

ORDER OF THE STATE OF WISCONSIN NATURAL RESOURCES BOARD
REPEALING, RENUMBERING, RENUMBERING AND AMENDING, AMENDING, REPEALING
AND RECREATING AND CREATING RULES

The Wisconsin Natural Resources Board adopts an order to **repeal** NR 102.04 (4) (b) and 102.06 (7) (Note 2); to **renumber** NR 102.06 (2) (a), (f), (fm), and (j); to **renumber and amend** NR 102.06 (2) (g), (i), and (4) (c); to **amend** NR 102.03 (intro.), 102.04 (4) (d) and (5) (b), 102.06 (1) and (2) (intro.), and 217.13 (2) (d) and (Note); to **repeal and recreate** NR 102.04 (4) (a) and 102.06 (3) (title); and to **create** NR 102.03 (1c), (1e), (1g), (1i), (1k), (1m), (1q), (1v), (6), and (6s) (Note), 102.04 (4) (am) and (f), 102.07, and 102 Subchapter III, relating to processes for waterbody assessments, biological assessment thresholds, biological confirmation of phosphorus impairments, and water quality criteria for dissolved oxygen.

WY-23-13

Analysis Prepared by the Department of Natural Resources

1-3. Statutory Authority, Statutes Interpreted, and Explanation of Agency Authority:

- Sections 281.11 and 281.12, Wis. Stats., grant necessary powers and establish a comprehensive program under the WDNR to enhance quality management and protection of all waters of the state. It grants the WDNR general supervision and control to carry out the planning, management and regulatory programs necessary for prevention/reduction of water pollution and for improvement of water quality.
- Section 281.13, Wis. Stats., grants the department authority to research and evaluate the quality and condition of the state's natural water sources.
- Section 281.15, Wis. Stats. mandates that the department promulgate water quality standards, including water quality criteria and designated uses. It recognizes that different use categories and criteria are appropriate for different types of waterbodies, and that the department shall establish criteria which are not more stringent than reasonably necessary to assure attainment of the designated use for the water bodies in question.
- Section 281.65(4)(c) and (cd), Wis. Stats., directs the department to prepare a list of waters impaired by nonpoint source pollution.

4. Related Statutes or Rules:

The proposed rules are related to one other rule package currently in progress. Rule package WT-17-12 creates processes for establishing site-specific criteria for phosphorus. A waterbody's eligibility for a site-specific criterion under that rule is largely dependent on whether the waterbody is attaining its phosphorus response indicators and biological assessment thresholds as specified in this rule package. Material created as part of this rule package is cross-referenced in the draft site-specific criteria rule. Therefore this rule package, WY-23-13, must be promulgated before or concurrent with rule package WT-17-12.

5. Plain Language Analysis:

This rule package addresses several areas related to the state's assessments of its streams, rivers, lakes and other waterbodies. It focuses largely on assessments related to the biological quality of a waterbody.

Waterbody Assessments and Reporting. Every two years, under federal Clean Water Act requirements, the department assesses the state's waterbodies to determine whether they are attaining water quality standards. A new subchapter is proposed that codifies Wisconsin's current procedures for conducting

surface water assessments, including public participation opportunities and U.S Environmental Protection Agency (U.S. EPA) approval.

Biological assessment thresholds. The most direct and commonly-applied method of measuring the quality of a waterbody is through assessing the biological communities within the waterbody—its fish, insects, plants, and algae. The proposed rule establishes biological assessment thresholds that are used to evaluate the biological health of surface waters in the state. The proposed “Waterbody Assessments and Reporting” subchapter includes the following sections related to biological assessments:

- *Narrative biological assessment thresholds.* Narrative thresholds set expectations and goals for the biological quality of these communities. They are used to measure the quality of a waterbody’s biological community and to determine attainment of its designated uses. This section also generally describes the types of biological assessments that have been conducted by the department to determine whether a waterbody’s aquatic community is considered healthy and attaining its designated uses.
- *Numeric biological assessment thresholds for lakes, reservoirs, and impounded flowing waters.* Numeric thresholds set benchmarks that indicate attainment of a lake or reservoir’s designated uses. Once a numeric biological assessment threshold is codified by rule, it cannot be revised unless the rule is revised. These thresholds include:
 - *Algae thresholds for Recreation and Aquatic Life.* The rule proposes algae (chlorophyll *a*) thresholds for lakes, reservoirs and impounded flowing waters. Algae levels are a top water quality concern for the public, and are a critical component of waterbody assessments to determine whether recreational goals are met. The chlorophyll *a* thresholds created in the proposed rule are the same considerations that have been used by the department to assess water quality for recreation and aquatic life uses. A minor exception to this is the aquatic life chlorophyll *a* threshold for two-story fishery lakes, which is lowered slightly from the previous recommended goal of 10 ug/L to a new codified threshold of 8 ug/L chlorophyll *a*, but this affects very few waters.
 - *Aquatic plant thresholds for aquatic life.* The rule includes numeric thresholds for aquatic plants in lakes and reservoirs. These thresholds indicate attainment of healthy plant communities within lakes, an important factor in lake habitat to support aquatic life.
- *Phosphorus assessment procedures using biological metrics.* Statewide phosphorus water quality standards were promulgated by rule in 2010. However, the rule did not include evaluation procedures for determining attainment of the phosphorus standard in a waterbody (e.g. evaluating criteria exceedances and impacts to biological community). This rule specifies how attainment of the numeric phosphorus criteria is determined. It also incorporates flexibility for evaluating phosphorus surface water impairments by creating a “combined assessment” approach. Under this approach, the waterbody’s phosphorus concentration is reviewed in conjunction with “phosphorus response indicators”—algae and plant metrics—that specifically indicate whether the waterbody is exhibiting a biological response to phosphorus. If a waterbody exceeds the statewide phosphorus criterion (within a specified range) but does not exhibit a biological or recreational use impairment, it would not be considered impaired for purposes of section 303 (d) listing.

Dissolved oxygen criteria for Aquatic Life. Revisions to the existing dissolved oxygen criteria clarify which criteria apply to different waterbody types:

- This rule specifies that the dissolved oxygen criterion of 7.0 mg/L applies not only to the time of spawning but also during the early life stages that require higher oxygen levels. This more protective time frame applies to only trout class I and II streams, which by definition support trout reproduction.

This rule removes the requirement for higher dissolved oxygen during spawning from class III trout streams, which by definition do not support reproduction.

- This rule relocates certain dissolved oxygen criteria from ch. NR 104 to s. NR 102.04(4), Wis. Adm. Code, so that all dissolved oxygen criteria are located in the same part of the code. The relocated criteria are the existing dissolved oxygen criterion of 3 mg/L for limited forage fish waters and 1 mg/L for limited aquatic life waters, diffuse surface waters, and wastewater effluent channels.
- The addition of oxythermal criteria for two-story fisheries is necessary because the existing dissolved oxygen criteria are not appropriate for this relatively rare and sensitive type of coldwater fishery, comprising only 1% of Wisconsin's lakes.

Chapter NR 217, Wis. Adm. Code, calculation of upstream background phosphorus concentrations. This rule includes a revision to a portion of ch. NR 217, Wis. Adm. Code, to align the phosphorus calculation methods used to determine background phosphorus concentrations for effluent limit calculations with those delineated in proposed s. NR 102.07 (1) (b) to (c), Wis. Adm. Code. Previously, slightly different methods were used to calculate ambient phosphorus concentrations for purposes of criteria assessment and to calculate upstream background phosphorus concentrations for Wisconsin Pollutant Discharge Elimination System (WPDES) permit limit derivation under s. NR 217.13 (2) (d), Wis. Adm. Code. Although these two methods yield very similar resulting phosphorus concentrations, the differences between the two methods have caused confusion and are unnecessary. The proposed procedure detailed in s. NR 102.07 (1) (b) to (c), Wis. Adm. Code, will be most appropriate for both applications.

Definitions. Several new definitions are included in this rule, and some definitions are relocated from the section of the rule dealing only with the phosphorus criteria to the section of the rule applying to the whole chapter. There are also some clarifications made to a few definitions, such as “stratified lake or reservoir” and “stratified two-story fishery lake.” These are not expected to change the waterbodies included in these categories, only to clarify the existing interpretation of these terms.

6. Summary of, and Comparison with, Existing or Proposed Federal Statutes and Regulations:

Federal regulations require that states assess surface waters and create an impaired waters list every two years. In addition, federal regulations require states to develop water quality criteria. However, federal regulations do not specify detailed procedures for assessing waters or listing them as impaired. This rule package establishes a general structure that the department follows in assessing surface waters and reporting under ss. 303 (d) and 305 (b) of the Clean Water Act, including listing waters on the impaired waters list. It also creates new biological assessment thresholds and water quality criteria to address the state's water quality needs, including numeric thresholds for algae and aquatic plants, general narrative biological thresholds, phosphorus response indicators, oxythermal criteria for two-story fishery lakes, and updates to the existing dissolved oxygen criteria.

- Sec. 303 (d) (1) (A) of the Federal Water Pollution Control Act (Clean Water Act) requires states to develop an impaired waters list that identifies waters that are not meeting any water quality standard.
- Sec. 305 (b) (1) of the Federal Water Pollution Control Act (Clean Water Act) requires states to prepare a biennial report documenting which waterbodies are attaining their designated uses.
- 40 CFR s. 130.4 Water Quality Monitoring. This section requires water quality monitoring and assessments of state waters.
- 40 CFR s. 130.7 Total maximum daily loads (TMDLs) and individual water quality-based effluent limitations. This section provides additional information related to requirements for developing the impaired waters list.
- 40 CFR s. 130.8 Water Quality Reports. States must submit water quality reports to EPA that include a water quality assessment of state waters.

- 40 CFR s. 130.3. Water quality standards. This section defines water quality standards as setting water quality goals for a waterbody that will protect its designated uses (such as protection of fish, wildlife, recreation, and public health and welfare). Criteria will be set to protect those uses.
- 40 CFR s. 131.11 Criteria. States must adopt those water quality criteria that protect the designated use. Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. For waters with multiple use designations, the criteria shall support the most sensitive use.

7. Comparison with Similar Rules in Adjacent States:

- All states follow assessment procedures similar to the department's general waterbody assessment procedures outlined in subch. III of ch. NR 102, Wis. Adm. Code.
- Biological assessments are used by states to evaluate the biological health of surface waters and the results of assessments are summarized in biennial reports that are submitted to U.S. EPA. Some states assess waterbodies through guidance and other states have established narrative or numeric biological thresholds or criteria in rules. Narrative biological assessment thresholds provide a general statement of goals and the types of metrics that an agency uses to evaluate the biological health (quality of fish, insects, plants, or other aquatic life) of a waterbody, while numeric biological assessment thresholds specify numeric benchmarks that an agency uses to evaluate a waterbody's biological health. Wisconsin is proposing both narrative and numeric biological assessment thresholds. Under Wisconsin's proposed structure, these will be part of the state's assessment protocols but will not be considered water quality criteria, as they are in some other states. Indiana currently has narrative biocriteria. Until recently, Minnesota had narrative biocriteria but recently revised their biocriteria to a numeric format. Ohio also has promulgated numeric biocriteria. Michigan, Illinois, and Iowa have not formally incorporated narrative or numeric biocriteria into their water quality standards. However, all Region 5 states, Iowa, and most other states in the nation do use biological metrics such as fish and insect scores for waterbody assessments and section 303 (d) listing, regardless of whether narrative or numeric thresholds or biocriteria are codified. Pursuant to 33 USC s. 1315, states are required to report on the biological health of surface waters every two years.
- Most Region 5 states use some variation on phosphorus response indicators, including algal indicators or criteria. Minnesota has a promulgated combined criteria approach to assessing nutrient levels and their biological and chemical responses. Minnesota's biological metrics center on chlorophyll *a*. Ohio's approach is to use a multi-metric scoring system that aggregates results from separate evaluations of primary productivity (algae/plants), biological health and in-stream nutrient concentrations. Indiana has a process for assessing phosphorus impairments using chlorophyll *a* response indicators. Illinois has numeric phosphorus criteria for lakes and is currently considering promulgating proposed numeric phosphorus criteria for streams/rivers. Illinois also has narrative nutrient criteria and considers a water to be not meeting the criteria if excess algae is present in the waterbody. Michigan does not currently have numeric phosphorus criteria, but does have narrative phosphorus criteria. Iowa does not currently have phosphorus criteria but does assess waterbodies for phosphorus and chlorophyll *a*, and uses chlorophyll *a* to list waters as impaired for eutrophication based on narrative criteria.
- Wisconsin, Minnesota, Michigan and Indiana are the main states in EPA Region 5 that have two-story fishery lakes supporting coldwater fish. Wisconsin's oxythermal criteria were developed using a modification of methods developed in Minnesota. Although Minnesota uses its methods for assessments, it has not yet codified oxythermal criteria for its two-story fishery lakes. Minnesota and Indiana have general dissolved oxygen and temperature criteria for cold waters, though they do not distinguish between lakes and streams. Michigan has dissolved oxygen criteria specific to lakes with coldwater fish. These criteria generally require maintenance of at least 7 mg/L dissolved oxygen within the lake at varying depths, depending on certain lake characteristics. Michigan's temperature

criteria for all inland lakes also apply to coldwater lakes and, among other provisions, do not allow decreases in the volume of the thermocline/hypolimnion.

8. Summary of Factual Data and Analytical Methodologies Used and How Any Related Findings Support the Regulatory Approach Chosen:

All of the biological metrics included in this rule package are based on detailed analysis of Wisconsin data, as well as review of relevant literature, EPA recommendations, and approaches used in other states. These analyses are described in a technical support document for the rule. The Waterbody Assessments subchapter in this rule package outlines the types of biological assessments done by the department to assess a waterbody's fish, aquatic insect, aquatic plant, and algae communities. These metrics are based on published scientific papers and are standard methods used and refined by the department over time.

- The oxythermal habitat criteria were newly developed as part of this rule package based on a modification of a method used in Minnesota, and was also recently published as a scientific paper.
- The algal metrics for recreation were developed using statistical analysis of Wisconsin lake user perception surveys.
- The suspended chlorophyll *a* assessment threshold for aquatic life are based on trophic status to prevent a waterbody from becoming algal dominated and impairing feeding and reproduction of fish and insects.
- The aquatic plant threshold for lakes was developed based on Wisconsin lake data and was recently published as a scientific paper.
- The stream benthic algae phosphorus response indicator is based on relationships between the occurrence of diatom taxa and phosphorus concentrations.

After initial recommendations for this rule were developed, an external stakeholder committee met periodically over the course of two years to review the recommendations and provide feedback, and additional information was provided throughout this process. EPA water quality standards staff were part of this committee and also provided technical input.

9. Analysis and Supporting Documents Used to Determine the Effect on Small Business or in Preparation of an Economic Impact Report:

This rule primarily pertains to biological assessments of surface waters. The department expects this rule package to have minimal economic impacts, for two main reasons:

1. This rule largely documents protocols and procedures already used by the department for standard assessments. These types of assessments are common among Region 5 and other states. Because it largely reflects the status-quo for waterbody assessments, additional costs are not anticipated.
2. Biological assessment thresholds are not expected to have direct impacts on the regulated community. Rather, they help the department determine what types of stressors may be affecting biological communities, and whether restoration actions may be needed to mitigate those stressors. In the rare case where a waterbody achieves the water quality criterion for a pollutant, but the biological community is degraded and the department determines through further research that the pollutant is causing or contributing to the biological degradation, the department could only develop a more protective site-specific criterion for the pollutant in that waterbody through rulemaking. Outside of that process, biological assessments do not affect permit limits.

Waterbody assessments and reporting. The first portion of this proposed subchapter provides a general outline of the types of waterbody assessments currently being used by the department as required under the Clean Water Act. As such, there is no economic impact expected from the creation of these sections.

Biological assessment thresholds. This rule incorporates both narrative and numeric biological assessment thresholds. These are described individually below, and neither type of assessment is expected to have an economic impact. The following information about how these thresholds are applied is pertinent to both narrative and numeric assessment thresholds:

- The department’s guidance for assessing waterbodies, Wisconsin Consolidated Assessment and Listing Methodology guidance or WisCALM, has additional detail on recommended goals and methods for biological assessment thresholds (both numeric and narrative). WisCALM guidance has been used by the department for years to prepare the biennial surface water quality report required under 33 USC 1315 that is submitted to U.S. EPA. It will continue to be used and updated every two years in preparation for the biennial report and any updates to the guidance are subject to a separate public notice and comment period. As WisCALM is updated over time, existing biological metrics such as those for fish and aquatic insects may be revised to reflect the most recent science and public input. If any new biological metrics are included in WisCALM in the future, waterbodies would then be assessed for attainment of the new biological metric as well. However, the proposed numeric assessment thresholds, once established in rule, may only be revised through future rulemaking.
- Under any biological assessment thresholds—narrative or numeric—a waterbody that is determined to be biologically degraded (listed as having “observed effects”) and for which a pollutant is identified as the cause of the degradation may be subject to future pollutant reduction measures that could entail a cost. However, permitted dischargers would only be fiscally impacted if a site-specific criterion (SSC) more stringent than the pollutant’s statewide criterion was developed by rule and approved by U.S. EPA. Development of such SSC through rulemaking is already allowable under existing authority.

Narrative biological assessment thresholds. This section establishes narrative biological assessment thresholds that describe the biological quality goals for a surface water’s aquatic life community, and provides a general outline of the procedures currently being used by the department to assess biological quality. As such, there is no economic impact expected from the creation of this section. WisCALM guidance recommendations will be used in interpreting narrative thresholds—for instance for fish and aquatic insect assessments that are not codified—but as guidance these recommendations are non-binding and subject to change.

Numeric biological assessment thresholds for lakes, reservoirs, and impounded flowing waters.

- *Aquatic plant numeric assessment thresholds.* Aquatic plant numeric thresholds established in this rule identify lakes or reservoirs in which the plant community has been degraded due to a variety of disturbance factors. This metric was added in response to stakeholder preferences to include numeric thresholds. As a biological assessment threshold, this metric would not affect permit limits. As with other biological thresholds, if a lake is not attaining these thresholds it would be listed as having “observed effects” in the state’s biennial report to U.S. EPA.
- *Algae (chlorophyll a) numeric assessment thresholds to determine attainment of Recreation and Aquatic Life uses.* These numeric thresholds apply to lakes, reservoirs and impounded flowing waters and are the same as algae levels already considered by the department to assess water quality for the biennial report to U.S. EPA and used to list a waterbody as impaired when its uses are adversely affected. The department’s analysis shows that, once attained, the existing statewide phosphorus criteria will be protective of the proposed chlorophyll a assessment thresholds in most waterbodies. The department does not intend to require chlorophyll a monitoring of discharges, and there are no permit implementation procedures associated with the chlorophyll a thresholds included in this rule package. The only way a more stringent phosphorus limit would be derived based on an exceedance of a chlorophyll a assessment threshold is if a more-stringent phosphorus SSC was developed by the

department through rulemaking and approved by U.S. EPA. Any potential costs associated with a more stringent SSC would be evaluated as part of that rulemaking process. The establishment of chlorophyll *a* assessment thresholds does not provide any new authority for developing SSC; that avenue is already available where algae levels are a concern. For these reasons, the department does not expect an additional economic impact based on this change.

Phosphorus assessment procedures using biological metrics. These sections clarify the protocols currently used by the department to assess attainment of the phosphorus criteria, and add a component that allows a waterbody's biological response to phosphorus, or lack thereof, to be taken into account before listing it as impaired for phosphorus. This will provide the benefit of keeping a small number of waters off the impaired waters list that have healthy biological communities, but which may have periodic exceedances of the phosphorus statewide criterion. It would not add additional waters to the impaired waters list. No costs are associated with this portion of the rule.

Dissolved oxygen criteria for Aquatic Life. Revisions to the dissolved oxygen section are minimal and help clarify which criteria apply to different waterbody types. These have no expected economic impact. The addition of oxythermal criteria for two-story fisheries is useful in assessing the health of the fishery but is not expected to have an economic impact, as there are no dischargers with individual Wisconsin Pollutant Discharge Elimination System (WPDES) permits on or upstream of two-story fishery lakes. If a waterbody is not attaining this criterion, the department may recommend a study to determine the reason for non-attainment and what restoration actions may be appropriate.

NR 217 calculation of upstream background phosphorus concentrations. The department does not anticipate an economic impact from this revision. Currently, the two methods yield very similar results and alignment of the calculation methods is not expected to have an impact. For a small number of facilities it is possible that this would change the upstream phosphorus concentration used and the resulting calculated limit, but this minor change would not necessitate different treatment types, and economic impacts are not expected.

Definitions. Because the clarifications to definitions are not expected to change the waterbodies included in the categories, only clarify existing interpretation of these terms, no economic impact is expected.

10. Effect on Small Business (initial regulatory flexibility analysis): As discussed above, this rule is not expected to incur additional costs for small businesses.

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12. Place where comments are to be submitted and deadline for submission:

Two comment periods and public hearings were held on this rule:

- The initial comment period was held from July to September, 2019 with a public hearing on September 12, 2019. After that initial comment period, Board Order WY-23-13 was adopted by the Board at its December 2019 meeting. After approval by the governor, the rule was submitted for legislative review on December 23, 2019. The Assembly Committee on Forestry, Parks, and Outdoor Recreation held a hearing on February 4, 2020, and received comments. The rule was subsequently recalled by the department from legislative committees on February 28, 2020 to make germane modifications in response to these comments. The modifications changed the term “biocriteria” to “biological assessment thresholds” and relocated biological thresholds from the surface water criteria section of chapter NR 102 to a subchapter titled “Waterbody Assessments and Reporting.” The

purpose of these changes is to further clarify that biological assessments differ from water quality criteria in that the assessments are not used to derive discharge permit effluent limits. Additionally, aquatic plant numeric thresholds for lakes and reservoirs were added to the code to address stakeholder preferences for inclusion of numeric thresholds. This Board Order reflects these germane modifications.

- A second public comment period was recently held pertaining to the germane modifications contained in the rule. This second comment period ran from September 7 to November 1, 2021 and a hearing was held on October 25, 2021.

RULE TEXT

SECTION 1. NR 102.03 (intro.) is amended to read:

NR 102.03 Definitions. In this chapter, the following definitions ~~are applicable to~~
~~terms used~~apply:

SECTION 2. NR 102.03 (1c), (1e), (1g), (1i), (1k), (1m), (1q), (1v), and (6) are created to read:

NR 102.03 (1c) “Benthic” means relating to the ecological zone at the bottom of a body of water, including the sediment surface and subsurface layers.

(1e) “Biological assessment threshold” means a numeric value or condition description used to measure the quality of a waterbody’s biological community and to determine attainment of its designated uses.

(1g) “Chlorophyll *a*” means a green pigment present in all green plants and in cyanobacteria, responsible for the absorption of light to provide energy for photosynthesis.

(1i) “Clean Water Act” means the federal Clean Water Act of 1972 and amendments.

(1k) “Confidence interval” means a range within which the true value of a parameter is likely to occur, with a specified level of confidence.

(1m) “Diatom” means a common and diverse group of unicellular algae of the phylum Chrysophyta, having cell walls containing silica.

(1q) “Impounded flowing water” means a waterbody impounded by a constructed outlet structure on a river or stream that is not a reservoir as defined in sub. (4m).

(1v) “Macrophyte” means an aquatic plant large enough to be seen without the use of a microscope.

(6) “Section 303 (d) list” means a list of waters that do not attain water quality standards and require a total maximum daily load analysis, as specified under section 303 (d) of the Clean Water Act, 33 USC 1313 (d).

SECTION 3. NR 102.04 (4) (a) is repealed and recreated to read:

NR 102.04 (4) (a) *Dissolved oxygen.* 1. For streams, rivers, and impounded flowing waters, dissolved oxygen criteria apply to samples taken from the main channel near the area with greatest flow. For lakes or reservoirs, the dissolved oxygen criteria in this paragraph apply to the epilimnion of stratified lakes and to all but the deepest one meter of the water column of unstratified lakes.

2. Except as provided in subds. 3. to 7. and par. (am), surface waters shall attain a minimum dissolved oxygen concentration of 5 mg/L at all times.

3. A waterbody classified by the department as a trout class I or II water under s. NR 1.02 (7), a cold water community that is not a two-story fishery lake covered under par. (am), or a great lakes tributary used by salmonids for spawning during the period of habitation, shall attain all of the following:

a. A minimum dissolved oxygen concentration of 6.0 mg/L at all times.

b. A minimum dissolved oxygen concentration of 7.0 mg/L when cold water fish are spawning through fry emergence from their redds, or gravel nests.

Note: The period from spawning through fry emergence from their gravel nests is approximately mid-October through April, but varies depending on water temperature and location in the state.

c. Dissolved oxygen concentrations and diurnal patterns may not be altered from natural background levels to such an extent that cold water populations are adversely affected.

4. A waterbody classified by the department as trout class III under s. NR 1.02 (7) shall attain a minimum dissolved oxygen concentration of 6.0 mg/L at all times.

5. A waterbody for which a use attainability analysis under 40 CFR 131.10 (g) (1) to (6) demonstrates that its otherwise applicable designated use category is unattainable shall attain the following:

a. For a coldwater community with an approved use attainability analysis that redesignates it as warmwater, a minimum dissolved oxygen concentration of 5 mg/L at all times.

b. For any other community except those under subd. 7., a minimum dissolved oxygen concentration of 3 mg/L at all times to protect aquatic life

Note: Waterbodies described in subd. 5 are also known as altered waters.

6. A waterbody designated by the department as limited forage fish shall attain a minimum dissolved oxygen concentration of 3 mg/L at all times.

7. A waterbody designated by the department as limited aquatic life or wetlands, or classified as diffuse surface waters or wastewater effluent channels shall attain a minimum dissolved oxygen concentration of 1 mg/L at all times when water is present.

SECTION 4. NR 102.04 (4) (am) is created to read:

NR 102.04 (4) (am) *Oxythermal layer thickness for two-story fishery lakes.* 1. ‘Criteria.’ A two-story fishery lake shall maintain, during its period of summer stratification, an oxythermal layer of at least 1 meter in thickness that maintains both a dissolved oxygen concentration of at least 6 mg/L and a maximum temperature of the following:

a. For a two-story fishery lake with lake trout, 57° F or less.

b. For a two-story fishery lake with whitefish but not lake trout, 66° F or less.

c. For a two-story fishery lake with cisco but not whitefish or lake trout, or that the department manages for brook, brown, or rainbow trout, 73°F or less.

d. For a two-story fishery lake with multiple coldwater fish species, the applicable criterion under subd. 1. a. to c. is that for the lake's species requiring the lowest temperature.

2. 'Assessment.' a. The monitoring period for the criteria under subd. 1. is June 1 to September 15. When monitoring for assessment purposes, depth profiles of temperature and dissolved oxygen shall, whenever possible, be taken in increments of 1 meter or less near the deepest part of the lake, at least monthly July to September. Samples taken outside this time frame but during summer stratification may also be used to determine assessment.

Note: Reservoirs, multi-lobed lakes, or very large lakes may need more than one sampling station to assess the lake.

b. If at any time during a lake's summer stratification the applicable criterion in subd. 1. is not met, that year is an exceedance year. At least 2 years of data are needed to make an attainment determination. If any 2 or more years within the most recent 5-year period are exceedance years, the lake is not attaining the water quality criterion. If insufficient data are available from the most recent 5-year period, data from up to 10 years may be used if representative of current conditions.

SECTION 5. NR 102.04 (4) (b) is repealed.

SECTION 6. NR 102.04 (4) (d) is amended to read:

NR 102.04 (4) (d) ~~Other~~Toxic substances. Unauthorized concentrations of substances are not permitted that alone or in combination with other materials present are toxic to fish or other aquatic life. Surface waters shall meet the acute and chronic criteria as set forth in or developed pursuant to ss. NR 105.05 and 105.06. ~~Surface waters shall meet the criteria which correspond to the appropriate fish and aquatic life subcategory for the surface water, except as provided in s. NR 104.02 (3).~~

SECTION 7. NR 102.04 (4) (f) is created to read:

NR 102.04 (4) (f) *Other criteria.* Surface waters shall meet all other criteria that correspond to the appropriate aquatic life subcategory for the surface water, including narrative criteria specified in sub. (1).

SECTION 8. NR 102.04 (5) (b) is amended to read:

NR 102.04 (5) (b) *Exceptions.* Whenever the department determines, in accordance with the procedures specified in s. NR 210.06 (3), that wastewater disinfection is not required to protect recreational uses, the criteria specified in ~~par. (a)~~ sub. (6) (a) and in chs. NR 103 and 104 do not apply.

SECTION 9. NR 102.06 (1) and (2) (intro.) are amended to read:

NR 102.06 (1) GENERAL. This section identifies the water quality criteria for total phosphorus that shall be met in surface waters. Assessment procedures for waterbodies are specified in ss. NR 102.07 and 102.60.

(2) DEFINITIONS. In this section, the following definitions apply:

SECTION 10. NR 102.06 (2) (a), (f), (fm), and (j) are renumbered 102.03 (1o), (4s), as affected by CR 21-083, (6e), and (7m).

[Note to LRB: A separate rule package, CR 21-083, creates a definition for s. NR 102.03 (4e) and (4m), which affects the numbering of definition (4s) renumbered under this Section.]

SECTION 11. NR 102.06 (2) (g) and (2) (i) are renumbered 102.03 (6m) and (6s) and amended to read:

NR 102.03 (6m) “Stratified lake or reservoir” means a lake or reservoir where ~~either of~~ sufficient field data demonstrate that the lake is dimictic or, in absence of sufficient field data, the following ~~equation~~ equation results in a value of greater than 3.8:

Maximum Depth (meters) — 0.1

Log₁₀Lake Area (hectares)

~~Maximum Depth (feet)* 0.305 — 0.1~~

~~Log₁₀Lake Area (acres) * 0.405~~

~~(6s) “Stratified two-story fishery lake” means a stratified lake which has supported a cold water fishery in its lower depths within the last 50 years~~ or “two-story fishery lake” means a lake greater than 5 acres in size that is typically stratified in the summer, with the potential for an oxygenated hypolimnion, that has documentation at any time since 1975 of a population of cold water fish species such as cisco, whitefish, or trout that is sustained through natural reproduction or long-term active stocking with year-to-year survival.

SECTION 12. NR 102.03 (6s) (Note) is created to read:

NR 102.03 (6s) Note: A list of two-story fishery lakes that contain naturally reproducing lake trout, whitefish, or cisco, or are stocked and managed by the department for brook, brown, rainbow, or lake trout, is available on the department’s designated uses website at <https://dnr.wi.gov/topic/SurfaceWater/usedesignations.html>.

SECTION 13. NR 102.06 (3) (title) is repealed and recreated to read:

NR 102.06 (3) (title) RIVERS, STREAMS, AND IMPOUNDED FLOWING WATERS.

SECTION 14. NR 102.06 (4) (c) is renumbered 102.06 (3) (c) and amended to read:

~~NR 102.06 (3) (c) Waters impounded on rivers or streams that don’t meet the definition of reservoir in this section~~An impounded flowing water shall meet the river and/or stream criterion in sub. (3) par. (a) or (b) that applies to the primary stream or river entering the impounded water.

SECTION 15. NR 102.06 (7) (Note 2) is repealed.

SECTION 16. NR 102.07 is created to read:

NR 102.07 Assessing phosphorus concentration. (1) DATA REQUIREMENTS. (a) *Lakes and reservoirs.* The total phosphorus criteria specified in s. NR 102.06 (4) apply to samples taken near a lake or reservoir’s deepest point, within 2 meters of the surface. For assessment

purposes samples shall, whenever possible, be taken at least once per month for 3 months during the sampling period of June 1 to September 15. The department shall calculate a lake or reservoir's arithmetic mean total phosphorus concentration using at least 2 years of data from the sampling period.

Note: Reservoirs, multi-lobed lakes, or very large lakes may need more than one sampling station to assess the lake.

(b) *Flowing waters.* The total phosphorus criteria specified in s. NR 102.06 (3) apply to samples taken from the main channel near the area with greatest flow. For assessment purposes samples shall, whenever possible, be taken at least once per month for 6 months during the sampling period of May 1 to October 31. The department shall calculate the median total phosphorus concentration for a stream, river, or impounded flowing water using at least one year of data from the sampling period.

(c) *Assessment timeframe for lakes, reservoirs and flowing waters.* 1. In this paragraph, "weather-controlled total phosphorus concentration" means a waterbody's mean or median total phosphorus concentration during the applicable assessment period, estimated from measured data while controlling for weather variability using a method such as the department's Phosphorus Mixed Effects Regression calculation method.

2. All representative data from the most recent 5 years shall be used for assessments, but data from the most recent 10 years may be used if representative of current conditions. If fewer than the recommended number of samples in par. (a) or (b) are available, the department may be able to make an assessment determination on a case-by-case basis. The department may calculate a site's weather-controlled total phosphorus concentration to correct for weather variability and use this value to make an assessment determination in place of the mean or median calculated under par. (a) or (b).

Note: A mean total phosphorus concentration is used for lakes or reservoirs; a median concentration is used for streams, rivers, or impounded flowing waters. Total phosphorus data may be submitted and weather-controlled concentrations can be obtained by contacting the department at DNRSWIMS@wisconsin.gov for access to the department's SWIMS database.

The statistical computer programming script to run the Phosphorus Mixed Effects Regression calculation can be obtained through the department's Water Evaluation Section by contacting the department's call center at 1-888-WDNRINFO (1-888-936-7463) or using options provided on its website at <https://dnr.wi.gov/contact/>.

Note: The procedures in pars. (b) to (c) are also used for determining upstream concentrations of phosphorus under s. NR 217.13 (2) (d) for purposes of calculating a water-quality based effluent limit for a Wisconsin pollutant discharge elimination system (WPDES) permit.

(2) EXCEEDANCE DETERMINATION. The department shall compare the mean or median calculated under sub. (1) to the waterbody's applicable total phosphorus criterion specified in s. NR 102.06 to determine whether the waterbody is exceeding the criterion. To determine whether additional data are needed to make an attainment decision for section 303 (d) listing purposes, the department shall apply the confidence interval approach in s. NR 102.52 (2) (b) to (c). If application of those methods indicates that the waterbody is exceeding the phosphorus criterion, the department shall propose to include the waterbody on the section 303 (d) list as impaired for total phosphorus unless the department determines the waterbody is not exhibiting a biological response to phosphorus as specified in s. NR 102.60.

SECTION 17. NR 102 Subchapter III is created to read:

Subchapter III – Waterbody Assessments and Reporting

NR 102.50 Waterbody assessments and reporting. As required under sections 303 (d) and 305 (b) of the Clean Water Act, 33 USC 1313 (d) and 1315 (b), the department shall report to U.S. EPA on the status of the state's waterbodies and attainment of water quality standards every two years. Waterbody assessments are used to determine the condition of the state's surface waters or segments thereof and whether waterbodies are attaining state and federal surface water quality standards.

NR 102.51 Assessment types. The department may conduct different types of assessments to determine the status of waterbody health and attainment of water quality

standards, depending on availability of data or methods used to collect the data. The department shall, at a minimum, conduct all of the following:

(1) STATEWIDECONDITION ASSESSMENTS. As part of the biennial assessment report required under section 305 (b) of the Clean Water Act, 33 USC 1315 (b), and 40 CFR 130.8 and 130.10 (a) (1), the department shall report on water quality status and trends at the state, regional, or watershed levels. The department shall assess the extent to which surface waters of the state provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities in and on the water. Broad-scale approaches may be used to conduct these assessments, including randomized monitoring designs or other appropriate statistical methods.

(2) INDIVIDUAL WATERBODY ASSESSMENTS ANDSECTION 303 (D) LIST. (a) The department shall identify and report on waters not meeting any applicable water quality standard pursuant to section 303 (d) of the Clean Water Act, 33 USC 1313 (d), and 40 CFR 130.7 (b) and 130.10 (b) (2). The department shall assess individual waterbodies that have sufficient and readily available datasets, as specified in the department's water quality standards and assessment protocols, to determine whether a waterbody is attaining water quality standards. The department determines whether a waterbody's designated uses are supported by evaluating attainment of its water quality criteria and biological assessment thresholds. The department shall assess data collected from a waterbody against each applicable water quality standard or assessment threshold independently, unless a combined assessment procedure is specified in rule. The department shall report any waters not attaining applicable water quality standards to the U.S. EPA.

(b) When the department submits the section 305 (b) biennial assessment report and section 303 (d) list, it shall provide all of the following information if an assessment indicates that one or more of a waterbody's water quality standards are not attained:

1. A waterbody is listed on the section 303 (d) list for a pollutant if a pollutant's water quality criterion is not attained and it may require a total maximum daily load analysis.

2. A waterbody is reported as having an observed effect of degradation if the waterbody does not attain one or more biological assessment thresholds or water quality criteria for parameters that are not pollutants, such as dissolved oxygen. In listing observed effects, the department may not formally attribute these effects to a specific pollutant until the department conducts an evaluation of potential causes, including nonchemical stressors such as habitat degradation or hydrological modification, and identifies one or more specific pollutants as causing or contributing to biological degradation. Listing of observed effects would not require development of a total daily maximum load for a waterbody unless a specific pollutant exceeding its promulgated water quality standard is identified by the department as a cause of the observed effect.

Note: If a waterbody is not attaining water quality criteria for a pollutant, it will be listed on the section 303 (d) list regardless of attainment of biological assessment thresholds unless otherwise specified in the pollutant's criteria or procedures specified in those chapters (for instance, the combined assessment approach for phosphorus under s. NR 102.60), or if site-specific criteria are developed and attained.

Note: This subsection does not preclude other types of assessments that may be needed or required for other purposes. The department has authority to research and assess the quality and condition of the state's waters under s. 281.13, Stats.

Note: As required under 40 CFR 130.7 (b) (4), waters on the section 303 (d) list may require a total maximum daily load analysis. The department prioritizes and develops total maximum daily load analyses as discussed in subch. III of ch. NR 212. In addition, if a specific pollutant is identified as contributing to biological degradation, a site-specific criterion for the pollutant may be developed through rulemaking if appropriate.

NR 102.52 Assessment protocols. (1) GENERAL. The department's protocols for assessing waterbodies shall be consistent with the state's water quality standards and federal regulations and be based on relevant scientific information. The department's protocols may include components such as minimum data requirements, sampling methods, quality control, statistical analysis of data, allowable frequency of exceedance of criteria or thresholds, and use of professional judgment.

Note: When assessing waterbodies, the department uses its guidance for waterbody assessments titled “Wisconsin Consolidated Assessment and Listing Methodology,” or WisCALM. Although a description of the state’s assessment methodology is required to be submitted to U.S. EPA, U.S. EPA does not approve or disapprove the state’s assessment methodology under section 303 (d) of the Clean Water Act.

(2) SAMPLE VARIABILITY AND CONFIDENCE INTERVALS. (a) For assessment determinations, the department may determine that multiple samples are necessary to account for variability inherent in the waterbody, sampling results, or other conditions. The department may evaluate attainment of criteria or thresholds, using assessment methodology that accounts for both the central tendency of the data, such as the mean or median, and the variability of the samples.

(b) The department may apply a confidence interval approach to determine the number of samples needed and to increase certainty in the attainment decision. For metrics expressed as a mean or percentile of a group of samples, the department may use the two-sided 80 percent confidence interval of the mean or percentile for assessment. Other methods of calculating a confidence interval may be applied as appropriate for a specific metric, data type, or statistical goal. Once the confidence interval is determined under this paragraph, it is then compared to the criterion or threshold as specified in par. (c).

(c) When applying an approach under par. (b), the department shall compare the confidence interval to the applicable criterion or threshold using one of the following evaluation criteria:

1. If the entire confidence interval is attaining the criterion or threshold, no further samples are needed to make the attainment determination.

2. If the entire confidence interval is not attaining the criterion or threshold, no further samples are needed to make the non-attainment determination.

3. If the criterion or threshold is within the confidence interval, the assessment will be deferred until more data can be collected with the goal of narrowing the interval to determine whether subd. 1. or 2. applies. After further data collection, if the criterion or threshold

continues to be within the confidence interval, the attainment determination shall be made by directly comparing the sample mean or percentile to the criterion or threshold.

Note: With confidence intervals calculated under par. (b), there is 90 percent confidence that the attainment decision is correct because there is 80 percent confidence that the waterbody's true value is within the interval, 10 percent confidence that it is greater than the interval, and 10 percent confidence that it is less than the interval.

NR 102.53 Reporting, public participation, and approvals. (1) REPORT DEVELOPMENT. For development of the biennial assessment report and section 303 (d) list, the department shall assemble, evaluate, and submit water quality-related data, information, and assessment protocols to U.S. EPA.

(2) PUBLIC PARTICIPATION. (a) The department shall solicit assessment data from citizens and partner groups prior to the waterbody assessment process. Readily available data sets that meet minimum data requirements and are submitted in the department's specified format during the biennial data solicitation period shall be considered by the department when conducting assessments.

(b) The department shall hold a public informational hearing and a public comment period of at least 30 days on the draft list of assessments and any proposed changes to the section 303 (d) list. The department shall provide notice of the public informational hearing and information regarding where written comments may be submitted on its website and through an electronic notification system.

Note: Prior to the data solicitation period under par. (a), the department provides an opportunity for the public to comment on the assessment guidance. The department generally responds to comments received during the comment periods for the assessment guidance and the draft section 303 (d) list. The department will provide a template for data submittal on the department's waterbody assessment website. The public can subscribe to the electronic notification system for the water quality standards program on the department's home page at <http://dnr.wi.gov/>.

(3) SUBMITTAL OF RESULTS TO U.S. EPA. After the public participation process is completed, the department shall submit waterbody assessment results to U.S. EPA Region 5 by April 1 of every even numbered year for approval. Assessment results shall be submitted in a report that integrates both statewide condition and individual waterbody assessment results to satisfy the requirements of sections 305 (b) and 303 (d) of the Clean Water Act, respectively.

Note: U.S. EPA has authority to approve or disapprove the section 303 (d) list.

(4) PUBLICATION OF THE FINAL SECTION 303 (D) LIST. The U.S. EPA-approved section 303 (d) list shall be made public and available on the department's website.

Note: The section 303 (d) list and statewide condition assessments are available on the department's website at <https://dnr.wi.gov/topic/SurfaceWater/assessments.html>.

NR 102.54 Biological assessment of designated uses. Biological assessments conducted under this subchapter are used to determine attainment of designated uses by documenting the health of aquatic biological communities and any observed effects of degradation as described under s. NR 102.51 (2) (b) 2. If a biological assessment threshold under this subchapter is not attained, the waterbody may be considered as not attaining the applicable designated use.

NR 102.55 Narrative biological assessment thresholds for aquatic life uses. (1)
GENERAL. This section establishes narrative biological assessment thresholds that characterize the biological community condition and that are used to measure attainment of aquatic life designated uses specified in s. NR 102.04 (3) for surface waters. This section also establishes methods for evaluating attainment of narrative assessment thresholds.

(2) NARRATIVE BIOLOGICAL ASSESSMENT THRESHOLDS. (a) The aquatic life uses under s. NR 102.04 (3), except for those specified in s. NR 102.04 (3) (d) to (e), shall be considered suitable for the protection and propagation of a balanced aquatic life community. Those uses are intended to support the growth, development, reproduction, and life cycle of the aquatic life communities for their designated aquatic life use categories, although such waters may exhibit moderate changes in aquatic life community structure due to loss of some rare native taxa or shifts in relative abundance. In determining attainment of a waterbody's designated uses, the department may compare its biological quality to the range of quality found in similar

waterbodies under natural conditions. A waterbody with distinct natural characteristics that result in an aquatic life community different from or less diverse than other waters in the same use category may be considered attaining its aquatic life use if those differences are clearly related to natural characteristics.

(b) A surface water that does not support a balanced aquatic life community as designated under s. NR 102.04 (3) (d) to (e) shall support its highest attainable use given its habitat and potential.

(c) A surface water shall maintain at least the highest biological condition it has achieved since 1975.

Note: Paragraphs (b) and (c) reflect federal requirements under 40 CFR s. 131.10 (g), pertaining to highest attainable uses, and 40 CFR s. 131.3 (e), specifying November 28, 1975 as the benchmark date from which to determine “existing uses” for aquatic life.

Note: Examples of waterbodies with distinct natural characteristics are wetland-dominated streams, naturally acidic bog lakes, and ephemeral streams with only small areas of short-term refugia. Biological condition assessments should not be conducted during periods when there is insufficient water due to natural conditions to support aquatic life.

(3) ASSESSMENT METHODS FOR NARRATIVE BIOLOGICAL THRESHOLDS. Biological assessments for determining attainment of designated uses may be conducted in accordance with the assessment protocols specified in s. NR 102.52 and may include any of the following:

(a) Biological community assessments. To conduct biological community assessments, the department shall use documented methods that have undergone technical review and produce consistent, objective, and repeatable results that account for methodological uncertainty and natural environmental variability. Such methods include indices of biological integrity or similar tools calculated from measured attributes of resident fish, aquatic invertebrates, aquatic plants, or other aquatic communities. Such indices or tools may include measures of species composition, diversity, and abundance; feeding and reproduction characteristics; condition of individual organisms; or other scientifically objective, credible, and supportable factors. Historic records of native species may also be used to assess whether a waterbody exhibits loss of native species.

(b) Biological integrity trends. All surface waters shall maintain existing biological integrity, such that no waterbody or portion thereof shall experience a significant declining trend since 1975 using indicators under par. (a) or other indicators of biological condition, as demonstrated through scientifically-based documentation.

Note: An example of methods the department uses for assessing biological health of surface waters are those found in the department's guidance for waterbody assessments, "Wisconsin Consolidated Assessment and Listing Methodology," or WisCALM. Protocols for assessing attainment of biological assessment thresholds using metrics such as fish or macroinvertebrate indices of biotic integrity or the macrophyte assessment of condition are contained in, or referenced in, WisCALM. WisCALM is available on the department's surface water assessment website at <https://dnr.wi.gov/topic/SurfaceWater/assessments.html> and is updated every 2 years with public input.

NR 102.56 Numeric biological assessment thresholds for lakes, reservoirs and impounded flowing waters. This section contains numeric biological assessment thresholds for evaluating the biological condition of lakes, reservoirs, and impounded flowing waters and determining whether applicable designated uses are being attained. Numeric biological assessment thresholds used to assess attainment of designated uses include all of the following:

(1) AQUATIC LIFE USE THRESHOLDS. (a) *Chlorophyll a*. 1. 'Assessment thresholds.' a. A lake or reservoir other than a stratified two-story fishery lake is not attaining its aquatic life use if its arithmetic mean suspended chlorophyll *a* concentration exceeds 27 ug/L.

b. A two-story fishery lake is not attaining its aquatic life use if its arithmetic mean suspended chlorophyll *a* concentration exceeds 8 ug/L.

2. 'Assessment methods.' Data requirements for chlorophyll *a* are the same as those specified for phosphorus in s. NR 102.07 (1) (a), except that the sampling period for chlorophyll *a* is July 15 to September 15. To determine attainment of the chlorophyll *a* threshold under subd. 1., the department shall compare the waterbody's mean suspended chlorophyll *a* concentration during the sampling period to the threshold, using the confidence interval approach described under s. NR 102.52 (2) (b) to (c) to determine if additional samples are needed.

Note: The aquatic life chlorophyll *a* thresholds do not apply to streams, rivers, or impounded flowing waters, as they were established based on lake trophic status levels.

(b) *Aquatic plants*. 1. ‘Assessment thresholds.’ Thresholds for evaluating the general health of an aquatic plant community in a lake or reservoir to determine whether its aquatic life use is attained are shown in Table 8. Thresholds used in the macrophyte assessment of condition indicate the acceptable percentage of a lake or reservoir’s vegetated area supporting species that are in each of three tolerance categories. The tolerance categories specify whether a plant species is sensitive to, moderately tolerant of, or tolerant of disturbance.

Table 8
Aquatic plant community thresholds for lakes and reservoirs

Lake Subcategory¹	Macrophyte Assessment of Condition Is Attained If:
Northern Seepage	Moderately tolerant ≤ 64%
Northern Drainage	Tolerant ≤ 73%
Southern Seepage	Sensitive > 15%
Southern Drainage	Tolerant ≤ 50%

¹ In Table 8, northern lakes are those north of 44.84707°N latitude, and southern lakes are those south of that latitude. These thresholds do not apply to the Great Lakes or lakes less than 5 acres in surface area.

2. ‘Assessment methods.’ The percentage of a lake or reservoir’s vegetated area supporting each tolerance category shall be determined using department-approved protocols for assessing macrophyte condition. The sampling period for southern lakes is June 15 to September 15, and for northern lakes is July 1 to August 31 unless the department determines that an extension from June 15 to September 15 is appropriate during warmer than average years. The department shall consider the threshold attained if the most recent plant survey conducted within the past 10 years, or other more representative survey, attains the applicable threshold in Table 8.

Note: Examples of department-approved sampling protocols include the “Recommended Baseline Monitoring of Aquatic Plants in Wisconsin,” available on the department’s website in the Electronic Guidance and Documents (EGAD) system at

<https://dnr.wi.gov/water/egadsearch.aspx>. Examples of department-approved analysis protocols include the “Macrophyte Assessment of Condition – General” (MAC-Gen) for general condition assessments applicable to this section, and the “Macrophyte Assessment of Condition – Phosphorus” (MAC-P) for phosphorus-specific assessments under s. NR 102.60 (2) (c). Each MAC protocol contains the tolerance groups assigned to each species. MAC-Gen and MAC-P scores can be obtained by contacting the department at DNRSWIMS@wisconsin.gov and submitting aquatic plant data collected and formatted according to department specifications. Computer programming script written in the R language to compute the MAC calculations can be obtained through the department’s Water Evaluation Section by contacting the department’s call center at 1-888-WDNRINFO (1-888-936-7463) or using options provided on its website at <https://dnr.wi.gov/contact/>.

(2) RECREATION USE THRESHOLDS. (a) *Definition*. In this section, “moderate algae level” means a chlorophyll *a* concentration of 20 ug/L or greater.

(b) *Frequency of moderate algae levels*. Thresholds in Table 9 shall be used when determining if a lake, reservoir, or impounded flowing water is attaining its recreational use.

Table 9
Algae thresholds for recreational use assessments

Waterbody Type ¹	Subcategory	Thresholds for frequency of moderate algae levels
Lakes, Reservoirs, Impounded Flowing Waters (includes cold and warm)	Impounded flowing water, Unstratified drainage, Unstratified seepage	Does not exceed 20 ug/L chlorophyll <i>a</i> for more than 30% of days during the summer sampling period ²
	Stratified drainage, Stratified seepage	Does not exceed 20 ug/L chlorophyll <i>a</i> for more than 5% of days during the summer sampling period ²
	Stratified two-story fishery	Does not exceed 20 ug/L chlorophyll <i>a</i> for more than 5% of days during the summer sampling period ²

¹ Terms used for waterbody types and subcategories are defined in s. NR 102.03.

² Summer sampling period is July 15 to September 15.

Note: Lakes and reservoirs are subcategorized based on both their stratification status (stratified vs. unstratified) and whether or not they have an outlet stream or river (drainage vs. seepage). To find a lake or reservoir’s subcategory, also known as its natural community, go to the department’s Surface Water Data Viewer online map at

<https://dnr.wi.gov/topic/surfacewater/swdv/> and turn on the layer for Surface Water: Lake Natural Communities. On the natural communities layer, unstratified is referred to as “shallow”, and stratified is referred to as “deep.” Headwater and lowland lakes are types of drainage lakes.

Note: The U.S. EPA has set human health swimming advisory levels for microcystin and cylindrospermopsin that accurately reflect the latest scientific information on the potential human health effects from recreational exposure to these two cyanotoxins. The department recommends that local and tribal public health agencies use these swimming advisory levels for notification purposes in recreational waters to protect the public. More information can be found at <https://dnr.wi.gov/lakes/bluegreenalgae/Default.aspx>.

(c) *Assessment methods.* Data requirements for chlorophyll *a* are the same as those specified for phosphorus in s. NR 102.07 (1) (a), except that the sampling period for chlorophyll *a* in all waterbody types is July 15 to September 15. To determine attainment of the threshold, the department shall determine a waterbody’s frequency of moderate algae levels during the chlorophyll *a* summer sampling period using the confidence interval for a percentile of a normal distribution, and use the approach described under s. NR 102.52 (2) (b) and (c) to compare that frequency to the applicable threshold in Table 9.

Note: The statistical calculation for determining the frequency of moderate algae levels is contained in Wisconsin’s Consolidated Assessment and Listing Methodology (WisCALM) guidance document.

102.60 Combined assessment procedure for phosphorus. (1) GENERAL. (a) This section establishes a combined assessment approach for making total phosphorus attainment determinations for surface waters in cases specified in par. (b). This approach is designed to account for variability in how waterbodies respond to phosphorus. The combined approach evaluates a waterbody’s quality by considering the total phosphorus concentration in the surface water in conjunction with an evaluation of the phosphorus response indicators specified in subs. (2) to (4). The phosphorus response indicators characterize the condition or abundance of aquatic organisms that are responsive to total phosphorus to determine whether aquatic life and recreation uses are being met. Together, the total phosphorus criteria and response indicators may be used to determine whether the phosphorus water quality standards are attained or

whether the waterbody should be listed as impaired for total phosphorus on the section 303 (d) list.

(b) 1. If a waterbody's calculated total phosphorus concentration exceeds its total phosphorus criterion using the assessment procedure under s. NR 102.07 and the waterbody's calculated phosphorus concentration is within the combined assessment range shown in Table 10, the department may make the total phosphorus attainment or impairment determination using phosphorus response indicators specified in subs. (2) to (4) if sufficient biological data are available to conduct these assessments. In that case, the following decision protocols apply:

a. A waterbody that attains all of its applicable phosphorus response indicators under subs. (2) to (4) may be excluded from the section 303 (d) listing of waters impaired for phosphorus.

Note: If a waterbody is not considered impaired using the combined approach, it may be a candidate for a less stringent phosphorus site-specific criterion under ch. NR 119. If a waterbody attains its phosphorus criterion but one or more phosphorus response indicators are not attained, it may be a candidate for a more stringent site-specific phosphorus criterion under ch. NR 119.

b. If a waterbody does not attain one or more of the applicable phosphorus response indicators in subs. (2) to (4) or if the department does not have sufficient data to evaluate all of the applicable response indicators, then the waterbody shall be considered impaired for total phosphorus and the department shall propose inclusion of the waterbody on the section 303 (d) list as not attaining its phosphorus criterion. As part of the public comment period for the section 303 (d) list, the department shall provide a list of waterbodies needing additional data to determine whether phosphorus response indicators are met. If sufficient phosphorus response indicator data becomes available in the future, the waterbody may be reassessed.

2. If a waterbody's calculated phosphorus concentration exceeds its total phosphorus criterion using the assessment procedure under s. NR 102.07 and the waterbody's calculated phosphorus concentration also exceeds the upper limit of the combined assessment range shown in Table 10, then the waterbody shall be considered impaired for total phosphorus regardless of

attainment of phosphorus response indicators, and the department shall propose to include the waterbody on the section 303 (d) list.

Table 10
Range for applying combined assessment for total phosphorus¹

Waterbody Type	Total Phosphorus Criterion (ug/L)	Combined Approach Range² (ug/L total phosphorus)
Stream or its Impounded Flowing Water	75	75 to <150
River or its Impounded Flowing Water	100	100 to <200
Unstratified Reservoirs, Unstratified Drainage or Seepage Lakes	40	40 to <60
Stratified Reservoirs, Stratified Drainage Lakes	30	30 to <45
Stratified Seepage Lakes	20	20 to <30
Two-Story Fishery Lakes	15	15 to <22.5

¹To determine whether a waterbody falls into the combined approach range, compare the lower confidence limit of the waterbody’s two-sided 80% confidence interval around the mean (for lakes/streams) or median (for rivers/streams) total phosphorus concentration to the ranges in the table.

²For streams and rivers the combined criteria range is between the applicable total phosphorus criterion and two times that criterion. For lakes, the range is between the applicable total phosphorus criterion and 1.5 times that criterion. If a waterbody has an approved site-specific phosphorus criteria, the combined criteria range for that waterbody shall be calculated using these multiplication factors.

(2) LAKE AND RESERVOIR PHOSPHORUS RESPONSE INDICATORS. A lake or reservoir 5 acres or greater for which the total phosphorus concentration is within the combined approach range specified in Table 10 shall be listed on the section 303 (d) list as impaired for phosphorus unless it attains all of the following phosphorus response indicators:

(a) *Frequency of moderate algae levels.* The biological assessment thresholds for frequency of moderate algae levels to attain recreation uses as specified in s. NR 102.56 (2).

(b) *Chlorophyll a.* The chlorophyll *a* biological assessment threshold to attain aquatic life uses as specified in s. NR 102.56 (1) (a).

(c) *Aquatic plants.* The aquatic plant phosphorus response indicator for aquatic life use in this paragraph. Thresholds for assessing macrophyte community response to phosphorus

levels in a lake or reservoir are shown in Table 11. Thresholds indicate the acceptable percentage of a lake or reservoir's vegetated area supporting species that are phosphorus-sensitive or phosphorus-tolerant. Non-attainment of a threshold indicates that an aquatic plant community is considered degraded by phosphorus concentrations in the surface water. Assessment methods are the same as those specified in s. NR 102.56 (1) (b) 2. except percentages are compared against thresholds in Table 11.

Table 11
Lake aquatic plant community phosphorus response indicator

Lake Subcategory¹	Macrophyte Assessment of Condition for Phosphorus Is Attained If:
Northern Seepage	Phosphorus Tolerant \leq 44%
Northern Drainage	Phosphorus Sensitive $>$ 51%
Southern Seepage	Phosphorus Sensitive $>$ 26%
Southern Drainage	Phosphorus Sensitive $>$ 42%

¹ In Table 11, northern lakes are those north of 44.84707°N latitude, and southern lakes are those south of that latitude. This plant phosphorus response indicator does not apply to the Great Lakes or lakes less than 5 acres in surface area.

(d) *Oxythermal layer thickness*. The oxythermal layer thickness criteria specified in s. NR 102.04 (4) (am). This paragraph applies only to two-story fishery lakes.

(3) RIVER AND IMPOUNDED FLOWING WATERS PHOSPHORUS RESPONSE INDICATOR. A river listed in s. NR 102.06 (3) (a), or its impounded flowing waters, for which the total phosphorus concentration is within the combined approach range specified in Table 10 shall be listed on the section 303 (d) list as impaired for phosphorus unless it exceeds 20 ug/L chlorophyll *a* for fewer than 30 percent of days during the summer sampling period of July 15 to September 15, as calculated following s. NR 102.56 (2) (c).

(4) STREAM PHOSPHORUS RESPONSE INDICATORS. (a) *General*. A stream for which the total phosphorus concentration is within the combined approach range specified in Table 10 shall be listed on the section 303 (d) list as impaired for phosphorus unless it attains the phosphorus response indicators specified in this subsection. When applying the phosphorus response indicators for streams, the department may apply the benthic algal biomass indicator under par.

(b) as a screening tool before determining whether the benthic diatom assessment under par. (c) is necessary for an attainment determination. If available, benthic diatom assessment results under par. (c) supersede results from the benthic algal biomass screening under par. (b).

(b) *Benthic algal biomass screening.* Benthic algal biomass is a measure of primary productivity in streams, and is quantified using a viewing bucket assessment method along stream transects. The benthic algal biomass phosphorus response indicator is applicable to both the aquatic life use and the recreational use, and may be used to make an initial use attainment determination as specified in Table 12. If results from the benthic algal biomass assessment conclusively demonstrate attainment or non-attainment of the benthic algal biomass indicator, no benthic diatom analysis under par. (c) is necessary for the attainment decision. If the benthic algal biomass assessment is inconclusive according to Table 12, or in cases where the assessment is inappropriate due to silted substrate, additional benthic diatom analysis under par. (c) is required to make the aquatic life use attainment determination. If a stream’s benthic algal biomass score is inconclusive and a benthic diatom sample is not available, the stream shall be proposed for inclusion on the section 303 (d) list.

Table 12
Stream benthic algal biomass phosphorus response indicator.

Benthic algal biomass, viewing bucket score (0-3)	Attainment decision	
	Aquatic Life Use	Recreational Use
< 1	Attained ¹	Attained
1 - 2	Inconclusive; assess benthic diatoms	
> 2	Not attained	Not attained

¹ If the mean score is <1 but 20% or more of individual transect points score a 3, a benthic diatom assessment under par. (c) is required to make an attainment determination.

Note: Wisconsin’s benthic algal viewing bucket methods are available on the department’s website in the Electronic Guidance and Documents (EGAD) system at <https://dnr.wi.gov/water/egadsearch.aspx> by searching for Viewing Bucket Method for Estimating Algal Abundance in Wadeable Streams.

(c) *Benthic diatoms.* Benthic diatoms are an algal taxonomic group that represents primary producer community structure, and are used for assessment of the aquatic life use. This

assessment is needed only if the benthic algal biomass assessment for aquatic life under par. (b) is inconclusive or inappropriate due to siltation. A stream's diatom taxa are statistically analyzed using Wisconsin's weighted average Diatom Phosphorus Index, or DPI. To determine use attainment, the DPI result shall be compared to the stream phosphorus criterion of 75 ug/L phosphorus. If only one diatom sample per site is available, the confidence interval approach described under s. NR 102.52 (2) (c) is applied. If the DPI is below 75 as specified under s. NR 102.52 (2) (c) 1., the phosphorus response indicator is attained. If more than one sample is available from the most recent 5 years, the mean score of the surveys is calculated and compared to the threshold of 75 ug/L without applying confidence intervals.

Note: The statistical code to run the Wisconsin DPI calculation can be obtained through the department's Water Evaluation Section by contacting the department's call center at 1-888-WDNRINFO (1-888-936-7463) or using options provided on its website at <https://dnr.wi.gov/contact/>.

SECTION 18. NR 217.13 (2) (d) and (Note) are amended to read:

NR 217.13 (2) (d) *Upstream concentrations (Cs).* The representative upstream concentration of phosphorus shall be used in specific water quality based effluent limit calculations. ~~At a minimum, the~~ The representative upstream concentration shall be either a concentration derived by the department based on data from the specific stream or from a similar location. ~~Where data is collected on the upstream location, the concentration used shall equal the median of at least four samples collected throughout the period of May through October. All samples collected during a 28 day period shall be considered as a single sample and the average of the concentrations used. Where data is available from more than one year in the last five years, the department may use all of the years of data in the calculation of the upstream concentration. The department may also use data older than five years provided that it is representative of current conditions.~~ Where data are collected on the upstream location, the site's upstream concentration shall be calculated as a median using the procedures specified in s. NR 102.07 (1) (b) to (c). Neither the two-sided 80 percent confidence interval around the median specified in s. NR 102.07 (2) nor the combined assessment procedures specified in s. NR 102.60 are applicable for purposes in this paragraph. Upstream concentrations may not be measured at a

location within the direct influence of a point source discharge. The determination of upstream concentrations shall be evaluated at each permit reissuance.

Note: The department has guidance on collection methods for ambient water sampling and may develop guidance for the evaluation of representative data. The guidance may be obtained from the offices of the department of natural resources, bureau of ~~watershed management~~water quality at 101 South Webster Street, P.O. Box 7921, Madison, Wisconsin 53707.

SECTION 19. EFFECTIVE DATE. This rule takes effect on the first day of the month following publication in the Wisconsin Administrative Register as provided in s. 227.22 (2) (intro.), Stats.

SECTION 20. BOARD ADOPTION. This rule was approved and adopted with germane modifications by the State of Wisconsin Natural Resources Board on January 26, 2022.

Dated at Madison, Wisconsin _____.

STATE OF WISCONSIN

DEPARTMENT OF NATURAL RESOURCES

BY _____

For Preston D. Cole, Secretary

(SEAL)