



MPCA's Wild Rice Sulfate Standard Frequently Asked Questions

How did we get here?

- In 1973 the Minnesota Pollution Control Agency (MPCA) publicized a sulfate standard of 10 mg/L (milligrams per liter) related to wild rice based on field observations in the 1940's that stated wild rice was generally absent when sulfate levels exceeded 10 mg/L and concluded that may be due to sulfate concentrations.
 - For comparison:
 - City of Virginia, MN drinking water (from an abandoned mine pit) ~60 mg/L
 - EPA's secondary drinking water standard (for taste and odor) = 250 mg/L
 - San Pellegrino = 445 mg/L
- Research was conducted in 2012 and 2013 on wild rice waters, and in 2016 the MPCA proposed an equation which would calculate a protective sulfate concentration for dischargers.

What state funded research has been conducted related to wild rice and sulfate?

- In 2011, the MN Legislature appropriated funds for the MPCA to conduct research regarding the effects of sulfate on wild rice. That research was conducted by the University of Minnesota; it began in 2012 and was completed in December of 2013.

What are the key concerns with the MPCA's research?

Sulfate

- The MPCA's initial hypothesis was that sulfate was the cause of wild rice decline. However, the original testing **demonstrated that sulfate, in and of itself, does not impede wild rice growth below concentrations of 2,500 mg/L.**

Sulfide

- MPCA then theorized that sulfate **may** affect wild rice growth by converting to sulfide in low oxygen conditions in the sediment. In response, the agency developed a draft equation to regulate sulfate discharges that hinges on a protective sulfide value of 120 µg/L (micrograms per liter).
- The University of Minnesota sulfide toxicity testing was significantly criticized by an MPCA-organized Peer Review Panel. One of their concerns was that the original study used a laboratory condition that would never occur in nature.
 - The panel recommended seven improvements to make should the research be repeated.

- The panel found the concentrations of sulfate and sulfide that impede the growth of wild rice through laboratory toxicity tests do not exist in the majority of Minnesota waters.

Other factors

- The current proposal does not account for impacts from all known wild rice stressors – such as water depth, water clarity, fluctuations in hydrology, invasive species, shoreland development, etc.

Has there been any other research conducted on this issue?

- In 2013, the Minnesota Chamber of Commerce conducted independent research through Fort Environmental Labs (FEL), a laboratory regularly used in the creation of new government issued standards, to correct the deficiencies identified in the MPCA's research during the peer review.
 - This research focused not only on sulfates but also on sulfide, and the results demonstrated that sulfide does not impact wild rice until concentrations of 12,800 µg/L. The most sensitive endpoint was unaffected by sulfide at concentrations below 1,600 µg/L.
- Meanwhile, the MPCA created a committee that met between 2011 and 2015 to evaluate the standard and deficiencies in its research.
 - Ramboll ENVIRON (one of the MPCA committee members) identified key improvements to the MPCA proposal using the data produced by MPCA-funded research, which would reduce the error rate of the proposed equation.

What are the key concerns with MPCA proposed equations?

- The MPCA's proposed equation has an error rate of 16% - meaning the equation is wrong 16% of the time. A reduction in the error rate would mean that the equation more closely represents field study observations. In order to reduce the error rate to 4%, two things must occur:
 - increase the toxic sulfide threshold based on evidence from the MPCA and FEL research, and
 - adjust the waterbodies included in the dataset used to develop the equation to only include those that are recommended as draft wild rice waters.
- The MPCA's proposal to enact a sediment-based standard for water quality has not been done by the MPCA OR the Environmental Protection Agency (EPA) in more than 40 years.
- The MPCA's proposal relies on a statistical method that has never been used in the development of a water quality standard.

The MPCA included waters where wild rice does not grow – and has not grown in the past – in its dataset when setting its equation. Furthermore, since these waters do not – and have not – contained

wild rice, they are not listed in the MPCA's draft wild rice waters list, though they were used in the equation.

Who does this affect?

- The proposed rule will affect any facility discharging into waters listed on the MPCA's [draft wild rice waters list](#).
 - This includes municipal wastewater treatment facilities across the state – primarily in Northeast Minnesota – as well as Minnesota's iron mining facilities and paper mills.

What are the ways to treat sulfide?

- Currently, the only proven way to treat water at discharge points for sulfide is reverse osmosis.
 - Reverse osmosis systems are incredibly costly to install and maintain. **The costs could result in an increase of \$150/month per household in affected communities.**