NEW YORK
STATE OF
OPPORTUNITY.

Department of
Environmental
Conservation

CONSOLIDATED ASSESSMENT AND LISTING METHODOLOGY

May 2023

This page intentionally left blank

Contents

Section 1: Introduction, Summary of Changes, and Key Terms

Introduction
The New York State Department of Environmental Conservation (DEC), Division of Water (DOW) uses this Consolidated Assessment and Listing Methodology (CALM) to assess the quality of the state's waters relative to the attainment of DEC water quality standards and to report assessment results to the United States Environmental Protection Agency (EPA).

The CALM establishes minimum quality and quantity requirements for water quality monitoring data to assess water quality. It also establishes a process to determine whether waterbodies can support their Best Use(s). DEC uses these protocols to develop waterbody assessments that are used for permitting, compliance, and enforcement activities; developing Total Maximum Daily Loads (TMDL); and funding water quality improvement projects.

The Clean Water Act (CWA) requires states to report the results of these assessments to EPA every two years. This water quality reporting under Section 305(b) and 303(d) of the CWA is referred to by EPA as Integrated Reporting (IR). With its IR submission, a state must also provide a CALM that documents the decision-making process for assessing and reporting on the quality of water in the Integrated Report.

EPA provides states with guidance for developing a CALM (*Guidance for 2006 Assessment, Listing and Reporting Requirements*, 2005). Each state's methodology should include:

- a description of the processes and procedures used to assess the quality of surface waters;

- an explanation of how all existing and readily available monitoring data and information was assembled and used to determine the attainment status in each assessment unit consistent with the applicable WQS; and

- decision rationales to not use any existing and readily available data and information (40 CFR Section 130.7).

What is an Assessment?

Water quality assessment means determining the condition of a waterbody segment based on all valid, existing, and readily available water quality-related data and information.

The Division of Water adheres to the CALM when conducting waterbody assessments.

What is Attainment?

Attainment refers to a waterbody meeting applicable water quality standards.

Summary of updates in the 2023 CALM

The following list summarizes the most recent updates made to the DEC CALM:

- Added citation of the DEC's publication on use of a power analysis to determine the number of samples needed to assess water quality in lakes and flowing waters

- Added minimum representativeness requirements for ponded and flowing waters

- Incorporated Commissioners Policy 42, Contact, Cooperation, and Consultation with Indian Nations, in the Integrated Reporting Schedule

- Incorporated Assessment, TMDL Tracking and Implementation System (ATTAINS) reporting to the IR schedule

> The DEC CALM is updated as needed to reflect current science, water quality regulations, and Division of Water priorities.

Key Terms

The following information and terms are key to understanding New York State's assessment and listing process.

305(b) Report: The 305(b) Report is a report submitted to EPA every two years that describes the quality of all water resources in the state and whether these waters are supporting their Best Uses.

303(d) List of Impaired Waters: The 303(d) List is a list submitted to EPA every two years of Impaired surface waters in the state that do not meet water quality standards, do not support Best Uses, and require the development of a TMDL.

Assessment: Assessment refers to evaluating the water quality of the state's waterbodies by determining whether they meet the state's WQS and support their Best Uses.

ATTAINS*:* The Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS) is an online system for accessing information about the conditions in the Nation's surface waters (EPA).

attains: a custom R package, created by DEC, that queries and transforms data from ATTAINS for use in *stayCALM* and then transforms the final *stayCALM* output to the required format for submission to ATTAINS*.*

Best Use(s) and Classifications: The assessment of New York State's surface waters is specific to the Best Use(s) assigned to a waterbody. All waterbodies in New York State are classified to reflect their Best Use(s) in accordance with NYS Environmental

Conservation Law (ECL) protections for sources of water used for drinking, bathing, boating, fishing, and shellfishing (ECL 17-0301). Water classifications and their Best Use(s) found in Title 6 NYCRR Part 701 are summarized in Appendix E (New York State Water Classification and Best Use(s)). Requirements for the protection of water quality vary based on the classification of a waterbody and its Best Use(s).

Factomatic: a custom R package, created by DEC, that automates the generation of NYS's water assessment factsheets based on the output of *stayCALM*.

Integrated Reporting (IR): EPA prefers that states submit the information from the 303(d) List and 305(b) Report as a single report, known as IR. DEC submits an IR via EPA's ATTAINS data system every two years. Appendix A (Integrated Reporting Schedule) outlines the schedule for New York State's IR. EPA requests that states categorize all waters into one of EPA's eight-part IR categories, as depicted in Appendix B (Integrated Reporting Categories).

Listing: Listing refers to the process of determining which waterbodies do not meet the state's WQS and do not support their Best Uses; and will be included on the 303(d) List of Impaired Waters within IR 5 – Impaired, Requiring a TMDL or IR 5r – Impaired, Alternative Restoration Plan.

Quality Assurance: Upon conclusion of water quality monitoring in a drainage basin, water quality data undergoes a quality assurance assessment. See Data Requirements for more information.

stayCALM: A custom R package, created by DEC, that automates New York State's waterbody assessment process. *stayCALM* uses the logic and procedures described in the CALM to evaluate available water quality data and information to produce assessments.

Total Maximum Daily Load (TMDL): Waterbodies on the 303(d) List are required to develop a TMDL, which is a type of clean water plan for a waterbody. A TMDL calculates the maximum amount of a single pollutant that a waterbody can receive and still meet WQS. For more information about TMDLs, visit DEC's Clean Water Plans webpage: https://www.dec.ny.gov/chemical/23835.html.

Waterbody Inventory/Priority Waterbodies List (WI/PWL): The WI/PWL is a statewide inventory of all New York State waterbodies and includes the most current assessment information for a waterbody segment. The WI/PWL is used to generate water quality assessment factsheets for each waterbody segment. These facts sheets share assessment information with the general public. All factsheets are available on the DECinfo Locator: https://gisservices.dec.ny.gov/gis/dil/. The WI/PWL is updated every two years and is used to compile the state's Integrated Report.

Water Quality Monitoring: Water quality monitoring data used for assessments may come from a variety of sources, including but not limited to DEC's surface water monitoring and regulatory programs, and monitoring network partnerships on rivers,

streams, lakes, reservoirs, estuaries, and coastal waters Appendix D (DEC Water Quality Monitoring and Assessment Cycle) shows DEC's statewide water quality monitoring programs' calendar cycle through 2026.

Water Quality Standards (WQS): WQS are the maximum allowable concentrations of a pollutant developed for the protection of Best Use(s) and assigned to the different classes of waters. WQS can be numeric or narrative. Numeric WQS are expressed as numeric concentrations that cannot be violated. Narrative WQS are descriptive and use terms such as "none in any amount." Narrative WQS are often associated with numeric guidance values (GVs) established in Technical Operation Guidance Series 1.1.1. DEC considers GVs in conjunction with the narrative WQS when conducting assessments.

Waterbody Segmentation: New York State's waterbodies are assessed by segment. DEC delineates waterbodies into discrete segments and assigns a unique eight-digit segment ID to each waterbody. Appendix C (Waterbody Segment Delineation) describes the process for segments delineation.

Section 2: Assessment Methodology, Listing Methodology, and Data Requirements

Assessment Methodology

This section provides the protocol for conducting a use assessment for a waterbody. A use assessment is the evaluation of a waterbody's ability to support its Best Uses based on all available and valid water quality data. A waterbody assessment is conducted based on a waterbody segment's use assessments.

1. ***Determine the Best Use(s) to assess.***
   The assessment process begins with identifying the Best Use(s) based on the waterbody's classification. Appendix E (New York State Water Classification and Best Use(s)) provides a summary of NYS classifications and uses[1].

2. ***Verify that water quality data meets minimum requirements.***
   The second step requires verifying that the water quality data to be used for the assessment are valid and that they meet the water quality data requirements described on page 12 and as listed in step 4, below.

3. ***Determine data indicator category type.***
   Next, the valid water quality data are reviewed and categorized as either a Core or Supplemental Indicator. Core Indicators are parameters with WQS adopted in 6 NYCRR. Supplemental Indicators include information that may be used as indicators of water quality but are not yet based on WQS adopted in 6 NYCRR.

4. ***Determine confirmation status of the assessment.***
   The confirmation of the assessment is then determined based on three factors:
   1. whether the data are core or supplemental indicators;
   2. how many years of data are available; and
   3. how many samples have been collected.

   "Confirmed" assessment status criteria:

   - Core Indicator
     and
   - Two years of water quality data met
     and
   - Minimum # of samples met

   "Unconfirmed" assessment status criteria:

---

[1] Water classifications and their best uses are described in regulation 6 NYCRR Part 701. The classification of individual bodies of surface water is in regulation 6 NYCRR Chapter X (Parts 800 - 941).

- Core or Supplemental Indicator
  and
- Two years of water quality data not met
  or
- Minimum # of samples not met

Use assessments that are confirmed may be included on the CWA Section 303(d) List. Use assessments that are unconfirmed are reported to IR Category 3 (Appendix B) due to insufficient information and not included on the CWA Section 303(d) List; however, these waterbodies may be prioritized for additional investigation or water quality monitoring.

5. ***Assess the Best Uses.***
   Next, the water quality data is compared with the WQS for each use. Based on these comparisons, each use is assigned one of four assessment categories:

   - **Fully Supported**—Data or information indicate no impact to the Best Use(s).

   - **Stressed**—Data or information indicate a potential impact to the Best Use(s).

   - **Impaired**—Data or information indicate failure to support a WQS (EPA 2006 IRG).

   - **Unassessed**—Water quality data is unavailable or does not meet water quality data requirements.

   A use may be assessed as Fully Supported when valid water quality data does not violate a WQS. A use may be assessed as Impaired when valid water quality data shows violations of WQS over multiple years. Where data cannot be used to conduct a use assessment, the use is categorized as Unassessed. Specific criteria for each of DEC's Best Use(s) is listed in Tables 1-5.

6. ***Assign overall waterbody assessment and IR category.***
   Once valid water quality data is evaluated and categorized as Core or Supplemental Indicators, and the Best Use(s) of the waterbody are assessed, an overall waterbody assessment is assigned.

   The waterbody assessment categories are:

   - **Impaired**—Any use is assessed as Impaired/Confirmed.

   - **Minor Impacts**—Any use is assessed as Stressed/Confirmed, unless a use is Impaired/Confirmed.

   - **Fully Supported**—All evaluated uses are assessed as Fully Supported/Confirmed.

- **Needs Verification**—Any use is assessed as Unconfirmed, unless a use is Impaired/Confirmed.

- **Unassessed**—All uses are unassessed.

7. *Reporting to EPA.*
   Every two years, states are required to submit all assessment information to EPA through EPA's ATTAINS data system (see Integrated Reporting).

   Each waterbody and its applicable uses must be assigned one of eight EPA IR categories or subcategories in the Integrated Report. IR categories are defined by the extent a waterbody meets its uses, and for Impaired waters, are further broken down into the cause of the impairment and/or the status of a TMDL or restoration plan.

   The IR categories are:

   - **IR 1** – All Uses are Fully Supported

   - **IR 2** – Some Uses are Fully Supported

   - **IR 3** – Unassessed or Insufficient Information

   - **IR 4a** – Impaired, TMDL Completed

   - **IR 4b** – Impaired, Other Restoration Plan in Place

   - **IR 4c** – Impaired due to Pollution not a Pollutant

   - **IR 5** – Impaired, Requiring a TMDL

   - **IR 5r** – Impaired, Alternative Restoration Plan

   See Appendix B (Integrated Reporting Categories) for a diagram of the IR categories.

   To fulfill the Integrated Reporting requirement, each waterbody, its IR category, and the parameter(s) identified as the cause of impairment, are tracked and reported via ATTAINS.

Assessment Fact Sheets

As they are completed, all assessments are made available to the public in the form of fact sheets (see DEC Info Locator).

Listing Methodology

This section outlines the methodology for including Impaired waterbodies on the state's 303(d) List, a process referred to as listing. Determining which waterbodies are Impaired, and can therefore be improved, is a key part of the assessment process.

Concurrent with the Reporting step of the assessment process (step 6, above), those waterbodies assessed as Impaired and categorized in the Integrated Report as IR 5 – Impaired, Requiring a TMDL or IR 5r – Impaired, Alternative Restoration Plan, are included in the NYS Section 303(d) List of Impaired Waters. This is required by CWA Section 303(d) and supporting federal regulation 40 CFR 130.7, which require states to submit to EPA a list of impaired waterbodies that require a TMDL every two years. The list must also include the identification of the pollutant that is causing the impairment and the priority ranking for TMDL development.

> **DOW Bridge Vision Process**
>
> Serving as a bridge between the 2015 Vision Approach to the CWA 303(d) Program and the new vision period that begins in 2024, DOW develops TMDLs in accordance with EPA's 2022-2032 Vision for CWA 303(d) Program.

Adding a Waterbody to the 303(d) List

To add a waterbody/pollutant combination to the Section 303(d) List of Impaired Waters, DEC adheres to the following listing rationale:

- Valid water quality data demonstrates that there are violations of applicable WQS, Best Uses are not supported, and a TMDL or alternative restoration strategy is required to mitigate the cause/pollutant. The violations must occur more than once and in more than one sampling year.

Removing a Waterbody from the 303(d) List

To remove a waterbody/pollutant combination from the list there must be sufficient justification that meets the EPA delisting rationale from 40 CFR 130.7 and the 2006 EPA IRG:

- state determines the WQS is being met; or

- flaws in original listing; or

- other point source or nonpoint source controls are expected to meet WQS; or

- impairment due to non-pollutant; or

- EPA approval of TMDL.

Data Requirements

Data quality and quantity requirements are needed to ensure that assessments, and subsequently listings and delistings of waterbodies on the 303(d) list, are accurate and science based. These requirements apply to both data collected by DEC and external data.

Data used to conduct assessments must:

> **Data Quality**
>
> All water quality data used for assessments must be transparent, reproducible, unbiased, scientifically valid, and documented.

- be collected following a Quality Assurance Project Plan (QAPP);

- demonstrate that Data Quality Indicators (DQI's) have been met: precision, accuracy, bias, representativeness (Table 7), completeness, comparability, and sensitivity;

- be accompanied with a Data Usability Assessment Report (DUAR);

- be analyzed by a NYS Department of Health (DOH) Environmental Laboratory Approval Program (ELAP) accredited Lab in accordance with New York State Public Health Law § 502 and Environmental Conservation Law § 3-0119, for parameters that DOH certifies, and using methods approved under 40 CFR Part 136. If alternate laboratories or analysis methods must be used, the specification of Technical and Operational Guidance Series (TOGS) 1.3.7 must be followed;

- be reflective of parameters with a WQS or a Supplemental Indicator identified in Tables 1-5;

- meet a minimum of two years* of data and be less than ten years old; and

- meet a minimum number of samples* (six samples for ponded and eight samples for flowing waters) (Conine et. al., 2021).

*When the minimum is not met, the use assessment will be Unconfirmed.

The collection of water quality data/information must follow nationally accepted quality assurance protocols in accordance with the American National Standard ASQ/ANSI E-4-2014. Additionally, water quality data/information must address the critical elements of data quality by employing QAPPs based on guidance provided by the EPA Guidance for Quality Assurance Project Plans (EPA QA/G-5 May 2006) and Standard Operating Procedures (SOPs) (EPA QA/G-6 March 2001), or similarly structured documentation.

Minimum Number of Samples and Years of Data
The amount of data used to conduct an assessment is important to ensure data accurately reflects the actual conditions in a waterbody. This section outlines how DEC determined the data quantity requirements for conducting assessments.

EPA encourages states to apply statistical methods to interpret water quality monitoring data and information that are used to conduct use assessments (EPA, 2006 IRG). As a result, DOW conducted a Power Analysis and an Analysis of Variability (ANOVA) on its historical water quality data for lakes and streams to define both the number of sample results, and the number of years of sampling required to make use assessment decisions with reasonable certainty (Conine et. al., 2021).

Power analysis uses the difference between the sample mean, the water quality standard, and the variability of historical data to calculate the number of samples required (Cohen, 1992). The ANOVA was used to determine the number of years of data required to accurately determine use attainment.

1. The results of the Power Analysis showed that in order to obtain at least 80 percent confidence in the collected data, a minimum of six samples are required per parameter for lakes and a minimum of eight samples are required per parameter for streams. The 80 percent confidence is considered the minimally acceptable power level for a statistical test as applied to use assessment determinations (EPA, CALM 4-10). As a result of this analysis, DOW concluded that a minimum of six samples for ponded waters and a minimum of eight samples for flowing waters are required to make a confirmed assessment decision.

2. The results of the ANOVA showed that for both lake and stream ecosystems, the variability within a single year was around 60 to 80 percent and was around five to nine percent between different years. While this indicates a high level of confidence in data collected within the same year, there is still potential for the one year of data to be anomalous. As a result, DOW concluded that a minimum of two years of data is required to make assessment decisions to account for this potential.

In addition, DOW conducted an analysis to define distribution of water quality data relative to WQS. This analysis involved the characterization of the Inter Quartile Range (IQR) for Core Indicators. The concept of defining IQR has been utilized by EPA for deriving nutrient criteria in lakes, reservoirs, rivers, and streams (EPA, 2000). Similar to the power analysis, the IQR analysis was conducted using the historical dataset that fell below the WQS for lakes, reservoirs, rivers, and streams. Through this analysis, water quality results that appear in the 75th percentile of a WQS will result in a Stressed use assessment. Water quality results that are below the 75th percentile of the WQS will result in a Fully Supported use assessment for the waterbody. A list of parameters and the 75th percentile for lakes and streams is included in Table 6.

Section 3. Tables and Appendices

The following tables and appendices provide further information about the assessment and listing processes, as described in the preceding text.

Table 1. **Shellfishing Use Assessment Criteria**

Shellfishing use assessments are based on NYSDEC Division of Marine Resources regulatory shellfishing closures as determined by evaluating monitoring results against Fecal Coliform WQSs from 6 NYCRR, Chapter 1, Part 47.3

Indicator	Parameter	WQ Results	Confirmation	Use Assessment	Waterbody Assessment	IR Category
Core	6 NYCRR, Chapter I, Part 47.3, Examinations of sanitary condition of shellfish lands	Regulatory shellfish closures	Confirmed	Impaired	Impaired	IR 5 IR 5r IR 4
		No regulatory shellfish closures	Confirmed	Fully Supported	Fully Supported	IR 1

Table 2. Source Water Supply Use Assessment Criteria

Indicator	Parameter	WQ Results	Confirmation	Use Assessment	Waterbody Assessment	IR Category
Core	Narrative and Numeric Health (Waters Source) WQSs in 6 NYCRR, Part 703 for Class A, AA, A-Special, AA-Special waters, including but not limited to: Ammonia Arsenic Cadmium Chloride Dissolved Solids Iron Manganese Magnesium Mercury Nickel Nitrate Nitrite Sulfate	At least two years of data with at least 6 samples for ponded waters or 8 samples for flowing waters and more than one violation of a WQS must occur in at least two years of the data.	Confirmed	Impaired	Impaired	IR 5 IR 5r IR 4
		One year of data and/or less than 6 samples for ponded waters or 8 samples for flowing waters with at least one violation of a WQS.	Unconfirmed	Impaired	Needs Verification	IR 3
		Multiple years with multiple results > 75th percentile of WQS (see Table 6)	Confirmed	Stressed	Minor Impacts	IR 1
		Single year with results > 75th percentile of WQS (see Table 6)	Unconfirmed	Stressed	Needs Verification	IR 3
		Multiple years with all results < 75th percentile of WQS (see Table 6) or more than one year of data with at least 6 samples for ponded waters or 8 samples for flowing waters and where there are no violations of a WQS.	Confirmed	Fully Supported	Fully Supported	IR 1
		Single year with all results < 75th percentile of WQS (see Table 6) or one year of data and/or less than 6 samples for ponded waters or 8 samples for flowing waters and where there are no violations of a WQS.	Unconfirmed	Fully Supported	Needs Verification	IR 3
Supplemental	NYS Department of Health (NYSDOH) has issued a closure of a public drinking water supply based on water quality		Unconfirmed	Impaired	Needs Verification	IR 3

Table 3. Primary Contact Recreation Use Assessment Criteria

Primary Contact recreation use assessments are based primarily on fecal indicator bacteria water quality standards adopted to protect human health. For parameters other than fecal indicator bacteria, at least two years of data with at least 6 samples for ponded waters or 8 samples for flowing waters are required for a confirmed use assessment.

Indicator	Parameter	WQ Results	Confirmation	Use Assessment	Waterbody Assessment	IR Category
Core	Narrative and Numeric WQSs in 6 NYCRR, Part 703 for Class B, SB waters, including but not limited to: Total coliform, the monthly median value and more than 20 percent of the samples, from a minimum of five examinations, shall not exceed 2,400 and 5,000, respectively. Fecal coliforms, the monthly geometric mean, from a minimum of five examinations, shall not exceed 200. E.coli for Coastal Recreation waters, the geometric mean of samples collected over any consecutive 30-day period shall not exceed 126, and no more than 10 percent of the samples collected in the same 30-day period shall exceed 410. Enterococci for Coastal Recreation waters, the geometric mean of samples collected over any consecutive 30-day period shall not exceed 35, and no more than 10 percent of the samples collected in the same 30-day period shall exceed 130.	At least 5 samples collected each year and more than one violation of the WQS must occur in at least two years of the data.	Confirmed	Impaired	Impaired	IR 5 IR 5r IR 4
		One year of data and/or less than the minimum 5 samples collected each year with at least one violation of the WQS	Unconfirmed	Impaired	Needs Verification	IR 3
		More than one year of data with the minimum 5 samples collected each year where there are no violations of the WQS.	Confirmed	Fully Supported	Fully Supported	IR 1
		One year of data and/or less than the minimum 5 samples collected each year and where there are no violations of the WQS.	Unconfirmed	Fully Supported	Needs Verification	IR 3
Supplemental	NYSDOH has issued a closure or advisory due to water quality for a public beach located within the waterbody segment.		Unconfirmed	Impaired	Needs Verification	IR 3

Table 4. **Secondary Contact Recreation Use Assessment Criteria**

Secondary Contact recreation use assessments are based primarily on fecal indicator bacteria water quality standards adopted to protect human health. For parameters other than fecal indicator bacteria, at least two years of data with at least 6 samples for ponded waters or 8 samples for flowing waters are required for a confirmed use assessment.

Indicator	Parameter	WQ Results	Confirmation	Use Assessment	Waterbody Assessment	IR Category
Core	Narrative and Numeric WQSs in 6 NYCRR, Part 703 for Class B, SB, and I waters, including but not limited to: Total coliform, the monthly median value and more than 20 percent of the samples, from a minimum of five examinations, shall not exceed 2,400 and 5,000, respectively. Fecal coliform, the monthly geometric mean, from a minimum of five examinations, shall not exceed 200. *E.coli* for Coastal recreation waters, the geometric mean of samples collected over any consecutive 30-day period shall not exceed 126, and no more than 10 percent of the samples collected in the same 30-day period shall exceed 410. Enterococci for Coastal recreation waters, the geometric mean of samples collected over any consecutive 30-day period shall not exceed 35, and no more than 10 percent of the samples collected in the same 30-day period shall exceed 130.	At least 5 samples collected each year and more than one violation of the WQS must occur in at least two years of the data	Confirmed	Impaired	Impaired	IR 5 IR 5r IR 4
		One year of data and/or less than the minimum 5 samples collected each year with at least one violation of the WQS	Unconfirmed	Impaired	Needs Verification	IR 3
		More than one year of data with the minimum 5 samples collected each year where there are no violations of the WQS	Confirmed	Fully Supported	Fully Supported	IR 1
		One year of data and/or less than the minimum 5 samples collected each year and where there are no violations of the WQS	Unconfirmed	Fully Supported	Needs Verification	IR 3

Table 5. Fishing Use Assessment Criteria

Indicator	Parameter	WQ Results	Confirmation	Use Assessment	Waterbody Assessment	IR Category
Core	Narrative and Numeric Health (Fish Consumption) and Aquatic (Acute and Chronic) WQSs in 6 NYCRR, Part 703 for Class C, SC, D, I, SD waters, including but not limited to: Ammonia/Ammonium Dissolved Oxygen Dissolved Solids Lead Mercury pH Zinc	At least two years of data with at least 6 samples for ponded waters or 8 samples for flowing waters and more than one violation of a WQS must occur in at least two years of the data	Confirmed	Impaired	Impaired	IR 5 IR 5r IR 4
		One year of data and/or less than 6 samples for ponded waters or 8 samples for flowing waters with at least one violation of a WQS	Unconfirmed	Impaired	Needs Verification	IR 3
		Multiple years with multiple results > 75th percentile of WQS (see Table 6)	Confirmed	Stressed	Minor Impacts	IR 1
		Single year with results > 75th percentile of WQS (see Table 6)	Unconfirmed	Stressed	Needs Verification	IR 3
		More than one year of data with at least 6 samples for ponded waters or 8 samples for flowing waters where there are no violations of a WQS and results are < 75th percentile of WQS where applicable (see Table 6)	Confirmed	Fully Supported	Fully Supported	IR 1
		One year of data and/or less than 6 samples for ponded waters or 8 samples for flowing waters and where there are no violations of a WQS and results are < 75th percentile of WQS where applicable (see Table 6)	Unconfirmed	Fully Supported	Needs Verification	IR 3
Supplemental	Fish consumption advisory issued by the NYSDOH Biological Assessment Profile (BAP) Score is Moderately to Severely Impacted	Unconfirmed	Impaired	Needs Verification	IR 3
	BAP Score is Slightly Impacted	Unconfirmed	Stressed	Needs Verification	IR3
	BAP Score is non-Impacted (includes Water Assessment by Volunteer Evaluators (WAVE) data)	Unconfirmed	Fully Supported	Needs Verification	IR 3

Table 6. Interquartile Ranges for Assigning a Stressed Use Severity in Fresh Water

Parameter	Class	Type of WQS[2]	Flowing Waters 75th percentile	Ponded Waters 75th Percentile	WQS	Units
Aluminum (ionic)	A, A-S, AA, AA-S, B, C	Aquatic (Chronic)	31.5	nd	100	µg/l
Ammonia	A, A-S, AA, AA-S	Health (Water Source)	49.3	65	2,000	µg/l
Ammonia	A, A-S, AA, AA-S, B, C	Aquatic (Chronic)	0-25.9**	0-25**	0.7-50**	µg/l
Ammonia	(T) (TS) designation	n/a	0-49.3**	0-20**	0.7-35**	µg/l
Arsenic	A, A-S, AA, AA-S	Health (Water Source)	0.853	0.812	50	µg/l
Arsenic (dissolved)	A, A-S, AA, AA-S, B, C	Aquatic (Chronic)	0.853	nd	340	µg/l
Arsenic	A, A-S. AA. AA-S, B, C, D	Aquatic (Acute)	0.853	nd	150	µg/l
Cadmium (dissolved)	A, A-S, AA, AA-S	Health (Water Source)	0.112	nd	5	µg/l
Cadmium (dissolved)	A, A-S. AA. AA-S, B, C	Aquatic (Chronic)	0.05-0.97*	nd	0.1-17.1*	µg/l
Cadmium (dissolved)	A, A-S. AA. AA-S, B, C, D	Aquatic (Acute)	0.031-0.097*	nd	0.05-78.4*	µg/l
Chloride	A, A-S, AA, AA-S	Health (Water Source)	42.7	30.9	250	mg/L
Copper	A, A-S, AA, AA-S	Health (Water Source)	2.8	7	200	µg/l
Copper (dissolved)	A, A-S. AA. AA-S, B, C	Aquatic (Chronic)	0.3-2*	nd	0.32-87.4*	mg/L
Copper (dissolved)	A, A-S. AA. AA-S, B, C, D	Aquatic (Acute)	0.32-2*	nd	0.33-167*	µg/l
Dissolved Oxygen	A, A-S, AA, AA-S, B, C	n/a	8	nd	>4[1]	mg/L
Iron	A, A-S, AA, AA-S	Aesthetic (Water Source)	218	165	300	µg/l
Lead	A, A-S, AA, AA-S	Health (Water Source)	0.99	nd	50	µg/l
Lead	A, A-S, AA, AA-S, B, C	Aquatic (Chronic)	0.042-0.271*	nd	0.4-57.8*	µg/l

[2] WQS types, as identified in Title 6 NYCRR Part 702.1

Table 6. Interquartile Ranges for Assigning a Stressed Use Severity in Fresh Water

Parameter	Class	Type of WQS[2]	Flowing Waters 75th percentile	Ponded Waters 75th Percentile	WQS	Units
Lead	A, A-S, AA, AA-S, B, C, D	Aquatic (Acute)	0.271	Nd	1.1-1483*	µg/l
Magnesium	A, A-S, AA, AA-S	Health (Water Source)	10000	5788	35,000	µg/l
Mercury	A, A-S, AA, AA-S	Health (Water Source)	0.014	nd	0.7	µg/l
Mercury	A, A-S, AA, AA-S, B, C	Aquatic (Chronic)	0.014	nd	0.77	µg/l
Mercury	A, A-S, AA, AA-S, B, C, D	Health (Fish Consumption)	6.4×10^{-4}	nd	7.0×10^{-4}	µg/l
Nickle	A, A-S, AA, AA-S	Health (Water Source)	2.2	nd	100	µg/l
Nitrite + Nitrate	A, A-S, AA, AA-S	Health (Water Source)	611	33.4	10,000	µg/l
pH low	A, A-S, AA, AA-S, B, C	n/a	7.4	7.2	>6.5	pH unit
pH high	A, A-S, AA, AA-S, B, C	n/a	8	7.9	<8.5	pH unit
Sulfate	A, A-S, AA, AA-S	Health (Water Source)	20,700	9,163	250,000	µg/l
Total Dissolved Solids	A, AA, AA-S, B, C	n/a	237	nd	500	mg/L
Zinc (dissolved)	A, A-S, AA, AA-S, B, C	Aquatic (Chronic)	2.6-5.2*	nd	3.0-802*	µg/l
Zinc (dissolved)	A, A-S, AA, AA-S, B, C, D	Aquatic (Acute)	3.3-5.3*	nd	4.3-1129*	µg/l

nd	Not determined in waterbody type
n/a	Does not apply
*	Indicates range is dependent on hardness
**	Indicates range is dependent on temperature and pH
µg/l	Micrograms per Liter
mg/L	Milligrams per Liter
[1]	This is a simplified interpretation of the Dissolved Oxygen Water Quality Standard

Table 7: Representativeness: Minimum Requirements for Ponded and Flowing Water Quality Assessments

Avoid collecting water quality samples at outfalls and within mixing zones. Water quality sampling procedures and locations for collecting samples are described in NYSDEC's Standard Operating Procedures for water quality sampling.

Waterbody Type	Indicator		Spatial	Temporal
Ponded[3]	Core	Total coliforms Fecal coliforms Enterococci *E.coli*	Deep Hole or Centroid (epilimnion)	See applicable water quality standard[4]
		Total Phosphorus	Deep Hole or Centroid (epilimnion)	Samples collected at least 2 weeks apart during June through September
		Narrative and Numeric WQSs in 6 NYCRR, Part 703	Deep Hole or Centroid (epilimnion and hypolimnion)	Samples collected at least 2 weeks apart
	Supplemental	Biological Assessment Profile	Shoreline	Single composite evaluation conducted at least once per year during June-September
Flowing[5,6]	Core	Total coliforms Fecal coliforms Enterococci *E.coli*	Most downstream point in the segment	See applicable water quality standard
		Narrative and Numeric WQSs in 6 NYCRR, Part 703		Samples collected at least 2 weeks apart
	Supplemental	Biological Assessment Profile (including WAVE)		Single evaluation conducted at least once per year during July-September

---

[3] Standard Operating Procedure: Collection Of Lake Water Quality Samples, NYSDEC SOP AMB-203-V21-1, https://www.dec.ny.gov/chemical/23850.html
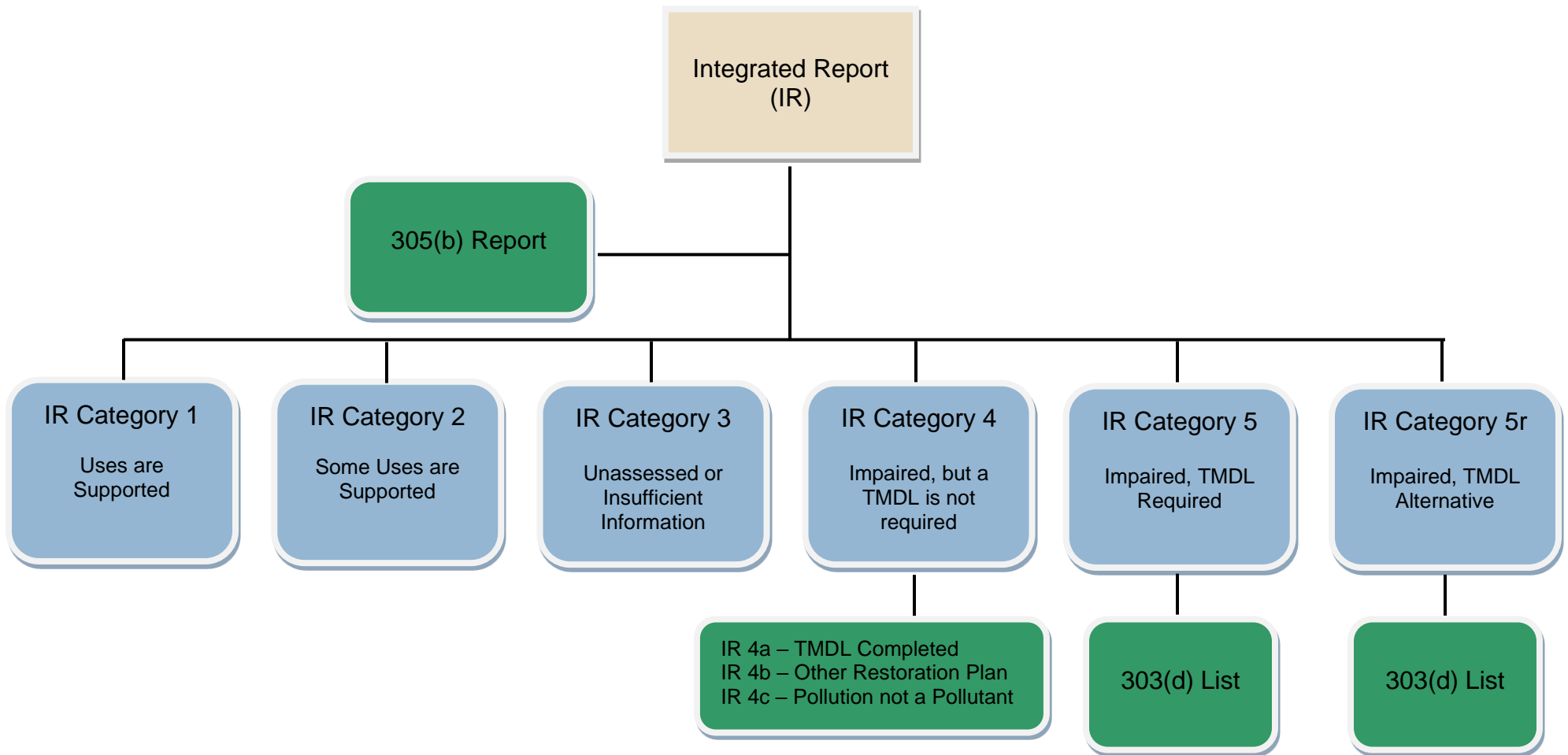[4] Water Quality Standards: 6 NYCRR Chapter X (Part 703): https://www.dec.ny.gov/regs/2485.html
[5] Standard Operating Procedure: Collection of Stream Water Column Samples for the Rotating Integrated Basin Studies (RIBS) Program as part of the Statewide Ambient Water Quality Monitoring Strategy, NYSDEC SOP AMB-210_V21-2, https://www.dec.ny.gov/chemical/23850.html
[6] Standard Operating Procedure: Biological Monitoring of Surface Waters in New York State, NYSDEC SOP-208_V21-1, https://www.dec.ny.gov/chemical/23850.html

Appendix A. Integrated Reporting Schedule

Integrated Reporting Schedule	
Milestone	**Schedule**
Data Solicitation Period (announced in the NYS *Environmental Notice Bulletin* and DEC's *MakingWaves* e-newsletter)	May – September of the odd year
Assessment of outside data and information received and development of Draft 305(b) Report and 303(d) List	October – December of the odd year
Assessment of DEC Monitoring Data	November 1st of the odd year
Contact, cooperation, and consultation with Indian Nations	January of the even year
Draft Section 303(d) List made available for public review	January of the even year
Section 303(d) list with applicable delisting rationales, 305(b) report, response to comments, CALM, and transmittal letter, submitted to EPA via ATTAINS	April 1st of the even year
EPA decision on the Section 303(d) List	30 days after submitted to EPA

Appendix B. Integrated Reporting Categories

Integrated Report (IR)

305(b) Report

IR Category 1 — Uses are Supported

IR Category 2 — Some Uses are Supported

IR Category 3 — Unassessed or Insufficient Information

IR Category 4 — Impaired, but a TMDL is not required
- IR 4a – TMDL Completed
- IR 4b – Other Restoration Plan
- IR 4c – Pollution not a Pollutant

IR Category 5 — Impaired, TMDL Required
- 303(d) List

IR Category 5r — Impaired, TMDL Alternative
- 303(d) List

Appendix C. Waterbody Segment Delineation

The size of an assessment unit is based on these factors:

- **Waterbody Type** – Assessment units are assigned to one of five surface water types: 1) Rivers and Streams, 2) Lakes and Reservoirs, 3) Estuary Waters, 4) Great Lakes Shoreline, and 5) Ocean Coastline.

- **Water Classification** – Assessment units are segmented based on surface water classification.

- **Hydrologic Drainage** – Assessment units are segmented using the United States Geological Survey's Hydrologic Unit Code (HUC-10) watershed. Assessment units that cross HUC-10 boundaries are broken into separate segments at the boundary.

- **Land Use and Character** – Assessment units are segmented by land use and character, and where land use and overall character within a watershed changes, a separate assessment unit is considered.

- **Waterbody Length/Size** – Assessment units that are too small and specific result in more segments than can be assessed with existing resources. Assessment units that are too large result in segments that are overly diverse and difficult to assess accurately.

  - **Rivers and streams** are divided into segments that are between 10 miles and 25 miles in length. Main stem river segments are segmented into multiple assessment units without their tributaries, and may be longer than 25 miles. Larger tributaries to main stem segments are considered separate segments that include small tributary waters.

  - **Lakes, ponds, and reservoirs** must be greater than 6.4 acres to be included as an assessment unit. Some very large lakes, such as Lake Champlain and the Finger Lakes, are segmented into multiple assessment units based on classification. Where land use characteristics are similar, some very small lake chains in remote watersheds are combined into one assessment unit. Ponds less than 6.4 acres may be included with the corresponding river/stream assessment unit.

  - **Estuary** assessment units are defined by physical features and waterbody classification, with consistency of size being less of a consideration.

  - **Great Lakes Shoreline/Ocean Coastline** assessment units are segmented to reflect classification and hydrologic unit boundaries.
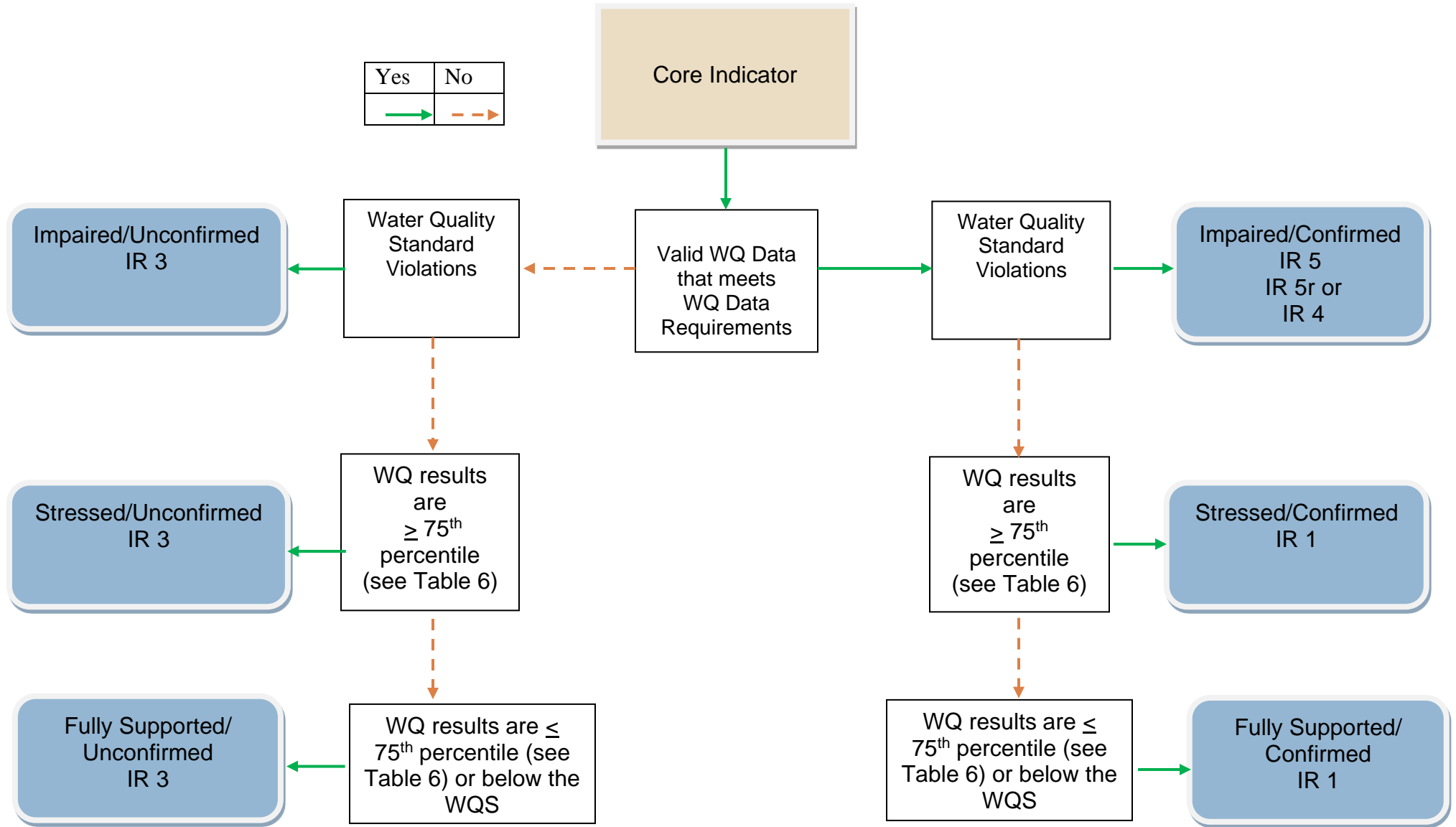
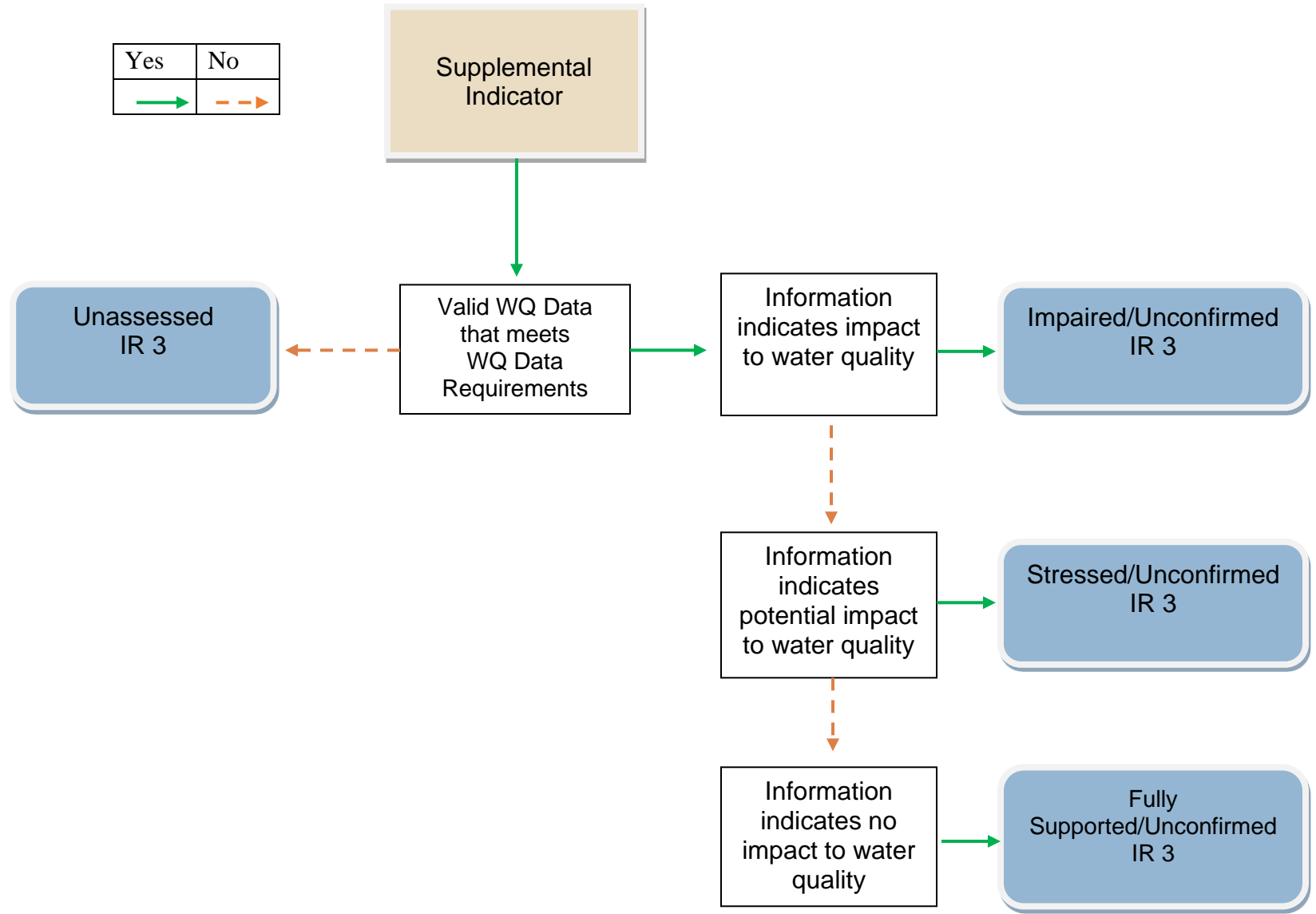## Appendix D. DEC Water Quality Monitoring and Assessment Cycle
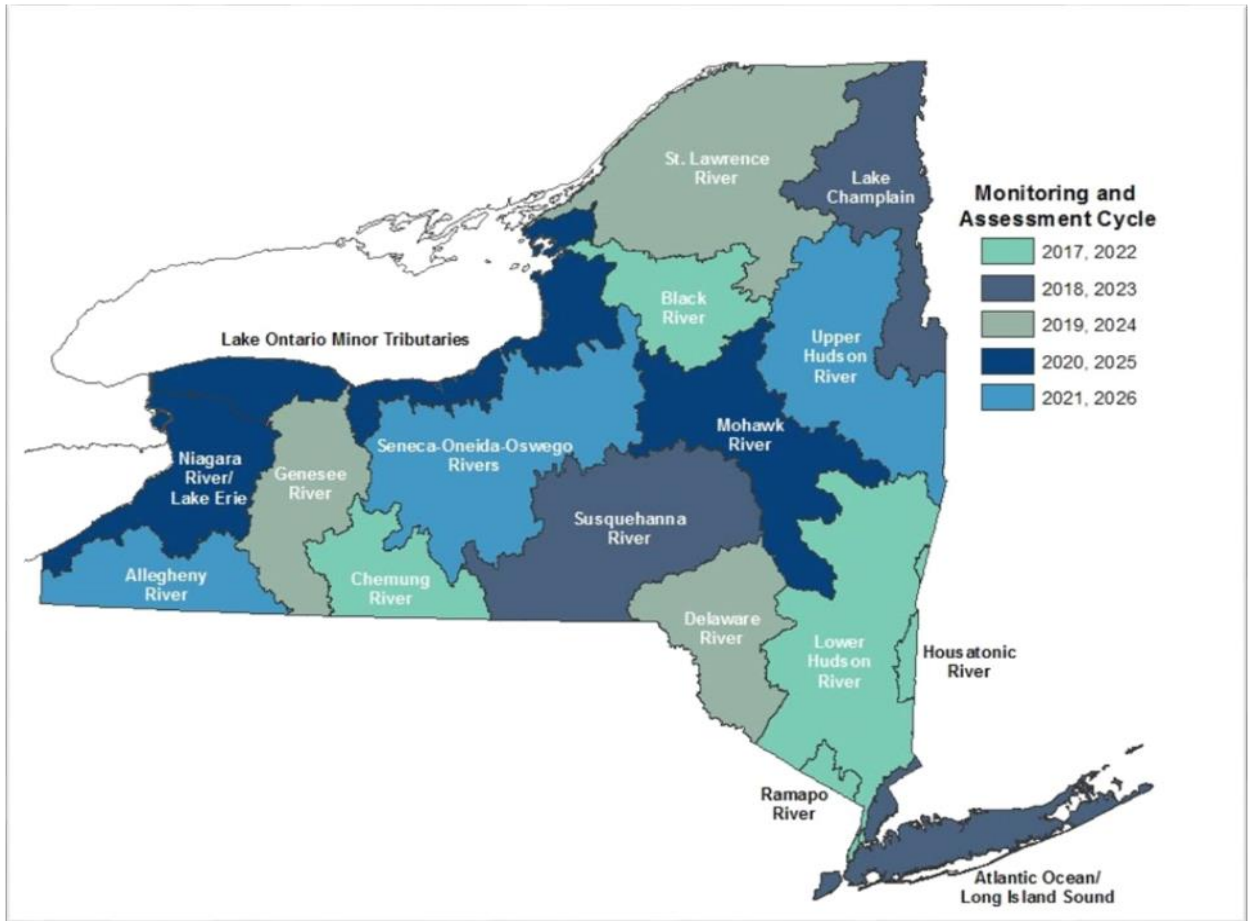
Appendix E. New York State Water Classification and Best Use(s)

New York State Water Classification and Best Use(s)		
Classification		**Best Use(s)**
Fresh Waters	A, AA, A-Special, AA-Special	Source of water supply for drinking, culinary, or food processing purposes; primary and secondary contact recreation; and fishing
	B	Primary and secondary contact recreation, and fishing
	C	Fishing
	D	Fishing
Saline Waters	SA	Shellfishing for market purposes, primary and secondary contact recreation, and fishing
	SB	Primary and secondary contact recreation, and fishing
	SC	Fishing
	I	Secondary contact recreation, and fishing
	SD	Fishing
Trout Designation		
Trout Waters	Trout (T)	Applies to the classified water when a (T) appears in the classification tables of 6 NYCRR Parts 800 through 941
	Trout Spawning (TS)	Applies to the classified water when a (TS) appears in the classification tables of 6 NYCRR Parts 800 through 941

Appendix F. Integrated Reporting Categories Using Core Indicators

Yes	No
→ (green solid)	⇢ (orange dashed)

Core Indicator

Valid WQ Data that meets WQ Data Requirements

Water Quality Standard Violations (left)

Impaired/Unconfirmed IR 3

Water Quality Standard Violations (right)

Impaired/Confirmed IR 5 IR 5r or IR 4

WQ results are ≥ 75th percentile (see Table 6) (left)

Stressed/Unconfirmed IR 3

WQ results are ≥ 75th percentile (see Table 6) (right)

Stressed/Confirmed IR 1

WQ results are ≤ 75th percentile (see Table 6) or below the WQS (left)

Fully Supported/ Unconfirmed IR 3

WQ results are ≤ 75th percentile (see Table 6) or below the WQS (right)

Fully Supported/ Confirmed IR 1

Appendix G. Integrated Reporting Categories Using Supplemental Indicators

References and Citations

40 C.F.R. Section 130.7 (2011).

Coleman, Laura. 2016. Message in a Water Bottle: The Call for a Tri-State TMDL for Western Lake Erie. William and Mary Environmental Law and Policy Review 40, 565.

Conine, Andrea, Rickard, Sarah, Onion, Alene, Wiegert, Eric, Smith, AJ. 2021. Use of Power Analysis to Determine the Number of Samples Needed to Assess Water Quality in Lakes and Flowing Waters. Integrated Environmental Assessment and Management. Vol. 18, 1621-1628.

DEC. 2009. Commissioners Policy-42/Contact, Cooperation, and Consultation with Indian Nations. https://www.dec.ny.gov/docs/permits_ej_operations_pdf/cp42.pdf

DEC. 1982. Gazetteer of New York State lakes, ponds and reservoirs. Albany, NY: DEC Division of Water.

DEC, Division of Water. 1985. Antidegradation Policy. Organization and Delegation memorandum Number 85-40.

DEC, Division of Water. 2004. Smith, A.J., Bode, Robert W. Analysis of Variability in New York State Benthic Macroinvertebrate Samples.

DEC, Division of Water. Water Quality Assurance resources. https://www.dec.ny.gov/chemical/23850.html

DEC. March 2018. Standard Operating Procedure: *Ceriodaphnia dubia* (*C. dubia*) 7-Day Chronic Screening Test for Toxicity of Ambient Water Samples of Effluents, DEC SOP #402-18. Division of Water, New York State Department of Environmental Conservation, 625 Broadway, Albany, New York.

DEC. 2021. Biological Monitoring of Surface Waters in New York State. Division of Water, New York State Department of Environmental Conservation, 625 Broadway, Albany, New York.

DEC. April 2021. Standard Operating Procedure: Collection of Lake Water Quality Samples. https://www.dec.ny.gov/chemical/23850.html

DEC. 2021. Water Assessment by Volunteer Evaluators (WAVE) Sampling Guide. Division of Water, New York State Department of Environmental Conservation, 625 Broadway, Albany, New York, 28 pages.

DEC. 2021. Collection of Stream Water Column Samples for the Rotating Integrated Basin Studies (RIBS) Program as part of the Statewide Ambient Water Quality Monitoring Strategy. Division of Water, New York State Department of Environmental Conservation, 625 Broadway, Albany, New York.

EPA. 1997. Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates: Report Contents. EPA-841-B-97-002A. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

EPA. April 2000. Nutrient Criteria Technical Guidance Manual. Lakes and Reservoirs. EPA-822-B-00-001. Environmental Protection Agency, Office of Science and Technology, Washington, D.C.

EPA. July 2000. Nutrient Criteria Technical Guidance Manual. Rivers and Streams. EPA-822-B-00-002. Environmental Protection Agency, Office of Science and Technology, Washington, D.C.

EPA. November 2000. Ambient aquatic life water quality criteria for dissolved oxygen (saltwater): Cape Cod to Cape Hatteras. EPA-822-R-00-012. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.

EPA. July 2002. [Online] Consolidated Assessment and Listing Methodology Toward a Compendium of Best Practices. First Edition. U.S. Environmental Protection Agency, Office of Wetlands, Oceans, and Watersheds, Washington, D.C.
https://www.epa.gov/waterdata/consolidated-assessment-and-listing-methodology-calm

EPA. 2004. Guidance for 2004 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d) and 305(b) of the Clean Water Act; TMDL-01-03. U.S. Environmental Protection Agency, Assessment and Watershed Protection Division, Office of Water, United States Environmental Protection Agency, Washington, D.C.

EPA. 2005. Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act. U.S. Environmental Protection Agency, Assessment and Watershed Protection Division, Office of Water, United States Environmental Protection Agency, Washington, DC.

EPA. 2008. Information Concerning 2008 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions. U.S. Environmental Protection Agency, Assessment and Watershed Protection Division, Office of Water, United States Environmental Protection Agency, Washington, DC.

EPA. 2010. Information Concerning 2010 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions. U.S. Environmental Protection Agency, Assessment and Watershed Protection Division, Office of Water, United States Environmental Protection Agency, Washington, DC.

EPA. October 2011. A Primer on Using Biological Assessments to Support Water Quality Management. EPA-810-R-11-01. U.S. Environmental Protection Agency, Office of Science and Technology, Office of Water, Washington DC.

EPA. 2012. Information Concerning 2012 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions. U.S. Environmental Protection Agency, Assessment and Watershed Protection Division, Office of Water, United States Environmental Protection Agency, Washington, DC.

EPA. 2013. Long-Term Vision for Assessment, Restoration and Protection under the Clean Water Act Section 303(d) Program. U.S. Environmental Protection Agency, Office of Water,

Washington, DC. https://www.epa.gov/tmdl/new-vision-cwa-303d-program-updated-framework-implementing-cwa-303d-program-responsibilities

EPA. 2014. Information Concerning 2014 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions. U.S, Environmental Protection Agency, Assessment and Watershed Protection Division, Office of Water, United States Environmental Protection Agency, Washington, DC.

EPA. 2016. Information Concerning 2016 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions. U.S. Environmental Protection Agency, Assessment and Watershed Protection Division, Office of Water, United States Environmental Protection Agency, Washington, DC.

EPA. 2018. Information Concerning 2018 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions. U.S. Environmental Protection Agency, Assessment and Watershed Protection Division, Office of Water, United States Environmental Protection Agency, Washington, DC.

EPA. 2022. Quality Assurance Resources https://www.epa.gov/citizen-science/quality-assurance-handbook-and-guidance-documents-citizen-science-projects

Keller, Arturo A., Cavallaro, Lindsey. 2008. Assessing the US Clean Water Act 303(d) listing process for determining impairment of a waterbody. Journal of Environmental Management 86, 699-711.

New York State Federation of Lake Associations in Cooperation with DEC. 2009. Diet for a Small Lake, Second Edition. https://www.dec.ny.gov/chemical/82123.html

Smith, Eric P., Keying, YE., Hughes, Chris., Shabman, Leonard. 2001. Statistical Assessment of Violations of Water Quality Standards under Section 3039d) of the Clean Water Act. Environmental Science and Technology 35, 606-612.

Title 6 New York Codes, Rules, Regulations, Parts 701-704.

United States Congress. Federal Water Pollution Control Act. Sections 104, 303, 305, and 406. https://www.epa.gov/laws-regulations/summary-clean-water-act

Water Quality Monitoring Resources:
- https://www.epa.gov/nps/nonpoint-source-volunteer-monitoring
- https://www.usgs.gov/mission-areas/water-resources/science/national-water-quality-project-sampling-methods?qt-science_center_objects=0#qt-science_center_objects