

The statement of scope for this rule, SS 052-21 was approved by the Governor on May 13, 2021, published in Register No. 785B on May 24, 2021, and approved by the Natural Resources Board on October 27, 2021. This rule was approved by the Governor on September 7, 2023.

ORDER OF THE STATE OF WISCONSIN NATURAL RESOURCES BOARD  
CREATING RULES

The Wisconsin Natural Resources Board adopts an order to **create** NR 102.06 (7) (a) (Note) and (b) 4. relating to site-specific phosphorus criteria for Lac Courte Oreilles.

WY-21-20

**Analysis Prepared by the Department of Natural Resources**

**1. Statute Interpreted:** Section 281.15, Wis. Stats.

**2. Statutory Authority:** Section 281.15(1), Wis. Stats.

**3. Explanation of Agency Authority:** The department is proposing to establish a more stringent site-specific phosphorus criterion for Lac Courte Oreilles (LCO), a lake in Sawyer County, to protect its aquatic life designated use. Section 281.15, Wis. Stats., provides the department with authority to promulgate by rule water quality standards for surface waters or portions of surface waters in the state. Water quality standards consist of designated uses and water quality criteria that are protective of the designated use. Designated uses for waterbodies include uses to support fish and aquatic life, recreation, public health and welfare, and wildlife. The department has promulgated statewide criteria for phosphorus for different types of surface waters in s. NR 102.06, Wis. Adm. Code. Department rules, specifically s. NR 102.06(7), Wis. Adm. Code, recognize that site-specific criteria for phosphorus may be adopted in place of the generally applicable criteria where site-specific data and analysis using scientifically defensible methods and sound scientific rationale demonstrate a different criterion is needed to protect the designated use of a specific surface water segment or waterbody. In accordance with s. 281.15(2)(c), Wis. Stats., the department may establish criteria which are no more stringent than reasonably necessary to assure attainment of the designated uses for the waterbodies in question.

**4. Related Statutes or Rules:** Section NR 102.06, Wis. Adm. Code, contains statewide criteria for phosphorus. This section of code also specifies that the state may promulgate site-specific criteria for phosphorus, and contains site-specific phosphorus criteria that have been promulgated for individual waterbodies. The statewide criterion for phosphorus in two-story fishery lakes like LCO is 15 µg/L, while the proposed site-specific criterion is more stringent at 10 µg/L.

Two other related rules are:

- Chapter NR 119, Wis. Adm. Code, which establishes a standardized process for developing site-specific criteria for phosphorus when appropriate for individual waterbodies. The proposed site-specific phosphorus criterion for LCO was developed in accordance with the standardized processes for site-specific criteria in ch. NR 119, Wis. Adm. Code.
- Section NR 102.04(4)(am), Wis. Adm. Code, which establishes statewide “oxythermal” criteria (criteria combining dissolved oxygen concentrations and temperature) to protect two-story fishery lakes throughout the state. The LCO proposed site-specific phosphorus criterion is derived based on protection of oxythermal metrics in LCO that are attainable given the site-specific characteristics of the lake.

Neither of the above rules are anticipated to conflict with this proposed rule.

## **5. Plain Language Analysis:**

*Background:* This rule proposes a site-specific criterion of 10 µg/L total phosphorus for Lac Courte Oreilles (LCO), a lake in Sawyer County. The lake straddles both state land and Tribal lands of the Lac Courte Oreilles Band of Lake Superior Chippewa. LCO is a state-classified Outstanding Resource Water and one of a small number of “two-story fishery” lakes in Wisconsin that support a coldwater fishery within its deep basins. Cisco and whitefish, both members of the coldwater community, are present in the three main basins of LCO. Of these two species, whitefish are the most sensitive to low oxygen levels and warm temperature.

Coldwater fish require a cold, oxygenated layer of water to survive, referred to as the oxythermal layer. Cisco and whitefish kills have occurred in the main basins of the lake due to the combination of low dissolved oxygen and warmer water temperatures, which have reduced the size of the oxythermal layer during the late summer. LCO is currently listed on the state’s impaired waters list as impaired for dissolved oxygen. The department’s analysis confirmed that phosphorus is one of the factors contributing to low dissolved oxygen levels. Phosphorus fuels the growth of algae and aquatic plants, and when these die their decomposition process consumes oxygen. The department quantified how phosphorus concentrations ranging from low to high affect the available oxythermal layer.

*Development of a site-specific criterion:* Pursuant to s. NR 102.06(7), Wis. Adm. Code, and s. 281.15, Wis. Stats., the department has the authority to develop a site-specific criterion in place of the generally applicable phosphorus criteria in s. NR 102.06, Wis. Adm. Code, if site-specific, scientifically defensible data and analysis demonstrate a different criterion is protective of the designated use of the specific surface waterbody and the site-specific criterion is no more stringent than reasonably necessary to protect the designated use. The applicable statewide phosphorus criterion for two-story fishery lakes is 15 µg/L under s. NR 102.06(4)(b)1., Wis. Adm. Code.

The department developed a model based on over thirty years of extensive data from LCO to predict how oxythermal habitat would respond to reduced phosphorus concentrations in the lake. The department’s analysis demonstrated that the statewide phosphorus criterion of 15 µg/L is not sufficient to protect whitefish in LCO—a lower criterion is necessary to enable whitefish survival. After modeling how oxythermal habitat conditions are expected to respond to varying levels of phosphorus in the lake, the department’s analysis confirmed that a phosphorus criterion of 10 µg/L is appropriate and necessary to increase survival during the most stressful warm periods. Further, it demonstrated that a criterion of 10 µg/L is not more stringent than reasonably necessary for attaining that protection, as concentrations above this point would not provide sufficient habitat.

While there are multiple factors affecting the oxythermal habitat in this lake, phosphorus levels are more controllable than other factors such as warmer water temperatures. In such cases, when setting a criterion for one of several contributing factors, the criterion should be set at a level that reasonably addresses that factor’s role in attaining the desired habitat quality. While reducing phosphorus can improve conditions in the lake to some extent, it is important to recognize that addressing this factor alone cannot result in optimal coldwater habitat for all coldwater species present. However, the department expects that reductions in phosphorus concentrations can decrease stress on coldwater fish during most warm years and help whitefish survive during these periods of stress. Although fish kills are still likely to occur in some years with more severe weather conditions, given that whitefish migrate into the lake from connected lakes that have more suitable whitefish habitat, the whitefish population may be maintained over time in LCO if provided tolerable conditions during most years. Conditions for cisco will also be improved if reduced phosphorus concentrations are attained.

*Assessing compliance with the criterion:* The department assesses compliance with the criterion by

sampling near the deep points of the three main basins, consistent with standard protocols for lake assessments in the state. If the criterion for the main basins is attained at all of the three deep points, then the lake as a whole would be meeting the criterion. If one or more of the three deep points exceeds the criterion, then the lake as a whole would be listed as impaired for phosphorus. Current annual average phosphorus levels in the three main basins range from approximately 12 to 15 µg/L. If the phosphorus criterion is set at 10 µg/L as proposed, the lake would be listed as impaired for phosphorus until such time that the new criterion is attained.

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

The Federal water quality standards regulation at 40 CFR 131.11(b)(1)(ii) provides states with the opportunity to adopt water quality criteria that are “modified to reflect site-specific conditions.” Wisconsin has used this authority, as well as the authority under s. 281.15, Wis. Stats., to promulgate existing numeric phosphorus site-specific criteria and related narrative language in s. NR 102.06(7), Wis. Adm. Code. The portions of 40 CFR 131 related to establishing water quality standards include:

- 40 CFR 131 Subparts A-C: Requirements for establishing state water quality standards.
- 40 CFR 131.4: States are responsible for establishing and revising water quality standards. The U.S. Environmental Protection Agency (U.S. EPA) approves or disapproves standards under 40 CFR 131.5.
- 40 CFR 131.6: Water quality standards consist of designated uses and criteria to protect the designated uses.
- 40 CFR 131.10: States must specify appropriate designated uses to be protected for waterbodies, and may adopt sub-categories of these uses.
- 40 CFR 131.11: States must adopt water quality criteria that protect designated uses. For waters with multiple uses, the criteria must protect the most sensitive use. 40 CFR 131.11(b)(1)(ii) authorizes states to adopt numeric water quality criteria that are “modified to reflect site-specific conditions.”
- 40 CFR 131.20: Revision of state water quality standards is subject to public participation procedures and U.S. EPA review and approval under 40 CFR 131.20.

#### **7. If Held, Summary of Comments Received During Preliminary Comment Period**

**and at Public Hearing on the Statement of Scope:** A preliminary hearing on the scope statement was held online on August 19, 2021, and the department received two comment letters. One letter supported approval of the scope statement. The Wisconsin State Cranberry Growers Association sought to clarify that the proposed rule would not result in regulatory requirements for cranberry operations; the department concurred.

**8. Comparison with Similar Rules in Adjacent States:** Wisconsin has numeric phosphorus criteria for lakes, reservoirs, rivers, streams, and impounded flowing waters. Wisconsin’s phosphorus criteria for lakes and reservoirs vary by lake type with values ranging from 15 to 40 µg/L. As described in Section 3, Wisconsin statutes provide authority to develop site-specific criteria, and s. NR 102.06(7), Wis. Adm. Code, recognizes that site-specific criteria may be developed for phosphorus.

Minnesota has adopted phosphorus criteria for lakes, reservoirs, rivers and streams. Minnesota’s phosphorus criteria for lakes and reservoirs vary by ecoregion with values ranging from 12 to 90 µg/L. Minnesota allows specific water quality standards, referred to as site-specific criteria in Wisconsin, to be adopted if information is available to derive standards based on a waterbody’s specific characteristics. This process is outlined in Minn. R. 7050.0220, 7050.0222, and 7052.0270. Site-specific standards must maintain and protect a waterbody’s beneficial uses. Several site-specific phosphorus criteria have been approved in Minnesota.

Illinois has adopted partial phosphorus criteria for lakes and reservoirs. Illinois’ phosphorus criteria for

any lake or reservoir greater than 20 acres is set at 50 µg/L. Illinois does not have provisions for site-specific criteria.

Iowa and Michigan do not have statewide numeric phosphorus criteria. However, Michigan widely applies a method to derive appropriate site-specific phosphorus targets for waterbodies in the state. The targets set by Michigan are applied in permits and Total Maximum Daily Load (TMDL) analyses.

Wisconsin, Minnesota, and Michigan are the main states in U.S. EPA Region 5 that have two-story fishery lakes supporting coldwater fish. Wisconsin's phosphorus criterion for two-story fishery lakes with cisco, whitefish, or lake or stream trout is 15 µg/L. Minnesota has a specified criterion for lakes with lake trout (the most sensitive species) of 12 µg/L, and for lakes with stream trout of 20 µg/L. Minnesota does not specify separate criteria for lakes with cisco or whitefish, although the Minnesota Pollution Control Agency indicated that it is considering doing so in the future. Under current Minnesota standards, a lake such as LCO, which does not have lake or stream trout, would have a phosphorus criterion of either 30 or 40 µg/L under Minn. R. 7050.0222 (3) and (4). Therefore, Wisconsin's statewide phosphorus criterion of 15 µg/L for two-story fishery lakes and the proposed site-specific criterion of 10 µg/L for LCO are both more stringent than Minnesota's current criteria of 30-40 µg/L for non-trout lakes. Michigan does not have phosphorus targets specific to lakes with coldwater fish.

**9. Summary of Factual Data and Analytical Methodologies Used and How Any Related Findings Support the Regulatory Approach Chosen:** A brief summary of the department's approach and findings is provided here. More detailed information is available in the department's Technical Support Document for this rule, which can be found on the department's website for proposed permanent rules under Board Order WY-21-20: <https://dnr.wisconsin.gov/news/input/ProposedPermanent.html>.

The department first determined the site-specific characteristics of LCO and the set of stressors that underly the need for a site-specific phosphorus criterion. The department then developed a model based on over thirty years of extensive data from LCO to predict how whitefish habitat would respond to a range of phosphorus concentrations in the lake. This analytical approach allowed the department to examine the effect of phosphorus on oxythermal habitat. It demonstrated that the current phosphorus criterion of 15 µg/L is not protective of whitefish in LCO and that a lower phosphorus criterion is necessary to provide more oxythermal habitat for whitefish in the East Basin. The department's analysis confirmed that a phosphorus criterion of 10 µg/L is appropriate and necessary to increase survival during the most stressful warm periods. This phosphorus concentration will likely preserve at least some depth of oxythermal habitat for whitefish with a dissolved oxygen concentration of at least 3 mg/L and temperature of not more than 18.9°C in 4 out of 5 years. Further, the analysis demonstrated that a criterion of 10 µg/L is not more stringent than reasonably necessary for attaining that protection, as concentrations above this point would not provide sufficient habitat. Achieving a criterion of 10 µg/L would also improve habitat conditions for cisco.

While the analysis indicates that phosphorus reduction alone will not result in optimal oxythermal habitat for whitefish, reduced phosphorus levels can increase the likelihood of survival during the most stressful warm periods for most years. Due to other factors influencing the lake (such as temperature), fish kills are still likely to occur in some years with more severe weather conditions.

**10. Analysis and Supporting Documents Used to Determine the Effect on Small Business or in Preparation of an Economic Impact Report:** The department does not anticipate any compliance costs related to this rule, because there are currently no point source dischargers within the lake's watershed. The phosphorus loads in the LCO watershed are all from nonpoint sources (forested or agricultural lands, cranberry bogs and septic systems at private residences), which are not under the department's regulatory authority. Because the department's authority does not extend to these sources, there will be no

regulatorily required reductions of phosphorus discharges and consequently no fiscal impacts from promulgating a site-specific criterion. Any new point source discharger to LCO would be permitted to discharge based on a limit that is calculated to achieve the site-specific phosphorus criteria.

If the proposed site-specific criterion is promulgated, follow-up phosphorus reduction efforts within the watershed would continue to be voluntary on the part of any nonpoint sources. The community has been proactive in seeking voluntary reductions; however, phosphorus levels continue to increase.

The lake is already on the impaired waters list for dissolved oxygen impacts. If a criterion of 10 µg/L total phosphorus is promulgated, the lake will also be listed as impaired for phosphorus until such time the criterion of 10 µg/L is attained. Listing status does not have a direct economic effect on stakeholders. Even if a TMDL analysis or other pollutant reduction plan is developed based on a more stringent phosphorus site-specific criterion of 10 µg/L, there will be no regulatorily required reductions of phosphorus for current sources of phosphorus under such a plan because all of the current phosphorus sources are nonpoint sources.

Although an impairment listing will not result in regulatory requirements or costs, it increases the potential for local entities to secure grant funding from the department or other sources. The department provides \$2.3 to 3.3 million annually to local communities to address lake and watershed issues through its Surface Water Grants program. These grants can fund a wide variety of water quality and restoration activities, which can be used to enable further voluntary efforts to address this issue.

**11. Effect on Small Business (initial regulatory flexibility analysis):** The department has determined the rule will have no fiscal impact on small businesses. Promulgation of a site-specific criterion for the lake will not impose additional pollution reduction requirements for Wisconsin Pollutant Discharge Elimination System (WPDES) permittees or nonpoint sources. Small businesses within the watershed could take voluntary measures to reduce phosphorus inputs to the lake with or without a phosphorus site-specific criterion for the lake.

**12. Agency Contact Person:**

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

A comment period was held from December 5, 2022 to January 30, 2023 with a public hearing on January 23, 2023.

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**RULE TEXT**

**SECTION 1. NR 102.06 (7) (a) (Note) and (b) 4. are created to read:**

**NR 102.06 (7) (a) Note:** Assessment procedures for site-specific phosphorus criteria are the same as those for statewide phosphorus criteria under s. NR 102.07, unless otherwise specified.

(b) 4. For Lac Courte Oreilles, a stratified two-story fishery lake, the total phosphorus criterion is 10 µg/L. Attainment of the criterion is determined by taking samples within 2 meters of the surface at the deepest points of the lake's two-story fishery basins: East, Central, and West Basins. If the criterion is not attained at any one of the 3 deep points, then the lake as a whole, including the bays, is not attaining the criterion.

**SECTION 2. 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 3. BOARD ADOPTION.** This rule was approved and adopted by the State of Wisconsin Natural Resources Board on June 28, 2023.