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Chapter NR 119

PHOSPHORUS SITE-SPECIFIC WATER QUALITY CRITERIA

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NR 119.01 General. This chapter establishes standard protocols for developing site-specific water quality criteria for total phosphorus. A phosphorus site-specific criterion may be established to appropriately protect a waterbody's designated uses when the applicable statewide total phosphorus criterion, as specified in s. NR 102.06, is determined by the department to be more or less stringent than necessary to protect the uses of the waterbody due to site-specific conditions. The requirements specified in s. 281.15 (1) and (2) (b) to (e), Stats., shall be met when developing a site-specific criterion under this chapter. Protection of a waterbody's designated uses is evaluated using indicators of the ecosystem's response to phosphorus and overall biotic integrity. After a phosphorus site-specific criterion is adopted, approved by the U.S. EPA, and takes effect, it becomes the applicable water quality criterion under s. 281.15, Stats., for the approved waterbody or segment.

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NR 119.02 Definitions. In this chapter the following definitions apply:

(1) "Biological assessment threshold" has the meaning defined in s. NR 102.03 (1e).

Note: Biological assessment thresholds are specified in subch. III of ch. NR 102.

(2) "Clean Water Act" or "CWA" means the federal Clean Water Act of 1972 and amendments.

(3) "Designated use" means a use assigned to Wisconsin's waterbodies as specified in s. NR 102.04.

Note: Pursuant to the Clean Water Act, all of Wisconsin's surface waters are assigned to the following use categories: aquatic life, recreation, public health and welfare, wildlife.

(4) "Less stringent SSC" means a site-specific phosphorus criterion that is established at a concentration higher than a waterbody's statewide phosphorus criterion.

(5) "More stringent SSC" means a site-specific phosphorus criterion that is established at a concentration lower than a waterbody's statewide phosphorus criterion.

(6) "Natural background phosphorus concentration" means the phosphorus concentration from natural sources, including forested and undeveloped lands, and from natural processes such as weathering and dissolution, that would exist in the absence of measurable impacts from human activity or influence.

(7) "Phosphorus response indicator" means an indicator and its thresholds, as specified in s. NR 102.60 (2) to (4), that characterize the condition or abundance of aquatic organisms that are responsive to phosphorus.

(8) "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 in Section 303(d) of the Clean Water Act.

(9) "Site-specific criterion" or "SSC" means a phosphorus criterion applicable to a waterbody or segment that differs from the statewide phosphorus criterion due to specific conditions at the waterbody or segment, documented using data for the specific site or a similar reference site.

(10) "Statewide phosphorus criterion" means the statewide phosphorus surface water quality criterion specified in s. NR 102.06 that applies to a specific waterbody in absence of an adopted, approved, and effective site-specific criterion.

(11) "Strahler stream order" is a numerical hierarchy of stream segments increasing from headwaters through downstream reaches.

Note: A map layer showing Strahler stream order is available online on the department's Surface Water Data Viewer, https://dnr.wi.gov/topic/surfacewater/swdv/.

(12) "Total maximum daily load" or "TMDL" has the meaning defined in s. NR 212.72 (11).

(13) "U.S. EPA" means the United States environmental protection agency.

(14) "Weather-controlled total phosphorus concentration" has the meaning defined in s. NR 102.07 (1) (c) 1.

(15) "WPDES permit" means a Wisconsin pollutant discharge elimination system permit issued by the department under ch. 283, Stats.

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NR 119.03 Less stringent SSC. A waterbody or segment may be eligible for a less stringent SSC if the requestor demonstrates and the department determines that the designated uses of the waterbody and its affected downstream waters can be protected by a less stringent phosphorus criterion based on the analysis of site-specific data. For the department to approve a less stringent SSC, the SSC shall be developed using methods specified in ss. NR 119.05 to 119.06 and be protective of downstream uses as specified in s. NR 119.06 (6). The categories of waterbodies that may qualify for less stringent SSC include all of the following:

(1) BIOLOGICAL METRICS ATTAINED. A less stringent SSC may be appropriate for a waterbody that is not attaining its statewide phosphorus criterion if all of its phosphorus response indicators and biological assessment thresholds are attained.

(2) BIOLOGICAL METRICS NOT ATTAINED. A less stringent SSC may be appropriate for a waterbody that is not attaining its statewide phosphorus criterion even if one or more of its phosphorus response indicators or biological assessment thresholds are not attained, provided a modeling analysis demonstrates that the phosphorus response indicators are expected to be attained if the waterbody's phosphorus concentration is sufficiently reduced to attain a proposed SSC that is less stringent than the statewide phosphorus criterion.

Note: Certain reservoirs with a statewide phosphorus criterion of 30-40 ug/L may fit in this category. An example of this analysis is the modeling and analysis conducted for Petenwell and Castle Rock Lakes.

(3) HIGH NATURAL BACKGROUND PHOSPHORUS CONCENTRATION. A less stringent SSC may be appropriate if a waterbody is not attaining the statewide phosphorus criterion because the nat-

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ural background phosphorus concentration is higher than the statewide phosphorus criterion.

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NR 119.04 More stringent SSC. A waterbody or segment is eligible for a more stringent SSC if the requestor demonstrates and the department determines that the statewide phosphorus criterion is not sufficiently protective of the waterbody's designated uses. A more stringent SSC may be appropriate if a waterbody is in one of the following categories:

(1) BIOLOGICAL METRICS NOT ATTAINED. A more stringent SSC may be appropriate if a waterbody attains its statewide phosphorus criterion but does not attain one or more of its phosphorus response indicators or biological assessment thresholds. However, a more stringent SSC is not appropriate under this subsection if a biological assessment threshold or phosphorus response indicator is not attained due to factors other than phosphorus, and the department determines that phosphorus is not contributing to the nonattainment.

Note: Because flowing waters may transport algae downstream from where it is produced, an SSC should only be established on the segment of the waterbody where the impairment is being generated. For example, if a river directly downstream of an impoundment attains its phosphorus criterion but receives high algae concentrations passed through from the impounded area, a more stringent SSC for the river segment downstream from the dam may not be appropriate since the source of the algae is upstream. Establishing an SSC downstream from the dam is not likely to achieve attainment of the phosphorus response indicator.

(2) BIOLOGICAL METRICS ATTAINED. A more stringent SSC may be appropriate even if a waterbody is below its statewide phosphorus criterion and it attains its phosphorus response indicators and biological assessment thresholds if it is demonstrated that a more stringent SSC than the statewide phosphorus criterion is necessary to maintain attainment of any of these indicators and the level necessary can be demonstrated through modeling.

Note: For example, certain impounded flowing waters with a statewide phosphorus criterion of 100 ug/L may fit in this category if the ambient concentration of the waterbody is below the statewide criterion but concentrations approaching 100 ug/L would be too high to support recreation and aquatic life.

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NR 119.05 Methods for determining an SSC. An SSC shall be developed using one of the following methods:

(1) SSC BASED ON AMBIENT PHOSPHORUS CONCENTRATION. For cases under s. NR 119.03 (1) when it is demonstrated that a less stringent SSC is appropriate because biological metrics are attained, the department may set the SSC at a concentration not to exceed a flowing water's median ambient concentration, or a lake or reservoir's mean ambient phosphorus concentration. If the weather-controlled total phosphorus concentration can be determined for the waterbody, this value may be used as the ambient phosphorus concentration.

Note: The SSC is set at the waterbody's median or mean ambient concentration (or weather-controlled phosphorus concentration) because the ambient concentration is deemed to be protective of designated uses if the waterbody attains its phosphorus response indicators and biological assessment thresholds at current concentrations.

(2) SSC DERIVED THROUGH MODELING. (a) *Modeling analysis.* If a statistical or modeling analysis demonstrates that attaining a phosphorus concentration higher or lower than the statewide phosphorus criterion will attain a waterbody's suspended chlorophyll *a* phosphorus response indicators specified in s. NR 102.60 (2) and (3), and the department initiates rulemaking to establish an SSC, the department shall propose an SSC at the modeled phosphorus concentration expected to attain the applicable indicators. The analysis shall be conducted following requirements specified in s. NR 119.06 (4) (b).

Note: Modeling demonstrations under this subsection do not require modeling of biological communities such as fish, aquatic insect, or aquatic plant communities because, while predictive modeling is well-established for chlorophyll *a* concentrations, there are no widely-accepted modeling approaches that predict community-scale responses of fish, aquatic insect, or aquatic plant communities to variation in phosphorus concentrations with a high degree of precision.

(b) *Use of natural background phosphorus concentrations.* An SSC may be set no lower than a waterbody's natural background phosphorus concentration if the background concentration can be determined. The natural background concentration may be estimated using the concentration for similar nearby waterbodies with minimal human impacts or other methods approved by the department. For natural lakes, the background concentration may be determined from a sediment core using paleolimnological methods.

Note: Natural background phosphorus concentrations can be inferred from diatoms deposited in the sediment prior to significant impacts from Euro-American settlement, circa 1850s but variable across the state.

(3) ALTERNATIVE METHODS. An alternative method for setting an SSC may be used in cases that are outside of those described in ss. NR 119.03 to 119.04, when methods in subs. (1) to (2) are not appropriate or feasible, or to consider alternative or additional metrics. An SSC based on an alternative method may be approved if the department and U.S. EPA determine that the SSC is protective of the designated uses of the waterbody and downstream waters under s. NR 119.06 (6).

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NR 119.06 Minimum requirements for an SSC submittal. Any person may submit a request to the department to review a proposed SSC for a waterbody or waterbody segment. The department may also develop an SSC through rulemaking absent any request. A person submitting the request is responsible for developing the proposed SSC, including conducting monitoring and modeling if needed. An SSC request submittal shall contain all of the following:

(1) SSC STUDY AREA. The submittal shall contain identification of all waterbodies and segments within the SSC study area. The SSC study area includes all waterbodies and segments for which monitoring data are needed to determine whether a proposed SSC would be protective of designated uses. The study area is determined as follows:

(a) For any SSC on an isolated waterbody such as a seepage lake, the isolated waterbody may comprise the entire SSC study area. At least one monitoring site within the waterbody is required.

(b) For a more stringent SSC on a flowing water system, a single waterbody or segment may comprise the SSC study area. In this case, at least one monitoring site within the waterbody is required. A larger study area may also be established.

(c) For a less stringent SSC on a flowing water system, the study area shall include monitoring sites on all of the following upstream and downstream waters:

1. A site upstream from the segment under consideration for an SSC.

2. At least one site within the segment under consideration for an SSC. This site shall be located downstream from any WPDES permitted dischargers present on the segment.

3. Downstream of the SSC segment, one site per Strahler stream order until the terminal waterbody defined in subd. 4. is reached.

4. At least one site within the study area's terminal waterbody, which is the nearest downstream waterbody that has a statewide phosphorus criterion different from the statewide phosphorus criterion applicable to the proposed SSC segment. If no terminal waterbody is reached before the Mississippi River, the Mississippi River is the terminal waterbody.

Note: Sampling beyond state lines is not usually necessary unless the department

determines it is needed for protection of a downstream water with a more stringent phosphorus criterion in an adjacent state.

Note: The combined sites listed in par. (c) should typically result in 6 or fewer sites. If more than one discharger is present, additional sampling sites may be needed. The delineation of the study area is consistent with the approach used by the department when developing an SSC.

(2) APPLICABLE WATER QUALITY STANDARDS, PHOSPHORUS RESPONSE INDICATORS, AND BIOLOGICAL ASSESSMENT THRESHOLDS. For each waterbody or segment identified in sub. (1), the submittal shall contain identification of all applicable designated uses under s. NR 102.04, phosphorus criteria under s. NR 102.06, phosphorus response indicators under s. NR 102.60 (2) to (4), and biological assessment thresholds under subch. III of ch. NR 102.

(3) MONITORING. The submittal shall contain sampling data for each of the study area monitoring sites specified in sub. (1). Data shall be collected following the department's monitoring and quality assurance protocols for each metric. If additional relevant data are available beyond the minimum requirements specified in this section, such as more frequent data or a longer-term data record, they shall also be submitted and analyzed under sub. (4). Monitoring data requirements include all of the following:

(a) At least 2 years of total phosphorus data. Sampling frequency at each site shall comply with one of the following:

1. For lakes and reservoirs, a minimum of 12 phosphorus samples are required over a 2-year period. Collection of 12 samples requires 6 samples from June 1 to September 15 each year.

2. For flowing waters, a minimum of 12 phosphorus samples are required over a 2-year period. Collection of 12 samples requires monthly sampling from May to October each year.

3. For sites with total phosphorus concentrations that are more variable than typical or where the phosphorus concentration is close to the statewide criterion, more frequent sampling than the minimum specified in subds. 1. to 2. may be necessary to demonstrate the need for an SSC and the appropriate SSC value. A requestor may consult with the department to determine if a higher sampling frequency is necessary.

Note: For example, if the two-sided 80% confidence interval around the proposed SSC phosphorus concentration contains the statewide criterion, then more frequent samples may be necessary to demonstrate the need for an SSC. A power analysis can be used to statistically estimate the amount of additional data needed.

(b) At least 2 years of data for each of the applicable phosphorus response indicators and biological assessment thresholds. For biological sampling, the department may approve sampling to be conducted by the requestor, conduct the sampling itself, or agree to a designee.

(c) Documentation of the monitoring protocols and quality assurance methods followed.

(d) Depending on site-specific circumstances, for the purposes of making an SSC determination, the department may require an additional number of samples, monitoring sites, or other chemical, biological, or physical metrics in addition to those specified in this section.

Note: The department's monitoring protocols and standard operating procedures, including quality assurance protocols, and existing data housed by the department may be accessed through the department's SWIMS database. Contact the department at DNRSWIMS@wisconsin.gov for access to the database. More information is available by contacting the department's surface water monitoring section or on its surface water monitoring website at https://dnr.wi.gov/topic/SurfaceWater/monitoring.html.

(4) ANALYSIS. The submittal shall contain an analysis of the data, including all of the following:

(a) An analysis of monitoring data following the department's assessment protocols to indicate current and historic attainment status of all water quality standards, phosphorus response indicators, and biological assessment thresholds identified in sub. (2). This shall include identifying whether any waters are or have been on the section 303(d) list, and any trends observable over time. If any relevant water quality standard is not attained, evaluate whether there is a relationship between phosphorus and the non-attainment, and any other potential factors that may be causing the non-attainment.

Note: The department's surface water assessment protocols are found under specific metrics within chs. NR 102 and 105 and in guidance titled "Wisconsin Consolidated Assessment and Listing Methodology," or WisCALM, which is available on the department's surface water assessments website at https://dnr.wi.gov/topic/SurfaceWater/assessments.html.

(b) A statistical or modeling analysis if needed to determine the appropriate SSC, as specified in s. NR 119.05 (2), and documentation of methods and results. The analysis shall demonstrate a clear link between phosphorus and attainment of a designated use, including characterization of the relationship between phosphorus and the applicable phosphorus response indicators. The analysis shall be based on or calibrated to data from the waterbody that are representative of the range of environmental variability that may influence the applicable phosphorus response indicators. For rivers that contain a reservoir, impounded flowing water, or natural drainage lake, the model may be based on attainment of the applicable phosphorus response indicators for frequency of moderate algae levels and chlorophyll *a* specified in s. NR 102.60 (2) (a) to (b). In those cases, a model demonstrating attainment of the river phosphorus response indicator for chlorophyll *a* specified in s. NR 102.60 (3) is not required. For rivers without a reservoir, impounded flowing water, or natural drainage lake, modeling shall include a demonstration that the river phosphorus response indicator for chlorophyll *a* specified in s. NR 102.60 (3) is expected to be attained.

Note: The option for rivers with impounded flowing waters, reservoirs, or natural drainage lakes is provided because modeling chlorophyll *a* – phosphorus correlations is more cost-effective for these waters than modeling such correlations in rivers, and attaining the chlorophyll *a* targets for lakes, reservoirs, and impounded flowing waters should ensure that chlorophyll *a* targets are also met within the river.

(5) PROPOSED SSC EXTENT. The submittal shall contain identification of the extent of the study area that may be eligible for the SSC. For a less stringent SSC, this may include any segments within the study area that do not attain their applicable phosphorus criteria but do attain all phosphorus response indicators and biological assessment thresholds. For a more stringent SSC, this may include any segments that are demonstrated to need a more stringent phosphorus criterion to protect designated uses.

Note: Typically, monitoring and analysis under subs. (3) to (4) will need to be completed before the extent of the study area eligible for the SSC can be identified.

(6) DOWNSTREAM PROTECTION. For less stringent SSC, the submittal shall contain a demonstration that potentially affected downstream waters' uses are protected by the proposed SSC, using one of the following methods:

(a) Waters in the study area under sub. (1) that are downstream of the extent of the study area that may be eligible for the SSC as determined under sub. (5) shall be assessed as follows:

1. If the downstream segment adjacent to the proposed SSC extent attains its applicable phosphorus criteria, phosphorus response indicators, and biological assessment thresholds, the SSC is protective of downstream waters.

2. If the proposed SSC extent directly joins a river listed in s. NR 102.06 (3) that is not attaining one or more of its phosphorus response indicators or biological assessment thresholds, an SSC may be established but shall not be set higher than either the phosphorus criterion of the river or the ambient total phosphorus concentration of the SSC extent.

Note: Under this paragraph, Strahler stream order should be used to determine the length of the adjacent downstream segment.

(b) If a demonstration for downstream protection under par. (a) is not appropriate or feasible, an alternative demonstration of downstream protection may be submitted by the requestor to the department.

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(7) PROPOSED SSC AND SUPPORTING MATERIALS. The submittal shall contain the proposed SSC and materials supporting the proposal, including all of the following:

(a) Determination of the SSC that would be appropriately protective of designated uses in the waterbody and downstream, based on the analyses in this section.

(b) Demonstration that there is a statistically significant difference between the proposed SSC and the statewide phosphorus criterion, based on estimation of the uncertainty in the relationships developed under sub. (4) (b).

Note: For example, an SSC may be demonstrated to be significantly different from the statewide criterion if the statewide phosphorus criterion is outside the 2-sided 80% confidence interval around the proposed phosphorus SSC concentration.

(c) A draft technical support document that contains the information required in this chapter to support the SSC and meets the requirements specified in s. 281.15, Stats. All raw data and calculations shall also be submitted to the department.

Note: Section 281.15 (2) (b) to (e), Stats., requires information on socioeconomic costs and considerations, a demonstration that the criterion is no more stringent than reasonably necessary to assure attainment of a waterbody's designated uses, application of reasonable statistical techniques, and a technical support document detailing methods used to develop the criterion.

Note: The department recommends that requestors meet with the department early in the process to determine additional data needs and protocols before developing a monitoring or modeling plan or submitting an SSC request. The department may provide technical assistance as resources allow. Any preliminary advice provided by the department is not binding, but is meant to inform the requestor's decision on whether to develop an SSC and the information needed to do so.

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NR 119.07 Decision regarding SSC request. (1) The department shall review an SSC request and make a determination on whether the SSC is approvable.

(2) The department may initiate rulemaking under subch. II of ch. 227, Stats., if, after reviewing the submittal, it determines that the proposed SSC is approvable under s. 281.15, Stats. The department shall notify the requestor of its determination. Promulgation of an SSC is a revision to a water quality standard and it requires U.S. EPA approval under 40 CFR 131.20 and 131.21.

Note: An SSC can only be used as the basis for a TMDL after it has been approved by U.S. EPA and taken effect.

(3) If the department determines that a proposed SSC is not approvable under s. 281.15, Stats., s. NR 102.06 (7), and this chapter, then it shall notify the SSC requestor in writing and provide an explanation of the reason for the denial. If a request for an SSC is denied, the requestor may choose to submit additional data or analysis or submit a petition for rulemaking to the department pursuant to the procedures specified in ss. NR 2.03 and 2.05 and s. 227.12, Stats.

Note: If the department chooses not to initiate rulemaking under this section, a petition for rulemaking may be submitted to the department pursuant to s. 227.12, Stats. A petition for rulemaking under s. 227.12 (1), Stats., may be submitted by a municipality, an association which is representative of a farm, labor, business or professional group, or any 5 or more persons having an interest in the rule. If a s. 227.12, Stats., petition is denied by the department, the petitioners may seek review of the decision under ch. 227, Stats. In addition, a person may request that U.S. EPA promulgate an SSC under 40 CFR 131.22 (b).

Note: To be notified of rulemaking related to water quality standards and assessments, including SSC, the public may subscribe to the water quality standards and assessments electronic notification system on the department's home page at http://dnr.wi.gov/. Requests to be placed on the WPDES permit public notification list may be directed to the Department of Natural Resources, WPDES Permits, P.O. Box 7921, Madison, Wisconsin 53707-7921. Notifications to the mailing list will be sent electronically unless the requestor specifies a preference for a mailed copy.

(4) Any promulgated SSC may later be revised through rulemaking.

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