

ADMINISTRATIVE RULES Fiscal Estimate & Economic Impact Analysis

1. Type of Estimate and Analysis

Date: 11/18/2021

Original Updated Corrected

2. Administrative Rule Chapter, Title and Number

NR 102, Water quality standards for Wisconsin surface waters; WY-23-13; CR 19-094

3. Subject

Processes for waterbody assessments, biological assessment thresholds, biological confirmation of phosphorus impairments, and water quality criteria for dissolved oxygen

4. Fund Sources Affected

GPR FED PRO PRS SEG SEG-S

5. Chapter 20, Stats. Appropriations Affected

APPR 401/411

6. Fiscal Effect of Implementing the Rule

No Fiscal Effect Increase Existing Revenues Increase Costs
 Indeterminate Decrease Existing Revenues Could Absorb Within Agency's Budget
 Decrease Cost

7. The Rule Will Impact the Following (Check All That Apply)

State's Economy Specific Businesses/Sectors
 Local Government Units Public Utility Rate Payers
 Small Businesses **(if checked, complete Attachment A)**

8. Would Implementation and Compliance Costs Be Greater Than \$20 million?

Yes No

9. Policy Problem Addressed by the Rule

Board Order WY-23-13 was previously 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 comments were received. 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. The germane modifications do not change the determination of minimal economic impact.

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 impairment 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:

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- *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 or is not attaining and should be placed on the impaired waters list (s. 303(d) list).
- *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 previously recommended goal of 10 ug/L to a 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 the biological community). This rule specifies how attainment of the numeric phosphorus criteria is determined. It also incorporates flexibility for evaluating surface water phosphorus 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 certain range) but does not exhibit a biological or recreational use impairment, it would not be considered impaired for purposes of s. 303(d) listing.

Dissolved oxygen criteria for aquatic life. Revisions to the dissolved oxygen section 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. It also establishes the dissolved oxygen criteria that apply to waters for which a use attainability analysis, a federally authorized process, shows that the otherwise applicable aquatic life use cannot be met.
- 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 .01% of Wisconsin's lakes.

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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, which is the method used for criteria assessment, parallels how the criteria were initially developed and 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.

10. Summary of the businesses, business sectors, associations representing business, local governmental units, and individuals that may be affected by the proposed rule that were contacted for comments.

This rule may affect lake or watershed associations or citizens interested in water quality assessments, environmental organizations, and businesses or municipalities discharging wastewater to surface waters. An external advisory committee worked with the department on development of this rule. Advisory committee members included a variety of business sectors that require WPDES permits for wastewater discharge, organizations representing municipal wastewater treatment facilities, and environmental organizations. The department emailed a draft of this fiscal estimate and economic impact analysis (EIA) to over 5,700 parties, including all permitted surface water dischargers and parties that have indicated an interest in water quality standards. The comment period was from April 16, 2019 through May 16, 2019. The department prepared responses to all comments and revised portions of the EIA accordingly.

11. Identify the local governmental units that participated in the development of this EIA.

The department provided an opportunity for local governmental units to provide information to the department for consideration in the EIA. Two entities representing municipal wastewater dischargers submitted comments during the EIA solicitation period: The City of Brookfield and Municipal Environmental Group. Several entities representing municipal wastewater dischargers participated as standing members of the department’s External Advisory Committee during development of this rule: Municipal Environmental Group, Central States Water Environment Association-WI Section, WI Rural Water Association, and Milwaukee Metropolitan Sewerage District.

12. Summary of Rule’s Economic and Fiscal Impact on Specific Businesses, Business Sectors, Public Utility Rate Payers, Local Governmental Units and the State’s Economy as a Whole (Include Implementation and Compliance Costs Expected to be Incurred)

This rule primarily pertains to biological assessments of surface waters. The department expects this rule package to have minimal economic impacts (less than \$50,000), 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 amongst 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 impaired and the department

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determines through further research that the pollutant is causing or contributing to the biological impairment, 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 federal 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 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 USEPA. 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 impairment 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” on the section 303(d) list.
 - *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 algal levels already considered by the department to assess water quality for the biennial report to U.S. EPA and used to list a
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waterbody as impaired when its uses are adversely affected. A waterbody not attaining its algal metrics but attaining phosphorus criteria would not affect permit limits unless a site-specific phosphorus criterion was promulgated for the waterbody. Therefore, the department does not expect an additional economic impact based on this change.

- The department's analysis indicates 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 required in the rule. 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.
- For a waterbody in which the phosphorus criterion is attained but the chlorophyll *a* assessment threshold is not attained, the solution is likely to involve addressing phosphorus. However, if this were to occur, the department would first evaluate whether a more stringent SSC for phosphorus is needed to attain the chlorophyll *a* assessment threshold. For any parameter for which the state has a numeric water quality criterion, such as phosphorus, permit limits are set based on attainment of that numeric criterion, not on a separate parameter even though they may be related.
- In such a case, if a more protective phosphorus SSC were developed to achieve the chlorophyll *a* assessment threshold and approved by U.S. EPA, then permit limits would be adjusted accordingly. However, development of a more protective phosphorus SSC would have to go through its own rulemaking process and any costs associated with it would be evaluated at that time. In accordance with these points, since 2012, when the department recommended chlorophyll *a* thresholds in WisCALM guidance, there have been no cases where a chlorophyll *a* listing has influenced a permit limit, except through the Wisconsin River Basin TMDL analysis and related phosphorus SSC rule promulgated for three waterbodies in the Wisconsin River Basin. The Wisconsin River Basin SSC rule had its own economic analysis.
- Although we maintain that there are not likely to be additional economic impacts from the chlorophyll *a* assessment thresholds, a portion of the rule was revised before its first submittal to the legislature to minimize concerns about effects on permits. That earlier revision limited the application of the chlorophyll *a* assessment threshold to lakes, reservoirs, and impounded flowing waters, and removed its application as an assessment threshold for rivers. Rivers should be adequately protected by a combination of the existing phosphorus criterion and the chlorophyll assessment thresholds for any impounded areas within it. The chlorophyll *a* threshold would still apply as a phosphorus response indicator for rivers and may be used as a basis for phosphorus SSC in rivers without impounded areas. The chlorophyll *a* assessment thresholds do not apply to streams.

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 (a.k.a. the "combined approach"). This will provide the benefit of keeping a small number of waters off the impaired waters list. 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 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

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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.

As part of the economic analysis comment period, more information was requested about how the economic impact and number of impaired waters might change based on whether biological assessments were not a part of the department's assessment protocols, whether it was in guidance (status quo), or in codified narrative or numeric biological assessment thresholds.

- (a) If the department had **never assessed the health of biological communities** in Wisconsin's waters, there would be zero impairments listed for fish or aquatic insects on the Section 303(d) impaired waters list. There would presumably be zero cost for the regulated public associated with that scenario. However, it would entail a major step backwards for understanding the health of Wisconsin's aquatic communities and documentation of which waterbodies may need restoration, and the state could lose funding under federal regulations. Federal regulations and the federal Clean Water Act require water quality assessments and biological evaluations of waterbodies (see 40 CFR ss. 130.4 and 130.8). The health of biological communities is critical in determining whether aquatic life uses are being met.
- (b) Under the **status quo**, DNR assesses biological communities **using recommended protocols in its WisCALM guidance**. Currently, these include metrics for fish and aquatic insects. If these are not attained, a waterbody is listed for "degraded biological community." Often there is no pollutant associated with this listing, and biological impairments are not directly addressed through permit limits. Biological metrics are developed to assess overall community health, and these communities can be sensitive to a wide range of stressors outside of specific pollutants, such as habitat loss, invasive species, and dams. Biological listings are not linked to specific pollutants unless a demonstration has been made that a pollutant is causing the degradation. To date, the department is not aware of any economic impacts of these listings.
- *Impairment listings:* As of the 2018 list, there were 228 river or stream segments listed for degraded biological community. This is 13% of rivers/streams that have been assessed for biology. WisCALM does not currently include metrics for lake biological communities such as aquatic plants.
 - *Metric updates:* The biotic metrics in guidance may be adjusted over time to reflect the most recent science, and a public comment period is held whenever updates are made.

With the germane modifications, the rule now includes both numeric and narrative biological assessment thresholds, described in (c) and (d) below.

- (c) Under the **numeric biological assessment thresholds** included in this rule for lakes and reservoirs, specific thresholds are established for chlorophyll *a* and aquatic plant communities. Additional numeric thresholds could be added in a future rule package for streams and rivers. If a surface water is not achieving a numeric threshold, it will be listed on the 303(d) impaired waters list as having "observed effects." As with narrative assessment thresholds below, we do not expect these numeric biological assessments will result in economic impacts to the regulated community.
- Chlorophyll *a* is discussed above.
 - For the aquatic plant assessments for lakes, we currently have approximately 600 lakes with plant surveys.

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Of these, about 80% are in good condition and attain the plant assessment thresholds, and about 20% (around 130 lakes) do not attain and would be listed as impaired. Several of these would not be lakes listed as impaired for the first time, as they are already on the list as impaired for other metrics. Similar to fish or insect metrics, this plant tool is designed to reflect a broad range of stressors, such as shoreline disturbance and invasive species. Lakes with poor plant communities would typically be addressed through voluntary shoreline and lake management rather than through permit adjustments. We therefore do not expect that these biological assessments will result in economic impacts to the regulated community.

- (d) Under the **narrative biological assessment thresholds** included in this rule package, DNR would continue to conduct assessments using the WisCALM guidance as in (b) above for recommended metrics such as fish and aquatic insects that don't have numeric assessment thresholds in code. As demonstrated by several years of listings for biological metrics, we do not expect an economic impact from these listings, even should the thresholds be adjusted in the future. As with the numeric thresholds above, the rule proposes that waters not attaining narrative biological assessment thresholds be listed as having "observed effects" on the 303(d) impaired waters list. In the rare case that a pollutant discharged by a facility is clearly and demonstrably impacting the community, an SSC for that pollutant may be promulgated by rule, and permit limits may be adjusted accordingly, as is appropriate if the biological community is being degraded by a discharge.
- Because DNR is currently in the process of reviewing and revising the existing metrics for fish and aquatic insects, we do expect that the biological metrics in WisCALM will be updated for the 2024 assessment cycle. These updates would be vetted first through the WisCALM public comment period. Until the tool revisions are complete, we do not yet know the number of waters that would be listed as impaired for fish or insects, but this information will be made available at that time.

13. Benefits of Implementing the Rule and Alternative(s) to Implementing the Rule

This rule has several benefits:

- It improves transparency for the public by documenting and clarifying several standard departmental procedures. These include documentation of general waterbody assessment procedures, use of biological assessments, and calculation procedures for phosphorus criteria.
- It provides new assessment thresholds or criteria for certain critical parameters. Algal metrics have been identified as the public's number one priority through the department's Triennial Standards Review, and are essential for assessing the recreational condition of our state's waters. Oxythermal criteria fill an important gap by providing criteria that are appropriate for the state's rare two-story (coldwater) fisheries.
- Phosphorus response indicators provide flexibility in determining whether a waterbody's recreation or aquatic life uses are impaired due to phosphorus. This may provide a benefit in keeping certain waters off the impaired waters list.

14. Long Range Implications of Implementing the Rule

The long-range implications of this rule are the same as the short-range implications. This rule package will provide transparency to the public on department procedures for assessing the quality of the state's waterbodies, including biological assessments. It will also provide improved methods for assessing algae, dissolved oxygen, and phosphorus-related metrics. Biological metrics and phosphorus response indicators are also tied to a related rule package that establishes procedures for deriving SSC for phosphorus. Along with use in standard waterbody assessments, these metrics would serve as a basis for determining the need for SSC for individual waterbodies.

15. Compare With Approaches Being Used by Federal Government

The federal Clean Water Act requires states to develop and update water quality criteria protective of waterbodies' designated uses, and requires states to conduct waterbody assessments based on these criteria or thresholds every two

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years. U.S. EPA has been working with states over the last two decades to develop robust biological metrics for use in these assessments, and supports states in implementing these procedures as part of their assessment protocols.

16. Compare With Approaches Being Used by Neighboring States (Illinois, Iowa, Michigan and Minnesota)

- 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 (revised through germane modifications), 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 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 and prepare an impaired waters list under 33 USC 1313(d).
- 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.

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