



## PRESERVE MINNESOTA'S WILD RICE STANDARD

PROTECT MINNESOTA'S NATURALLY-GROWING WILD RICE (MANOOMIN)

Submitted by WaterLegacy  
November 1, 2010

## SUMMARY

WaterLegacy and the Minnesota citizens we represent, many of whom harvest wild rice and hunt waterfowl in rice beds, are strongly opposed either to weakening the wild rice sulfate standard or to applying a “seasonal” wild rice standard either to naturally-growing wild rice or to potential sulfate seeps, releases and discharges from sulfide mining for the following reasons:

- Historic and scientific information confirms that the 10 mg/L limit on sulfates is necessary to protect naturally-growing wild rice.
- The Minnesota Pollution Control Agency (MPCA) has repeatedly affirmed that the 10 mg/L standard is needed to protect wild rice.
- The proposed “seasonal” limitation from April 1 through August 31, although it might be suitable for paddy rice, is inappropriate for naturally-growing wild rice that grows in sediments where sulfates and sulfides will be stored and has a harvest season extending into the fall.
- The proposed “seasonal” limitation might be possible to implement for a single pipe waste stream, but would be meaningless for a sulfide mine facility that releases sulfates through seeps, fissures, and precipitation. Potential capture and impoundment of all mine water from spring through early fall, even if it were to be feasible, would create other serious water quality risks.

Weakening of the wild rice sulfate standard or applying it “seasonally” would allow mining companies to devise models that obscure future violation of water quality standards. Such changes would neither be protective of wild rice nor protective of the integrity of Minnesota’s regulatory process.

## MINNESOTA’S WILD RICE STANDARD

John B. Moyle established the relationship between wild rice and sulfates back in the 1940’s. In 1944 he wrote in the *Journal of Wildlife Management*, “No large stands of rice occur in waters having a SO<sub>4</sub> content greater than 10 ppm, and rice generally is absent from water with more than 50 ppm.”

*Wild Rice in Wisconsin* by Fannucchi, Fannucchi and Carven similarly states that “wild rice requirements: sulfates—less than 10 ppm.” Based on this research, Minnesota established by rule a Wild Rice Standard limiting sulfates to 10 mg/L to permit wild rice to thrive. Minnesota Rule 7050.0224, subp. 2 applies to water used for

production of wild rice “during periods when the rice may be susceptible to damage by high sulfate levels.”

Various corporations proposing new sulfate releases as a result of mining projects in Northern Minnesota have proposed weakening the 10 mg/L standard due to the challenge of meeting existing State water quality standards. The U.S. Environmental Protection Agency (EPA) affirmed the application of the 10 mg/L standard where proponents of a taconite mine expansion suggested that Minnesota’s water quality standard for wild rice waters might not be applied. The EPA cautioned:

[T]he current applicable Minnesota water quality standard for sulfate in these waterbodies is 10 mg/L. The Final EIS would be strengthened by including a more detailed discussion addressing the following concerns:

- An affirmative statement that the 10 mg/L sulfate criterion is applicable for the four water bodies;
- A discussion of the past monitoring data and exceedance of the 10 mg/L sulfate standard;
- A discussion of state antidegradation rules and whether an expanded discharge of this pollutant could occur in the NPDES permit, given that the standard is already exceeded.<sup>1</sup>

The Minnesota Pollution Control Agency has already reviewed the appropriateness of weakening the sulfate standard for the PolyMet mine project, and has determined that such a change would be unsupportable. As Richard Clark explained in a communication dated February 26, 2010, MPCA staff met with PolyMet yesterday and informed them of the following:

MPCA staff has reviewed and considered the currently available information for the PolyMet project, including site specific wild rice data and water quality data. Based on the information and data received to date, MPCA staff has determined that it cannot at this time support a sulfate value other than 10 mg/L as the applicable ambient standard for waters used for the production of wild rice that may be impacted by the PolyMet project.<sup>2</sup>

The Monthly Mining Projects Status Report prepared by the MPCA in February 2010 stated;

---

<sup>1</sup> EPA Region 5 Comments, p. 7, attached to letter of Kenneth Westlake to Ralph Augustin dated January 27, 2010 regarding Draft Environmental Impact Statement, U.S. Steel Keetac Taconite Mine Expansion Project, near Keewatin in Itasca and St. Louis Counties, Minnesota EIS # 20090419.

<sup>2</sup> Email Richard Clark to Len Anderson February 26, 2010.



MPCA staff informed PolyMet and cooperating agencies of its determination that based on currently available information it cannot at this time support a sulfate value other than 10 mg/L as the applicable ambient standard for waters used for the production of wild rice that may be impacted by the proposed project. (p. 2)

Recently, in September 2010, the MPCA reiterated in their Monthly Mining Projects Status Report,

Based on the information and data received to date, MPCA staff has determined that it cannot at this time support a sulfate value other than 10 mg/L as the applicable ambient standard for waters used for the production of wild rice that may be impacted by these projects. (p. 8)

Neither federal nor state regulators believe a weakening of the Minnesota Wild Rice Standard is appropriate. Integrity in the regulatory process precludes a change in regulations to accommodate an industry unwilling or unable to control its releases and comply with standards.

#### **FIELD OBSERVATION OF WILD RICE WATERS**

According to the DNR Study of the St Louis River (John Lindgren and Nancy Schuldt) released August 29, 2006, at river mile 171 -- above the junction with the Partridge River -- the St Louis River has a sulfate concentration of only 2 mg/L and "wild rice dominates this reach."

Investigator Leonard Anderson has harvested wild rice and hunted waterfowl continuously since 1954. He, along with three other observers, paddled two canoes in the lower Partridge River and adjacent St Louis River reaches on September 16, 2009, the height of the wild rice harvest season. Below are excerpts from Mr. Anderson's findings:

Four of us paddled the lower Partridge and adjacent St Louis River reaches. Above the junction with the Partridge Rive at river mile 161, the St Louis River was full of high quality rice with several hundred waterfowl feeding and resting in the rice.

Next, we entered the lower Partridge River and searched for wild rice. There were stands there, but they were in such poor health that even though we were there to harvest wild rice, the plants were so stunted that you could not bend the stalks over the side of a canoe to harvest the grain. The plants averaged

about 10 inches in height and the color was more reddish than green. Most plants had no viable seed, but obviously with perfect substrate conditions they were able to perpetuate the stand. Not surprisingly, we saw no waterfowl there.

Data from Moyle, documented in DNR Fisheries Report No 69, April 2, 1944, showed sulfate concentrations of only .3 mg/L in the Partridge. In 2008, the Partridge had a sulfate concentration as high as 77.42; at SW-114 it has averaged 10 mg/L for the last 4 years. Recent impacts of mining have raised sulfate levels to the point that natural wild rice beds are no longer productive, but are still alive.

After noting the abundance of productive rice above river mile 161, we paddled on down the St Louis River to a take out at the highway 100 bridge. Downstream from the Partridge River the wild rice in the St Louis had the stunted and reddish and thin appearance of the rice in the Partridge. As reported by Mike Bernd and Travis Bavin of MN DNR in 2009, this reach of the St Louis River is consistently above the Wild Rice Standard of 10mg/L.

With concentrations of sulfate projected to be as high as 31.7 mg/L in the Partridge and 63.4 in the Embarrass River at closure of the PolyMet operation, the area of influence will definitely extend considerable distance down the St Louis River. In fact because of the many other sources of anthropogenic sulfates along the St Louis River, the "area of interest" for sulfates must go all the way down to Lake Superior.

Mr. Anderson concluded:

In the field observations clearly support the State Wild Rice Standard with tall productive rice teeming with waterfowl where sulfates were low and stunted unproductive rice in water contaminated with sulfates. Wild rice may survive above 10 mg/L, but it does not thrive. . . The remnant stands of wild rice in the Partridge, Embarrass and entire St Louis must be protected and with enforcement of the State Wild Rice Standard they would flourish again. Anything less would be a betrayal of the rights of us that harvest and eat this valued wild grain and the waterfowl that depend on it. (Wild Rice and Sulfates Report September 2009).

## **“SEASONAL” APPLICATION OF THE WILD RICE STANDARD**

On June 16, 2010, in an internal memorandum, the MPCA proposed a novel approach to application of the wild rice sulfate standard to Minnesota wild rice waters, suggesting that the 10 mg/L could be applied to portions of the Partridge and Embarrass Rivers impacted by the PolyMet Project from April 1 through August 31. This “seasonal” approach is both unsuitable for naturally-growing wild rice and inappropriate for the type of discharge from a sulfide mine such as the PolyMet Project.

### **Naturally-Growing Wild Rice**

WaterLegacy has not evaluated whether seasonal discharge limits might or might not be suitable for cultivated wild rice in diked paddies. However, such limits would be inadequately protective for naturally-occurring wild rice as explained in detail below.

As summarized on the Save Wild Rice web site, the cultivated wild rice industry began in the 1950's when researchers at the University of Minnesota, through cross breeding, created a variety of wild rice that could grow in a paddy and be harvested with a combine. In paddy rice production, the rice is planted in a flooded diked paddy, fertilizers, herbicides, and other chemicals are applied, the rice grows, and then when it's time for the harvest, the paddies are drained, and the paddy rice is harvested with a combine. There are approximately 25,000 acres of paddy rice in Minnesota.

(<http://www.savewildrice.org/cultivated>)

Natural wild rice is not planted, nor is it cultivated. It grows naturally on the lakes, rivers and streams of Northern Minnesota, and other parts of the Great Lakes region, and is harvested by hand, usually by canoe using a push pole and two wooden sticks. Connoisseurs of naturally-growing wild rice explain that the color, flavor and cooking time of paddy rice and natural wild rice are quite different.

(<http://www.savewildrice.org/cultivated>)

The way in which natural wild rice grows makes application of a seasonal sulfate standard unprotective. Testimony from the 1975 Minnesota Power Company hearings cited by the MPCA in their June 16, 2010 proposal states that sulfate in the water column can be deposited or transferred to sediment which can, under certain conditions (e.g. anaerobic or reducing conditions) create hydrogen sulfide known to be toxic to wild rice (Dr. Stewart). Wetlands, mud flats and vegetated shallows in rivers are likely

to have anaerobic conditions that lead to formation of hydrogen sulfide. There is consensus that stagnant water conditions would make sulfide toxicity more likely. (Dr. Grava).

Paddy rice is grown in a field that is seasonally flooded, drained, and machine re-seeded. It is not grown in natural sediment from seeds in sediment substrates. As a matter of fact, thinning of paddy rice stands is recommended to avoid sulfate conversion; in dense stands the farmed rice soils are more likely to become anaerobic.

The production practices that permit a seasonal approach to sulfate standards for paddy rice do not apply to natural beds of wild rice. Natural wild rice grows in anaerobic muck sediments, which store sulfates and chemically change sulfates to less mobile sulfides. Although water in vegetated shallows fluctuates with the seasons, it is never drained completely and thus remains generally anaerobic. Since seeds are stored in and germinate from sediment substrates in natural wild rice stands, impacts of sulfates extend throughout the year. Sulfates also impact the vigor of wild rice by reducing root mass. It makes little difference when sulfates arrive if they increase the sulfate load of the sediments. A “seasonal” standard that permitted high levels of sulfate discharge from the beginning of September through early spring would allow sulfates and sulfides to build up in sediments and adversely impact wild rice growth.

Sulfate discharged into or seeping up through stagnant water, such as fens, bogs and swamps, adjacent to or upstream from natural wild rice stands would also result in formation and storage of sulfates and sulfides. Irrespective of the time of year when sulfate is discharged, precipitation or flooding during spring and summer months could flush large amounts of accumulated sulfides into wild rice waters, with potentially devastating results.

Furthermore, ripening of natural wild rice and natural wild rice harvests extend into the fall. In many areas of Lake, Cook and St. Louis Counties, wild rice does not fully mature until early or mid-September. A “seasonal” standard that permitted high levels of sulfate discharge after August 31 could adversely affect the maturation of wild rice seed, impacting both current harvests and future natural wild rice reproduction.

### **Sulfate Releases from Sulfide Mining and Processing**

The application of a discharge schedule to an open pit sulfide mine such as the PolyMet NorthMet Project is also inappropriate and illogical. Even the small amount of

Duluth Complex rock exposed to the elements at the Dunka pit demonstrates year-round sulfate releases. Sulfate data from Dunka pit seeps do not demonstrate seasonal variations except in a couple of months in the winter when everything freezes. Most of the values range from 1000 to 2500 mg/L of sulfate.<sup>3</sup>

The Draft Environmental Impact Statement (DEIS) for the PolyMet Project makes it obvious that sulfate releases from the mine and tailings basin during and after operations will come from a variety of sources -- such as fissures in bedrock, precipitation on waste rock piles, seeps and upwelling through wetlands -- that could not be controlled seasonally. Specifically, the PolyMet Project would release sulfates into waters upstream of naturally-growing wild rice in at least the following ways:

- Rain and snow will percolate through waste rock piles flushing metals and sulfates from the rock. (DEIS, p. 4.1-69). Waste rock stockpiles have the potential to exceed groundwater criteria for sulfate for over 2,000 years. (DEIS, p. 4.1-84).
- Even if liners are applied to control drainage from more reactive materials, liner leakages will occur. (DEIS, pp. 4.1-71, 4.1-75, 4.1-76).
- Sulfates permeate to groundwater that recharges surface waters through fissures in exposed mine pit sidewalls. Acid-generating rocks are believed to comprise 65 percent of the wall rock in both the east and west pits. Mine pit blasting also produces fractures and physical weathering creates greater hydraulic permeability, increasing oxidation of sulfates. (DEIS, p. 4.1-71).
- Leachate from waste rock stockpiles after the wastewater treatment facility (WWTF) is decommissioned as well as partially treated water from the WWTF after year 20 will be discharged to and seep from the East Pit wetlands. (DEIS, p. 4-111).
- Overflow from the West Pit containing high sulfate levels will drain into wetlands and streams of the Partridge River watershed. (DEIS, pp. 4.1-114, 4.1-115).
- Existing LTVSMC tailings seeps violate water quality standards for pH and have concentrations of sulfate as high as 473 mg/L. (DEIS, p. 4.1-43, Table 4.1-30).
- Groundwater seepage from the tailings basin will exceed aquifer capacity and well up to the surface under all proposed project alternatives. (DEIS, pp. 4.1-63, 4.1-64, 4.1-149). Tailings basin seeps drain to the Embarrass River and to the headwaters of Second Creek, a tributary of the Partridge River. (DEIS, p. 4.1-63).
- The hydrometallurgical cell on the tailings basin will have very high sulfate

---

<sup>3</sup> See MPCA DMR Summary Reports for Cliffs Erie – Dunka Mining Area, NPDES/SDS Permit MN0042579, SD 005, SD 007, SD 009 for 2007 and 2008.



concentrations – over 7,300 mg/L (DEIS, p. 4.1-118). Any liner leakage would impact the Embarrass and Partridge River watersheds.

Over the duration of the mine, 394 million tons of waste rock will be excavated from the PolyMet NorthMet project. (DEIS, pp. S-5, 1-1). The mine site will remove surface runoff on 2.4 square miles draining to the Partridge River as a result of waste rock stockpiles and mine pits. (DEIS, p. 4.1-98). Given the extent of excavation and the volumes of water affected by mine dewatering and precipitation on the site, collection and discharge of all water in contact with sulfide containing rock would be infeasible and would also create a potential for catastrophic release.

Bruce Johnson, former staff at both the MPCA and the Minnesota Department of Natural Resources (MDNR), has estimated the release of leachate from waste rock stockpiles at the PolyMet site based on extensive experience with AMAX test plots and Dunka pit releases. The 394 million tons of waste rock PolyMet states they will have produced by the end of operations amounts to 53,972 tons of waste rock per day or 20 million tons of waste rock each year. (DEIS pp. 3-5, 3-6). At closure this waste rock would cover 855.9 acres. (DEIS, p. 3-17). Since the average annual precipitation for the Project area is 28.4 inches, the 855.9 acres of stockpiles for the PolyMet mine site can be expected to receive 660 million gallons of precipitation in an average year. Based on the AMAX experience where 50 to 60 percent of precipitation was released as leachate, in an *average* year, PolyMet rock stockpiles at closure would produce 330 million to 396 million gallons of leachate each year -- containing sulfides as well as heavy metals.

The rate of sulfate release from the Dunka pit stockpiles has been relatively consistent over the past 30 years, averaging approximately 1750 mg/L of sulfates.<sup>4</sup> Applying an average of 1750 mg/L sulfate and an average flow of 363 million gallons per year, by the end of operations waste rock from the PolyMet NorthMet Project would have the potential to release of 2,651 tons per year of sulfates.

Although the idea of a “seasonal” limit on sulfate discharge for a mine project upstream of natural stands of wild rice might have a superficial appeal, on closer examination it is unreasonable and unprotective. It might permit project proponents to

---

<sup>4</sup> Eger, P. and Lapakko, K, MDNR, *Environmental Leaching of Duluth Gabbro under Laboratory and Field Conditions: Oxidative Dissolution of Metal Sulfide and Silicate Minerals*, (1980), p. 196. Median average seepages from Dunka stockpiles were approximately 1250, 2500, 1500 mg/L sulfate seepages were approximately 1250, 2500, 1500 mg/l sulfate. See MPCA data for NPDES/SDS Permit MN0042579.

manipulate modeling so that an appearance of compliance is created. But, a “seasonal” limit would not consider sulfate or sulfide storage in sediment and wetlands, would not capture the risk of all seepage and other non-point source discharge from a sulfide mine project and would not protect the rare and important resource of Minnesota’s naturally-growing wild rice.

## CONCLUSION

The United States Forest Service has recognized the uniqueness of wild rice beds and the importance of preserving the remaining stands:

Wild Rice (*Zizania aquatica*) is a very valuable native aquatic plant, with high value as both wildlife and fish habitat, and for its cultural value to area tribes. Wild Rice once occurred extensively throughout much of Minnesota, northern Wisconsin and the Western U.P. of Michigan. Over time, many wild rice beds in our area have been lost. (L. Sybeldon, U.S. Forest Serv., *Success Stories, Ottawa Partners with Tribes to Restore Wild Rice*, (Sept. 9, 2007), available at <http://www.fs.fed.us/r9/ssrs/story?id=3346>.)

The Great Lakes Indian Fish and Wildlife Commission explains the ecological significance of natural wild rice, which the tribes call manoomin.

Wild rice is important in the ecology of many lakes and streams. Its nutritious seeds have long been recognized as a valuable waterfowl food. Within its core range in Minnesota and northern Wisconsin there may be no food more important to waterfowl, being readily and heavily consumed by mallards, blue-winged teal, ring-necked ducks, wood ducks and other species. Wild rice also benefits breeding waterfowl, providing roosting and loafing areas to adults, and essential brood cover for the young.

Wild rice’s other ecological contributions are often less appreciated. From the muskrat that feeds on a tender spring shoot, to the invertebrate that lives on the fall’s dying straw, wild rice benefits a wide range of species because of the food, cover, or physical structure it adds to the environment. The habitat it provides species ranging from moths to moose and snails to rails adds to the biological diversity of the wetlands where it is found.

Wild rice can also help maintain water quality by binding loose soils, tying-up nutrients and slowing winds across shallow wetlands. These factors can increase water clarity and reduce algae blooms. Wild rice is an ecological treasure. (Great Lakes Indian Fish & Wildlife Comm’n, *Wild Rice Brochure*, Exhibit F, available as of Sept.13, 2010 at [http://www.glifwc.org/publications/Wildrice\\_Brochure.pdf](http://www.glifwc.org/publications/Wildrice_Brochure.pdf))

Minnesota's Wild Rice Standard is intended to protect the ecological treasure of natural wild rice. Neither weakening the 10 mg/L standard nor the contrivance of applying it "seasonally" to naturally-growing wild rice impacted by mining projects is justifiable. Foresight, stewardship and regulatory integrity require that Minnesota's existing Wild Rice Standard be preserved and enforced year-round.

Submitted by WaterLegacy November 1, 2010

Paula Maccabee  
JUST CHANGE LAW OFFICES  
1961 Selby Ave.  
St. Paul MN 55104  
phone: 651-646-8890  
fax: 651-646-5754  
Cell: 651-775-7128  
e-mail: pmaccabee@visi.com  
Attorney for Water Legacy