

2015 Wild Rice Sulfide Toxicity Study

Executive Summary

A new study found that sulfate and sulfide are not toxic at levels that typically exist in Minnesota's wild rice waters.

Background:

Minnesota has a 42-year-old rule limiting how much sulfate can be discharged into wild rice waters. The current standard of 10 milligrams per liter (mg/L) is not consistently enforced and there has been significant discussion on whether the standard is scientifically supported. Minnesota is the only state with a wild rice sulfate standard.

Based on recent research, the Minnesota Pollution Control Agency (MPCA) has concluded that **sulfate** is not directly toxic to wild rice but that elevated **sulfide** can be toxic to wild rice. Under certain conditions, sulfate can be converted to sulfide in the sediment where wild rice grows. To replace the current 10 mg/L sulfate standard, the MPCA proposes a standard that takes into account the sulfide-producing characteristics of a water body and its sediment to calculate a "Protective Sulfate Concentration" to protect wild rice.

A key to the new standard is defining the toxicity of sulfide to wild rice. The MPCA funded research by University of Minnesota Duluth Biologist Dr. John Pastor to address that issue. The MPCA convened a Peer Review Panel to review the Pastor study. The Peer Review Panel made seven specific recommendations to improve the accuracy of the results.

Study details:

Responding to the Peer Review Panel recommendations, a [2015 study was conducted by Fort Environmental Laboratories](#), a nationally-renowned environmental toxicology laboratory. The study followed all seven Peer Review Panel recommendations, and is being submitted to a peer reviewed journal for publication.

Findings:

The study – which included 10- and 21-day toxicity studies on the effects of sulfide on wild rice – examined six sulfide treatments and 11 wild rice biological endpoints. The study concluded that **sulfide is significantly less toxic to wild rice than was indicated by Dr. Pastor's tests, and not toxic at levels that typically exist in Minnesota wild rice waters.** The study also confirmed that **the presence of iron in the sediment where wild rice grows significantly reduces the toxicity of sulfide.**

Conclusion and next steps:

The findings in this study contrast sharply with Dr. Pastor's 2013 hypothesis. It confirms that **Minnesota's current wild rice sulfate standard of 10 mg/L is not supported by science and that sulfide is not toxic to wild rice at levels that exist in the vast majority of Minnesota.** The MPCA intends to move ahead with rulemaking to refine the existing wild rice sulfate standard to reflect the most up-to-date science and to identify wild rice waters. To inform this rulemaking, the **MPCA is accepting public comments on this issue until December 18.**

**Public comments should be emailed to the MPCA by December 18
at minnrule7050.pca@state.mn.us.**