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Ms. Carol Nankivel
MPCA/RMAD
520 Lafayette Blvd North
St. Paul, MN 5515

Re: Water Rulemaking-Sulfate Standard for Wild Rice

Dear Ms. Nankivel:

Thank you for the opportunity to provide comments regarding the proposed revisions to the sulfate standard for wild rice.

Our comments are divided into two parts, a review of the scientific, statistically- sound, existing sulfate water quality standard [WQS] and an assessment of the proposed equation substituting for a clear standard, which has been developed with a paucity of data.

The existing sulfate WQS was developed using data from before the state water quality suffered as much from large-scale mining in the northeast, and agriculture in most of the remainder of the State, as we do today. Many confounding factors were therefore not present. MPCA staff reviewed the standard several years ago and the Agency was prepared to declare their support for the existing standard until political forces intervened.

See here, for an outline of the political interference: https://www.minnpost.com/environment/2015/03/mpca-plans-different-sulfate-limits-individual-wild-rice-waters

An example of the information Agency scientists used is contained on page 16, Figure 10. in the Agency document Wild Rice Sulfate Standard Study Preliminary Analysis [http://www.pca.state.mn.us/index.php/view-document.html?gid=20743]. The Figure contains eight bars with surface water sulfate concentration on the x-axis and proportion of sites with at least 5% cover of wild rice on the Y-axis. As sulfate concentrations increase the number of sites generally decrease. At the 10 mg sulfate per liter concentration, only about 50% of the sites are present. Sulfate is clearly depressing the populations of wild rice.

When assessing water quality data for a parameter to it's numeric water quality standard, at least 90% of the data must meet that standard {Guidance Manual for Assessing the Quality of Minnesota Surface Waters for Determination of Impairment: 305(b) Report and 303(d) List [http://www.pca.state.mn.us/index.php/view-document.html?gid=21257] }. As an example, see page 35, last paragraph of the Guidance Manual.

Figure 10. demonstrates the 10 mg sulfate/L l WQS is not close to meeting this 90% goal, suggesting a more stringent WQS is needed. In fact, even at very low concentrations of sulfate the populations are below the 90% goal, again suggesting a much lower sulfate WQS is needed.

We recommend that the existing sulfate WQS be reduced to less than 10 mg, or, at a minimum kept the same. This would be scientifically defensible, statistically sound and based on a deep and complex set of data. Our recommendation is supported by the scientific review provided to the agency.

And now to the hastily developed site-specific sulfate WQS equation. The data to justify this approach is lacking. If the MPCA had developed two regional equations, one for the loamy, agriculturally affected south and one for the granitic, mining-affected northeast, and if those equations had been developed based on a very large dataset and met statistical goals, this methodology might be acceptable.

For example, in the initial iterations of the EPA-approved mercury total maximum daily load [TMDL], there were three regions: the northeast, the metro, and the southern & western region. However, the Metro region was not statistically different from the southern & western region and was subsumed by it, leaving two large regions in the final mercury TMDL. This was based on a very strong dataset collected over many years.

In another example, the EPA-approved lakes and rivers nutrient WQS and the EPA-approved total suspended solids [TSS] WQS also use large scale regions appropriately, using very deep datasets and strong statistical analyses. In comparison to these examples,it is clear in this instance how shallow the data are, and how limited in scope the areas studied are for this proposed site-specific equation.

The proposed sulfate WQS equation is not regionally based but is instead site-specific. It suffers from an extreme paucity of data and has very little statistical strength. It does not appear to contain any type of safety factor. Furthermore, it is not apparent if or when the resources necessary to address this lack of data and statistical rigor will ever be made available.

The proposed equation that is supposed to calculate safe levels of sulfate that allows wild rice to grow is as follows:

“Safe” Sulfate [mg/L] = 0.0000136 times [organic carbon]-1.410 times [Iron]+1.956

Empirically, increased sulfate concentrations and reduced wild rice community populations are related. In this equation, if total organic sediment carbon is held equal and the extractable iron in the sediment is increased, the amount of “safe” sulfate increases. The reverse happens if the amount of iron decreases. In the same way, if iron is held equal, as total organic sediment carbon increases, the amount of safe sulfate decreases, and as carbon decreases, the amount of safe sulfate increases.

This equation fundamentally and pragmatically does not make sense. Relatively speaking, there are and have always been very large amounts of organic sediment carbon in the agricultural regions of the state; so much so that, compared with available “protective” iron concentrations, there should be no wild rice communities outside of the northeast, based on the equation structure. Yet before modern agriculture overwhelmed our southern lakes and rivers with excess sediments and nutrients, there were numerous wild rice communities throughout the south. That doesn’t appear “possible” with the proposed equation.

In the same vein, wild rice communities should be lush in the granitic northeast, with the relative lack of organic sediment carbon and the extra available iron from mining discharges. But that is not the case either, significantly throwing into question the validity and utility of the proposed equation. With no robust statistical underpinning to the equation, these concerns cannot be adequately addressed.

If the MPCA, in spite of the doubts about this equation, continues proposing the use of the equation, in lieu of a statistically proven standard of 10 or less, additional questions arise.

There does not appear to be any safety factor involved in the equation. Safety factors are an important precautionary tool to ensure environmental protection despite unknown negative factors that have not been accounted for. How, in the subsequent permitting and monitoring process, would safety factors come into play?

Because this is a site-specific equation and not a regional equation, does the MPCA envision the "sites" to be individual lakes? And how would the St. Louis River, for example, be assessed – river mile by river mile or by river reach? River reaches are artificial constructs, where for example,larger tributaries empty into the river.

We understand these questions are easily answered by the approach "It depends on each site". That response does not explain how the proposed equation will be utilized. In addition, because the equation is sensitive to iron concentrations, it will be important that natural background concentrations of iron be used and not aquatic iron concentrations increased from mine pollution. Sulfate pollution, and its concomitant reductions in wild rice communities, must not ride on the shoulders of iron discharges from mines.

We believe the proposed equation is ill suited as a scientifically based, statistically- sound construct. The data are not offered, nor is it available to appropriately apply this approach as a regulatory tool. We urge the MPCA to return to its decision that the existing10 mg/L sulfate WQS is not only appropriate, but that evidence suggests the standard might even be too high.

Thank you for the opportunity to provide comments regarding the proposed modifications to the sulfate WQS.

Sincerely,

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