Fond du Lac Band of Lake Superior Chippewa
Resource Management Division

Administration; Conservation Enforcement; Environmental; Fisheries
Forestry; Land Information; Natural Resources; Wildlife

Submitted Via MPCA Public Comment Webpage (https://mpca.commentinput.com/?id=Q4hZRckTW)

September 1, 2023

Katrina Kessler, Commissioner
Minnesota Pollution Control Agency
520 Lafayette Road
Saint Paul, MN 55155-4914

Re: Proposed MPCA Framework for developing and evaluation site-specific sulfate standards for the protection of wild rice

Dear Commissioner Kessler:

For nearly twenty years, staff from the Fond du Lac Resource Management Division, along with our tribal environmental and natural resource professional colleagues across Minnesota, have been providing extensive information, comments, recommendations, and sharing our knowledge and experience regarding the protection of manoomin/Psiŋ (wild rice) with staff and leadership at the Minnesota Pollution Control Agency. While the focus has often been on the interpretation, implementation and enforcement of the long-established sulfate criterion applicable to "waters used for the production of wild rice", we have also strongly and consistently urged the agency to take a more holistic approach to implementing a water quality standards-based framework for protecting this culturally and ecologically irreplaceable resource.

The Fond du Lac Band appreciates the staff-to-staff opportunities we've had recently to discuss the MPCA's proposed framework for developing and evaluating site-specific sulfate standards for wild rice. Understanding that the Clean Water Act (CWA) provides for the option of site-specific standards, federal statute also requires a clear, scientifically-defensible and legally sound process for doing so.[1] That process must include a public review and comment period prior to the Environmental Protection Agency's ultimate review and approval determination, before it can be implemented through the various sections of the CWA (monitoring and assessment, establishing permit limits, identifying and addressing impairments).

In addition to numerous comments, questions and concerns already shared with MPCA staff, the Band also submits the following written comments for the administrative record.

Equation-based calculation of site-specific standard

– MPCA should clarify that a proposed SSS derived from the sediment-based equation defined in the 2017 rulemaking should only be considered ancillary information, not itself determinative of a protective site-specific criterion. There is substantial and compelling scientific evidence that "sufficient" iron in sediment porewater does not mitigate the toxic effect of sulfide (reduced from

[1] 40 C.F.R. § 131.11 (a)

sulfate in the overlying water)[2]. MPCA's own scientists, at the time, recognized the extensive variability (even within a single wild rice waterbody) of the porewater sulfide, iron and carbon measurements that form the basis for that equation. There has been no subsequent research or refinement of that equation that provides any confidence that it will be protective of the wild rice beneficial use in the receiving waters of a high-sulfate discharger.

Seasonality of application of sulfate standard

- MPCA should clarify that the existing approved sulfate standard, as well as any proposed site-specific standard that may be approved, applies year-round. The existing "WUFPOWR" language in Minnesota Rules that references "…during the time that wild rice is susceptible to the effects of sulfate…" is confounding the interpretation of this proposed framework for calculating a SSS. It conflates the specific life-cycle seasonal factors (i.e., nitrogen uptake by wild rice plants) that have been so clearly elucidated through the mesocosm experimental treatments by Dr. John Pastor and Dr. Nate Johnson, with a false presumption that those periods of high nitrogen uptake are the *only* time that sulfate is problematic for wild rice.

- The experimental data Dr. Johnson provided during the MPCA's research program supporting the earlier rulemaking showed clearly that sulfate reduction to sulfide in lake sediments occurs year-round, just somewhat more slowly under winter temperatures. Year-round sulfate loading contributes to year-round reduction to sulfide in sediment porewater. There is no time where wild rice waterbodies are not impacted by sulfate loading. This is an essential factor to establish.

Specific examples of potentially protective SSS for the Mississippi River at Pool 8

- The Band defers to Dakota tribes in southern Minnesota who may have more knowledge of historic and current wild rice condition in those reaches of the Mississippi River for which the USGS has been monitoring and tracking the location and relative abundance of wild rice since 1989. If in fact wild rice is increasing in abundance and extent and is "clearly not in decline", this specific scenario suggests we should remain cognizant of Dr. John Moyle's original empirical research across the state of Minnesota. His extensive observational dataset showed a strong correlation between sulfate concentration and the presence or absence of vigorous wild rice stands. This correlation was defined as a range, wherein the lower limit of his range of sulfate concentrations (below 10 mg/L) can be clearly interpreted as protective of wild rice. His defined range of sulfate concentrations between 10 mg/L and 50 mg/L may represent wild rice's adaptive capacity for surviving or thriving across a range of *ambient* (natural, not resulting from anthropogenic discharges) sulfate concentrations. 30 mg/L may in fact be protective of a population that has adapted to that ambient water chemistry condition.

Existing criterion will be implemented until SSS is approved

- The Band appreciates that MPCA explicitly states that the existing criterion will be implemented in permits and other regulatory decisions during the time a permittee may be requesting/developing the scientific basis for a site specific standard. We have waited decades to see this WQS enforced.

[2] LaFond-Hudson, S., Johnson, N.W., Pastor, J. *et al.* Iron sulfide formation on root surfaces controlled by the life cycle of wild rice (*Zizania palustris*). *Biogeochemistry* **141**, 95–106 (2018). https://doi.org/10.1007/s10533-018-0491-5

Antidegradation

– The Band urges MPCA to include Dr. LaFond-Hudson's figure[3] (see below) in the final framework, showing wild rice population oscillations trending over time towards extirpation with continued sulfate loading. This conceptual model is critical for understanding that ongoing environmental stressors, like high sulfate loading, imposed upon natural population oscillations, can drive a wild rice population towards complete extinction. It is essential for visualizing what the Band and other tribes have long argued: that high sulfate loadings over time represent one critical element of cumulative adverse effects to this sensitive organism, which is inherently variable and already subject to other profound stressors: climate change, hydrologic disruption, other pollutant loadings, unbalanced biological communities leading to competition or increased grazing, invasive species.

AGU ADVANCING EARTH AND SPACE SCIENCE
Journal of Geophysical Research: Biogeosciences 10.1029/2022JG006809

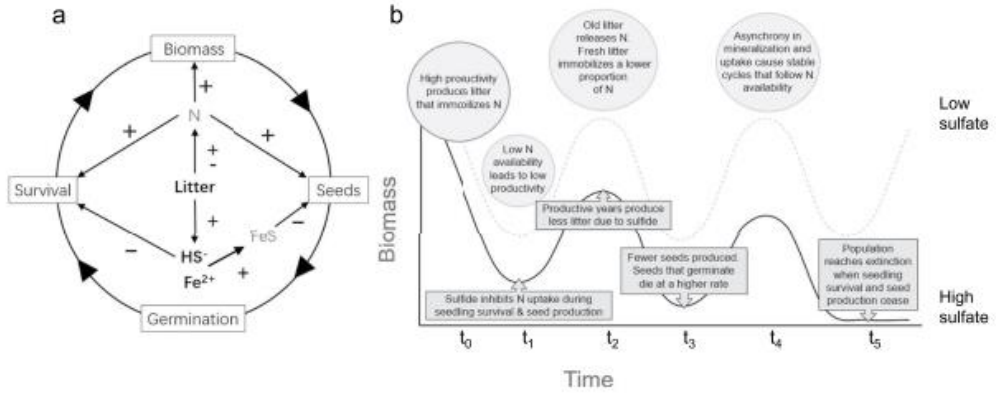

Figure 7. A conceptual model synthesizing the interactions of sulfur, iron, and litter during the life cycle of wild rice (a), and the effect of sulfur on interannual biomass cycles of wild rice (b) based on this study, Walker et al. (2010), and LaFond-Hudson et al. (2018). In (a), the (+) and (−) symbols in (a) represent positive or negative relationships between geochemical constituents and plant traits. In (b), the top, dashed line represents low-sulfate conditions, and the lower, solid line represents conditions with elevated sulfate loading. Time intervals ($t_0 - t_5$) do not represent consecutive years, because time between peaks is typically 3–5 years for wild rice.

– Unfortunately, the lack of historic wild rice population data makes it impossible to know whether current stand density in a particular wild rice waterbody represents long-term natural variation, or if the population oscillations are trending downward across time. The MPCA is suggesting ten years or two population "cycles" of stand density data to be collected as part of a SSS application, and while the regulated community may feel that is onerous, it still may not be a sufficient time interval for longer-term trends to be apparent. The ongoing mesocosm experiments with multiple sulfate concentration treatments has indisputably demonstrated that lower experimental concentrations, over time, also lead to eventual extirpation.

Effectiveness of enforcing the 10 mg/L sulfate criterion

– We urge the MPCA to include the more recent experimental mesocosm data from Dr. Nate Johnson that demonstrates wild rice population can and do recover when sulfate loading ceases. It is critical for both the regulated community and the public to understand that implementing and enforcing water quality standards *actually works* to protect the wild rice beneficial use.

[3] LaFond-Hudson, S., Johnson, N. W., Pastor, J., & Dewey, B. (2022). Sulfur geochemistry destabilizes population oscillations of wild rice (Zizania palustris). Journal of Geophysical Research: Biogeosciences, 127, e2022JG006809. https://doi. org/10.1029/2022JG006809

Economic Impacts for regulated community

- The Band suggests it may be helpful and informative for the MPCA to conduct an affordability analysis of the costs of compliance with the wild rice sulfate standard, similar to the analysis the agency did regarding the Mercury Reduction Rule (Minn. R. 7007.0502) in May 2022. This analysis demonstrated that, under the EPA-accepted process (1995 EPA Interim Economic Guidance for Water Quality Standards) considering profitability, liquidity, solvency and leverage, Minnesota's taconite mercury emitters could not demonstrate substantial and widespread socioeconomic impacts sufficient to approve a variance to the statewide mercury TMDL reduction goals for the taconite sector. A site-specific standard, like a variance to existing water quality standards, represents a change to a federally approved WQS and must be approved by EPA. There has been substantial research into several sulfate treatment technologies that further reduce the economic impacts of sulfate pollution treatment to industrial and municipal dischargers.

Continued collaboration with tribes

- The Band urges MPCA to continue both formal and informal consultation with Minnesota tribes on the best practices for protecting manoomin/Psiŋ under the CWA, identifying critical research questions, and jointly developing research funding proposals that will advance our shared objective of protecting and restoring our state grain and cultural resource. Minnesota tribes and our tribal partners across the region have significant expertise, and also significant experience in collaborative research with more "typical" academic research partners. We have found those collaborations incredibly informative and successful in advancing our collective knowledge.

Sincerely,

Nancy Schuldt

Nancy Schuldt, Water Projects Coordinator
Fond du Lac Environmental Program