

DEPARTMENT: POLLUTION CONTROL AGENCY

STATE OF MINNESOTA  
Office Memorandum

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TO: MPCA Advisory Committee Members

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SUBJECT: Wild Rice Sulfate Standard  
Rulemaking

## I. Status

The Minnesota Legislature directed the MPCA to undertake rulemaking to make any needed changes to Minnesota's water quality standard to protect wild rice from sulfate in the water, and to identify waters that need such protection (wild rice waters). The work on the sulfate standard began with scientific studies to understand and develop the science around the impact of sulfate on wild rice, and has proceeded through preliminary proposals to revise the standard to protect wild rice. All the work has involved extensive engagement with stakeholders and other governmental organizations (including state and tribal representatives), through informal meetings and a formal Wild Rice Advisory Group.

MPCA is currently working to develop a draft rule and the supporting Statement of Need and Reasonableness (SONAR). Our goal is to put the proposed rule on public notice for formal comment in the first quarter of 2017. The legislative deadline for completing this rulemaking is January 15, 2018. This memo provides background information and a brief summary of the current status of the proposed rule.

## II. Background

The federal Clean Water Act requires states to designate beneficial uses for all water bodies (i.e. "waters") and develop water quality standards to protect each use. Water quality standards include the following components:

- Beneficial uses — identification of how people, aquatic communities, and wildlife use our Minnesota waters.
- Numeric or narrative standards — typically the allowable concentrations of specific chemicals in a water body, or statements of unacceptable conditions in and on the water, established to protect beneficial uses. Numeric standards can also include measures of biological health.
- Antidegradation protections — extra protection for high-quality or unique waters and existing uses.

Minnesota's beneficial uses include aquatic life and recreation, industrial uses, agriculture and wildlife, and domestic consumption. A water body may have more than one beneficial use. Minnesota Rules Chapter 7050 assigns a series of beneficial use classifications to all waters of the state. Although there is a lot of commonality among the beneficial uses established by states – for example, every state designates and protects drinking water as a beneficial use – states may also set beneficial uses that reflect the unique nature of their waters and aquatic resources.

In 1973, Minnesota established a unique beneficial use by designating “water used for production of wild rice” and setting a numeric standard to protect the production of the wild rice seed. Wild rice is an important plant species in Minnesota – for instance, the Minnesota legislature designated wild rice as the state grain. It provides food for waterfowl and is economically important to many who harvest and market it. Furthermore, wild rice (manoomin, in Ojibwe) is a significant and sacred cultural resource to the Chippewa/Ojibwe Indian tribes of the region, who have gathered wild rice for generations and use it as an important nutritious food source.

The specific pollutant from which the “water used for production of wild rice” beneficial use is protected is sulfate; the current standard is 10 mg/L of sulfate “during periods when the rice may be susceptible to damage by high sulfate levels.” Sulfate is a natural chemical commonly found in surface and groundwater. It can also be found at varying concentrations in discharges from permitted facilities such as mining operations, municipal wastewater treatment plants, and industrial facilities. The observed relationship between the presence of wild rice in waters with lower sulfate levels, and its absence in waters with elevated sulfate, led to the adoption of the wild rice sulfate standard in 1973.

#### Highlights/Overview of Likely Proposal

In response to questions that began to arise regarding application of the wild rice sulfate standard in permits and environmental review, the Minnesota Legislature (in 2011) provided funding for a Wild Rice Sulfate Standard Study and related research to gather additional information about the effects of sulfate and other substances on the growth of wild rice. The legislation directed the MPCA to consult with Minnesota tribes and the Minnesota Department of Natural Resources (MDNR), and to consider historical wild rice harvests, and minimum acreage and density of wild rice stands to clarify where the standard applies. The legislation also required the MPCA to undertake rulemaking to identify waters subject to the standard and to make any other needed changes to the sulfate standard following completion of the study.

The Wild Rice Sulfate Standard Study began in 2012 and was completed in December 2013. The MPCA subsequently produced a preliminary analysis of the study data, and the analysis went through a scientific peer review process in 2014. Since that time, MPCA staff have been working to refine the analysis in response to the peer review and other comments received, develop the needed changes to the sulfate standard, and to transition into a rulemaking process that will revise the numeric standard and clarify where it applies.

In July 2016, the MPCA released the *Draft Technical Support Document: Refinements to Minnesota’s Sulfate Water Quality Standard to Protect Wild Rice* (Draft TSD). That document was released publicly, and discussions were held with tribal representatives and stakeholders, including the Wild Rice Advisory Group.

Drawing on the Draft TSD and subsequent comments received, the MPCA is currently proceeding down a path of rule development that includes:

**Beneficial Use.** The protection of waters used for the production of wild rice is in use Class 4, which protects water quality for agricultural and wildlife use. Currently a subset of Class 4A waters that are “used for production of wild rice” are protected with a numeric standard for sulfate. The MPCA is proposing to clarify the beneficial use designation by moving the description of the designation and the standard to Class 4D. This maintains the beneficial use but provides clarity in the rule structure and language. We are also generally referring to those waters as “wild rice waters” rather than “waters used for production of wild rice”. In the 1970s, the word “production” was used by academic ecologists to refer to plant growth and reproduction in natural ecosystems. Today, “production” has a more mechanistic or industrial implication, so removing it provides clarity that the beneficial use continues to relate to the “harvest and use of grain from this plant as a food source for wildlife and humans.”

**Standard.** The MPCA is currently planning to propose an equation as the sulfate standard to protect wild rice, i.e., to set waterbody-specific calculated protective sulfate values. MPCA's research and data analysis show that the actual pollutant that adversely impacts wild rice is not sulfate, but sulfide. Sulfate in surface water can be converted to sulfide in the sediment of lakes and streams. The amount of sulfide produced depends equally on sulfate in the water, extractable iron in the sediment, and total organic carbon in the sediment. Controlling sulfate in the surface water will help protect wild rice from the toxic effects of sulfide, but the amount of sulfide is also dependent on the iron and carbon in the sediment.

Because of these interactions, MPCA staff believe setting a water quality standard that is an equation will best protect wild rice. After examining and analyzing the study data, MPCA staff have determined that a sulfide level of 120 µg/L (in sediment porewater) is adequately protective of wild rice. The equation results in a waterbody-specific calculated protective sulfate value designed to keep sulfide below harmful levels.

As shown in Chapter 2, part 6 of the draft TSD, using an equation is the most precise approach – resulting in the fewest number of waters where the required sulfate levels will be either over protective (more stringent than needed to protect rice) or under protective (not sufficiently stringent to protect rice). To implement this standard, each wild rice water would need to have its sediment sampled for organic carbon and iron, and a calculated protective sulfate level developed based on the equation.

The equation is based on analyses using sediment samples taken at one location in each of several wild rice waters. Analysis of multiple samples from a limited number of wild rice waters shows sufficient variation in organic carbon and iron to produce a range in calculated protective sulfate concentrations within a given wild rice water. The proposed methodology to implement the equation approach is to take 25 different samples of sediment from wild rice stands in a given wild rice water, clustered in groups of five. Each group of five would be mixed and analyzed for organic carbon and iron, and then used to calculate the protective sulfate concentration. We propose in the draft TSD to use the lowest sulfate concentration as the calculated protective sulfate value for that wild rice water.

**Listing Wild Rice Waters.** The 2011 legislation directed the MPCA to identify waters where the wild rice sulfate standard applies. To help clarify the beneficial use and where the sulfate standard applies, the MPCA plans to specifically identify “wild rice waters” and list them as (class 4D) waters to which the sulfate standard will apply. The legislation stated:

*“Waters containing natural beds of wild rice” means waters where wild rice occurs naturally. Before designating waters containing natural beds of wild rice as waters subject to a standard, the commissioner of the Pollution Control Agency shall establish criteria for the waters after consultation with the Department of Natural Resources, Minnesota Indian tribes, and other interested parties and after public notice and comment. The criteria shall include, but not be limited to, history of wild rice harvest, minimum acreage, and wild rice density.”* Laws 2011 First Special Session Chapter 2, Article 4

Based on the legislative direction, extensive research, and consultation, the MPCA plans to initially identify and list over 1300 wild rice waters. Listing of additional waters in the future would have to occur through additional rulemaking. This initial rulemaking would contain language describing the conditions that would lead MPCA to propose additional waters be added to the list of wild rice waters.

The MPCA believes that any water where the “harvest and use of grain from [wild rice] as a food source for wildlife and humans” is an existing use should be listed as a wild rice water. EPA first promulgated water quality

standards in 1975, and therefore has set a date of November 28, 1975 to define “existing uses” that states must protect. Any beneficial use that a water body supported on November 28, 1975 or at any time thereafter is a use that must be maintained.

One way to demonstrate that the harvest and use of the wild rice grain is an existing use in a water body is to demonstrate that there has been either a history of harvest, or wild rice stands of a certain acreage and density, at any time since November 28, 1975. For acreage and density, we are planning to propose general criteria of at least one observation of wild rice presence at a minimum stem density of 8 stems/m<sup>2</sup> over at least one-quarter acre or wild rice presence at a minimum stem density of 4 stems/m<sup>2</sup> over at least one-half acre. This level of acreage and density is a reasonable one for assuming that there is, at least in some years, sufficient rice to support wildlife or to draw human harvesting, recognizing that wild rice experiences dramatic year-to-year variation in population sizes and density.

For developing the initial list, the MPCA considered a number of sources of information including: data and information received following a 2013 MPCA request for relevant information; a 2008 MDNR report to the Minnesota Legislature titled Natural Wild Rice in Minnesota; and wild rice surveys completed by Minnesota tribes, mining companies, and the University of Minnesota. (See Appendix 3 of the Draft TSD.)

Many of these documents do not contain information about density or acreage for all waters. Therefore, MPCA staff have used our best professional judgement to determine if other information provided in the source documents makes it reasonable to assume that the water does have the wild rice beneficial use as an existing use (for example, if it does or has contained wild rice beds that meet the criteria). As an example, waterbodies that the MDNR identified as having beds of wild rice greater than two acres in size were assumed to meet the acreage and density criteria above and therefore demonstrate the beneficial use as an existing use.

Moving forward, the MPCA believes that the rule should require that waters be added to the list through rulemaking where there is either 1) a demonstrated history of harvest, or 2) wild rice stands of a certain acreage and density. The rule will also state that the Commissioner may propose rulemaking to add waters to the list where other information shows that the beneficial use is an existing use.

**Application of the Standard.** The MPCA is planning to propose that the standard (and resulting calculated sulfate value) would apply as an annual average – a concentration that must be met in the waterbody when averaged over the whole year. This annual averaging time reflects the fact that sulfate is not directly harmful to wild rice, but levels of the harmful sulfide are influenced by longer-term sulfate concentrations and that sulfate can be converted to sulfide throughout the year. An annual average also appropriately recognizes the natural variability in the system.

The standard would apply at the location of wild rice beds within the wild rice water. (That would be the point where sulfate levels are examined for compliance and effluent limits would be based on meeting the calculated protective sulfate value at that location.) However, we recognize that wild rice beds may be in different locations within a water body from year to year. For lakes, because the water is well mixed, in general the entire lake would be designated as a wild rice water and the standard would apply to the whole lake. (Lakes with hydrologically separate bays might be different.) For rivers and streams, the situation is more complicated. The MPCA is planning to propose that the standard apply to an area surrounding the location of any known wild rice bed; we have suggested an area of 800 m upstream and 800 m downstream of the wild rice bed. This is likely to be a smaller area than that designated as a wild rice water.

**Stakeholder Involvement.** There has been significant stakeholder involvement throughout this process. MPCA staff have met with Minnesota Tribes, MDNR, EPA, and others. A specific Wild Rice Advisory Group was

established to provide the MPCA with input on the scientific study and the resulting draft technical support document. The MPCA expects the Advisory Group to continue to provide input on the draft rule.

An initial draft proposal that included the proposed use of the equation was shared in March 2015 with the Wild Rice Advisory Group, Tribes, and a wide group of stakeholders via a news conference and an email list. In October 2015, the MPCA published a Request for Comments (RFC) in the *State Register*. The RFC is the first “official” step for state rulemaking and is a legal requirement of the Administrative Procedures Act (*Minn. Stat.* ch. 14). The RFC asked the public for comments and information about the wild rice sulfate standard rulemaking generally and what the MPCA was considering in the March 2015 Draft Proposal. In July 2016, the MPCA released a draft Technical Support Document (TSD). The draft TSD has been presented to the Wild Rice Advisory Group and placed on the web for review by all interested stakeholders.

### Points of Known Controversy

The MPCA received more than 600 comments in response to the October 2015 RFC. The key themes of those comments are summarized in Appendix 1 of the Draft TSD.

Notable issues or topics of concern are described below:

#### **Beneficial Use.**

- Whether the wild rice beneficial use should remain in Class 4, which is based on protecting waters for agricultural and wildlife use, or move to another class (such as Class 2 aquatic life).
- Whether the MPCA is establishing a new beneficial use (“wild rice waters”, different from “waters used for the production of wild rice”) that therefore needs a detailed waterbody-specific assessment, called a use attainability analysis, to designate the use to each water.

#### **The Sulfate Standard.**

- Many questions about the standard revolve around the reliability of the science and statistics used to develop the components, from the level of sulfide that is protective of wild rice growth to the interactions between sulfate, iron, and organic carbon and how sulfate moves from water to the sediment.
- Some commenters have stated that the MPCA has chosen a sulfide level that is not sufficiently protective, and therefore the resulting standard is not adequately protective. Other commenters have stated that the MPCA has chosen a sulfide level that is too stringent. Some feel that no numeric standard is needed because neither sulfate nor sulfide are toxic to wild rice and that MPCA should promulgate a narrative standard. Concerns raised include that the work:
  - Does not account for uncertainty
  - Is based on statistics that only looked at whether wild rice was present or absent, not at the abundance of the rice
  - Relies on very different techniques than other water quality standards
  - Does not account for new research
- There are concerns about uncertainty with an equation based standard.
- There are concerns about the time and resources needed to gather the data to implement an equation approach.

#### **Wild Rice Waters and Application of the Standard.**

- Commenters have questioned the appropriateness of the density and acreage thresholds for designating wild rice waters – whether those are too restrictive and any instance of wild rice needs to be protected, or whether those are insufficient and an additional use attainability analysis needs to be completed for each water.

- There have been concerns that the use of the 800 m upstream and downstream threshold is arbitrary.
- Some commenters feel that the standard should apply seasonally, not as an annual average.

### III. Questions for the Advisory Committee

- A. Does the approach to clarifying the beneficial use and listing waters seem reasonable?
- B. The proposal involves the use of an equation as the sulfate standard.
  - Has the MPCA clearly explained the steps in developing the equation?
  - If you have concerns about using an equation as a standard, are they based around how the equation was developed, the feasibility of implementation, or both?
- C. As part of the SONAR, the MPCA needs to evaluate who is impacted and the costs of compliance with the standard.
  - If you had to conduct this analysis, how would you go about it? What components would the analysis include?
  - Do you have suggestions on how we can gather the most effective input to complete this task, or who we should approach to give us more information about the economic impacts of the standard?

### Attachments (see link for electronic access)

- Wild Rice Standards Study: <https://www.pca.state.mn.us/water/wild-rice-sulfate-standard-study>
- Wild Rice Advisory Group: <https://www.pca.state.mn.us/water/protecting-wild-rice-waters#advisory-committee-075198ac>
- Draft Technical Support Document: Refinements to Minnesota’s Sulfate WQ Standard to Protect Wild Rice
  - Summary: <https://www.pca.state.mn.us/sites/default/files/wq-s6-43w.pdf>
  - Full Report: <https://www.pca.state.mn.us/sites/default/files/wq-s6-43v.pdf>
  - Comments Received: <https://www.pca.state.mn.us/sites/default/files/wq-s6-43y.pdf>
- Draft Database of Wild Rice Waters: <https://www.pca.state.mn.us/sites/default/files/wq-s6-43x.xlsx>