this approach in delivering the monitoring program, the adoption of a common basin rotation schedule has since been extended to other division assessment and management programs as well. This coordinated schedule also facilitates the integration of monitoring, assessment and management programs and moves the division toward a more unified water program. Because of these aspects, the rotating basin schedule was adopted as the framework for the Comprehensive Assessment Strategy.

Enhanced Communication and Information Sharing

The goal of incorporating "all available data and information" into the Comprehensive Assessment Strategy requires communication with and information sharing among not only Division of Water program staff, but with water quality "partners" in other NYS DEC divisions, other state and county agencies and local groups outside the department. Realization of this goal also requires a process that actively facilitates communication and encourages the exchange of information. The schedule of Comprehensive Assessment Strategy activities (outlined below) institutionalizes interagency and public participation in the process with a series of water quality partnership meetings and workshops throughout the five-year monitoring, assessment and management cycle.

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

A third critical aspect of the Comprehensive Assessment Strategy is the linkage of 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 a Water Management Advisory Committee, Statewide Nonpoint Source Committee, County Water Quality Coordinating Committees, citizen advisory committees for Remedial Action Plans and Lake Management Plans, and other means.

In establishing a more coordinated and inclusive approach to water quality monitoring and assessment activities, the Comprehensive Assessment Strategy encourages the functional integration of monitoring, data analysis and interpretation and water quality reporting. In doing so, the strategy produces a more complete and thorough evaluation of all available monitoring data and information – from both within and outside the department – resulting in a comprehensive assessment of water quality throughout the state.

Building on the completed water quality assessments, the recently introduced *Watershed Restoration and Protection Strategies* direct attention on the management of those water quality issues specifically identified in a basin. These strategies bring together all appropriate governmental agencies as well as public stakeholders to focus all available tools (grant dollars, technical assistance and other resources) on the priority water quality and natural resource needs of a targeted basin.

The development and implementation of Watershed Restoration and Protection Strategies provide a water quality management component that completes what then becomes a continuous five-year cycle of water quality monitoring, assessment and management. The various activities contained within this five-year cycle are outlined in Figure 2.

Figure 2 Five-Year Cycle of Water Quality Monitoring, Assessment and Management

<table>
<tr><td>Year 1</td><td>Year 2</td><td>Year 3</td><td>Year 4</td><td>Year 5 +</td></tr>
<tr><td colspan="2">W. Q. Monitoring Activities</td><td>W. Q. Assessment Activities</td><td colspan="2">W. Q. Management Activities</td></tr>
<tr><td colspan="2">Comprehensive Assessment Strategy</td><td rowspan="3">Review/Update of Waterbody Inventory and Priority Waterbodies List</td><td colspan="2" rowspan="2">Watershed Restoration and Protection Strategy</td></tr>
<tr><td colspan="2">Statewide Waters Monitoring Program</td></tr>
<tr><td>W.Q. Issue Identification & Screening</td><td>Intensive Monitoring and Data Collection</td><td>Strategy Development</td><td>Strategy Implementation</td></tr>
</table>

Each year two or three major drainage basins (encompassing, on average, about 20% of the state) become the focus of new three-year Comprehensive Assessment Strategy efforts. At the conclusion of these monitoring and assessment activities, water quality management components become the focus of Years 4 and 5 (and beyond). The specifics of these activities are discussed in detail below.
As the cycle runs its course, new studies on 2 or 3 other basins (comprising another 20% of the state) begin each year. The staggered implementation of these monitoring, assessment and management program components, and the way in which they fit together to provide statewide coverage over a five-year period is presented in Figure 3.

Year One: Identification of Water Quality Issues and Water Quality Screening
The first year of a Comprehensive Assessment Strategy effort in a basin begins with a review of current available information – including the division's Waterbody Inventory/Priority Waterbodies List (WI/PWL) – to identify pertinent water quality problems and issues. Regional staff, other division and agency monitoring units and the network of local/county Water Quality Coordinating Committees and other water quality partners are also consulted to determine where monitoring efforts in the basin should focus.

In addition to the identification of water quality issues, *Year One* Statewide Waters Monitoring Program activities include Biological Screening Network sampling. This effort uses qualitative biological assessments to identify waters that support uses and waters that require further study. A similar screening effort for lake waterbodies and lake use assessments at previously unassessed lakes is also under development; as are attempts to incorporate water quality screening and problem verification efforts (fishery community and habitat assessment, facility toxicity testing, shellfish area assessment, etc.) by other NYS DEC monitoring programs at other waters in the targeted basins.

Figure 3

Schedule of *Comprehensive Assessment Strategy* Activities

Basin/Watershed	1998	1999	2000	2001	2002	2003	2004	2005
Lake Champlain Atl.Oc/Long Isl Sound	W.Q. Issue Identification and Screening	Monitoring and Data Collection	Evaluation and W.Q. Assessment	Management/Restoration Strategies and Activities				
Genesee River Delaware River		W.Q. Issue Identification and Screening	Monitoring and Data Collection	Evaluation and W.Q. Assessment	Management/Restoration Strategies and Activities			
Niagara River Mohawk River			W.Q. Issue Identification and Screening	Monitoring and Data Collection	Evaluation and W.Q. Assessment	Management/Restoration Strategies and Activities		
Allegheny River Oswego-Sen-Oneida Upper Hudson	This grouping of basins represents the complete coverage of all New York State waters and will be repeated every five years.			W.Q. Issue Identification and Screening	Monitoring and Data Collection	Evaluation and W.Q. Assessment	Management/Restoration Strategies and Activities	
Chemung River Black River Lower Hudson					W.Q. Issue Identification and Screening	Monitoring and Data Collection	Evaluation and W.Q. Assessment	Management/ Strategies an
Susquehanna R. Lake Champlain Atl.Oc/Long Isl Sound						W.Q. Issue Identification and Screening	Monitoring and Data Collection	Evaluation and W.Q. Assessment
Genesee River St.Lawrence R. Delaware River							W.Q. Issue Identification and Screening	Monitoring and Data Collection
Niagara River Mohawk River								W.Q. Issue Identification and Screening

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The goal of these screening activities is to conduct an evaluation of **all** river and lake waterbodies in a basin study area over a period of two sampling cycles (10 years). Such a *census* approach has distinct advantages over *targeted* monitoring designs (which are often biased toward "problem" waters and result in skewed inferences regarding statewide use support) and *random/probabilistic* monitoring (which provides a statistical evaluation of statewide water quality, but limited segment-specific information). However, targeted monitoring is a key component in the second year of monitoring (see below). Additionally, a pilot study to determine a possible role for random/probabilistic monitoring in the Statewide Waters Monitoring Program is continuing.

Year Two: Intensive/Chemical Network Monitoring

The results of the *Year One* water quality review and water quality screening are used to develop more intensive basin monitoring plans for selected waters in the target watersheds. The Intensive/Chemical Network monitoring component of the Statewide Waters Monitoring Program incorporates a wide range of water quality monitoring including chemical analyses of contaminants in water, bottom sediment, whole organisms (benthic macroinvertebrates) and fish flesh samples, as well as more detailed biological assessments and ambient toxicity evaluations. Much of this sampling is conducted by the Statewide Waters Monitoring Program staff. However, the goals of the Comprehensive Assessment Strategy have led to the incorporation of data and information from other sources into its water quality evaluations. These may include a number of other division/department activities, such as lake studies and management programs, fishery habitat and community assessment, fish tissue contaminant sampling, chemical sampling of facility effluents, groundwater quality evaluation, pollutant track-down efforts, and nonpoint source monitoring.

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

Year Three: Water Quality Evaluation/Assessment and WI/PWL Update

The third year of the Comprehensive Assessment Strategy focuses on the evaluation and assessment of results from the multi-faceted monitoring during the first two years of effort. This evaluation and assessment component uses monitoring data and information to compare against a wide range of water quality indicators to determine the level of use support in the waters of the state. The water quality evaluation and assessment culminates in an update of the WI/PWL for the basin study area. The methodology for evaluating monitoring data and information against specific indicators to determine the level of use support and an assessment of water quality (detailed in the *Assessment Methodology* section of this document) is integral to Section 303(d) List development.

WI/PWL Assessment Methodology
The methodology for evaluating monitoring data and information against specific indicators to determine the level of use support and an assessment of water quality is integral to Section 303(d) List development.

Like the monitoring effort, the WI/PWL update process involves the 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. Accommodation of such a wide range of participants is managed through NYS DEC regional staff involvement and a network of local/county Water Quality Coordinating Committees.

Year 4: Watershed Restoration and Protection Strategies Development

The completion of a basin WI/PWL marks the end of the monitoring and assessment efforts within that basin. Armed with all available water quality information, the focus of division programs turns toward the management, protection and, where necessary, the restoration of water resources in the state. The primary activity in the fourth year of the cycle is the development of Watershed Restoration and Protection Strategies for targeted basins. These strategies bring together all appropriate agencies and stakeholders to focus all available tools (grant dollars, technical assistance and other resources) to address the priority water quality and natural resource needs of a basin and identify a detailed action plan.

Year 5 (and beyond): Implementation of Management Strategies

The completed strategy includes recommendations and specific commitments by water quality partners to implement various components of the strategy. The Schedule of Activities (Figure 3) shows the development and implementation of management/restoration strategies and activities extending through Years 4 and 5 and beyond. These activities are represented in this manner because exact schedules for these efforts can vary significantly from basin to basin. More detailed schedules will be developed as part of the strategy development phase.

Data Management

Results of water quality sampling conducted through the SWMP are reported by analytic laboratories to Division of Water staff electronically. Once received, raw data values are reviewed and compared against expected ranges and water quality standards. Outliers are routinely verified with the analytic laboratory. Quality control results are also evaluated. Specific monitoring programs within the SWMP maintain electronic databases of their raw data results; the data is available by request (once it has been reviewed and verified.)

Additionally, NYS DEC monitoring programs have long used the USEPA STORET national water quality database to store raw data and make it available to others. USEPA recently modernized the STORET system; in effect, building an entirely new data management system. NYS DEC is currently setting up the new system on its local network, establishing a storage environment for division water quality data, and developing a data management plan for the storage of future, as well as backlogged, water quality data.

In addition to maintaining water quality data results in electronic databases, the division also maintains a database of water quality assessment information. This database – the Waterbody Inventory/Priority Waterbodies List Database – contains available information regarding waterbody location and description, use support, severity of impacts/use impairments, pollutants and sources, problem/issue management and resolution, and additional narrative discussions for individual waterbodies throughout the state. Currently the WI/PWL database is being expanded to include all waters of the state, and characterize them into one of four categories: *Priority Waters* (those waters with documented impacts or threats to water quality), *Waters with Impacts Needing Verification*, *Waters with No Known Impacts*, and *UnAssessed Waters*. This information is being recorded in geographical information system (GIS) coverages to allow for more efficient querying and more effective presentation of the assessment information.

The New York State

2002 *Draft* Section 303(d) List of Impaired Waters Requiring a TMDL and Consolidated Assessment and Listing Methodology

The Federal Clean Water Act requires states to periodically assess and report on the quality of waters in their state. Section 303(d) of the Act also requires states to identify *Impaired Waters*, where specific designated uses are not fully supported. For these Impaired Waters, states must consider the development of a *Total Maximum Daily Load (TMDL)* or other strategy to reduce the input of the specific pollutant(s) that restrict waterbody uses, in order to restore and protect such uses. Additionally, states are required to provide an assessment and listing methodology that explains their approach to water quality monitoring, data evaluation and listing.

Presented here for public review and comment is the New York State 2002 *Draft* Section 303(d) List of Impaired Waters. The list includes those waters that do not support appropriate uses and that require and are scheduled for TMDL development. The waterbody listings in the Section 303(d) List are segmented into a number of categories. The various categories, or Parts, of the list are outlined below. A more complete discussion of the segmentation of the Section 303(d) List can be found in the Listing Methodology section of the Consolidated Assessment and Listing Methodology (see below). A list of "de-listed" waters (listed on the 1998 Section 303(d) List, but not on the 2002 List) and their reason(s) for de-listing is also outlined below.

Section 303(d) List of Impaired Waters Requiring a TMDL

Part 1 High Priority for TMDL Development by NYSDEC
These are waters where NYSDEC is currently developing a TMDL or has scheduled the development of TMDL

Part 2 Multiple Segment/Categorical TMDL Waters
These are groups of waters affected by similar causes/sources where a single TMDL may be able to address multiple waters with the same issue. Part 2 is subdivided into:
a) Waters Impaired by Atmospheric Deposition (acid rain)
b) Waters Impaired by Fish Consumption Advisories
c) Waters Impaired by Shellfishing Restrictions

Part 3 Waters Requiring Re-Assessment Based on New Methodology
These are waters where scheduling of TMDL development may be deferred until evaluation of water quality using the new/revised methodology has been completed.

De-Listed Waters

These waters are NOT included on the 2002 Section 303(d) List, but were listed on the previous (1998) list. These waters are categorized according to the reason for their de-listing. These reasons include:

- TMDL Development is Complete and Being Implemented,
- Control Strategy Other than a TMDL is More Appropriate,
- Impairment is Result of □□□□□□□, Rather than □□□□□□□□□
- More Recent Assessment Shows No Known Impairment, and/or
- New Segmentation of Waterbodies/Other Factors.

Also Available for public review and comment is the NYSDEC Division of Water [illegible]. The [illegible] outlines in considerable detail the process that the department follows in monitoring and assessing the quality of New York State waters. It also includes a Listing Methodology that details the identification of impaired waters, the evaluation of the appropriateness of a TMDL and the determination as to whether specific waters are included on the Section 303(d) List.

Public comments regarding the [illegible] and/or the [illegible] should be mailed to:

NYSDEC Bureau of Watershed Assessment and Research
625 Broadway, 4th Floor
Albany, NY 12233-3502

If you would like hard copies of the list or methodology, have additional questions or need further information, please do not hesitate to contact the Bureau of Watershed Assessment and Research at the above address, or by phone at 518-402-8179.

Public comment on these documents will be accepted for 45 days, through April 30, 2002.

Section 303d
Listing Methodology

May 2002

The Clean Water Act, in Section 303(d), requires states to identify and prioritize waterbodies for which technology-based effluent limitations are not stringent enough to attain and maintain applicable state water quality standards. Presented below is the New York State Section 303(d) *Listing Methodology* – which guides the development of the state's *Section 303(d) Impaired Waters List*. This Listing Methodology builds on the monitoring data/information and assessment decisions that come out of the implementation of the Monitoring Strategy and Assessment Methodology outlined previously.

By the time the development of the New York State Section 303(d) List begins, considerable monitoring activities and the assessment of monitoring data have already been completed. Previous portions of this document present the New York State *Monitoring Strategy* and *Assessment Methodology* for collecting, considering and evaluating all existing and readily available water quality data and information. That process culminates in the update of the Water Inventory/Priority Waterbodies List (WI/PWL) and a report on the quality of the state's waters, as required in Section 305(b). The list of waterbodies to be included on the New York State Section 303(d) List is drawn directly from the updated WI/PWL.

The *CALM Listing Methodology* outlined here is an extension of the *CALM Assessment Methodology*. Consequently, use of this *Listing Methodology* to identify "Impaired" waters to be included on the Section 303(d) List is best applied only to waters that have been assessed using the *CALM Assessment Methodology*. Waters in drainage basins where the current water quality assessments pre-date the *CALM Assessment Methodology* and are based on previous assessment guidance and should be re-evaluated using the new methodology. The scheduling of TMDL development may be deferred until the re-assessment is complete and the appropriateness of a TMDL is determined.

The re-assessment of *Waters Requiring Evaluation Based on the New Methodology* will be conducted according to the *Statewide Basin Monitoring and Assessment Schedule* (Figure 2, page 6). Determination of the need and scheduling of TMDL development will be based on results of the re-assessment and application of the *CALM Assessment* and *Listing Methodologies*.

This Listing Methodology describes the Use Support/Attainment Categories used by USEPA to report nationally on the quality of all waters under Section 305(b). The methodology also outlines the relationship between the WI/PWL Water Quality Assessment Categories used to characterize waterbodies (detailed in the preceding *Assessment Methodology* section) and the national Use Support/Attainment Categories. Guidelines for making final Section 303(d) listing decisions and various other issues that affect those decisions are discussed as well.

When compiled, the New York State *Draft* Section 303(d) Lists are presented for Public Notice, and an appropriate period for the receipt of and response to written comments regarding the *Draft* List will be announced. However, as noted above, much of the decision-making regarding which waters are impaired and are to be included on the list takes place during the water quality assessment process. Consequently, while written comments during the public notice and comment period are welcome, greater participation in the entire Comprehensive Assessment Strategy – including the monitoring and particularly the assessment and WI/PWL update activities which precede the compilation and submission of the Section 303(d) List – is equally (perhaps more) important and highly encouraged.

Standards Attainment Categories

In October 2001, USEPA issued integrated monitoring and assessment guidance to the states encouraging the consolidation of methodologies for the assessment of all waters (Section 305(b) reporting) and the identification of impaired waters under Section 303(d). This guidance established five unique Use Attainment Categories which are to be used to characterize the degree of use support and standards attainment for all waters. These Use Attainment Categories are outlined below.

Waters Attaining All Standards describes waters where data and information indicates all standards are met and appropriate uses are supported, and no standards or uses are threatened.

Waters Attaining Some Standards describes waters where data and information indicates standards are met and appropriate uses are supported (and none are threatened), but where some standards/uses have not been fully assessed due to insufficient data/information.

Waters with Insufficient Data/Information describes waters where insufficient or no data is available to make a determination of standards attainment and use support.

Impaired/Threatened Waters Not Requiring a TMDL describes waters where standards are not being met and/or uses are not supported, but where TMDL development is not necessary because 1) a TMDL has been completed, or 2) other actions required by federal, state and/or local agencies are more appropriate than a TMDL and are expected to result in water quality improvement, or 3) the impairment/threat is attributed to *pollution* (such as flow alteration, hydrologic modification, degraded habitat, exotic, invasive and/or non-native species, or other cause not associated with a contaminant), rather than a specific *pollutant*, and TMDL development is not appropriate.

Impaired/Threatened Waters Requiring a TMDL describes waters where standards are not being met and/or uses are not supported, and where TMDL development is an appropriate response to the impairment/threat.

The same water quality information that these Use Attainment Categories were designed to capture also form the basis of the Waterbody Inventory/Priority Waterbodies List (WI/PWL). As a result the national categories correlate very well with the *severity of water quality problem* and *level and documentation* used in the WI/PWL assessments. The relationships between the USEPA categories and the WI/PWL severity/documentation information are outlined in Table 9.

Waters listed in the WI/PWL as having *No Known Impact/Impairment* are assigned to the *Waters Attaining All/Some Standards* categories. Waters listed as *Stressed* (*Known* or *Suspected*) on the WI/PWL are also assigned to one of these categories. Although *Stressed* waters exhibit indications of minor water quality impacts, these waters meet water quality standards and fully support uses. Additionally, these waters cannot be considered *"threatened"* by USEPA definition because conditions in these waters are considered stable, and additional protection activities are not considered necessary to maintain use support into the future. Consequently *Waters Attaining All/Some Standards* is the most appropriate of the available USEPA categories for these waters.

Although *Stressed* waters exhibit indications of minor water quality impacts, these waters meet water quality standards and fully support uses...Consequently *Waters Attaining All/Some Standards* is the most appropriate of the available USEPA categories for these waters.

Table 9 Relationships Between WI/PWL Use Support/Severity/Documentation and USEPA 305(b) Use Attainment Categories

Severity of Problem	Level of Documentation	USEPA Water Use Attainment Categories
Precluded	Known	Impaired/Threatened for Water Quality Standards [1]
Impaired	Known, Suspected	
Stressed	Known, Suspected	Attaining All/Some Water Quality Standards [2]
	Possible	Insufficient Data to Determine Standards Attainment
Threatened [3]	Known	Impaired/Threatened for Water Quality Standards [1]
	Suspected	Insufficient Data to Determine Standards Attainment
	Possible	Attaining All/Some Water Quality Standards [2]
No Known Impact/Impairment		Attaining All/Some Water Quality Standards [2]
UnAssessed Waters		Insufficient Data to Determine Standards Attainment

[1] Determination as to whether a TMDL is required will be made on a case-by-case basis.

[2] Determination as to whether all or some standards are attained will be made on a case-by-case basis.

[3] In order to support WRAPS and other efforts, the WI/PWL uses a broader definition of *Threatened* to track potential threats to waters that do not meet the EPA threshold of data that reveals a declining water quality trend; hence the assignment of the appropriate Use Attainment Category for WI/PWL *Threatened* waters is dependent upon the Level of Documentation.

Determinations as to which of the two *Waters Attaining Standards* categories (i.e., *Waters Attaining All Standards* or *Waters Attaining Some Standards*) are more appropriate are made on a case-by-case basis. Generally, uses corresponding to Class C or other waters with best usages of recreation and aquatic life support can be evaluated using similar data and information. As a result, Class C waters with *No Known Impact/Impairment* are usually categorized as *Attaining All Standards*. Class A and B (and similar) waters support additional uses beyond recreation and aquatic life support (e.g., drinking water supply, public bathing, etc.). Because these additional uses are measured by other more use-specific indicators, it is more likely that some of the wider range of uses for these waters are not evaluated. Consequently these waters are more likely to fall into the *Attaining Some Standards* category.

The two USEPA categories that capture waters that are *Impaired/Threatened for Water Quality Standards* (either requiring or not requiring a TMDL) include all waters listed in the WI/PWL as having *Precluded* and/or *Impaired* uses. The determination as to whether a waterbody requires a TMDL or not is made separately (this determination is discussed in more detail later).

USEPA categories of *Impaired/Threatened for Water Quality Standards* include all waters listed in the WI/PWL as having *Precluded* and/or *Impaired* uses. The determination as to whether a waterbody requires a TMDL or not is made separately.

Waters listed in the WI/PWL as *UnAssessed Waters* or as corresponding to *Waterbody Impacts Needing Verification* (these include *Stressed/Possible* and *Threatened/Suspected* waters) will be assigned to the USEPA category *Waters with Insufficient data/information.* Additional monitoring to provide the data/information necessary to make an attainment decision will be conducted according to the *Comprehensive Assessment Strategy* schedule of activities.

The assignment of waters listed in the WI/PWL as *Threatened* to an appropriate USEPA Use Attainment Category is dependent upon the WI/PWL level of documentation for the threat. This is because the use of the term "threatened" in the WI/PWL is much broader than USEPA's use of the term, encompassing a wider-range of threats. To satisfy the more stringent USEPA definition of a "threatened" water, available data must indicate a declining trend in water quality that is predictive of the non-attainment of standards in the future – specifically, by the end of the current listing cycle. Only WI/PWL *Threatened* waters with a level of documentation of *Known* potentially meet this threshold. Consequently, only waters listed on the WI/PWL as ***Known*** to be *Threatened* are considered for assignment to the *Impaired/Threatened Waters* categories. Whether these waters are designated as *Impaired/Threatened* is dependent upon the rate of water quality decline (i.e., does the water meet the USEPA condition that non-attainment is expected by the end of the current listing cycle?), which will be evaluated on a case-by-case basis.

The term "threatened" in the WI/PWL is much broader than USEPA's use of the term, encompassing a wider-range of threats. Consequently, only waters listed on the WI/PWL as ***Known*** to be *Threatened* are considered for assignment to the *Impaired/ Threatened Waters* categories.

Waters listed in the WI/PWL as *Threatened* but with a level of documentation of *Suspected* or *Possible* reflect potential threats, and do not meet the USEPA threshold of "threatened." WI/PWL *Threatened* waters characterized as *Suspected* have some reasonable evidence to suggest declining water quality but results remain inconclusive. Consequently *Threatened* ***Suspected*** waters are designated as *Waters with Insufficient data/information. Threatened* ***Possible*** waters, where anecdotal evidence (with limited documentation) suggests a threat, are assigned to the *Waters Attaining All/Some Standards* categories.

Impaired/Threatened Waters Not Requiring a TMDL

Waters assessed as *Impaired/Threatened Waters* are to be evaluated for the appropriateness of TMDL development to address the impairment/threat. Some waters assessed as *Impaired/Threatened Waters* are not included on the Section 303(d) List because TMDL development is not the most appropriate response to the water quality issue. These *Impaired/Threatened Waters Not Requiring a TMDL* generally fall into one of three sub-categories.

Impaired/Threatened Waters where a TMDL is Developed and Being Implemented
Once a TMDL has been developed and approved, the waterbody is no longer included on the Section 303(d) List. Progress regarding completion of TMDLs and the de-listing of waters where TMDLs are in place will be evaluated with the development of each subsequent 303(d) List.

Impaired/Threatened Waters where Other Controls are More Suitable
This sub-category recognizes that for some water quality impairments and threats, actions other than TMDL development provide a more appropriate and effective response. Assignment of waters to this sub-category is based on the availability and appropriateness of other strategies that are expected to be more effective in addressing impairments/threats than TMDLs. These strategies include the correction of failing or inadequate treatment facilities, implementation of best management practices (BMPs), zoning restrictions or other local initiatives. Progress and effectiveness of these strategies – relative to the development of a TMDL – will be evaluated during the development of each

Waters Impaired by Pollution, Not by Pollutant(s)
Waterbodies assigned to this sub-category are not meeting standards due to *pollution* and no *pollutant* is contributing to the impairment. Because TMDLs represent a pollutant-specific approach, the development of a TMDL for these waters is NOT required. Specific examples of impairments/threats that fall into this sub-category include, but are not limited to:

- exotic, invasive, non-native species,
- flow alteration or other hydrologic modification, or
- natural conditions or conflicting use.

Section 303(d) Listed Waters

For waters where TMDL development is an appropriate response to the water quality impairment/threat, the waterbody will be assigned to the *Impaired/Threatened Waters Requiring a TMDL* category. ***This list of waters – that do not meet water quality standards in spite of technology-based effluent limits and for which TMDL development is the most appropriate response to address water quality issues in the waterbody – represents the New York State Section 303(d) List.***

Prioritization of Section 303(d) List Waters

The Section 303(d) List of *Impaired/Threatened Waters* requiring a TMDL includes a schedule for the development of TMDLs for specific waters/pollutants. This schedule reflects the priorities for TMDL development in New York State. To provide a more general sense of these priorities, the waters on the New York State Section 303(d) List are segregated into sub-parts to allow for clarification to the public and stakeholders of widely differing conditions, limitations and other circumstances which affect the scheduling and development of TMDLs. These sub-parts are outlined below.

Part 1 - *Waters with High Priority for TMDL Development by NYS DEC*

These *Impaired/Threatened Waters* have been identified by the state as priority waters for TMDL development. TMDLs for these waters and specified pollutants are either currently being developed by NYS DEC, or they are scheduled for TMDL development by NYS DEC. A specific schedule for the development and submission to USEPA for approval of TMDLs for each of these waters will be included in the list, and will further highlight priorities among the waters on this part of the list.

Part 2 - *Multiple Segment/Categorical TMDL Waters*

These are *Impaired/Threatened Waters* that also require TMDLs. However because these waters are impaired by similar pollutants/sources it is more effective to develop a TMDL to address the cause and/or source of the impairment rather than the specific waterbody condition. Due to the complexity of the problem and number of segments involved, development of multiple segment TMDLs for these impairment categories may require additional time and involvement of agencies (USEPA, others) outside NYSDEC in order to complete. These *Multiple Segment/Categorical TMDL Waters* include:

- Atmospheric Deposition (Acid Rain) Waters - where much of the pollutant source lies outside of New York State and for which the issue requires a national effort/program. This effort is being led by USEPA and is currently underway.
- Fish Consumption Waters - which are the result of 1) historic/legacy pollutants (PCBs, dioxins, mirex, etc) in bottom sediments, the continuing discharge of which has effectively been regulated; or 2) atmospheric deposition pollutants (mercury) that must, like acid rain waters, be addressed nationally.

- Shellfishing Waters - restricted due to urban/stormwater runoff sources and for which the scheduling of TMDLs will occur after the completion of pilot TMDL development for selected shellfishing waters (Oyster Bay and Flanders Bay) and/or the implementation and evaluation of the impact of new stormwater regulations which are expected to address, at least in part, this water quality issue.

Part 3 - *Waters Requiring Re-Assessment Based on the New Methodology*

The assessment and listing methodologies outlined in this document have been developed only recently. The incorporation of these methodologies into New York State's multi-year Comprehensive Assessment Strategy are being phased in and will take some time to be fully implemented across the state. In those drainage basins where the CALM Assessment Methodology has been used to identify *Impaired/Threatened Waters*, those waters are listed and prioritized according to the Listing Methodology. However for drainage basins where the methodology has not yet been applied, waters listed on the previous (1998) Section 303(d) List may need to be re-evaluated. The re-assessment of these previously listed waters and the comprehensive assessment of all other waters in these basins will be conducted according to the *Statewide Basin Monitoring and Assessment Schedule* (Figure 2, page 6). Scheduling of a TMDL may be deferred until the re-assessment is complete and the appropriateness of a TMDL is determined.

Other Listing Issues

In compiling the Section 303(d) List a number of other issues which have an impact on decision-making should be considered. These issues are discussed below.

De-Listing of Waters from Section 303(d) List

Progress regarding the establishment of TMDLs, as well as their effectiveness, can be tracked by the movement of waterbodies off and within different parts of the list. However, as is the case with determining what waterbodies to list, removal of waterbodies from the list (de-listing) and movement of waterbodies within the list must be governed by specific guidelines. De-listing of a previously listed water prior to the development of a TMDL can occur only 1) if the water is shown to be meeting all applicable water quality standards, or 2) if, upon re-examination, the original basis for listing the water is determined to be inaccurate. Based on these thresholds, the following presumptions guide de-listing of waters for the three types of assessment criteria outlined in the Assessment Methodology.

Use Restriction Orders

For listings based on use restriction orders, waters will be de-listed if the restriction is lifted by the issuing authority. This applies to drinking water advisories, public bathing beach closures, fish and shellfish consumption advisories. The lifting of a restriction order represents sufficient evidence that standards that previously were not being met are now being met. As a result, this justification for de-listing corresponds to the first of the two thresholds for de-listing: that the water is meeting applicable water quality standards.

So long as a use restriction order remains in effect, the waterbody cannot be de-listed. Subsequent monitoring data showing water quality improvement and the attainment/maintenance of standards alone is not sufficient to de-list; that data must be forwarded to the appropriate agency and result in the lifting of the use restrictions.

If use restriction orders are modified, the degree of use impairment should be re-evaluated in light of the assessment methodology to determine the appropriateness of continued listing. For example, if a seasonal shellfishing restriction for a listed waterbody is lifted due to improved water quality but an administrative closure in the waterbody remains in effect for portion of the waterbody due to proximity of wastewater discharges, the water may be de-listed since the assessment methodology indicates that administrative closures alone do not result in listing.

Numerical and Narrative Standards and Criteria

For listings based on the failure of the water to meet water quality standards, de-listing requires more recent monitoring data showing that the standards are now being attained and maintained. In most of these de-listings, sufficient evidence of a sufficient water quality improvement is needed. However if the applicable water quality standard or criteria is revised upward, if site-specific criteria are developed for the waterbody, or if other water quality measures are determined to be more appropriate, and existing data meets the new threshold, then waters may be de-listed without a documented improvement in water quality.

Surrogate Water Quality Indicators

For listing based on surrogate water quality indicators, requirements for de-listing are similar to those for listing based on standards and criteria. Generally, de-listing requires monitoring data showing sufficient water quality improvement and that conditions resulting in the original listing (as outlined in the Assessment and Listing Methodologies) are no longer present. However if more appropriate and/or accurate indicators are developed and implemented, waters may be de-listed without documented water quality improvement.

The justification for de-listing waters based not on water quality improvement, but on changes in water quality standards, criteria and/or indicators corresponds to both of the two thresholds for de-listing outlined above. In such cases the waters are, in fact, *meeting all (new) applicable water quality standards*. Additionally, in these cases the *basis of the original listing* (i.e., the standard, criteria or indicator) *has, in fact, been re-evaluated and determined to be inaccurate* (or, at a minimum, less accurate than the revise standard, criteria or indicator).

Other reasons for the de-listing of Section 303(d) List waters without documentation of specific water quality improvement include:

TMDL Development is Complete

Once a TMDLs has been developed for a water on the Section 303(d) List, the water becomes an *Impaired/Threatened Water Not Requiring a TMDL* and is, by definition, no longer included on the list. The de-listing of such waters will occur during the compilation of the next Section 303(d) List.

Re-Assessment Based on New Methodology

As discussed previously, the incorporation of these new methodologies into New York State's multi-year Comprehensive Assessment Strategy will take some time to implement fully across the state. Waters previously listed based on water quality assessment guidance pre-dating the *CALM Assessment Methodology* may need to be re-evaluated. If any of these waters do not meet the new thresholds for listing, they will be proposed for de-listing. Justification for such de-listings will reflect that the water is meeting applicable water quality standards and that the original basis for listing is not longer accurate/appropriate.

Age of Data/Information

Generally, data and information used in the listing decisions should have been collected within the preceding 5 years (one statewide cycle of the Comprehensive Assessment Strategy rotating basin schedule). Waters with data/information indicating *No Known Impairment* may be assessed and considered as having no impairment (*Water Attaining All/Some Standards*) for as long as 10 years (two rotating basin cycles), assuming no subsequently collected data/information contradicts this assessment. However, waters assessed as having *No Known Impairment* based on data that is between 5 and 10 years old should be considered "*evaluated*" rather than "*monitored*" (see Assessment Methodology, page 27). After 10 years (2 cycles) with no new verification of fully supporting conditions, waters having *No Known Impairment* will be listed as *UnAssessed* in the WI/PWL and assigned to the *Waters with Insufficient data/information* category.

Once a waterbody is assessed as impaired (using the accompanying *Assessment Methodology*) and included on the Section 303(d) List, the water must not be removed based solely on passage of time that results in the initial assessment data/information becoming more than ten years old. De-listing of waters requires subsequent data/information showing that pollutants are meeting standards and/or that the waterbody use is no longer impaired.

Impairment Due to Natural Conditions/Conflicting Uses

Waters where impairments result from natural conditions, unrelated to anthropogenic sources (such as a high sediment load carrying river that restrict recreation, low dissolved oxygen in deep lakes, habitat that does not support diverse biological communities, etc.) are assigned to the *Impaired/Threatened Waters Not Requiring a TMDL* category. Also included in this category are waters where an impairment is due to multiple conflicting uses, both/all of which cannot be reasonably resolved (such as fluctuating reservoir levels that affect aquatic life that are the result of flood control practices, the administrative closure of waters for shellfishing due to the proximity of recreational boating marinas, etc). Consideration of natural conditions and conflicting uses is conducted on a case-by-case basis.

High (Natural) Background Concentrations of Specific Substances

Naturally occurring levels of some substances (iron) that do not meet water quality standards have been found in some waters of the state. Yet there is little if any measured impact on aquatic life support and/or other uses that these standards are designed to protect. Because of this discrepancy, evaluation of use support and consideration of these waters for inclusion on the Section 303(d) List should take into account the policy of *Independent Application* (and *Weight of Evidence*) discussed in the Assessment Methodology. Additionally, these substances are often given particular attention during the periodic standards review process. Evaluation and listing decisions should also reflect the most current thinking regarding what is an appropriate standard for these substances.

For some other substances (lead, phenolic compounds) sampling and analytical procedures limit the ability to confidently quantify concentrations of the specific fraction defined by the standard (e.g., acid-soluble) or at/near a very low standard. Waters where reported in-stream concentrations (or approximations) relative to standards are not consistent with observed biological effects or other use support information are evaluated for inclusion on the Section 303(d) List on a case-by-case basis.

USEPA's Consolidated Assessment and Listing Methodology (CALM) guidance recognizes the occurrence of conflicting indicators such as those outlined above and proposes approaches to resolve these conflicts. In cases where the conflict may be attributed to artifacts of the data or environmental factors USEPA suggests delaying the classification in order to collect more data, re-evaluate the criteria, investigate site-specific criteria or conduct use attainability analysis. This approach is supported by the "Integrated Reporting" *category of Waters with Insufficient data/information* which tracks these waters until sufficient information is available to determine the attainment status and whether it is to be listed.

Waters Needing Verification of Impact

In addition to waters with conflicting indicators of use support, waters thought to experience impacts based on anecdotal information or insufficient data will be recorded in the WI/PWL as having uses that may (*Possible*) be *Stressed* and will be tracked as *Waters Needing Verification of Impact*, and assigned to the *Waters with Insufficient data/information* national use attainment category. Because clear evidence of an impairment or non-attainment of standards is lacking, these waters will not be included on the Section 303(d) List. Such waters will be designated as priorities for evaluation during the next rotating basin cycle of the Comprehensive Assessment Strategy. The reasoning for this approach lies in the difficulty in showing water quality improvement (a requirement for de-listing) if there is insufficient baseline information to document an impairment.

Although it has been suggested that *Waters with Insufficient data/information* be included on the Section 303(d) List, the practical effect of not listing these waters is not significant. Whether the waterbody is listed or not, these waters require additional monitoring to better document water quality conditions before a TMDL can begin to be developed. In accordance with the *Comprehensive Assessment Strategy*, such monitoring will be conducted within five years, which – given the likely low priority assigned the water if placed on the list and the resource limitations of the state – equals or improves the time frame for monitoring under a TMDL approach.

Impaired Waters with Unknown Causes/Pollutants

Waters known to be impaired, but by causes/pollutants that have not been identified, will not be included on the Section 303(d) List. Because a determination regarding the need for a TMDL is dependent upon the cause/pollutant creating the impairment, these waters are more appropriately assigned to the *Waters with Insufficient data/information* category. As is the case with *Waters Needing Verification of Impact* (discussed above), whether the water are listed or not, the first step toward addressing and resolving any water quality problem remains the identification of contributing pollutants. Whether this verification is conducted as part of the Comprehensive Assessment Strategy, or as the first step in the development of a TMDL is inconsequential.

Segmentation of Waterbodies

As discussed in the *Assessment Methodology*, the designation of specific waterbodies in the Waterbody Inventory must strike a balance between being too specific (resulting in more segments than can be assessed with finite resources) and too general (resulting in segments that are too large and diverse and difficult to assess accurately). Determining the specific boundaries for individual waterbody segments is based on a number of considerations, including waterbody type, stream classification, hydrologic drainage, waterbody length/size, and homogeneity of land use and watershed character. Waterbody segments are **not** defined based upon the length/size of area impacted by a water quality problem. Because estimates of the extent of water quality impacts are often inexact and may change regularly, using this information to establish segment boundaries would make the Waterbody Inventory/Priority Waterbodies List considerably more difficult to manage and update, while providing little added benefit. However some flexibility in the segmenting of waterbodies is allowed in order to provide sufficient protection of all designated uses.

Determining the specific boundaries for individual waterbody segments is based on a number of considerations, including waterbody type, stream classification, hydrologic drainage, waterbody length/size, and homogeneity of land use and watershed character. Waterbody segments are **not** defined based upon the length/size of area impacted by a water quality problem.

Generally water quality impacts/impairment affecting at least 10% of a waterbody length/area are assigned to the entire waterbody segment in the database. Any limitation regarding the extent of the impact/impairment is noted in the segment narrative. If impacts/impairments affect less than 10% of the total waterbody area, the impact/impairment may not be recorded for the entire segment. However, the nature and extent of the impact will be recorded in the segment narrative. Additionally, if the limited area does not support designated uses, the affected area of the segment may be considered for inclusion on the Section 303(d) List.

Transition from 1998 Section 303(d) List

Recent USEPA guidance regarding integrated water quality monitoring and assessment and the development of New York State's Consolidated Assessment and Listing Methodologies will somewhat alter the process used to compile New York State's Section 303(d) List. The methodologies outlined here rely on recently updated monitoring and assessment strategies for the development of the upcoming (2002) New York State Section 303(d). As was discussed previously, these revised strategies have not yet been implemented throughout the state. And while these new strategies are similar, they are not identical to the approaches used to develop the previous (1998) Section 303(d) List. Consequently, it is possible that waters listed previously may not meet the revised thresholds for listing contained in the new methodology.

However as stated previously, the removal from the list (de-listing) of previously listed waters prior to the development of a TMDL can occur only 1) if the water is shown to be meeting all applicable water quality standards, or 2) if, upon re-examination, the original basis for listing the water is determined to be inaccurate. Therefore, any waters on the 1998 New York State list that do not appear to meet conditions for inclusion on the 2002 list will be evaluated on a case-by-case basis. These waters will either be added to the 2002 list (most likely prioritized for TMDL development as *Part 3 - Waters Requiring Evaluation Based on the New Methodology*), or will be submitted for de-listing based on the two considerations outlined above.

Other issues regarding the transition from the 1998 Section 303(d) List to the 2002 (and future) lists are discussed below.

Waterbody Segmentation

Implementation of a more systematic approach to defining the bounds of individual waterbody segments (discussed previously in the Assessment Methodology and Listing Methodology) will result in some inconsistency regarding the number of segments, total area/length affected and the specific waterbody names listed on the 1998 and 2002 Section 303(d) Lists that are not related to changing 303(d)/TMDL status. To address any possible confusion, changes resulting from the new approach to the segmentation of waterbodies will be outlined in the final 2002 Section 303(d) List.

Acid Rain Segments

The 1998 Section 303(d) List included 388 waterbodies impacted by atmospheric deposition. Because development of a comprehensive monitoring strategy required limiting the WI/PWL database to lakes 6.4 acres or larger, many of these lakes are no longer tracked as individual waterbodies in the database. As a result, the 2002 Section 303(d) List will not list these smaller lakes individually, but instead will combine them into one listing group: *Smaller Lakes Impaired by Atmospheric Deposition.* Previously listed acid rain lakes greater than 6.4 acres will continue to be evaluated, tracked in the database and, if appropriate, listed individually. Also, to facilitate the transition from the 1998 to 2002 list, a list of the smaller lakes included in the previous Section 303(d) List but no longer tracked individually will be included as an appendix to the new list.

Additionally, the grouping of these multiple small lakes into one listing group is also reasonable considering the current TMDL effort to address atmospheric deposition. Because sources of impairment due to atmospheric deposition are not subject to control under Clean Water Act provisions, a TMDL in the classical sense is not appropriate. USEPA is currently developing an appropriate TMDL to address this problem in all affected waterbodies nationally. Because this TMDL is designed to address multiple segments, a multiple segment listing on the Section 303(d) List is a reasonable and appropriate approach to listing these waters.

Section 305(b)
Assessment Methodology

January 2002

Assessment Methodology refers to what monitoring activities are used and how resulting data and information are interpreted to arrive at an assessment of water quality and determine the level of support of designated uses. In some cases a lack of use support is apparent or can be directly evaluated (e.g., beaches closed to public bathing, acid rain lakes devoid of fish). However in most cases, designated use support is evaluated using standards or other surrogate indicators of water quality. The assessment methodology presented here outlines various water quality monitoring tools and considers other aspects of the resulting data and information, including the type of data and information generated (numerical, observational/narrative, anecdotal), the source of the data/information, and the level of confidence in the data/information. The methodology also includes specific criteria that, in the absence of more direct measurement, relates 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.

The methodology outlined here relies on a combination of three categories of assessment criteria:

- Use Restriction Orders,
- Numerical and Narrative Standards and Criteria, and
- Surrogate Water Quality Indicators

Use Restriction Orders are administrative restrictions or closures of waters to specific uses. These orders are issued by regulatory agencies charged with protecting particular aspects of public health and are based on data collected through monitoring programs and activities directed by those agencies. While the restriction orders are based on monitoring data, the raw data itself is not usually considered by NYS DEC in making the use support decisions; rather the level of restriction drives the use support determination. Examples of use restriction orders include fish consumption advisories for specific waterbodies, closed shellfishing areas, seasonal or conditional shellfishing areas, public bathing beach closures, etc.

Numerical (and narrative) Water Quality Standards and Criteria represent parameter-specific thresholds for acceptable levels of substances in the waters of the state. These limits are designed to protect various water uses and are adopted in the state Code of Rules and Regulations. For many substances there exists a numeric standard based on observed effects levels on human health and/or aquatic life. For other parameters, the standard is more descriptive (narrative) in nature (e.g.,*no increase in turbidity that will cause a substantial visible contrast to natural conditions*).

Surrogate Water Quality Indicators are indirect measures of the level of designated use support. Often a direct measurement of use support is not possible. For example, it is difficult to say exactly when a waterbody moves from supporting to not supporting recreational activities. The use of water quality indicators, such as nutrient levels and Secchi disc measurements, bring added consistency to the evaluation. Biological assessments, Section 319 nonpoint source assessments, source water assessments, dilution calculations and predictive models all provide measures of water quality and use support without reliance on standards. Even where these indicators are more subjective, indicator-specific criteria help to maintain a degree of consistency and allow for the incorporation of additional information/data sets into water quality assessments.

Waterbody Inventory/Priority Waterbodies List

NYS DEC maintains use support/impairment information for the waters of the state through its *Waterbody Inventory/Priority Waterbodies List (WI/PWL)* database. The *Waterbody Inventory* refers to the listing of all waters, identified as specific individual waterbodies, within the state that are assessed. An inventory for each large drainage basin in the state will be established as one of the first steps in the WI/PWL update and water quality assessment effort for each drainage basin. The *Priority Waterbodies List* is the subset of waters in the Waterbody Inventory that have documented water quality impacts, impairments or threats. The Priority Waterbodies List provides the candidate list of waters to be considered for inclusion on the Section 303(d) List.

The Priority Waterbodies List provides the candidate list of waters to be considered for inclusion on the Section 303(d) List.

Segmentation of Waterbodies

The designation of waterbodies must strike a balance between being too specific (resulting in more segments than can be assessed with finite resources) and too general (resulting in segments that are too large and diverse and difficult to assess accurately). Determining the specific boundaries for individual waterbody segments is based on a number of considerations. These include:

Waterbody Type Different waterbody types cannot be combined into single waterbody segments. That is, lakes, reservoirs and ponds cannot be combined with river reaches to form one segment. Similarly, estuary waters, ocean coastline and Great Lakes shoreline are distinct waterbody types that must be tracked as separate segments.

Stream Classification A change in the stream class (A, B, C, D) of a waterbody usually necessitates the division of the waterbody into separate segments. This is necessary since the two different classes of waters will be assessed for the support of different designated uses. Differences regarding trout support (T, TS waters) or other classifications (I, AA, etc) that support uses similar to adjoining waters do not require designation of a separate segment.

Hydrologic Drainage Waterbodies that cross 8-digit Hydrologic Unit Code (HUC) and 11-digit watershed boundaries are usually broken into separate waterbody segments.

Waterbody Length/Size As a practical matter, waterbodies should not be too large or too small. Generally, river segments include between 10 and 25 miles of stream. Lakes segments must be greater than 6.4 acres (0.01 square mile), the size threshold for inclusion in the New York State Lake Gazetteer. Lakes are generally listed as "entire lake." However, for some very large lakes (e.g., Lake Champlain) they may be segmented into separate portions. Conversely, some lake chains and/or smaller lakes in a watershed may be joined together as a single segment.

In addition, all waters within a single waterbody segment should drain areas of generally similar land use and character. If land use and other character changes, a separate segment is considered.

Note also that waterbody segments are **not** defined based solely upon the length/size of area impacted by a water quality problem. Because estimates of the extent of water quality impacts are often inexact and may change regularly, using this information to establish segment boundaries would make the Waterbody Inventory/Priority Waterbodies List considerably more difficult to manage and update, while providing little added benefit. However some flexibility in the segmenting of waterbodies is allowed in order to provide sufficient protection of all designated uses.

WI/PWL Water Use Support

The assessment of New York State water resources contained in the WI/PWL is based on the ability of waters to support a range of specific designated uses (see box). The particular uses that a specific waterbody is expected to support are dependent upon the classification of that waterbody. For example, only specifically designated waterbodies are considered to have best uses of *Drinking Water Supply* (Class A, AA), *Shellfishing* (Class SA) and *Public Bathing* (Class A, SA, B, SB). (see Appendix A, *New York State Water Quality Classifications*).

WI/PWL Water Uses

Drinking Water Supply
Shellfishing
Public Bathing
Recreation
Fish Consumption
Aquatic Life Support
Habitat/Hydrology
Aesthetics

The use support/impact information in the WI/PWL database is generated from a wide range of available sources and assessed using various criteria. These assessment criteria include use restriction orders (drinking water restrictions, bathing beach closures, fish consumption and shellfishing advisories) comparison of data (from NYS DEC ambient monitoring network as well as other agency, local or public/citizen monitoring program) with parameter-specific water quality standards, the use of surrogate indicators, and more qualitative perception and observational information (stream habitat assessments, recreational use or fishery resource surveys, citizen complaints). Given the growing involvement of local agency and citizen volunteers in water quality monitoring, the WI/PWL updating process has expanded to include a significant public participation and outreach component. This effort relies on a network of local Water Quality Coordinating Committees working in conjunction with the NYS DEC staff to capture additional available water quality information. To help ensure consistency in the assessments, basin update efforts begin with a regional WI/PWL workshop with other agency and local partners to introduce the assessment methodology and solicit water quality information.

WI/PWL Severity of Use Impact

PRECLUDED

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

IMPAIRED

Occasional water quality, or quantity, conditions and/or habitat characteristics *periodically prevent* specific uses 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 (i.e. uses are *Fully Supported*), but *occasional* water quality, or quantity, conditions and/or associated habitat degradation *periodically discourage* specific uses of the waterbody.

THREATENED

Water quality supports waterbody uses and ecosystem exhibits no obvious signs of stress, however *existing or changing land use patterns* may result in restricted use or ecosystem disruption, or;
Data reveals decreases in water quality or presence of toxics below the level of concern, or;
Waterbody uses are not restricted and no water quality problems exists, but the support of a specific and distinctive use make the waterbody more susceptible to water quality threats.

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

- what specific use(s), if any, is/are affected,
- the severity of the impact on the use(s), and
- the level of documentation that correspond to the use impact/impairment.

The focus of a water quality assessment is based on whether a specific use is restricted. If this is the case, then the severity of use impact (i.e., the degree to which the use is restricted) is evaluated as either *Precluded*, *Impaired*, *Stressed* or *Threatened* (see definitions in box on page 13). The water use impact and level of severity are also identified as *Known*, *Suspected* or *Possible* (see definitions in box at right) based upon available documentation. The severity of use impacts and the corresponding levels of documentation are dependent upon a number of factors, including the *magnitude* of the impact, the *frequency* of occurrence or *extent* of affected area, and *confidence* of data.

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 - Reasonably strong evidence, supported by best professional judgement of DEC staff, *suggests* the use of the waterbody is impacted. However, water quality data/studies that establish an impact *have not been completed* or there is *conflicting information*.

Possible - Anecdotal evidence, public perception and/or specific citizen complaints indicate that the use of the waterbody *may be restricted.* However, there is *currently very little, if any, documentation* of an *actual* water quality problem.

The *magnitude* of water quality impacts or degrees of use restrictions are reflected in the WI/PWL level of severity; the more significant the impact, the greater the severity. For example, fish consumption advisories may recommend eating no more than one fish per week (*Stressed*), eating no more than one meal per month (*Impaired*), or eating no fish at all (*Precluded*). With regard to water quality monitoring and its comparison to standards or other criteria, in-stream concentrations may be below, near, at, above or well above applicable water quality standards. Such conditions correspond to varying degrees of impact ranging from *No Known Impact*, *Threatened*, *Stressed*, *Impaired* or *Precluded*.

The *frequency* with which water quality conditions occurs, is also reflected in the WI/PWL level of severity. The more frequently a specific condition occurs, the more significant – or severe – the effect on related water resource uses. Similarly, the spatial *extent* of the water quality condition (i.e., the percent of total waterbody affected) is also reflected in the severity. For example, a bay where shellfishing is restricted in one small cove is less severely impacted than if shellfishing were restricted in the entire bay.

Frequency of occurrence and spatial extent also influence the WI/PWL level of documentation. For example, if a specific condition occurs less than 10% of the time (or in less than 10% of the waterbody), the overall water quality impacts for the total waterbody are less certain than if the frequency/extent of the condition is greater than 50%. In general, if frequency/extent of conditions are less than 10%, the level of documentation for impacts to uses corresponding to that condition is considered *Possible*. If the frequency/extent is between 10 and 25%, the level of documentation is considered *Suspected*. If greater than 25%, the impact is considered *Known*.

However, the use of the 10%/25% thresholds outlined above assumes that the frequency/extent of a condition is well-established. For some measures of impact, this is not very difficult (e.g., fish consumption advisories are in effect 100% of the time, for beaches that are closed 14 days out of a 100 day season the frequency is 14%, for estuary segments where shellfishing is restricted in 40 of 200 acres the extent is 20%). However, for other water quality monitoring the determination of frequency/extent depends upon a number of factors, including the level of data confidence.

Data confidence refers to statistical measures that help to determine the degree of certainty that a condition exists. Such statistical confidence depends upon a number of factors – including the monitoring design, the number of samples collected, and the variability of results – and is an important factor in determining the WI/PWL level of documentation. Other considerations, such as quality and age of data, also influence the level of documentation.

Though they are related, it is important not to confuse data confidence with the frequency/extent of a condition. For example a single data point might show exceedence of a standard. While this represents high frequency of a condition (100%), the level of data confidence based on just one sample is usually quite low.

Waterbody Assessment Categories

Based on the degree of use support, severity of impact/impairment and level of documentation, all waterbodies in the WI/PWL are assigned to one of five possible *Water Quality Assessment Categories*. These are outlined below and on Table 1.

Water Quality Impacted Segments are waterbodies with documented water quality problems or impacts. These are defined as having a severity of *Precluded, Impaired* or *Stressed* (*Threatened* uses are not included in this category) and a level of documentation of *Known* or *Suspected*.

Threatened Waterbody Segments are waterbodies for which uses are not restricted and no water quality problems currently 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 where the support of a specific and/or distinctive use make the waterbody more susceptible to water quality threats.

Waterbody Impacts Needing Verification are segments that are thought to have water quality problems or impact, but for which there is not sufficient or definitive documentation. These segments include waters with *Stressed* uses and a level of documentation of *Possible*. Such waterbodies require additional monitoring to determine whether uses are restricted.

Waterbodies Having No Known Impacts are segments where monitoring data and information indicate that there are no use restrictions or other water quality impacts/issues.

UnAssessed Waterbodies are segments where there is insufficient water quality information available to assess the support of designated uses.

The WI/PWL Water Quality Assessment Categories differ somewhat from the national Use Attainment Categories used by USEPA to report on water quality. Whereas the national categories are designed to answer questions concerning the attainment of water quality standards and the appropriateness of TMDLs to address water quality impairments, the WI/PWL categories are crafted to provide support for a myriad of NYS DEC water quality management programs.

Perhaps the most significant difference between the two frameworks involves the WI/PWL's inclusion of *Stressed* waters within Water Quality Impacted Segments category. The *Stressed* category allows the WI/PWL to track waters that fully support uses but with less than ideal water quality. Conditions in these waters are considered stable, have been well documented and additional protection activities are not considered necessary to maintain use support into the future.

The tracking of these *Stressed* waters – while not readily accommodated in the national Use Attainment Category scheme – supports the NYS DEC water quality management programs and is an integral component of the *Watershed Restoration and Protection Strategies*. Because of limited resources, NYS DEC focuses it restoration and protection activities on waters that do not support uses (*Precluded, Impaired*) or that may not support uses in the future (*Threatened*). *Stressed* waters, on the other hand, often become the focus of restoration and protection by other/local watershed partners in the state.

The tracking of *Stressed* waters – while not readily accommodated in the national Use Attainment Category scheme – supports the NYS DEC water quality management programs and is an integral component of the *Watershed Restoration and Protection Strategies*.

Although the current national Use Attainment Categories differ from the WI/PWL Assessment Categories, the two schemes share significant similarities. As a result it is possible to relate waters assigned to certain WI/PWL Assessment Categories to corresponding USEPA groupings. A detailed discussion of the linkage between the Water Quality Assessment Categories outlined above and the national use Attainment Categories is presented in the Listing Methodology (see Table 9, page 33).

Table 1 Relationships Between WI/PWL Use Support/Severity/Documentation and Water Quality Assessment Categories

Severity of Problem	Level of Problem Documentation		
	Known	**Suspected**	**Possible**
Precluded	Water Quality Impacted Segments	N/A*	N/A*
Impaired	Water Quality Impacted Segments	Water Quality Impacted Segments	N/A*
Stressed	Water Quality Impacted Segments	Water Quality Impacted Segments	Waterbody Impacts Needing Verification
Threatened	Threatened Waterbody Segments	Waterbody Impacts Needing Verification	Threatened (Possible) Waterbody Segments
No Known Impacts	Waterbodies Having No Known Impacts		
UnAssessed	UnAssessed Waterbodies		

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

Use-Specific Assessment Criteria

More detailed guidelines regarding the relationships between the results of various monitoring and assessment indicators and corresponding levels of support for specific water uses are discussed on the following pages. These discussions include assessment criteria tables for specific designated water uses which are intended to provide some guidance to insure a more consistent evaluation of water quality indicators. ***The criteria in the tables are not intended to be all inclusive, but merely represent examples intended to provide a sense of the type of water quality data and information used and interpreted.*** Individual waterbody assessments are evaluated on a case-by-case basis, taking into account all available information, including some considerations not captured in the assessment criteria tables.

Also recognize that the guidelines in these tables are crafted to indicate the point(s) at which the corresponding severity of impact is obvious. In some cases, **more** severe use impacts/impairments may be assigned to waters where use restriction orders, water quality data or other indicators do not clearly indicate such a level of water quality impact. This approach allows the use of *best professional judgement* to identify impacts/impairments that otherwise would not be listed; but limits the use of judgement to not list waters.

Drinking Water Supply Use

Only those waters where *Drinking Water Supply* is designated as the best usage (i.e., Class A, AA, A/AA-Special surface and Class GA groundwaters) are evaluated for their support of this use. The evaluation of *Drinking Water Supply* use support is driven largely by water quality information and monitoring data generated by the New York State Department of Health (NYS DOH) and/or local health departments, which are primarily responsible for the protection of public health in the state.
A comprehensive evaluation of *Drinking Water Supply* use must consider the use on a number of levels. The first of these considerations focuses on administrative closures or restrictions on a *Drinking Water Supply* use. However, while this criteria is most directly related to the use, it is not very sensitive to impacts.

Consequently a secondary level of assessment looks at the degree of treatment necessary for a water supply to be used for drinking water. The intent of this assessment criteria is to categorize as *Impaired* any water supply that requires "extra-ordinary" treatment measures. Given national filtration rules and other considerations, defining "extra-ordinary" is somewhat difficult. The criteria language – *"additional treatment beyond conventional processes (coagulation, sedimentation, filtration, disinfection) is required to remove any impurities that are not naturally present"* – reflects similar language used in the NYS Water Quality Regulations for classification of waters.

Because of the human health implications, threats to and protection of the *Drinking Water Supply* use take on added significance. Therefore, it is also appropriate to evaluate water in these waters prior to and without consideration of final treatment. This level of assessment evaluates contaminant concentrations relative to standards for the protection of Health (Water Source). In addition, other information regarding nutrient levels, precursors to THM formation and other contaminants that may affect *Drinking Water Supply* use and quality is reflected in measures of natural sensitivity and susceptibility as determined through the NYS DOH Source Water Assessment Program (SWAP).

The relationship between drinking water supply advisories, monitoring data, SWAP determinations and other information and the level of *Drinking Water Supply* use support is outlined in Table 2.

Table 2 Drinking Water Supply Use Assessment Criteria

Use Assessment Criteria	WI/PWL Use Impact	
	Severity	Documentation
Frequent/Persistent Conditions Prevent Use • NYS/local Health Department drinking water supply closures lasting supply for more than 30 days.	Precluded	Known
Occasional Conditions Prevent Use • NYS/local Health Department drinking water supply closures lasting for up to 30 days.	Impaired	Known
Frequent/Persistent Conditions Discourage Use • Impacts do not require closure or advisories but adversely affect the quality of the finished water and/or treatment costs (e.g., taste/odors, color, turbidity, activated charcoal filtration, etc.), or • Monitoring data show exceedence of *Impaired* criteria* for cryptosporidium, coliform, or • Monitoring data show exceedence of *Impaired* parameter-specific criteria* for other substances more than 10% (*suspected*) or 25% (*known*) of time.	Impaired	Known or Suspected
Occasional Conditions Discourage Use • SWAP determination of *very high susceptibility* [1] • Monitoring data show exceedence of *Stressed* criteria* for cryptosporidium, coliform, or • Monitoring data show exceedence of *Stressed* parameter-specific criteria* for other substances more than 10% (*suspected*) or 25% (*known*) of time.	Stressed	Known or Suspected [1]
Conditions Support Use, but Threats Noted • SWAP determination of *high susceptibility* [1] • Monitoring data show exceedence of *Threatened* parameter-specific criteria* for other substances more than 10% (*suspected*) or 25% (*known*) of time.	Threatened	Known or Suspected [1]
No Known Impairment or Imminent Threat • No drinking water restrictions, and • No additional treatment required, and • No significant contaminants/threats present.	No Known Impact	

* Parameter-Specific Criteria	*Impaired*	*Stressed*	*Threatened*	
Cryptosporidium (average)	7.5	3.0	–	oocysts/100 l
Cryptosporidium (individual)	–	7.5	3.0	oocysts/100 l
Coliform, Total (median)	2,400	–	–	per 100 ml
Coliform, Fecal (geometric mean)	200	–	–	per 100 ml
Ammonia/Ammonium	20	10	5	mg/l
Nitrate, as N	10	5	2	mg/l
other substances (source water) [2]	Standard	50% of Std.	20% of Std.	
other substances (finished water) [3]	MCL	50% of MCL	20% of MCL.	

[1] Impacts/impairments based on SWAP susceptibility determinations should be listed as *Suspected*.

[2] Refers to substances for which there are NYS water quality standards for protection of *Health (Water Source)*.

[3] Refers to substances for which there are Maximum Contaminant Levels for treated/finished drinking water.

Shellfishing Use

Support of *Shellfishing* use is assessed for Class SA marine waters only. These assessments reflect the level of certification of the waters for the taking of shellfish as determined by DEC Division of Fish, Wildlife and Marine Resources and based on National Shellfish Sanitation Program requirements. Shellfishing waters that are not certified may be closed year-round, seasonally, or conditionally (after rainfalls events of a specific magnitude). Other restrictions on the use include requirements to transplant the shellfish to cleaner waters for depuration prior to harvesting.

Shellfishing restrictions may be driven by either water quality or by administrative requirements. Water quality-based closures are the result of actual bacteriological monitoring and subsequent findings that the waters do not support safe consumption of shellfish. Administrative closures are precautionary; they are not necessarily reflective of water quality conditions but are issued for areas where the *potential* for contamination of shellfish exists. Administrative closures are generally issued for areas in close proximity to WWTP discharges and for waters around marinas.

Table 3 Shellfishing Use Assessment Criteria

Use Assessment Criteria	WI/PWL Use Impact	
	Severity	Documentation
Frequent/Persistent Conditions Prevent Use • NYS DEC Division of Fish, Wildlife and Marine Resources (DFWMR) has designated more than 25% of the waterbody area as uncertified year-round for shellfishing based on water quality conditions and contaminants, or • DFWMR has designated more than 10% of the area as uncertified year-round (w.q.) AND shellfishing in remaining area is restricted	Precluded	Known
Occasional Conditions Prevent Use • DFWMR has designated 10 to 25% of the waterbody area as uncertified year-round based on water quality conditions, or • DFWMR has designated more than 25% of the waterbody area as restricted (i.e., only *seasonally* or *conditionally* certified) based on water quality conditions.	Impaired	Known
Occasional Conditions Discourge Use • DFWMR has designated up to 25% of the waterbody area as restricted (i.e., only *seasonally* or *conditionally* certified) based on water quality conditions, or • DFWMR has designated more than 10% of the waterbody area as uncertified based on administrative guidelines (outfall, marina)	Stressed	Known
Conditions Support Use, but Threats Noted • DFWMR has designated less than 10% of the waterbody area as uncertified, or • DFWMR has designated entire the waterbody as certified, but significant trib waters are uncertified due to water quality conditions	Threatened	Known or Suspected
No Known Impairment or Imminent Threat • DFWMR has designated the entire waterbody as certified for the taking of shellfish and all significant trib waters are also certified.	No Known Impact	Assessment Level: *Monitored*

Generally closures based on actual water quality monitoring correspond to *Precluded/Impaired* uses, depending on the type of restriction (year-round, seasonal, conditional) and the percent of waterbody area affected. If the area affected by a water quality-based closure is relatively small, the severity of impact may be listed as *Stressed*. (See *Segmentation of Waterbodies* in Listing Methodology.) Administrative closures – because they are more precautionary in nature – correspond to *Shellfishing* that is *Stressed* or *Threatened*. The relationship between certification and level of *Shellfishing* use support is reflected in Table 3.

Generally, closures based on actual water quality monitoring correspond to *Precluded/Impaired* uses...Administrative closures – because they are more precautionary in nature – correspond to a *Shellfishing* use that is *Stressed* or *Threatened*.

Waters that are designated Class SB or SC are not assessed for *Shellfishing* use support, even if they have been evaluated by the DEC Shellfishing Program. However because shellfishing is arguably the most sensitive of the uses assessed, if any Class SB, SC waters are certified for shellfishing they will be assessed as having *No Known Impairment* to other uses (unless additional/other water quality data indicates an impairment). If these waters are uncertified (due to water quality) then *Public Bathing/Recreation* are considered to be *Stressed*. A more severe level of impact to *Public Bathing/Recreation* requires monitoring data corresponding to those uses.

Public Bathing and Recreation Uses

Swimming and other recreational activities are important and popular uses for the waters of the state. The assessment of these activities involves two separate use categories: *Public Bathing* and *Recreation*. While the assessment of both *Public Bathing* and *Recreation* uses rely on similar water quality indicators, these two distinct uses are evaluated separately.

Evaluation of *Public Bathing* use is limited to those waters classified by New York State for primary contact recreation (i.e., Class B, SB, A, AA, A/AA-Special and SA). This classification applies to waters specifically designated as suitable for public beaches and bathing areas, which see an increased level of swimming use and are more regularly monitored by public health agencies. State and local/county health departments conduct regular bacteriological sampling programs and perform sanitary surveys designated at public bathing areas. 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.

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.

Evaluation of the *Public Bathing* use focuses primarily on public health concerns, particularly bacteriological contamination and water clarity. However excessive nutrient levels, which may increase turbidity, lower dissolved oxygen, and promote aquatic plant and algal growth, may also discourage the use of lakes, ponds and reservoirs for recreation activities. Recognizing this, NYS DEC derived a total phosphorus criterion of 20 µg/l for the protection of recreational uses in lakes. The criterion is based on lake user surveys and is indicative of *elevated nuisance conditions and slight impacts to recreation*. Because of its basis, the criterion is more appropriate in assessing more general *Recreation* uses. However since conditions resulting from elevated nutrients and weed/algal growth also may threaten swimming, these indicators suggest *Public Bathing* use is *Threatened*. Considerable effort is also currently underway in New York State and nationally to establish appropriate additional nutrient criteria for the protection of swimming and recreational uses. Once established, these new criteria will be incorporated into the Assessment Methodology as well.

The relationship between bathing restrictions, water quality monitoring and other indicators (including the *Recreation* use assessment) and the level of *Public Bathing* use support is reflected in Table 4.

Table 4 Public Bathing Use Assessment Criteria

Use Assessment Criteria	WI/PWL Use Impact	
	Severity	Documentation
Frequent/Persistent Conditions Prevent Use • NYS/local Health Department has closed the waterbody to swimming for the entire season, based on water quality (bacteriological, clarity) monitoring data.	Precluded	Known
Periodic/Occasional Conditions Prevent Use • NYS/local Health Department has issued temporary closures of the waterbody to swimming, based on water quality (bacteriological, clarity) monitoring data, or • Sufficient stream flow/water level necessary to support swimming uses are artificially restricted.	Impaired	Known
Frequent/Persistent Conditions Discourage Use • Swimming use requires additional measures (e.g., aquatic weed harvesting/control). • Monitoring data show exceedence of *Impaired* criteria* (coliform, clarity) more than 10% (*suspected*) or 25% (*known*) of time.	Impaired	Known or Suspected
Occasional (Other) Conditions Discourage Use • *Recreation* uses are assessed as *Impaired/Precluded*[1], or • Monitoring data show exceedence of *Stressed* criteria* (clarity) more than 10% (*suspected*) or 25% (*known*) of time.	Stressed	Known or Suspected[1]
Conditions Support Use, but Threats Noted • Monitoring data show exceedence of *Threatened* criteria* (clarity, phosphorus) more than 10% (*suspected*) or 25% (*known*) of time.	Threatened	Known or Suspected
No Known Impairment or Imminent Threat • NYS/local Health Department has not restricted swimming, and • Swimming use does not require any additional measures, and • Monitoring data does not exceed criteria* (>10% of time), and • *Recreation* uses are not *Impaired/Precluded.*	No Known Impact	Assessment Level: *Monitored*

* **Monitoring Data Criteria**	*Impaired*	*Stressed*	*Threatened*	
Coliform, Total (median)	2,400	–	–	per 100 ml
Coliform, Fecal (geometric mean)	200	–	–	per 100 ml
Clarity (Secchi Disc)	1.2	1.5	2.0	meters
Total Phosphorus [2, 3]	–	–	20	µg/l

[1] *Public Bathing* assessments based on *Recreation* use support should be listed as *suspected.*
[2] Application of the Total Phosphorus criteria is limited to lakes and ponded waters.
[3] Based on currently New York State criteria indicative of elevated nuisance conditions and slight impacts to recreation; other state/national nutrient criteria currently being developed will be incorporated into the Assessment Methodology once adopted.

The category of *Recreation* tracks impacts and impairments to a more expansive list of recreational activities, such as fishing, boating, water skiing, rafting, wading and other primary/secondary contact activities, including swimming. The requirement of all waters to support *Recreation* uses addresses the federal Clean Water Act goal that all waters be *swimmable.*[1] 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 differing criteria and the varying levels of monitoring, *Public Bathing* (Class B, SB, A, AA, A/AA-Special and SA) waters are evaluated more rigorously than other *Recreation* use waters.

Whereas the *Public Bathing* use assessment has a greater focus on public health concerns, *Recreation* uses are assessed with greater emphasis on aesthetics. The evaluation of *Recreation* use support places emphasis on excessive weed growth, silty/muddy lake bottoms, color, odors and other conditions that discourage recreational activity.

The relationship between water quality monitoring and other indicators and the severity and documentation of an impact to *Recreation* use is reflected in Table 5. For various nutrient parameters, Table 5 refers to *"state/national criteria to be developed and incorporated into the Assessment Methodology."* This flexibility of language reflects a need to accommodate the ongoing efforts by NYS DEC (and USEPA) to develop and implement nutrient criteria, including the use of different ecoregion-specific criteria for various regions of the state. Once these criteria are established, the Assessment Methodology will be revised to reflect them. Until then the surrogate indicators outlined below will be used to assess recreational use support.

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 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. These general advisories are to protect against eating large amounts of fish that have not been tested or that may contain unidentified contaminants. Because the general statewide and marine waters advisories are precautionary and not based on any actual contaminant monitoring data, it does not represent any documented impairment of *Fish Consumption* use. Consequently, the general statewide advisories are 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.

[1] 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 5 Recreation Use Assessment Criteria

Use Assessment Criteria	WI/PWL Use Impact	
	Severity	Documentation
Frequent/Persistent Conditions Prevent Use • NYS/local Health Department has closed the waterbody to swimming, boating or other recreational use for the entire season, due to water quality concerns.	Precluded	Known
Periodic/Occasional Conditions Prevent Use • NYS/local Health Department has issued temporary closures of the waterbody or portions of the waterbody to swimming, boating or other recreational use due to water quality concerns, or • Sufficient stream flow/water level necessary to support recreational uses are artificially restricted.	Impaired	Known
Frequent/Persistent Conditions Discourage Use • Recreational uses of water require additional measures (e.g., weed harvesting/control), or • *Public Bathing* uses are assessed as *Impaired/Precluded*, or • Monitoring data show exceedence of *Impaired* criteria* more than 10% (*suspected*) or 25% (*known*) of time, or • Observational criteria* indicating restricted recreational uses are noted more than 50% of the time.	Impaired	Known or Suspected [2]
Occasional (Other) Conditions Discourage Use • *Public Bathing* uses are assessed as *Stressed*, or • Monitoring data shows exceedence of *Stressed* criteria* more than 10% (*suspected*) or 25% (*known*) of time, or • Observational criteria** indicating restricted recreational uses are noted more than 25% of the time.	Stressed	Known or Suspected [2]
Conditions Support Use, but Threats Noted • Monitoring data shows exceedence of *Threatened* criteria* more than 10% (*suspected*) or 25% (*known*) of time. • Observational criteria** indicating restricted recreational uses are noted more than 10% of the time.	Threatened	Known or Suspected [2]
No Known Impairment or Imminent Threat • *Public Bathing* uses are not *Stressed, Impaired, Precluded*, and • Recreation uses not restricted, nor require additional measures, and • Monitoring data does not exceed criteria* (>10% of time), and • Observational criteria** for restricted use not noted (>10% of time).	No Known Impact	Assessment Level: *Monitored*

* **Monitoring Data Criteria**	*Impaired*	*Stressed*	*Threatened*	
Total Phosphorus [1, 2]	–	20	–	µg/l
Chlorophyl a [1]	15	12	8	µg/l
Clarity (Secchi Disc) [1]	1.2 1.5	2.0	meters	

*** Observational Data Criteria** [3, 4]
Swimming/recreation slightly (or more) restricted by specifically identified causes (algae, clarity, etc).

[1] State/national nutrient criteria to be developed and incorporated into the Assessment Methodology.
[2] Application of the Total Phosphorus criteria is limited to lakes and ponded waters.
[3] *Observational Criteria* refers to responses on ***CSLAP Field Observation Forms***. (See Appendix B) Specifically, *Condition of Lake* notes presence of algae, *Suitability for Recreation* notes some impacts/impairment, and *Opinion of Recreational Use* notes weeds and/or clarity problems.
[4] Impacts/impairments based on observational criteria should be listed as *suspected*.

Other general advisories recommend limiting the consumption of striped bass, bluefish and eels taken from marine waters due to specific habits or characteristics that make these species more likely to accumulate contaminants (particularly PCBs). Because these marine water advisories (outside of New York Harbor and Western Long Island Sound) are also more precautionary in nature and no more significant than the statewide advisory for freshwaters, They correspond to *Stressed* rather than *Impaired* use.

The relationship between the waterbody-specific fish consumption advisories and the severity and documentation of an impact/impairment to *Fish Consumption* use is reflected in Table 6.

Table 6 Fish Consumption Use Assessment Criteria

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

Aquatic Life Support

A primary focus of the Statewide Waters Monitoring Program (SWMP) involves determining the degree to which waters support aquatic life. There are a number of reasons for this emphasis:

- *Aquatic Life Support* must be maintained in all waters, regardless of classification, and
- *Aquatic Life Support* is one of the most sensitive of national use support categories, and
- *Aquatic Life Support* can be assessed easily and economically using biological sampling techniques.

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 Support*. This was a reflection of the designated uses outlined in New York State standards. However, the change to the broader category of *Aquatic Life Support* 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 Support* 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.

Different types of monitoring data may be used to determine *Aquatic Life Support* use. The SWMP relies most heavily on biological sampling. The assemblage most frequently used is macroinvertebrates, however the program has recently incorporated periphyton and, to a lesser degree, fish. The relationship between biological (macroinvertebrate) assessment, as described in the *Quality Assurance Work Plan for Biological Stream Monitoring in New York State* (Bode, etal, 1996) and the impact/impairment to *Aquatic Life Support* is shown in Table 7.

Table 7 Aquatic Life Support Assessment Criteria

Biological (Macroinvertebrate) Assessment		WI/PWL Use Impact	
		Severity	Documentation
Severely Impacted (Very Poor)		Precluded	Known
Moderately Impacted (Poor)		Impaired	Known
*Slightly Impacted** (Good)	Other indications of impact present	Stressed	Suspected or Known
	No other indications of impact	No Known Impact	Assessment Level: *Evaluated*
Non-Impacted (Very Good)		No Known Impact	Assessment Level: *Monitored*

* *Slightly Impacted* represents a broad category ranging from generally good water quality to conditions causing minor impacts, but still providing adequate support of aquatic life.

Independent Applicability

Table 7 outlines the interpretation of biological monitoring results independent of other water quality information. However a comprehensive evaluation of *Aquatic Life Support* must also consider all available physical/chemical monitoring data for dissolved oxygen, temperature, pH, phosphorus (nitrogen in marine waters), trace metals, organic compounds and other substances, and a comparison of these data results against the applicable water quality standards for the protection of aquatic life. Toxicity testing results from bioassays on ambient water are also a useful means to evaluate *Aquatic Life Support* and are incorporated into the assessment when available.

In addition to biological monitoring, a comprehensive evaluation of *Aquatic Life Support* must also consider all available physical/chemical monitoring data for dissolved oxygen, temperature, pH, nutrients, trace metals, flow and other substances, and a comparison of these results against applicable water quality standards for protection of aquatic life. Toxicity testing results are also incorporated into assessments when available.

Instances where these multiple indicators suggest different levels of use support require further consideration. To address the possibility of conflicting results, USEPA developed a policy of *Independent Application*. This policy states that where there are equally valid data sets no one type of assessment (biological, physical/chemical, toxicity) can be used to override a finding of water quality impact/impairment that is based on another type of assessment. However, while no one assessment type takes precedence over others, the evaluation of conflicting assessments must take into account levels of documentation, overall confidence, and artifacts of monitoring data (e.g., analytic methods, sampling techniques, etc.). These considerations (or *weight of evidence* approach) may, in fact, lead to favoring one assessment over others for specific assessments.

The USEPA policy also recognizes the difficulty and time involved in resolving conflicting results that might be due to site-specific environmental factors. In these cases, site-specific criteria, use attainability analysis or re-evaluation of a standard may be needed to determine use support. Because these efforts may require additional monitoring, USEPA recently suggested an assessment category of *Monitoring Insufficient to Determine Impairment*. This category corresponds to the WI/PWL category of *Segments Needing Verification of Impact/Impairment*, and allows for the deferring of a use support decision until appropriate evaluation is complete.

Atmospheric Deposition (Acid Rain) Impacts on *Aquatic Life Support*

One particularly useful chemical indicator for evaluation of *Aquatic Life Support* is pH. Separate criteria regarding the use of pH data 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 Support/Acid Rain* criteria takes advantage of the considerable amount of available chemical (pH) data.

The relationship between chemical (pH) monitoring data and the impacts to aquatic life is shown in Table 8.

Natural Resources Habitat/Hydrologic Use Support

In an effort to better incorporate wetlands and other natural resources concerns into the water quality assessment, the water use category of *Natural Resources Habitat/Hydrology* was recently added to the list of uses to be assessed. This broad category captures waterbodies where water quality is appropriate to support uses, but various activities result in degradation of natural resources (e.g., fish and wildlife populations, habitats) and/or impacts to wetland uses such as flood protection, erosion control, nutrient recycling and surface and groundwater recharge. This category may also be used to capture impacts to various water quantity and flooding/flood plain issues including excessively low flows, increased peak flows, alterations to the frequency, duration and timing of floods and loss of flood storage.

For many impacts to habitat and hydrologic use support, the situation is more clearly defined by the cause or source of the problem, than by the use affected. Such causes/sources include dredging, draining, excavation and/or filling of wetlands, stream channels, lakes/ponds; stream widening; stream downcutting; sediment embeddedness; other losses of wetlands; habitat fragmentation; loss of riparian vegetation or upland buffer zones. Generally, *Natural Resources Habitat/Hydrology* use impacts and impairments are, more likely attributed to *"pollution"* rather than *"pollutant"* sources.

Specific criteria for *Natural Resources Habitat/Hydrology* use support have not yet been developed.

Table 8 Acid Rain/Aquatic Life Assessment Criteria		
Lake pH/Fishery Assessment	**WI/PWL Use Impact**	
	Severity	**Documentation**
pH less than 5.0	Precluded	Known
pH between 5.0 and 6.0	Impaired	Known
pH greater than 6.0, but fish surveys indicate a fishery impact, and lake characteristics and/or other indications suggest acid rain as cause	Stressed	Known*
No indications of acid rain effects	No Known Impact	Assessment: *Evaluated*

* Documentation of the Pollutant/Cause (*pH*) and Source (*Atmospheric Deposition*) should be less than *Known*.

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).

Aesthetics

An evaluation of waterbody support of *Aesthetics* is much more subjective than those for the other assessed uses. Because of this subjectivity and the difficulty in assigning a level of severity of impacts to aesthetics, available choices for the assessment of aesthetics are limited to *No Known Impact* and *Stressed*. Because of this subjectivity and the limitations on the level of severity, there is no table of specific assessment criteria to determine support of aesthetics. Instead, the assessment of aesthetics use support should reflect what objective information (CSLAP Lake Perception Surveys, preponderance of citizen complaints, etc) is available.

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 includes biological monitoring (macroinvertebrate assessment, toxicity testing) and/or 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 previously, 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 impacts/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 (ending in 2004). Until a basin-wide 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 has been 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.

As discussed in the Monitoring Strategy, recent modifications to the division's Statewide Waters Monitoring Program (SWMP) includes an expanded biological screening component. This effort uses a fairly simple but effective set of on-site assessment criteria based on the presence/absence of key macroinvertebrate indicator taxa. Where the assessment criteria are met, the waterbody is assessed as having *No Known Impacts*. Where the criteria is not met, possible water quality problems are evaluated using more intensive sampling methods to collect more complete data.

A similar effort is being developed and implemented to evaluate all currently unassessed lakes in the state. This effort relies on basic water chemistry sampling in conjunction with visual assessment of aesthetics and support of recreational activities.

These screening efforts, which greatly increase the number of sites assessed in a basin study area, reflect the incorporation of a "census" approach into the SWMP and are key components in the state's goal of providing a comprehensive assessment of its waters.

Pollutants (Causes) and Sources of Water Quality Impacts

The primary focus of the Statewide Waters Monitoring Program is on determining use support, and not pollutant (cause) and source identification. More detailed investigations of pollutants and sources are generally conducted during the *Watershed Protection and Restoration Strategy* development phase of the water quality monitoring/assessment/management cycle (see figure 2). However, the initial assessment of waterbody use support in the WI/PWL does includes an indication of likely pollutants/causes and sources causing the impact on water uses. These pollutant/source identifications are based on Impact Source Determinations drawn from biological sampling and/or water chemistry data collected during Intensive Network Monitoring, or other available monitoring data. In the absence of any such data, best professional judgement based on surrounding land use may be used to identify possible causes/sources.

Because of the limitations of pollutant and source identification through SWMP, it is necessary to qualify the degree to which specific pollutants and sources are thought to contribute to water quality problems. Consequently, each pollutant and source is listed as *Known*, *Suspected*, or *Possible*. Additionally, it is not uncommon for multiple pollutants and sources to be indicated as contributing to a water quality impact. As a result, multiple pollutants and sources may be identified for one waterbody. Each pollutant and source is listed as a either *major* or *minor* contributor to the impact. Note that major and minor refers to the contribution to the most significant (severe) water quality impacts/impairments; pollutants/sources that contribute only to lesser impacts are always listed as *minor*.

Resolution/Management Information

The WI/PWL database also allows for the tracking of information relating to management and status regarding the resolution of water quality impacts for each waterbody. This information includes:

- Resolvability which indicates where a waterbody needs additional study, the development of a strategy, the implementation of a strategy, or the verification of the effectiveness of an implemented strategy. In some cases a water quality impact may be deemed *Not Resolvable* at this time due to technical and/or economic limitations or if the impact is the result of natural conditions or conflicting uses.
- Status of Verification refers to the specific aspect of the waterbody that needs further study. The verification effort may need to focus on the existence of an impact, the pollutant/cause of a known impact, the source of a known pollutant, or the development of a management strategy to address the problem.
- Lead Agency/Office indicates the specific government agency, office or other group that has primary responsibility for managing/addressing the impact to the waterbody.
- Resolution Potential is used to reflect the degree to which the expenditure of available NYS DEC resources on the waterbody or water quality issue is appropriate. Resolution Potential reflects the level of public interest, the expectation that measurable improvements can be reasonable achieved, and the appropriate role for NYS DEC.
- TMDL Note indicates the status of planned and/or ongoing Total Maximum Daily Load activities, if any.

Such information allows NYS DEC to better prioritize monitoring, restoration and protection activities, target the expenditure of limited resources to those waters where there is there is greatest public interest and/or the expectation that measurable improvements can be achieved, and track progress toward water quality improvement and problem resolution.

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