Clearinghouse Rule 19-083

DRAFT
February 18, 2019

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

The Wisconsin Natural Resources Board proposes an order to **renumber** NR 102.06 (7); to **amend** NR 102.06 (4) (intro.); and to **create** NR 102.06 (7) (b) relating to site-specific phosphorus water quality criteria for Petenwell Lake located in Wood, Juneau, and Adams counties, Castle Rock Lake located in Adams and Juneau counties, and Lake Wisconsin located in Columbia and Sauk counties.

WY-09-18

Analysis Prepared by the Department of Natural Resources

1. Statute Interpreted: Section 281.15, Stats.

2. Statutory Authority: Section 281.15, Stats.

3. Explanation of Agency Authority: Section 281.15, Stats., provides the Department with authority to promulgate by rule water quality standards for surface waters or portions of surface waters in the state. 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 (SSC) may need to 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 the specific surface water segment or waterbody. Through a total maximum daily load analysis (TMDL) conducted on the Wisconsin River Basin, the Department determined that the statewide criteria for the Petenwell and Castle Rock Lakes were overprotective and the statewide criterion for Lake Wisconsin was not sufficiently protective to achieve the recreational and aquatic life uses.

4. Related Statutes or Rules: Section NR 102.06, Wis. Adm. Code and ch. 283, Stats.

5. Plain Language Analysis: Petenwell and Castle Rock Lakes are the largest reservoirs on the Wisconsin River. These reservoirs are included on Wisconsin's impaired water's list (33 USC 1313(d)) and are listed as impaired for phosphorus. To address the impairment, the Department has developed proposed Total Maximum Daily Loads (TMDLs) for discharges of total phosphorus throughout the Wisconsin River Basin.

For Petenwell and Castle Rock Lakes, the TMDL analysis found that the applicable statewide phosphorus criteria of 40 µg/L contained in s. NR 102.06 are more stringent than necessary to achieve the designated uses (recreational and aquatic life uses). The existing phosphorus criterion of 40 µg/L for Petenwell and Castle Rock is based on research on Minnesota lakes that showed that an increase in algal blooms occurs in shallow lakes when total phosphorus exceeds 40 µg/L. However, analysis of water quality monitoring data from Petenwell and Castle Rock lakes that was conducted during the development of the TMDL indicates that less algae is produced at a given phosphorus concentration in these reservoirs than is typically observed in shallow lakes across the state. Section 281.15(2)(c), Stats., states that water quality criteria shall be no more stringent than necessary to protect the designated use. Based on the analysis

conducted during the TMDL for the Wisconsin River Basin, the Department has proposed a phosphorus SSC of 55 µg/L for Castle Rock Lake and an SSC of 53 µg/L for Petenwell Lake

Pursuant to s. NR 102.06(4)(c), Lake Wisconsin is classified as an impounded flowing water because its summer water residence time is less than 14 days, so the TP criterion that applies to the lake is equal to the criterion of the inflowing river (100 µg/L). However, the current summer mean TP concentration in Lake Wisconsin is 98 µg/L, and at this concentration, the lake has frequent and severe algal blooms (mean summer chlorophyll a (CHL) is 48 µg/L compared to the recreational use benchmark for CHL of 20 µg/L). The applicable criterion of 100 µg/L for Lake Wisconsin which allows frequent nuisance algal blooms is therefore not protective of recreational uses. A more restrictive phosphorus SSC is needed.

The existing criterion of 100 µg/L is not protective enough to meet the recreational and aquatic life uses because although the retention time of phosphorus in the lake is short similar to a river, Lake Wisconsin responds to phosphorus loading in the same manner as a lake. Based on the analysis conducted during development of the TMDL, the Department is recommending a phosphorus SSC for Lake Wisconsin of 47 µg/L. The Department believes the proposed criterion of 47 µg/L will achieve the designated recreational and aquatic life uses and therefore satisfy the state statutory requirement and federal regulatory requirement that criteria be developed to protect the designated uses. s. 281.15 (1), Wis. Stats., and 40 CFR 131.11.

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

40 CFR 131 Subparts A-C contain requirements for establishing state water quality standards.

40 CFR s. 131.4: States are responsible for establishing and revising water quality standards. U.S. EPA approves or disapproves standards under 40 CFR s. 131.5.

40 CFR 131.6: Water quality standards consist of designated uses and criteria to protect the designated 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.

Wisconsin has authority under s. 281.15,Stats. to promulgate and revise water quality standards. Promulgation of site specific criteria for the three lakes would provide consistency with the federal regulations in 40 CFR 131.6 and 131.11 and s. 281.15, Stats., that require that criteria be based on protecting the designated uses of a waterbody.

7. Comparison with Similar Rules in Adjacent States: Although Iowa, Ohio, and Indiana have narrative standards that can be applied to nutrients, they do not have numeric phosphorus or nutrient criteria, and therefore do not have a provision for site-specific criteria for surface waters.

Illinois has adopted partial phosphorus criteria for lakes and reservoirs. The 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 for surface waters.

Minnesota (MN) has adopted phosphorus criteria (standards) for lakes and reservoirs by ecoregion with values ranging from 12 to 90 µg/L. In addition, MN allows specific water quality standards, referred to as SSC in Wisconsin, to be adopted when appropriate and information is available to derive standards based on information specific to a water body including temperature, variations in hydraulic residence time, watershed size, and distance from neighboring ecoregion. This process is outlined in Minn. R. 7050.0222. Other site-specific standards can be considered using Minn. R. 7050.0220, Subp. 7 (Site-specific Modification of Standards) and in the Lake Superior Basin using Minn. R. 7052.0270 (Site-specific water quality standards or criteria). Site-specific standards must maintain and protect the beneficial use.

In MN, six site-specific standards for lakes have been approved and one is proposed. The proposed site-specific standard is for the Sauk River Chain of Lakes and was submitted to U.S. EPA for their approval in June 2017. The Sauk River Chain of Lakes is a reservoir system. Given the unique characteristics of this reservoir system, MN deemed it appropriate to propose and use site-specific eutrophication standards to protect swimming and boating uses. The flowage lakes are very shallow, with a large watershed to lake surface area, and water residence times are very low. The non-flowage lakes are influenced by their connection to the flowage lakes and were adjusted accordingly to utilize appropriate standards. The site-specific standards focus on reduction in the frequency and intensity of algal blooms so that aquatic recreational uses are protected for the majority of the summer.

8. Summary of Factual Data and Analytical Methodologies Used and How Any Related Findings Support the Regulatory Approach Chosen: The current statewide phosphorus criteria for lakes and reservoirs were designed to support designated recreation and aquatic life uses. The most sensitive use is recreation, which is supported when moderate algae conditions (20 µg/L chlorophyll *a*) occur no more than 30% of the summer. The statewide phosphorus criterion for shallow lakes, 40 µg/L, was chosen in part because it corresponds to this chlorophyll target in most lakes. However, some lakes produce more or less chlorophyll per unit phosphorus than average and may warrant site-specific criteria.

The SSC analysis for Petenwell Lake, Castle Rock Lake, and Lake Wisconsin is based on four years of biweekly water quality monitoring that was conducted at 3-4 stations per reservoir during the open water seasons of 2010-2013. The first step in the analysis was to plot chlorophyll concentration against several potential drivers of chlorophyll variability, including nutrients, day of year, river discharge, and water temperature. Next, several statistical models were fit to estimate multiple regression relationships between selected variables and chlorophyll. The best models were then used to estimate daily chlorophyll concentrations during the open water seasons of 2010-2013, and to simulate how those concentrations would change with lower phosphorus loading to the reservoirs. Based on these models, the total phosphorus concentrations that will meet the 20 µg/L chlorophyll target are 53 µg/L in Petenwell Lake, 55 µg/L in Castle Rock Lake, and 47 µg/L in Lake Wisconsin. More detail is contained in Appendix C of the Wisconsin River TMDL Report – "Total Maximum Daily Loads for Total Phosphorus in the Wisconsin River Basin," dated August 20, 2018, which can be found at: https://dnr.wi.gov/topic/tmdls/wisconsinriver/.

9. Analysis and Supporting Documents Used to Determine the Effect on Small Business or in Preparation of an Economic Impact Report: Water quality criteria are established to protect designated uses of surface waters and are used in calculating limitations that apply to point source discharges covered by Wisconsin Pollutant Discharge Elimination ("WPDES") permits. Limitations on pollutant loads established in TMDLs are based on promulgated criteria and are required to be included in WPDES permits under state law (s. 283.31(3)(d)3., Stats, and federal regulations. Adoption of recommended SSC will impact allocations resulting from the TMDL and thus have an economic impact, both through changes in direct compliance costs and the positive indirect economic benefits associated with improvements in water quality. Adoption of recommended SSC for these waterbodies will have differing impacts among regulated dischargers. The anticipated increased compliance cost from establishing SSC

for the three waterbodies is estimated to be moderate ($1 million year in present worth). The estimated compliance costs reflect wastewater treatment cost (capital and O&M costs) at the facility. The cost savings (economic benefit) for facilities that will be associated with establishing SSC for the three waterbodies is estimated to be very significant ($11.5 million per year). We assume a 20-year period for compliance cost and benefit estimations in this section and also assume implementation of the TMDL based on the revised SSC criteria. The indirect positive economic benefits associated with improvements in water quality are not factored into the costs.

For the 109 individually permitted wastewater treatment facilities:

- 3 facilities are already installing treatment capable of meeting TMDL derived effluent limits under both the current criteria and recommended SSC, so the SSC will have no economic impact.

- 2 facilities that discharge to large wetland complexes may not be impacted by the SSC as the department currently believes the discharges do not impact downstream waters, so the SSC will have no economic impact.

- 20 facilities are already meeting TMDL derived effluent limits under both the current criteria and recommended SSC, so the SSC will have no economic impact.

- 32 facilities have no change in TMDL derived effluent limits, so the SSC will have no economic impact.

- 16 facilities will have similar treatment options under both the current criteria and recommended SSC such that it is unlikely the recommended SSC will shift compliance costs much in either direction.

For the remaining 36 wastewater treatment facilities, 29 of the facilities are municipal wastewater treatment plants and 7 are industrial facilities. None of the industrial facilities meets the definition of a small business. The economic impact for these 36 facilities is summarized in Table 1.

Table 1: Wastewater Compliance Costs

	# of Facilities	**Total Present Worth Cost ($)** (20 years)	**Annual Cost ($)** (20 years)
Municipal Facilities			
Reduced Costs	19	93,617,625	5,593,602
Increased Costs	10	8,951,719	534,860
Industrial Facilities			
Reduced Costs	5	86,115,333	5,895,862
Increased Costs	2	7,554,925	517,245

This equates to an estimated annual cost savings of almost $5.5 million for industries with five facilities facing reduced compliance costs under the recommended SSC and two facilities looking at increased compliance costs.

The compliance cost estimates assume compliance via treatment plant upgrade and are based on the incremental difference between the capital and operation and maintenance (O&M) costs needed to achieve the two TMDL-based limitations: the limit based on the current criteria and the limit resulting from the recommended SSC. (NOTE: Compliance costs could be lower than these estimates if an

affected facility chooses to comply with TMDL-based effluent limits through adaptive management or water quality trading or seeks a variance.) These assumptions were based on the cost curves developed by Arcadis as part of the Economic Impact Analysis Supporting Report developed for the Department of Administration in support of Wisconsin's phosphorus multi-discharger variance (MDV) determination. The Arcadis work developed cost curves based on the following assumptions:

The assumed treatment process to achieve >0.5 to 1 mg/L TP was multi-point chemical precipitation of phosphorus with alum and with clarification. To achieve >0.1 to 0.5 mg/L TP, it was assumed that multi-point chemical precipitation with clarification and sand filtration was required. Multi-point chemical precipitation with clarification and dual-stage sand filtration are the processes required to achieve TP less than or equal to 0.1 mg/L.

Arcadis developed cost curves (capital and O&M) for 755 municipal and industrial facilities across the state for the three levels of treatment technologies outlined above.

To determine the impact of the SSC, the estimated capital and O&M costs were tallied and compared for the individual facilities. Of these facilities, it was determined that an additional seven municipal lagoon and recirculating sand filter facilities would have similar treatment costs with or without SSC. For the remaining facilities, present worth was calculated based on a 20-year period and a discount rate of 3.20% for industries and 1.76% for municipalities.

10. Effect on Small Business (initial regulatory flexibility analysis): The department has determined the rule will have no direct effect on small business. The fiscal impacts from the proposed rules will affect WPDES permitted municipalities and industries (with phosphorus discharges to surface waters) that are not considered small businesses. There may be an indirect effect on small businesses that discharge to municipal wastewater treatment plants, but this impact is difficult to estimate because user fees are set by the municipality. The rule does not create any reporting, bookkeeping or other compliance procedures for any regulated facilities.

This rule will not impose additional pollution reduction requirements for nonpoint sources and CAFOs as the establishment of the recommended SSC itself does not invoke any new regulatory requirements for nonpoint sources or CAFOs.

For Lake Wisconsin, the recommended SSC allows TMDL allocations to be assigned such that water quality and the designated uses can be attained for the lake. Attainment of the designated uses is anticipated to have economic benefits for recreational activities such as boating and fishing, small business involved in the service and tourism industry, and increased property values due to improved water quality.

11. Agency Contact Person: Marcia Willhite, Chief, Water Evaluation Section, Wisconsin Department of Natural Resources, PO Box 7921, Madison, WI 53707-7921; 608-267-7425; Marcia.Willhite@wisconsin.gov

12. Place where comments are to be submitted and deadline for submission:
Written comments may be submitted at the public hearings, by regular mail or email to:

Marcia Willhite – WT/3
Department of Natural Resources
PO Box 7921
Madison, WI 53707-7921
Email: Marcia.Willhite@wisconsin.gov

Written comments may also be submitted to the Department at DNRAdministrativeRulesComments@wisconsin.gov.

A public hearing will be held at the following time:

Date:	August 13, 2019
Time:	1:30 p.m.
Location:	Wood County Land & Water Conservation Dept. River Block 111 W Jackson St. Wisconsin Rapids WI, 54495

The deadline for submitting public comments is August 20, 2019.

SECTION 1. NR 102.06 (4) (intro.) is amended to read:

NR 102.06 (4) RESERVOIRS AND LAKES. Except as provided in ~~sub. (1)~~subs. (6) and (7), to protect fish and aquatic life uses established in s. NR 102.04 (3) and recreational uses established in s. NR 102.04 (5), total phosphorus criteria are established for reservoirs and lakes as follows:

SECTION 2. NR 102.06 (7) is renumbered NR 102.06 (7) (a).

SECTION 3. NR 102.06 (7) (b) is created to read:

NR 102.06 (7) (b) Site specific criteria apply to the following waterbodies to protect fish and aquatic life uses and recreational uses:

1. For Castle Rock Lake, the total phosphorus criterion is 55 ug/L.
2. For Petenwell Lake, the total phosphorus criterion is 53 ug/L.
3. For Lake Wisconsin, the total phosphorus criterion is 47 ug/L.

SECTION 4. 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 5. BOARD ADOPTION. This rule was approved and adopted by the State of Wisconsin Natural Resources Board on [DATE].

Dated at Madison, Wisconsin _____.

STATE OF WISCONSIN

DEPARTMENT OF NATURAL RESOURCES

BY _____

Preston D. Cole, Secretary

(SEAL)