

Chapter 10. Numeric Nutrient Water Quality Criteria

Element 8. Develop Work Plan and Schedule for Numeric Criteria Development

10.1 EPA and Gulf Hypoxia Task Force Expectations

Both the EPA Framework and the Gulf Hypoxia Action Plan call for states to develop numeric water quality standards for both phosphorus and nitrogen. EPA has provided further elaboration in its national performance measure WQ-26, where, if a state has not completed adoption of numeric criteria, it must provide a schedule of activities with annual milestones for adoption no later than 2016. That schedule must include milestones for each of these activities:

1. Planning for criteria development
2. Collection of information and data
3. Analysis of information and data
4. Proposal of criteria
5. Adoption of criteria into the state's or territory's water quality standards (related to measure WQ-1a)

WQ-26 implies that states may have the option to scientifically justify that criteria are not needed for certain waters, such as phosphorus criteria are sufficient and nitrogen criteria are not needed.

10.2 Wisconsin's Approach and Future Directions

Phosphorus Criteria

In 2010, the Wisconsin Department of Natural Resources adopted numeric phosphorus water quality standards criteria for three categories of waters: rivers and streams; lakes and reservoirs; and nearshore and open waters of the Great Lakes within Wisconsin jurisdiction. These numeric phosphorus water quality criteria were approved by EPA in December 2010 and met the EPA imposed deadline of December 31, 2010.

The table below shows the adopted phosphorus water quality standards criteria by type of water body. The specific water body types are defined in the s. NR 102.06, Wis. Adm. Code.

Adopted Phosphorus Criteria by Type of Water Body	Total Phosphorus in ug/L
NR 102.06 listed rivers	100
All other streams	75
Stratified reservoirs	30
Non-stratified reservoirs	40
Stratified "two-story" fishery lakes	15
Stratified drainage lakes	30
Non-stratified (shallow) drainage lakes	40

Stratified seepage lakes	20
Non-stratified (shallow) lakes	40
Impoundments	Same as inflowing river or stream
Lake Michigan open and nearshore waters	7
Lake Superior open and nearshore waters	5
Note: There are some exclusions, such as lakes under 5 acres and ephemeral streams	

The adopted criteria for streams and rivers were based primarily on two peer-reviewed published reports by the U. S. Geological Survey and the Wisconsin Department of Natural Resources: “Nutrient Concentrations and Their Relations to Biotic Integrity of Wadeable Streams in Wisconsin” (USGS Professional Paper 1722, 2006) and “Nutrient Concentrations and Their Relations to Biotic Integrity of Nonwadeable Rivers in Wisconsin” (USGS Professional Paper 1754, 2008). These research studies analyzed the relations between phosphorus and nitrogen and biotic indices, such as those for fish and aquatic insects. In general, the studies showed stronger relations for phosphorus than nitrogen, but there appeared to be an influence on biotic integrity from nitrogen.

Nitrogen Criteria – Surface Waters

EPA maintains a position that states must develop both phosphorus and nitrogen water quality standards criteria “unless the state provides a strong technical and scientific justification, considering both local and downstream effects, that one or the other is not needed” (EPA WQ-26). Where a state has not completed adoption of numeric nutrient criteria, EPA requires the state to provide a full set of performance measure milestone information for adopting numeric criteria (EPA WQ-26). Each year the state must report on progress for adopting criteria for at least one class of water, such as streams, lakes or estuaries, by 2016.

EPA has identified the following key activities and requires milestones be established for each of the activities:

1. Planning for criteria development
2. Collection of information and data
3. Analysis of information and data
4. Proposal of criteria
5. Adoption of criteria into the state’s water quality standards.

Each of these activities is briefly described below.

1. Planning for criteria development -- completed

As mentioned above, the wadeable stream and non-wadeable river studies were designed to analyze the relations of both phosphorus and nitrogen on biotic indicators. Water quality samples were collected and analyzed for both phosphorus and nitrogen.

In 2011, the Department of Natural Resources convened a work group of technical experts from the Department, USGS, EPA and the University of Wisconsin to review previous work and identify any additional study needs. The work group recommended that additional information be collected on streams with relatively higher nitrogen concentrations and lower phosphorus concentrations. A working list of 15 to 20 of these streams was prepared.

2. Collection of information and data -- completed

In 2011 and 2012, water chemistry and biotic data was collected on the selected streams. Laboratory analysis of the collected samples was completed in late 2012.

3. Analysis of information and data – planned to be completed July 2014

Statistical analysis and expert review of the data is planned for 2013 and extending into 2014. The data from the new sites will be assessed both as a group and as part of the previously compiled data set on about 240 wadeable streams. The scientific review will include analysis of the strength of relations between nitrogen and biotic indices and conform to the suite of EPA guidance.

4. Proposal of criteria

Whether the Department of Natural Resources proposes criteria or pursues the option of showing that nitrogen criteria are not needed will be determined after the scientific analysis in the step 3 above is completed..

5. Adoption of criteria

Any proposed criteria will need to go through Wisconsin's process for adoption of administrative rule development. Generally, this includes approval from the Natural Resources Board and Governor to pursue rule development, convening of a stakeholder advisory committee, presentation of proposed rules for public comment, development of an economic impact analysis, approval by the Natural Resources Board, legislative review and approval by EPA. Often this is at least a three year process. Included in the review process is an assessment of whether nearby states have adopted similar water quality standards criteria.

Nitrogen Standards – Groundwater and Drinking Water

Wisconsin has adopted nitrogen water quality standards for groundwater and drinking water. Specifically, ch. NR 140, Wis. Adm. Code, includes a concentration of 10 mg/L nitrate (expressed as N) as the enforcement standard for groundwater. Similarly, ch. NR 809, Wis. Adm. Code identifies a nitrate concentration of 10 mg/L as a maximum contaminant level for drinking water. Chapter NR 809 also identifies 1 mg/L as a maximum contaminant level for nitrite.