

## Current and Future Wild Rice Sulfate Water Quality Standard Implementation

Sulfate is a chemical commonly found in air, soil and water. It can be found at varying concentrations in discharges from permitted facilities such as mining facilities, wastewater treatment plants and other industrial facilities. Water quality standards addressing sulfate concentrations are found in Minnesota's Class 1 drinking water standards, and Class 4 agriculture and wildlife standards.

The Class 4 sulfate standard of 10 mg/L was adopted into Minnesota Rule in 1973 to protect "water used for production of wild rice during periods when the rice may be susceptible to damage by high sulfate levels" (Minnesota Rules 7050.0224, Subpart 2). Based on testimony presented at public hearings leading to the adoption of this sulfate standard, it was intended to apply to waters with natural wild rice stands and waters used for paddy wild rice production.

There has been limited past implementation of the wild rice standard in permits. The single NPDES permit with a sulfate limit up until recently was the Minnesota Power and Light Clay Boswell power plant on the Mississippi River at Cohasset. Recent implementation of the standard has become much more high profile, contentious and open to varied interpretation. This has been the result of more actively implementing Class 3 and 4 water quality standards along with the recognition of high sulfate discharges from mining and other industrial and municipal permitted facilities and the presence of wild rice in downstream waters. For these reasons the Agency has been striving to clarify current and future implementation of the wild rice sulfate water quality standard. The following narrative discusses a direction forward for standard implementation in both the short and longer term. The intended audience for this document is external parties especially those holding NPDES permits.

### Current Status: Sulfate Standard

The 10 mg/L sulfate standard is the numeric criteria needing to be met in "water used for production of wild rice." Effluent limits are established on this basis. There are essentially three components to the standard, as follows:

1. The specification that it applies to "water used for production of wild rice",
2. The numeric sulfate criterion of 10 mg/L, and
3. The specification that the standard is applicable during "periods when the rice may be susceptible to damage by high sulfate levels".

Each of these components has been the subject of recent questions and discussion. The determination of a "water used for production of wild rice" is being made on a case-by-case basis with specific considerations for the various life stages of plant development. The 10 mg/L sulfate standard is applicable during "periods when the rice may be susceptible to damage by high sulfate levels". In recent mining discharge discussions (Mesabi Nugget and PolyMet, Partridge and Embarrass River watershed, respectively) the time period of wild rice sensitivity to high sulfate was considered as April through August. This same time period is expected for other river wild rice receiving waters but will need to be verified in each case. Lake wild rice stands will need to be considered separately.

### Current Status: Sulfate Requirements in NPDES Permits

The MPCA currently has limited information about sulfate concentrations in discharges for most NPDES permitted facilities. To address this, the MPCA is obtaining sulfate data from facilities through application of the "NPDES Strategy for Salty Dischargers" guidance. The continued implementation of the salty discharge monitoring requirements into permits will result in significantly more sulfate data in the future.

In accordance with guidance, monitoring for sulfate and other "salty" parameters is being added to NPDES permits as they come up for reissuance or as new permits are issued. Where elevated effluent sulfate levels are suspected, but sulfate data are not available, sulfate monitoring is required upon permit reissuance either through continued implementation of the salty discharge monitoring guidance or other discharge-specific sulfate monitoring requirements. Implementation of the salty discharge monitoring requirements into permits began during the summer of 2009. Based on the five year permit cycle, it will be approximately four years before all facilities that meet the monitoring criteria spelled out in the guidance will have the sulfate monitoring requirement added to their permits.

Sulfate data collected in the interim years will be reviewed during routine compliance inspections, annual compliance reports and/or during permit reissuance. If monitoring data collected during the permit cycle indicate a reasonable potential to cause or contribute to an exceedance of the sulfate standard for wild rice, the permittee will be required to submit application for a permit modification and a compliance schedule (if appropriate) will be added to the permit to ensure progress towards meeting the standard. The compliance schedule will contain a requirement that the facility either demonstrate compliance with the standard as soon as possible or submit a variance request with the application for permit reissuance.

Where sulfate effluent data are available for a new or existing discharge, these data are evaluated during the permitting process. Facilities with data that indicate reasonable potential to cause or contribute to an exceedance of the sulfate standard for wild rice are assigned effluent limits accordingly. The first step in this process is the determination if the discharge will affect waters used for production of wild rice. Where waters are determined to be used for production of wild rice, a reasonable potential analysis is completed using the available sulfate effluent and receiving water monitoring data. If reasonable potential is found, a sulfate effluent limit is developed for inclusion in the permit, along with a compliance schedule if appropriate. Note that in accordance with federal law, compliance schedules may not be used for new dischargers.

### Next Steps: Sulfate Standard Revision

Revisions to the sulfate standard for wild rice are being considered as part of the 2012 Triennial Review. The Class 3 and 4 standards, including the wild rice standard, are included in the scope of potential revisions. Please see the "Timeline for Wild Rice Based Sulfate Water Quality Standard Review" document for more information about current and future considerations to the sulfate standard for wild rice.

## Wild Rice Based Sulfate Water Quality Standard Review Timeline

**Background:** The current Class 4A 10 mg/L sulfate standard was adopted into Minnesota's water quality standards rule in 1973. It was included in the rule to protect "water used for production of wild rice during periods when the rice may be susceptible to damage by high sulfate levels" (Minn. R. 7050.0224, subp. 2). According to testimony presented at public hearings leading to the adoption of this sulfate standard, it was intended to apply to waters with natural wild rice stands and waters used for paddy wild rice production.

Recent implementation of the standard has become much more high profile, contentious and open to varied interpretation. For these reasons the MPCA has been striving to clarify current and future implementation of the wild rice sulfate water quality standard. The MPCA has also been looking to complete a more general re-evaluation and update of the existing Class 3 (Industrial Consumption) and Class 4 (Agriculture and Wildlife) water quality standards as part of the current standards review effort, the 2012 Triennial Review. The potential for updating the wild rice sulfate standard is being considered within this overall effort to address Class 3 and 4 standards.

Three elements of the wild rice sulfate standard are being reviewed: 1) the 10 mg/L sulfate numeric standard; 2) in what waters of the state does the sulfate standard apply; and 3) when does the sulfate standard apply in these waters. The following paragraphs summarize the current status of the wild rice sulfate standard review effort, and identify anticipated next steps for both the 2012 Triennial Review and future triennial standards reviews.

### **Current (2012) Triennial Review:**

Clarification of the definition of "water used for production of wild rice": Currently there is no definition in Minnesota Rules Chapter 7050 of a "water used for production of wild rice." Out of necessity MPCA staff has been gaining experience in making such determinations in NPDES permit issuance on a case-by-case basis. The need to make these permit decisions is resulting in development of a set of considerations to make specific determinations that a water is used for production of wild rice. It is expected that these considerations will assist in clarifying during the 2012 Triennial Review what constitutes "water used for production of wild rice," and therefore where the numeric sulfate standard applies.

Task: As part of the 2012 Triennial Review, MPCA plans to develop a proposed list of waters used for production of wild rice for inclusion in Minn. R. 7050.0470 (listed water use classifications), and to explore the feasibility of adopting a definition/criteria for identifying additional waters that are not specifically listed based on an objective set of measures. To do so, MPCA will draw upon the work already done by the MDNR and Tribal representatives to identify "significant" wild rice waters.

Timeline: MPCA staff has begun exploring approaches to identifying a list of waters used for production of wild rice and crafting a definition/criteria for identifying additional waters that are not specifically listed. Considerable internal discussion and review will be needed prior to

proposing a list and definition/criteria. MPCA anticipates discussing, on a conceptual level, the timeline and approach to this effort during the November 2010 information sessions. Development of the particulars, including internal review and stakeholder input and discussion, will coincide with the drafting of the Statement of Need and Reasonableness for the proposed amendments to Minn. R. 7050 and 7052. The proposed rule revision language and Statement of Need and Reasonableness for the 2012 Triennial Review are currently scheduled to be released in fall 2011.

#### **Future Triennial Reviews:**

Revision of the 10 mg/L value: While revision of the 10 mg/L sulfate criterion continues to be evaluated for the 2012 Triennial Review, it seems unlikely that sufficient data will be available to propose a revision to the numeric standard. The University of Minnesota report *Minnesota Surface Water Quality Investigation – Industrial Supply, Irrigation and Livestock Uses* dated June 29, 2010, recommends a revised wild rice sulfate standard. However, the focus of the recommendation pertains to paddy-grown wild rice which has significant water level manipulation and intense management especially as compared to natural wild rice stands. The University of Minnesota - Duluth is conducting sulfate wild rice studies, with funding in part from the Fond du Lac Band and Grand Portage Band, which may provide new information on the sulfate wild rice standard. Study results are expected to be available in January 2011.

The MPCA will consider the University of Minnesota report and the University of Minnesota – Duluth studies along with any additional information that is identified in evaluating revisions to the sulfate standard. However, based on a review of available studies and information, MPCA believes that additional wild rice plant toxicity studies are needed to better characterize the direct and indirect effects of sulfate and other ionic constituents on the various life stages of wild rice before a revision to the numeric standard can be considered. These studies will have to be conducted following a prescribed set of testing protocols that are deemed appropriate from a scientific basis as well as considering recommendations from involved stakeholders (Tribal governments, MDNR, EPA and other federal agency researchers, NPDES/SDS permittees, and academic researchers).

Task: In anticipation of the need for further studies beyond the University of Minnesota report and the University of Minnesota – Duluth studies, MPCA will work cooperatively with USEPA toxicologists, MDNR and Tribal wild rice/plant specialists, and other researchers to establish plant toxicity testing protocols that address the effects of exposure of sulfate, sulfide, and likely other salinity related parameters present in the water column and sediments. MPCA will consult and consider recommendations from Tribal, MDNR, and regulated parties on these testing protocols.

Timeline: The goal is to have a draft toxicity testing protocol developed by the end of December 2010. Anticipated tasks:

- Determine EPA protocol development assistance – level of involvement, specific staff involved. MPCA (Gerald Blaha, Phil Monson, Mark Tomasek, Ed Swain), EPA Region 5 (point of contact Christine Wagener), EPA Headquarters (to be determined). EPA Region 5 has

made initial contact with EPA plant toxicity researchers who have expressed a willingness to support protocol development. Early and continued EPA involvement is critical to this process not only from the standpoint of tapping into their expertise, but also to insure buy-in on the ultimate testing approach and subsequent findings. MPCA will provide Region 5 and Headquarters staff with our identified research objectives.

- Protocol development discussions – EPA, research scientist(s), MPCA (Gerald Blaha, Phil Monson, Ed Swain), MDNR (potentially Welby Smith, Ray Norrgard, Jeff Lightfoot). Discussion expected to occur through a series of phone conversations.
- Draft protocol document – include technical aspects and study cost estimate. MPCA lead writer with assistance from EPA Region 5 and Headquarters, MDNR, and select University researcher review. Anticipate three rough drafts prior to final draft protocol. Last draft circulated for internal MPCA management review.
- Share protocol document with interested parties – Tribal, MDNR-mining staff, regulated community and their consultants, University researchers (more broad distribution), other plant and wild rice experts (USDA Salinity Lab, University of California-Davis). Meet with protocol reviewers to discuss draft; request written comments.

*Changes to the application of the sulfate standard (i.e. when the sulfate standard applies):* Currently the applicable period for the wild rice sulfate standard (i.e. the specific period during which “the rice may be susceptible to damage by high sulfate levels”) is determined on a case-by-case basis during the permitting process. While interest has been expressed in further defining the period(s) of susceptibility in rule, MPCA staff believes that additional sediment sulfide toxicity studies are needed before proposed rule refinements for all “water used for production of wild rice” can be developed. Therefore, the next steps for refining this aspect of the sulfate wild rice standard are also reflected in the protocol development effort identified above. As part of the study protocol development, MPCA will ensure that the toxicity-related plant studies evaluate the full life-cycle of the plant to account for potential seed germination impacts from sediment sulfide levels. In the interim, the applicable period for the wild rice sulfate standard (i.e. the specific period during which “the rice may be susceptible to damage by high sulfate levels”) will continue to be determined on a case-by-case basis during the permitting process.