Bill Newman

I am a chemist with almost four decades of experience in surface water and groundwater treatment. I am the president, owner, and founder of RNAS Remediation Products. RNAS Remediation Products manufactures and sells bioremediation products for groundwater remediation. I find it very frustrating when politics gets in the way of enforcing water quality standards, especially when effective treatment technologies are available to prevent pollution and restore impaired waters.

I think sulfate pollution from iron mining is a good example of not enforcing water quality standards that have a clear impact on the environment. When will we stop letting politics get in the way of protecting wild rice from sulfate pollution? Many of the recently listed "impaired waters" are wild rice lakes and streams that have been impacted by sulfate pollution. The Governor's Wild Rice Task Force report was a huge disappointment, because it ignored the primary source of the sulfate problem and did not include known solutions to the problem.

In contrast 2018 Tribal Wild Rice Task Force Report (attached) is an excellent resource that studies in detail the primary sources of sulfate pollution and the scientifically proven impacts to wild rice waters. While the Governor's report went out its way to avoid identifying active and closed mining operations as the source of high sulfate discharge volumes of high sulfate concentration water into wild rice waters. Table 3 of the report identified the top sixteen sulfate pollution sources by discharge volume. Of the sixteen two are domestic wastewater treatment plants with minimal impact, two are power plants with very high sulfate concentrations and volumes and the remaining twelve are mining related.

As we phase out coal fired power plants the two power plant sources will likely go away. I believe that one power plant is no longer burning coal and the second will phase out coal as well. There should be no need in the future for sulfate treatment at these power plants.

The domestic wastewater treatment plants effluents generally have much lower sulfate concentrations than mining impacted waters, and when they do have elevated sulfate concentrations the source of the sulfate in the wastewater is primarily from sulfate polluted drinking water. Household wastewaters rarely add more than 50 mg/L of sulfate to the sulfate concentrations that came from the tap. When we prevent mining pollution from impacting polluting our drinking water supply, we not only have a better-quality potable water, we also prevent the municipal wastewater sulfate pollution.

If we want to restore the impacted wild rice waters, we need to treat water in the high sulfate, high volume sources from mining impacts and power plants at the source of the pollution, not downstream. Treating sulfate where it is present in high concentrations and removing sulfur from the environment at the source is much less expensive and prevents harm to the environment farther downstream.
Other impacts of unnaturally high sulfate inputs to sediments are well documented including the release of ionic mercury, phosphate, and TOC from sediments. The release of ionic mercury and sulfate reduction in sediments promotes methyl mercury production, the toxic insult that harms wildlife and humans that eat contaminated fish. When we fail to remove sulfate pollution before it enters our aquatic environment, we are faced with the choice of not eating wild caught fish or

poisoning our children with mercury.

We need to remove the sulfur at these high concentration sulfate sources before it can enter the natural environment. Low-cost biological systems are available to remove sulfur from these source areas!

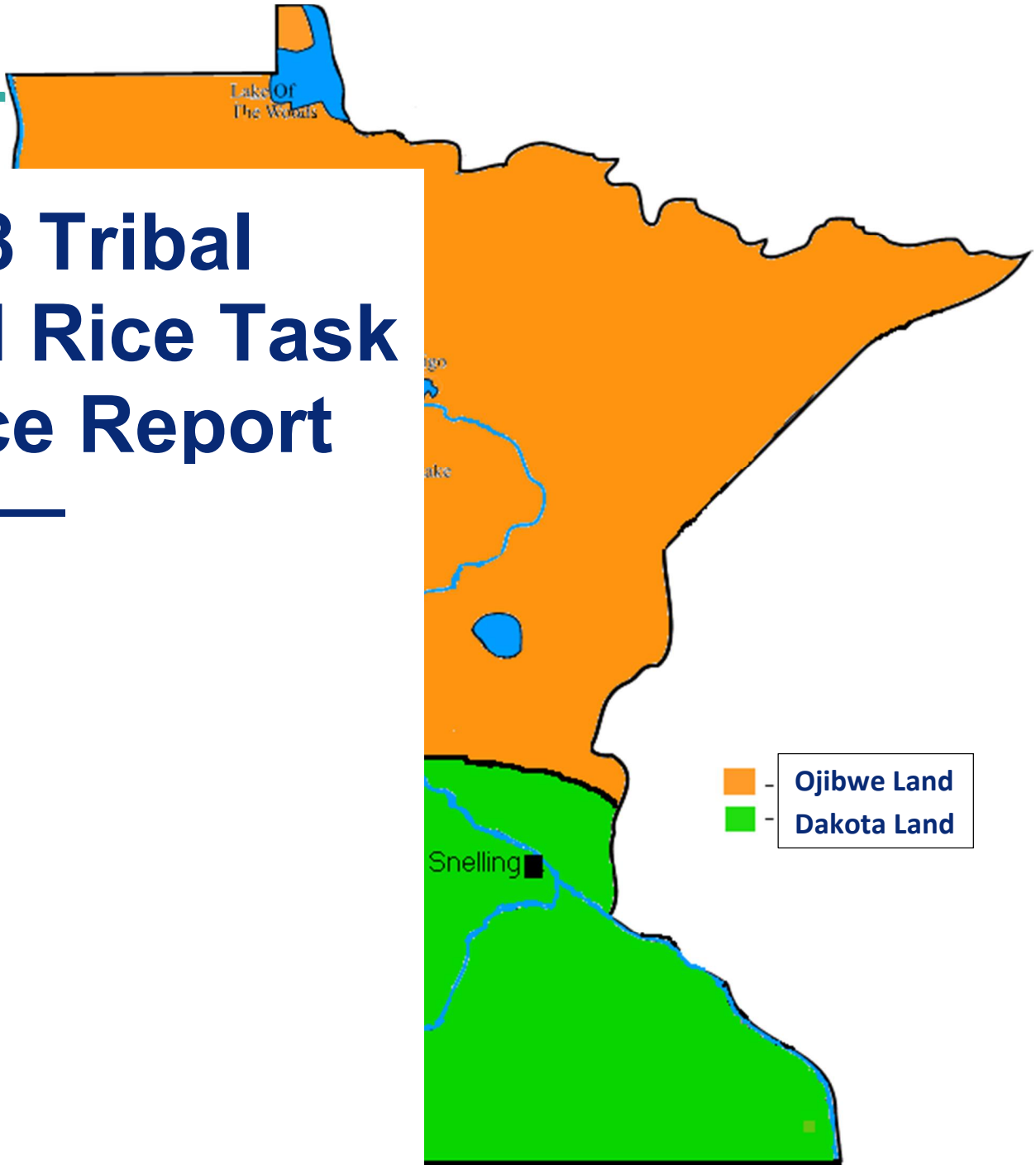
The original floating bioreactor systems were first tested at the former Erie Mine (future site of Polymet) in a mine pit lake with 1,000-1,200 mg/L sulfate. Over several years of four season operation 60%-100% sulfate reduction to sulfide (HS-) was achieved. With a relatively low pilot test flow rate a pulsed electron donor feed was used to supply ethanol and this appears to have been the cause of variable effluent quality. With a plug flow bioreactor, the pulses of ethanol resulted short-term variations in effuelent quality. When sampling effluent that was well supplied with ethanol electron donor 100% sulfate removal was achieved, between pulses of electron donor the effluent treatment could be reduced to as low as 60%.
Removal of sulfur by precipitating elemental sulfur via partial oxidation and precipitation as iron sulfide proved very effective but was more expensive than the treatment cost goals. The partial oxidation method used hydrogen peroxide and pH adjustment requiring relatively expensive chemicals. Removing sulfide as an iron sulfide precipitate was very effective, but the use of ferric or ferrous chloride as the source of soluble iron resulted in high concentrations of chloride in the treated water.

The floating bioreactor technology has been improved and patented by Clearwater BioLogic www.ClearwaterBioLogic.com. Two US Patents have been issued for this technology US-10.597.318-B2 and US-11.104.596. With a continuous feed of electron donor (ethanol/glycerin and nutrient blend) the fiber bioreactor test columns have consistently reduced sulfate to less than 10 mg/L with a ND effluent (less than 3 mg/L) observed when the columns are operated without any abrupt changes in flow or influent concentrations.

Treating the sulfide bioreactor effluent now has a low-cost solution as well. Clearwater BioLogic has developed two sulfide treatment methods that are patent pending using direct reduced iron pellets (DRI). One method uses a simple adsorption of sulfur onto the surface of the porous iron matrix. The second method second utilizes the DRI pellets in electrodes with a sacrificial anode that releases iron cations to rapidly precipitate out iron sulfide. By combining the floating bioreactor technology with the DRI treatment methods it is now possible to remove sulfate and all of sulfur from sulfate reduction at the source without adding any chemicals. This treatment method does not increase specific conductance or hardness and can potentially reduce both.

We are finally acknowledging that sulfate pollution of our wild rice waters is a serious problem. Now that we admit that they are "impaired waters" we need to plan for solutions to restore them!

2018 Tribal Wild Rice Task Force Report



DECEMBER 15TH, 2018

Prepared by the:

MINNESOTA TRIBAL WILD RICE TASK FORCE

“You will know the chosen ground has been reached when you come to a land where food grows out of the water.”

SEVEN FIRES PROPHECY

CONTENTS

EXECUTIVE SUMMARY

This report, and the creation of a Minnesota Tribal Wild Rice Task Force, serves as a response to the 40th Governor of the State of Minnesota creating a "Wild Rice Task Force" that is *disrespectful and contrary to Executive Order 13-10 …* and *directly relegates the Tribes to the status of special interest groups and industry rather than honoring Tribal sovereignty* (*Minnesota Chippewa Tribe Resolution 107-18*).

On May 30th, 2018, Governor Mark Dayton filed Executive Order 18-08 which provided for the establishment of the Governor's Task Force on Wild Rice. The Governor's Task Force on Wild Rice was charged with reviewing scientific literature to identify information related to the impacts of sulfate or other sulfur compounds or habitat conditions on wild rice, and preparing comments that addressed environmental conditions that contribute to wild rice population declines. The proposed composition of the Governor's Task Force on Wild Rice does not respect the sovereignty of the eleven federally-recognized Native American Tribes, Bands, and Communities in the State of Minnesota or the unique status of federally-recognized Tribes that have guaranteed usufructuary rights by Treaties. The proposed Governor's Task Force on Wild Rice composition does not acknowledge that Minnesota's Native American Tribes will be disproportionately affected by the loss of a usufructuary property right directly related to legislation prohibiting enforcement of existing water quality standards and the composition of the task force minimizes the technical expertise, knowledge, and interests of the Tribes.

On May 31st, 2018, the Minnesota Chippewa Tribe (MCT) responded to Executive Order 18-08 by passing resolution 82-18 and sending a correspondence to Governor Dayton informing him that the MCT would support the creation of a wild rice task force provided that each of the member reservations of the MCT be provided a separate seat on the Governor's Task Force on Wild Rice.

On June 28th, 2018, Governor Mark Dayton filed Executive Order 18-09 which amended Executive Order 18-08 and changed the composition of the task force from a representative appointed by the Minnesota Indian Affairs Council to adding a representative nominated by the four Minnesota Dakota Tribes and a representative nominated by the Red Lake Nation, but maintained only one seat available for a nomination by the six Bands of the Minnesota Chippewa Tribe. Furthermore, the proposed composition of the Governor's Task Force on Wild Rice was similar to the Minnesota Pollution Control Agency (MPCA) Wild Rice Advisory Board where during the process and through consultation, the comprehensive comments provided on behalf of the Tribes to the MPCA were generally disregarded and not incorporated into the then proposed wild rice rule.

This resulted in the Tribal Executive Committee of the MCT, comprised of the top two elected officials from each of the MCT Bands, to find that it was in the Tribes' best interest to decline/reject the Governor's offer to participate in the Governor's Task Force on Wild Rice and instead form the Minnesota Tribal Wild Rice Task Force (TWRTF). MCT Resolution 107-18 established the TWRTF which was to be comprised of, provided that such other federally-recognized tribes in Minnesota chose to participate, two representatives from each of the eleven federally-recognized tribes of Minnesota. It also served as an invitation for the other federally-recognized Native American Tribes in Minnesota to participate in gathering and reviewing information, preparing documents, and making recommendations utilizing their own expertise.

The purpose of the TWRTF is to review existing literature, including literature and information based on tradition, culture, and science, that is available to inform the understanding of the impacts of sulfate or other sulfur compounds on habitat conditions on wild rice, identify information gaps, make recommendations on priorities for wild rice research, and prepare a report with recommendations in a similar fashion to that included in Executive Orders 18-08 and 18-09, providing a report to the Governor by December 15th, 2018.

INTRODUCTION

An existing water quality standard for wild rice (10 mg/L sulfate) has been a USEPA federally recognized standard in: Minnesota since 1973, Fond du Lac Reservation since 2001, and Grand Portage Reservation since 2005. The original 1973 rule was promulgated following Minnesota's assumption of Clean Water Act authority and was based upon extensive biological surveys done by state biologist John Moyle in the 1940s. However, while this standard has largely been unenforced by state or federal agencies, the Tribes have fully implemented it. Fond du Lac and Grand Portage have both sponsored basic ecological research and research into the effects of sulfate on wild rice, beginning in 2003 and continuing today. With the concern over the impact discharges with elevated sulfate may have on impact wild rice, Tribes and environmental groups began pushing the Minnesota Pollution Control Agency (MPCA) about 15 years ago to enforce the standard. Concern was also raised from the dischargers (i.e., it would be too expensive to meet standard; is the standard the appropriate number?) who would potentially be regulated.

In 2010 the MPCA was directed by the state legislature to further evaluate the impacts of sulfate and sulfide, and determine if changes to the current standard are needed. MPCA had three goals: to revise the numeric standard to incorporate the latest scientific understanding of the impacts of sulfate; to clarify the beneficial use and which waters support the beneficial use; and to clarify what it means to meet or exceed the standard. The timeline of the process is as follows:

- **Wild Rice Advisory Committee (2011-2017)** – A group of a variety of interests (agencies, tribes, researchers, harvesters, environmental groups, industry, etc.) provided input to MPCA on the standard and scientific studies.

- **Studies (2011-2013)** – State sponsored research programs were completed including field surveys, controlled laboratory experiments, and outdoor container

experiments. Results indicated that sulfate (when converted to sulfide) impacts wild rice.

- **Peer Review Committee (2014)** – Group of independent scientists provided feedback to the MPCA on research projects and results.

- **Minnesota Chippewa Tribe letter to Governor Dayton (2014)** – The letter addressed concerns regarding the definition of "waters used for the production of wild rice" and water quality standards pertinent to wild rice.

- **Legislative Rules (2015, 2016, 2017)** – Rules were passed prohibiting MPCA from identifying impaired wild rice waters and enforcing the existing 10 mg/L wild rice sulfate standard, until a revised rule would take effect. These actions unduly restricted MPCA's regulatory authority, leaving them vulnerable to losing their delegated National Pollutant Discharge Elimination System (NPDES) authority according to the USEPA.

- **MPCA issues proposed rule (2017)** – Instead of the current standard of 10 mg/L sulfate, the proposal was for an equation-based standard (depending on the amount of sulfate, iron, and organic carbon in a system). A unique sulfate standard would be calculated and developed for each system where it applies. A partial list of known wild rice waters, to which the standard would apply, was also published in the revised rule.

- **Minnesota Indian Affairs Council letter to MPCA Commissioner Stine (2017)** – The letter highlighted the deficiencies of MPCA's proposed rule revisions for Minnesota's sulfate standard to protect wild rice.

- **Administrative Law Rudge rulings (2018)** – In January 2018, a report from the Administrative Law Judge was issued disapproving MPCA's repeal of the existing standard and replacing it with the agency's proposed rule revisions. The MPCA asked the judge to reconsider, but the Chief Administrative Law Judge's Order on Review issued in April 2018 confirmed the earlier decision to disapprove MPCA's approach to changing the standard. Some key points of the decision were:

  1) MPCA failed to establish the reasonableness of the repeal of the existing 10 mg/L sulfate standard, and the repeal conflicted with state and federal

statute; 2) the proposed equation-based standard failed to meet the definition of a rule under Minnesota statute, was not rationally related to the MPCA's objective, and was unconstitutionally void for vagueness; 3) the proposed list of wild rice waters was deficient, as it violated federal statutes; 4) the Agency failed to establish need or reasonableness, specifically related to the limited list of wild rice waters that are provided additional protection under narrative standard, in violation of state statute.

- **MPCA withdraws rule (2018)** – Proposed changes to the wild rice sulfate standard were withdrawn by MPCA in May 2018. The existing standard of 10 mg/L sulfate remains in place with legislative restrictions of 2015, 2016 and 2017.

- **Proposed legislation, vetoes, and executive order (2018)** – Attempts were made in the legislature to pass bills removing the existing standard, but the governor vetoed the proposed legislation twice (May 9th letter to Speaker of the House and May 30th letter to Speaker of the House). In May 2018, the governor issued Executive Order 18-08 which established a task force to further evaluate the standard and issue a report by December 15th, 2018. The order also states that no existing permitted facility will be required to install unaffordable equipment to meet existing sulfate standard.

- **Minnesota Chippewa Tribe Resolution 82-18 and letter to Governor Dayton (2018)** – The letter supported the creation of the wild rice task force provided that each member reservation of the Minnesota Chippewa Tribe be provided a seat on the Governor's task force.

- **Letter from Governor Dayton to Minnesota Tribal Leaders (2018)** – Amendments to be made to Executive Order 18-08 were outlined, which included adding one seat for the four Minnesota Dakota Tribes and one seat for the Red Lake Nation, but maintained the one seat for the six Bands of the Minnesota Chippewa Tribe.

- **Governor Dayton issues Executive Order 18-09 (2018)** – This amended Executive Order 18-08 as described in the governor's letter to the Minnesota Tribal Leaders.

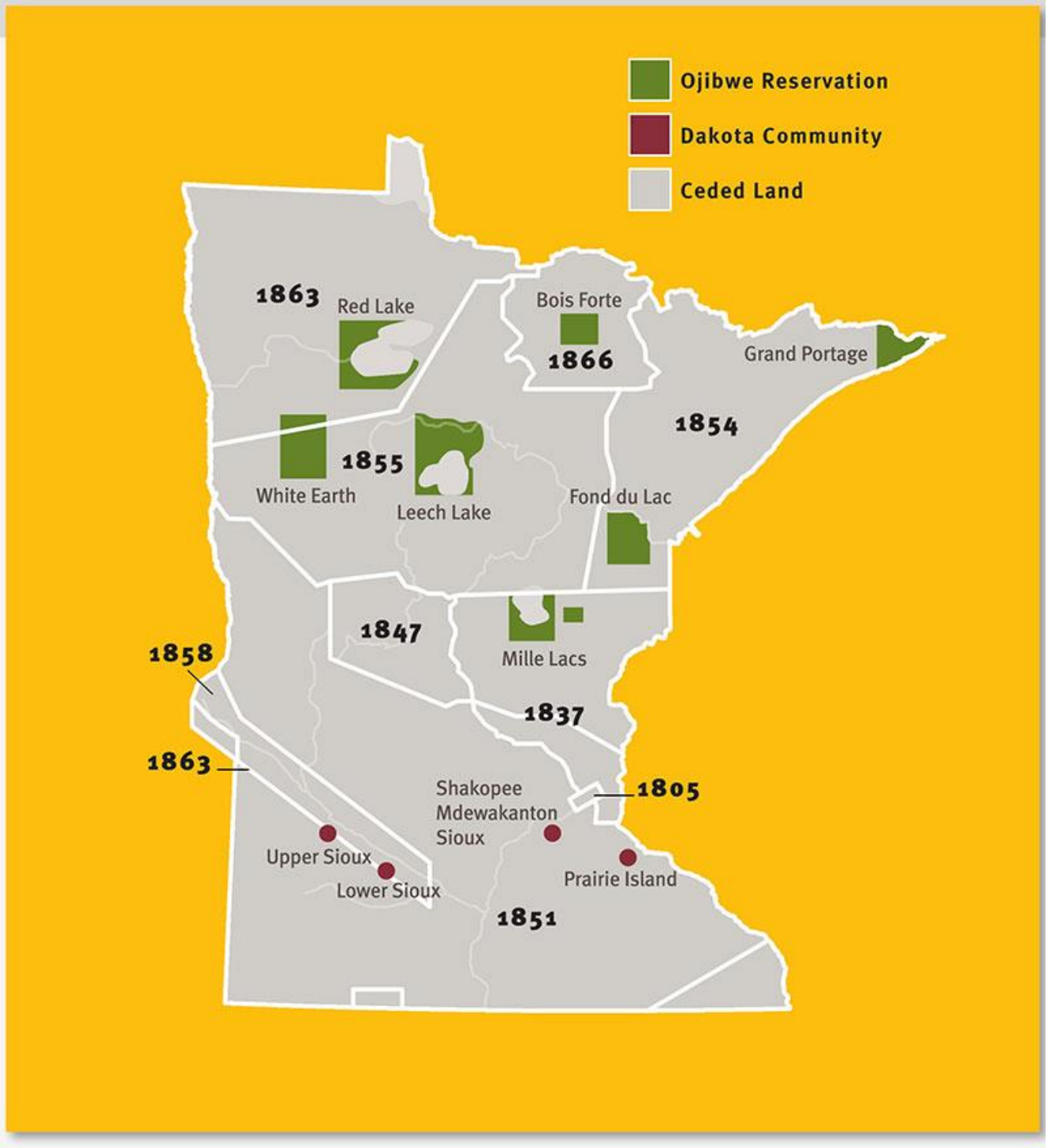
- **Minnesota Chippewa Tribe letter to Governor Dayton (2018)** – This letter respectfully explained the reason for declining the offer to serve on the Governor's Task Force on Wild Rice and subsequently the creation of the Tribal Wild Rice Task Force by the federally-recognized sovereign nations of Minnesota. Furthermore, it stated that the Minnesota Chippewa Tribe will only participate in government-to-government consultation in order to strengthen the relationship between the State and the Tribe, and to ensure that Executive Order 13-10 is implemented properly.

- **Tribal Wild Rice Task Force (2018)** – The formation of the Governor's Task Force on Wild Rice did not allow representation by all tribes in Minnesota. Tribes found this unacceptable as each is a sovereign government and must necessarily represent themselves. In August 2018, the Minnesota Chippewa Tribe passed resolution 107-18 creating a Tribal Wild Rice Task Force charged with developing its own report and recommendations, and communicated its intent by letter to the Governor of Minnesota.

- **Fond du Lac Revised Water Quality Standards (2018)** – In September 2018, Fond du Lac published notice of their revised water quality standards for public comment under their federal Clean Water Act authority. The Band is proposing to maintain their 10 mg/L sulfate standard, as recent research has confirmed it is scientifically defensible, and adding protective narrative standards for wild rice waters.

Tribes did remain engaged with the MPCA throughout the process outlined above. Staff representing some, but not all, Minnesota tribes participated as members of the Wild Rice Advisory Committee. In addition, the MPCA did make efforts to hold additional consultation with all tribes indicating interest, including several Ojibwe Bands from Wisconsin. This consultation did include formal government-to-government meetings and more informal staff-to-staff communications. But despite this involvement and consultation, tribal expertise has not been reflected in the state's policies or rulemaking for wild rice. Tribes have put forth considerable effort in information sharing and commenting, yet most key thoughts and concerns have not been addressed to date. This report reiterates many of the previous concerns. We ask that state and federal regulating agencies meet their responsibilities and work with tribes to protect and maintain natural stands of wild rice for future generations.

Ojibwe Reservations/Dakota Communities and Treaty-Ceded Territories



Cultural Context

The third of seven prophets came to the Anishinaabe people more than one thousand years ago and told them to head west to their chosen land. When they found "the food that grows out of the water," they would know they were home, and this sacred food would feed their families' bodies and souls for generations to come. This journey is at the core of the Ojibwe migration story, and the sacred food at the center of their cultural identity, spiritual traditions, and physical well-being is manoomin (Ojibwe word for wild rice). To the many bands of Ojibwe people who have made their homes for centuries around the lakes of Minnesota, manoomin is far more than a crop or a staple food. It is a sacred symbol that represents their journey, their relationship to the land that sustains them, and their very identity as Ojibwe people. Anishinaabe people live by the philosophy "that if we care for the nibi (Ojibwe word for water) and manoomin, the manoomin will care for us".

While Ojibwe or Anishinaabeg historic and cultural connections to wild rice have been communicated to the public through various media, many people are surprised to learn that ricing also has deep roots in Dakota history. Dakota people used to travel without boundaries around the land which is now the state of Minnesota. Psiŋ (Dakota word for wild rice) was abundant across the state, including in southern Minnesota. Lakes and rivers were clean enough for psiŋ growth then, with unaltered hydrology.

Dakota people were ricing long before the Ojibwe's prophecy relocated them to the Dakota homelands. Dakota people shared their ricing traditions with the Ojibwe, and these traditional harvest and parching methods are those still used by the native communities today. The settlement era influenced the placement of Dakota people in the southern reaches of Minnesota along the Minnesota and Mississippi Rivers. Dakota people have harvested psiŋ both when it was in the territory they occupied, and when it was in "contested territory" or the middle section of Minnesota that was then a war zone where people weren't allowed to camp. That territory was often hunted and harvested by both peoples' groups.

Four Dakota communities now reside in the southern half of Minnesota, with Prairie Island Indian Community lands located along the Mississippi River near Red Wing, Shakopee Mdewakanton Sioux Community located just off the Mississippi River near Prior Lake in Shakopee, and Lower Sioux Indian Community & Upper Sioux Indian Community residing in the Minnesota River valley.

According to Jenks (1901) and many oral history accounts, manoomin/psiŋ used to grow along the reaches of the Mississippi and Minnesota Rivers, as well as the St. Louis river basin. Deloria (1967) gives an account of people in the Red Wing area gathering psiŋ, along with places specifically near Sakpe (now Shakopee) and St. Paul. Oral history tells us Dakota people gathered psiŋ for sustenance along the Mississippi River and backwater lakes on down to Lake Pepin. Psiŋ sustains the Dakota culture to this day, but there is hardship being that psiŋ no longer grows with the same abundance it once did along these rivers.

The Dakota custom of harvesting psiŋ has never stopped since a time immemorial. However, Dakota people now have to travel much farther to reach areas where psiŋ is appropriately abundant for harvest. For many, this means traveling to another Tribe up north because psiŋ has been removed for so long from Dakota people's current place of residence that the tradition surrounding an annual harvest has been lost. Psiŋ is still deeply embedded in Dakota culture as is evident in ceremonies, gifts, diet, and traditions carried down for generations. The Dakota communities today are working to restore the rice that was once there, and bring back this nutritious resource to their own lands.

This very brief history of the Dakota people tells of a broken connection with something that was abundant in their homelands and is no longer. The Dakota nations must rely on their relatives in the northern half of the state to supply manoomin/psiŋ for restoration seeding, for consumption, and for ceremonies. May this history show us clearly that Minnesotans need to prevent the loss of any more rice in northern regions of Minnesota where manoomin/psiŋ still grows in its native range. Manoomin/Psiŋ is health and life to tribal culture both for the Ojibwe and Dakota people.

Minnesota tribes entered into treaties with the United States in the 1800's to reserve hunting, fishing, and gathering rights in the lands and waters ceded to the United States. The exercise of these rights is fundamental to tribes' cultures and ways of life and maintains religious, ceremonial, medicinal, subsistence, and economic needs.

Every federal agency has a responsibility to these tribes and their treaty rights, and this extends to the protection of the habitats and environmental quality that sustain manoomin/psiŋ. The recognition of sovereign rights is part of any given tribes' ongoing struggle to preserve a culture that is best understood in terms of their relationship with the natural environment. Tribal members continue to harvest and rely upon manoomin/psiŋ for religious purposes including naming ceremonies, funerals, Midewiwin ceremonies, and various seasonal feasts.

These activities are critical components in perpetuating Anishinaabeg/Dakota lifeways and cultural practices. Anishinaabeg/Dakota spiritual beliefs mandate the use of certain plants, animals, and fish in ceremonies attendant to hunting, fishing, and gathering activities. These ceremonies ensure the perpetuation of the resources and the physical, mental, and spiritual well-being of the person. Tribal leaders have noted that elders in their communities reaffirmed the position that traditional foods, including manoomin/psiŋ, are medicine for Anishinaabe and Dakota people. Today, tribes experience higher than average rates of diseases such as diabetes and heart disease. Much of the current state of Native American health can be traced back to historical practices that have displaced tribes and limited access to healthy and traditional foods, such as manoomin/psiŋ. Many tribes are dependent upon manoomin/psiŋ for subsistence needs.

Many Native Americans eat manoomin/psiŋ at least once a month, though historically this rate was much higher. Survey results show that manoomin/psiŋ is the most commonly consumed traditional food, and Native Americans wish to eat it more often. The annual hand-harvest on Minnesota lakes and rivers is a cherished ritual that preserves time-honored traditions and builds tribal community.

Harvesting rice by hand is part of a deeply held belief that this wild gift from the Creator, and the land that sustains it, should be treated with respect and gratitude rather than cultivated and exploited. Hand-harvested rice is frequently offered as gifts and is used as an offering in spiritual ceremonies and funerals.

Health and Subsistence

Despite its cultural significance, Minnesota tribes have experienced challenges in documenting and publicizing the impacts to community health, social cohesion, and access to healthy food that they bear as wild rice resources are being degraded and diminished. The Fond du Lac Band attempted to bring these health and cultural inequities to light in a Health Impact Assessment or HIA, and to clearly and simply articulate the importance of manoomin to the health of the Ojibwe people. This HIA explored historical trauma, grave disparities in health outcomes and access to health care, and socioeconomic inequities (social determinants of health) that shape the lives of traditional people in a modern world. It highlighted the need to protect and support resilient cultural and spiritual practices that connect people to their ancestors, their identity, and future generations. The practices of harvesting, processing, eating, sharing and gifting manoomin; the language associated with these practices and ceremonies that celebrate manoomin are central to the health of tribal communities.

From *Expanding the Narrative of Tribal Health: The Effects of Wild Rice Water Quality Rule Changes on Tribal Health* (Fond du Lac Health Impact Assessment 2018):

> "Food sovereignty is the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and the right to define their own food and agricultural systems… Harvesting what is naturally occurring and compatible with one's own environment is a key component. When people harvest, process, prepare and serve native foods, they build strong relationships with the land and with each other… The establishment of reservations limited access to traditional foods and replaced them with less nutritious, more expensive store-bought foods, leading to nutritional deficiencies and food insecurity that Native Americans experience today…

A history of displacing tribes and limiting access to traditional foods like manoomin has had profoundly negative and persistent impacts to Native American health and well-being."

To address these health disparities, Prairie Island Indian Community (PIIC) has initiated a movement of food sovereignty in the community. In 2017, PIIC conducted a Food Sovereignty Assessment which strongly revealed a desire by the community to increase the availability, harvesting opportunities and consumption of local psiŋ. PIIC community members classified psiŋ as one of the top five "food(s) that you need or would like to eat that are difficult to get, or are not available, in your community" (Community Assessment Report, 2017). In addition, out of the 75 respondents, 88% felt that "health issues (such as diabetes, heart disease, and obesity) in our community are related to food and diet" and 82% felt that "health issues would improve with access to traditional foods" (Community Assessment Report 2017). This puts a high importance on increasing access to indigenous foods like psiŋ for the health of the community.

Also in the 2017 Food Sovereignty Assessment, the following comments relating to psiŋ were provided in response to the question "if you could tell your tribal or community leaders anything about food and hunger issues in your community, what would you tell them?"

- We need to utilize our land to grow our own foods
- Food is healthcare
- Reconnecting with our land is important to food issues
- Increasing access to traditional foods in order to teach about them
- Providing better access to healthier, fresher food in order to provide people with options
- Becoming as self-sufficient as possible would benefit our community greatly
- More people would eat healthier if they had better access to healthier food
- We need to introduce more traditional foods into community events

A movement in bringing back cultural traditions surrounding wild rice is also taking place at PIIC as multiple educational community events have been happening each year since 2015.
These events, in addition to continued tribal community involvement in psiŋ restoration efforts, include harvesting field-trips, parching, push-poling, and cooking classes.

Similarly to PIIC, the Lower Sioux Indian Community is addressing concerns on food sovereignty. The 'Honoring Little Crow through Healthy and Indigenous Foods Initiative' resolution was adopted by the Lower Sioux Tribal Council in 2016. This policy was developed to implement a system change to increase visibility of and access to healthier indigenous food and beverage choices to support a healthy Lower Sioux Community. Results from the Community's 2018 Food Sovereignty Assessment found that almost half of the respondents considered wild rice the top choice of traditional foods. However, nearly 75% of the respondents stated that they are not able to eat traditional foods as often as they would like. The Lower Sioux Office of the Environment is working on wild rice restoration efforts at four trial sites within the Community (initial seeding in 2015). During the same time, Lower Sioux Recreation department has provided trips during wild rice harvesting season so the Dakota Youth are able to experience ricing "Up North".

Ecology

Wild rice (genus Zizania) is an annual grass that grows in shallow water and slow-flowing streams and produces an edible grain. It is native to Minnesota and can be found in 55 counties in the northern region of the state and few in the southern region, though its range once covered the entire state. Current coverage of wild rice has declined to at least 64,000 acres when growing conditions are favorable.

A fast-growing, aquatic grass, it sustains both migratory and local wildlife, providing critical food and shelter at every stage of its growth and throughout all four seasons. Migrating and resident species alike rely on the plant's nutritious and abundant seeds. In the fall, many species of duck rely on wild rice as a staple food source.

Plant stems provide brood cover for waterfowl and nesting material for species such as common loons, red-necked grebes, and muskrats. Insect larvae that feed on wild rice serve as a rich food source for blackbirds, bobolinks, rails, and wrens. In the spring, decaying rice straw supports a diverse community of invertebrates that in turn supports birds, fish, and amphibians. In the summer, the whole plant provides food for herbivores like Canada geese, trumpeter swans, muskrats, beavers, white-tailed deer, and moose. In the late summer, wild rice provides cover for molting waterfowl and their young. Due to the plant's diverse ecological value, wild rice lakes and streams serve as breeding and nesting areas for at least 17 species listed as "species of greatest conservation need" on MNDNR's Comprehensive Wildlife Conservation Strategy. As an aquatic plant, it also provides habitat for fish. Wild rice provides additional ecological values by improving the quality of ecosystems, allowing for increased ecosystem function. By sequestering nutrients such as phosphorous and nitrogen, wild rice enriches soils while countering the negative effects of nutrient loading in water bodies that can cause algal growth and turbidity. Stands of wild rice form windbreaks and slow water velocity, limiting the mixing of soil nutrients into the water column. They also prevent erosion by stabilizing loose soils.

Management and Restoration

The Stoney Brook watershed encompasses over half of the Fond du Lac Reservation in northeastern Minnesota, at 59,248 acres, and its headwaters include the Reservation's premier wild rice lakes, designated as "Outstanding Reservation Resource Waters" in the Band's federally-approved Water Quality Standards. The watershed was extensively ditched under judicial order in the early 1900's to drain wetlands and open up acreage for crop agriculture, facilitate development, and encourage non-tribal settlement on tribal lands. But the substantial hydro-modification of this ditch system persists, and has resulted in detrimental fluctuating water levels in the wild rice lakes and significant stream and riparian habitat impairment throughout the watershed.

Because of the altered drainage, water level fluctuations in the wild rice lakes, perhaps the single most critical factor affecting natural wild rice productivity, are difficult to moderate during storm events.

Wetlands have been fragmented, and while the direction and flow of shallow ground water between the wild rice lakes is not well understood, it has likely been impacted by the ditch system. The ditch system, which was excavated between 1916 and 1921, lowered the lake levels on Perch, Jaskari, Rice Portage, Miller, and Deadfish Lakes. The total area of these five wild rice lakes prior to the excavation of the drainage ditches was 1,617 acres. The partial drainage of the lakes resulted in the loss of 850 acres of wild rice habitat to competing vegetation such as cattail, pickerel weed, water lily, sedge and horsetail.

The Fond du Lac Band is very committed to protecting, managing and restoring their wild rice lakes. Tribal leadership has expended considerable resources on the restoration of critical habitat on these wild rice lakes, and has directed the Fond du Lac Natural Resources Program (NRP) to manage and restore the wild rice lakes. Over the past twenty years the NRP has planned and implemented projects to accomplish this goal. A series of four water control structures were built to manage water levels for optimizing wild rice growth, and to restore the lakes to their historical size. Restoring lake levels and proper water level management will help the remnant wild rice stands thrive, but lake level management alone cannot restore wild rice in the areas choked with competing vegetation. The restoration of open water habitat favorable for wild rice requires the mechanical removal of many acres of vegetation with a large sedge mat cutter and two aquatic weed harvesters. The benefits from restoring the wild rice lakes include improved wildlife habitat, especially for waterfowl, in addition to providing wild rice for harvesting.

The topography of the White Earth Reservation varies greatly throughout its boundaries and ranges from prairie pothole, transition zones to forests. The landscape supports over sixty-eight thousand acres of surface waters and over three hundred miles of rivers and streams across three watersheds. The soils also range from loam, heavy clay to sandy. Within these zones a multitude of land uses occur, including agriculture. As agriculture practices increase so does the use of fertilizers, pesticides and herbicides, resulting in negative impacts to surface waters and aquatic life including wild rice.

With the added stress of runoff, sedimentation, lack of adequate surface water buffers and accumulation of sulfate, aquatic life is in dire need of protections.

In 1938 the U.S. Army Corps of Engineers built Lock and Dam 3, located in Red Wing, MN, creating Pool 3 of the Mississippi where the Prairie Island Indian Community (PIIC) now resides. The desire to create better shipping lanes along the Mississippi brought about the installation of lock and dams and a 9 foot deep shipping channel along the length of the river. Pool 3 contains both Sturgeon and North Lake, where psiŋ originally grew. The implementation of the lock and dam system drastically changed the function of the river. It created better shipping lanes, but also flooded much of PIIC land. The flooding from the dam increased the size of Sturgeon Lake and North Lake, greatly expanding the backwater areas of the Mississippi. Many isolated lakes and large expanses of marshland important to fish, waterfowl, plants, and other native wildlife were lost. These hydrology changes are thought to be a large reason why psiŋ beds shrank or were extirpated on the Mississippi in the years following the installment of the dams.

PIIC has been working to re-establish psiŋ since 2003 in the Mississippi backwaters and wetlands of Tribal land with a goal to restore 30 acres of wild rice beds. PIIC land sits on about 2,200 acres of backwater lakes, with a band of emergent plants and wetlands encompassing large portions of the Island. PIIC's restoration process includes planting psiŋ in areas of potential growth. Psiŋ is an annual plant, so if flooding prevents growth one year it is not able to re-seed itself for the following year – creating a challenge in the growth cycle. Stocking up a seed bank aids the rice in adapting to its environment, as some rice seed will remain dormant for a number of years before growing. The Land & Environment Department organizes follow-up aquatic plant surveys and appropriate seeding each year to document this re-establishment effort for the Tribe. There have been several years of psiŋ growth on PIIC; 2013, 2015, 2017 being three recent years marking dense rice beds and full growth. Even so, the restored psiŋ beds have totaled just over 7 acres in size and continue to struggle due to extreme spring flooding events. Clearly, there is still more work to be done in restoration on PIIC lands.

Economic Importance, Past and Present

In assessing the importance of manoomin/psiŋ to tribal economies, it is important not to limit the benefit metrics to job and income measures. In regard to tribal manoomin harvests, sales of a portion of the harvest are often used to supplement subsistence (i.e. selling a portion of the manoomin harvest to cover costs for gasoline and other expenses enables tribal members to participate in subsistence activities and provide food for their extended families). Because tribes were forced to participate in a western cash economy by European settlement, and manoomin has been appropriated as a commodity, it has since become a source of material wealth and economic survival for the Ojibwe as well. However, the traditional role of manoomin/psiŋ is still clear today.

Historically, wild rice was the most important grain in Minnesota's economy. Because it was a dietary staple, easily stored for long periods of time, and easy to use, it held considerable economic value for native people and early explorers and settlers. Although other grains became common over time as they were introduced to Minnesota by immigrants, wild rice continued to be popular. Records of state license sales going back to the 1950s clearly show the enduring popularity and value of wild rice. More than 300,000 licenses have been sold since 1957.

Prior to 1970, Minnesota provided half of the global market supply of wild rice; most of which was from hand-harvested natural stands. As cultivation of wild rice increased, by 1990, natural hand-harvested wild rice in Minnesota accounted for less than 10% of the global supply of wild rice. Yet, hand-harvested wild rice remains a vital part of the state's tribal and local economies. In fact, the largest part of the economy revolving around wild rice is the "underground" economy. Much of people's manoomin harvest is gifted or traded and is never tracked in any organized fashion. There is very little accounting or tracking related to wild rice sales, spending, or harvest. Yet, aside from the cultural importance of the activities, this barter and trade system is also important to the economic wellbeing of harvesters by reducing food costs and improving food security.

As part of the Health Impact Assessment, Fond du Lac worked with Earth Economics to develop an economic benefits analysis describing the impact of seasonal manoomin harvest to the tribal and state economies. This analysis estimated impacts on economic activity, food security, and public health, and then estimated changes in those impacts as a result of potential decreases in wild rice productivity and abundance. While the report was not intended to establish any monetary value to the cultural significance of manoomin, recognizing that these values are beyond economic measure, it did make a strong economic case for protecting manoomin and thereby preserving these benefits for future generations.

The effects of wild rice harvesting ripple throughout the economy in obvious and less obvious ways. Some harvesters sell a portion of the wild rice they gather for obvious economic gain. But additional contributions stem from the costs to undertake harvesting, such as gas, drying tarps, or canoes. Those expenditures support other sectors in the Minnesota economy, like retail and service. Wild rice also supports the Minnesota economy in other, less obvious ways. Conservation agencies, tribes, and other groups and organizations invest enormous amounts of money in ecosystem restoration projects that rely on native wild rice as an important plant; and due to their magnetism for waterfowl, wild rice waters serve as popular hunting grounds.

According to the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, waterfowl hunters contributed more than 43 million dollars ($43,000,000) to the Minnesota economy. Although hunting numbers on wild rice waters are currently unknown, Ducks Unlimited suggests that no other habitat sees such high concentrations of waterfowl. The shared value that so many Minnesotans place on wild rice habitat is reflected by the widespread efforts of hunting clubs, private citizens, and conservation groups to seed and expand it.

SUPPORTING EVIDENCE OF SULFATE/SULFIDE IMPACTS AND THE NEED TO PROTECT WILD RICE

Hydroponic studies – John Pastor

Dr. Pastor investigated the effects of sulfate and sulfide on the life cycle of wild rice in hydroponic solutions. Sulfate itself had no effect on seed germination or juvenile seedling growth and development, but sulfide greatly reduced juvenile seedling growth and development. The hydroponic experiments demonstrated that the adverse effects to wild rice are an indirect result from sulfide (formed in the low oxygen sediments of mesocosms and natural wild rice ecosystems), not a direct effect of the sulfate.

Mesocosm studies – John Pastor

In outdoor mesocosms (experimental systems that mimic natural ecosystems under controlled conditions), sulfate additions to the water increased sulfide production in the sediments. Wild rice seedling emergence, seedling survival, biomass growth, viable seed production, and seed mass all declined with increasing sulfate concentrations. These adverse effects are a result of the toxicity of the sulfide formed, and the decline in wild rice survival and growth grew steeper over the course of this multi-year experiment. Wild rice grown in mesocosms with higher sulfate concentrations went extinct, at progressively lower concentrations over time. After eight growing seasons of experimental sulfate additions, only the mesocosms with sulfate concentrations of 50 mg/L and the control (no sulfate additions) mesocosms still have wild rice growing and reproducing. This line of research essentially confirms the earlier research by a state biologist, who originally observed that no large populations of wild rice occurs in waters that exceed 10 mg/L sulfate, and wild rice stands are uncommon or absent where sulfate exceeds 50 mg/L.

Iron sulfide formation on roots – Sophia LaFond-Hudson

During the onset of seed production, wild rice root surfaces grown under experimental sulfate-amended treatments developed black iron sulfide plaques on their root surfaces, replacing the typical orange iron hydroxide plaques seen in natural ecosystems and control mesocosms (without sulfate amendments). Iron hydroxides are thought to protect aquatic plants from toxic substances such as sulfide by providing an oxidized barrier around the roots. After these iron sulfide plaques formed on the roots, the wild rice plants ceased uptake of nitrogen, during a point in their life cycle where nitrogen is needed to form seeds. This observed phenomenon may explain the mechanism by which sulfate reduction to sulfide affects seed production and seed biomass, contributing to the decline and extinction of wild rice populations exposed to higher sulfate over time.

Field studies – Amy Myrbo

Comprehensive field surveys led by Dr. Amy Myrbo as part of the state's research program characterized 64 chemical and physical variables over 100 sites across Minnesota. Analysis of the data concluded that, while water temperature and water transparency controlled the suitability of habitat for wild rice, the sulfide in sediment pore water, generated by microbial reduction of sulfate, is the primary control of wild rice occurrence. Anaerobic microbes in lake and river sediments make sulfide from sulfate in the overlying water, and waterbodies that have high concentrations of dissolved sulfide in the sediment have a low probability of hosting wild rice. This research confirms the earlier research by a state biologist, who originally observed that no large populations of wild rice occur in waters that exceed 10 mg/L sulfate, and wild rice stands are uncommon or absent where sulfate exceeds 50 mg/L.

Rooting zone geochemistry – Nate Johnson

Dr. Johnson collected and analyzed rooting zone depth profiles in the experimental mesocosms (Pastor studies) and field sites (Myrbo surveys) to characterize sulfate, sulfide and iron in the rooting zone of wild rice plants. In the mesocosms, a portion of each tank was isolated from plant roots with a sheet of Plexiglass in order to assess the effect of wild rice roots on porewater chemistry (oxidation or reduction). “Peepers” (porewater sensors) were deployed in the plant-free and planted sections of selected mesocosms, and in two field sites where sulfate was elevated (Second Creek, Sandy Lake). He observed a consistent reduction in porewater sulfate as summer progressed, while sulfide increased and was highest just below the sediment-water interface. Lower sulfide concentrations deeper in the sediment layer are likely a result of precipitation with ferrous iron, which had higher concentrations in the deeper sediments, but decreased over the summer season. There was no consistent difference in the porewater of the plant and plant-free portions of the mesocosms, although there were clear differences among the sulfate treatment concentrations.

Temperature dependent diffusion rates of sulfate – Nate Johnson

Dr. Johnson conducted a sediment incubation study to explore the effect that ambient air temperature has on the rate that elevated sulfate concentrations in the water column are converted in the underlying sediment to sulfide, and later release sulfate back into the overlying water. This study was intended to inform whether the seasonal application of the existing sulfate standard was protective (only control sulfate discharges during the growing season). Porewater sulfate decreased over time, as it was reduced to solid-phase sulfide, in both temperature treatments (4.5^{o} C and 23^{o} C), although at a slower rate in the cold treatment; that sulfate reduction rate was calculated, and consistent with observed rates in other studies.

Twin Lakes Monitoring Case Study

A monitoring program has been completed in 2010-2018 at Sandy Lake and Little Sandy Lake. The 1854 Treaty Authority completed the work in support of the Bois Forte Band, and in some years also in cooperation with the United States Steel Corporation. Sandy Lake and Little Sandy Lake, also known locally as the Twin Lakes, historically have produced good stands of wild rice. Wild rice harvesters utilized the lakes when suitable beds for harvest were present, including a history of use by tribal members.

A lake survey in 1966 indicated moderately dense to dense stands covering both lakes. Rice production generally declined through the 1970s and 1980s, with little or no rice found in the lakes during a 1987 survey. Rice production has since remained poor to nearly non-existent. The lakes are located downstream of the tailings basin at the U.S. Steel Minntac iron ore operation. Construction of the tailings basin began in 1966, and the resulting changes to the system have impacted wild rice in the Twin Lakes. Monitoring activities were completed in 2010-2018 to document conditions in the lakes and have included water depth recording, inlet and outlet field surveys, water sampling, vegetation surveys, and aerial surveys.

Under another initiative in 2013, lake sediment cores were collected by University of Minnesota researchers to investigate the historical sulfur inputs to Little Sandy Lake. Their analysis found a significant increase in sulfur counts in only the uppermost 10cm of the sediment core which corresponds with the development and operation of the Minntac mine and tailings basin. This increase in sulfur corresponds with the decline in manoomin. The report “Reconstructing Past Sulfur Loading and Wild Rice Abundance in Little Sandy Lake” summarizes the techniques and findings of their investigation.

Four water sampling locations have been established at the Twin Lakes in a downstream order: at the inlet to Little Sandy Lake, near the center of Little Sandy Lake, near the center of Sandy Lake, and at the outlet of Sandy Lake.
If focusing at water quality entering the lakes from the tailings basin at the inlet to Little Sandy Lake, sulfate has remained well elevated beyond the current standard of 10 mg/L.

Sulfate Concentration at Inlet to Twin Lakes

	Average Sulfate (mg/L)	Sulfate Range (mg/L)
2010	**483**	**360-661**
2011	**357**	**208-561**
2012	**207**	**137-275**
2013	**355**	**215-650**
2014	**301**	**180-419**
2015	**460**	**386-590**
2016	**289**	**217-347**
2017	**379**	**251-589**
2018	**300**	**198-489**

During the monitoring time period of 2010-2018, natural wild rice presence in the lakes has been limited. In general, wild rice has not been observed or a few individual stalks in Little Sandy Lake. In Sandy Lake, sparse stalks of rice have been observed in a few locations. The report *"Sandy Lake and Little Sandy Lake Monitoring (2010-2017)"* referenced in the Appendix summarizes information from the monitoring program. A summary report including information from 2018 has not been completed to date.

Lists of Wild Rice Waters

A piece of the wild rice water quality standard includes a definition of what is a wild rice water. A list of wild rice waters is critical to understand where a numeric water quality standard would apply and be implemented by the state of Minnesota. This list is necessary for treaty areas, but it does not include waters within tribal boundaries. Waters within tribal boundaries are up to the individual Tribes to manage and regulate.

In addition to scientifically determining what is the numeric wild rice water quality standard, it is critical to understand where it would apply. The MPCA was directed by the legislature to answer an important question: what is a wild rice water? From a tribal view, all waters are connected and have importance. Colonization of Minnesota has changed the hydrology of the area with dams and culverts and what once were "rice waters" have changed and new areas now hold wild rice. With the continued exacerbation of climate change it is difficult to predict what waters will continue to hold rice, or what water will need to hold rice for culture and customs to continue. With that in mind, if a lake or river supports, has supported, or could support any wild rice, it is a wild rice water. We do not see any other way to define it.

White Earth continues to express concern regarding how outside agencies define a wild rice water. White Earth contends all surface waters are wild rice waters and therefore no limit(s) should be applied to what constitutes or defines them. Many surface waters were harmed prior to the protections of the Clean Water Act. Numerous historical rice beds have been lost or displaced and these waters also need protection. Due to these reasons, White Earth feels the state's wild rice producing water inventory is incomplete and needs further updating.

Because Minnesota's wild rice waters have not been systematically inventoried, monitored, assessed or protected through regulatory controls for sulfate under the existing standards, many more once-harvestable stands have been degraded or destroyed since the effective date of the Clean Water Act. It is our understanding that the MPCA has utilized a two-acre threshold to initially identify waters where the wild rice sulfate standard would apply. We do not agree with the basis or justification for this criterion to define a wild rice water.

Any wild rice is important and worth protecting. Furthermore, wild rice acreage information is not available for most waters in the state. Monitoring data for waters across the state does not exist for that type of detailed information on wild rice presence. Wild rice is a variable resource throughout the years, and it takes multiple years (and even historic consideration) to understand the potential density and acreage of wild rice in each water. Data collected over an extended period of time may be needed to determine if a water meets the proposed acreage. The MPCA utilized judgement to include or exclude waters, but the acreage criterion they proposed is based on information that largely does not exist, because the state has never invested the resources necessary to establish a baseline inventory of wild rice waters.

The MPCA also proposed to apply an existing narrative standard (Minn. R. 7050.0224), protective of wild rice and the habitat and environmental quality needed to maintain it, *only* to the arbitrary list of 24 wild rice waters identified in Minnesota Rules (Minn. R. 7050.0470) through rulemaking in 1997-98 for waters in the Lake Superior Basin. Tribes had urged the agency to apply that aquatic life use-protective narrative standard to all wild rice waters in the state, but the agency did not do so despite the administrative record that clearly includes commitments by the state to move beyond that initial step.

In the Statement of Need and Reasonableness (SONAR) from 1997, the agency said:

> Finally, the proposed amendments specifically listing the wild rice waters in Minn. R. 7050.0470 and the inclusion of the wild rice narrative language in Minn. R. 7050.0224 are needed because: 1) they are viewed as initial steps in a broader process intended to provide greater public awareness as to the ecological importance of this unique plant species; 2) they provide further support for the study of the physical, chemical and biological factors that are needed to support wild rice development; and 3) the proposed wild rice amendments represent an affirmation of the MPCA's commitment to work in concert with the American Indian Bands on environmental issues of mutual concern.
>
> … The proposed listing of the 24 wild rice waters in Chapter 7050 is specific to a select number of waterbodies within the Lake Superior Basin that have current and/or historic stands of wild rice. No additional numerical standards for wild rice protection purposes are being proposed during the present rulemaking effort. It is the current intent of the MPCA to participate in ongoing studies and assessments of the wild rice plant and wild rice habitat protection issues. MPCA staff also plan to continue to work with the MNDNR and the various Bands to identify additional wild rice waters on a statewide basis.
>
> … The listing of these waters and the proposed narrative wild rice waters standard in Minn. R. 7050, in and of themselves, will not automatically translate into greater protection levels that are afforded to this plant species. Rather, increased protection of natural wild rice stands will happen as a result of a continued dialogue and information exchange between interested and affected parties.

The MPCA has not honored or fulfilled the specific commitments they made with the Tribes in that rulemaking process twenty years ago, to address the overall decline in the number and distribution of wild rice waters in the state, and to continue research and develop best management practices and standards.

A report entitled *"Natural Wild Rice in Minnesota"* was completed in February 2008 by the Minnesota Department of Natural Resources (MNDNR). As part of this report directed by the state legislature, the MNDNR compiled a list of wild rice waters. Although no statewide inventory of wild rice waters can likely be perfect, this MNDNR led effort was well done and completed with input from many partners including tribes and tribal organizations. The MNDNR continues to refine and update this statewide inventory, with additional waters identified and shared with MPCA in 2013.

The 1854 Treaty Authority has developed and maintains with annual updates a list of wild rice waters in the 1854 Ceded Territory. The MPCA proposed list where the standard would apply largely includes the waters from the 2016 updated list (dated 3/24/2016 – 393 locations), but not for most additions made for the current list (dated 3/28/2018 – 512 locations). The procedure for developing and updating the 1854 Treaty Authority inventory of wild rice waters has not changed over time, and reports are utilized from other partners (such as MNDNR) or field observations are recorded. However, the MPCA did not recognize the latest updates in their proposed rule. Analysis shows that the wild rice sulfate standard would not apply at over 100 wild rice locations in the 1854 Ceded Territory.

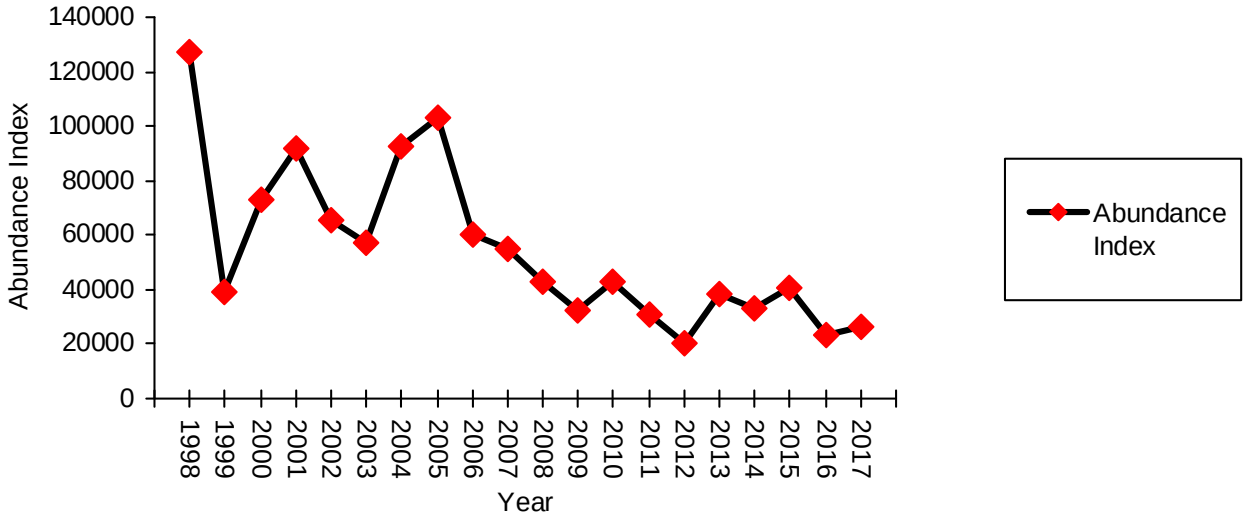
Utilizing available information (2008 MNDNR report, MNDNR updates, 1854 Treaty Authority, other sources) the MPCA compiled a list of wild rice waters in Minnesota. This list included waters with any record or report of wild rice presence. This was a comprehensive exercise, and the best effort to date at compiling wild rice locations across the state. The entire list of wild rice waters developed by the MPCA contains 2,347 locations. This full list is the best statewide inventory that currently exists. However, the MPCA has listed 998 locations as having "insufficient information" where the wild rice water quality standard would not apply. Again, no relevant criteria or long-term monitoring data exists to exclude these waters. The MPCA approach of identifying waters where the wild rice sulfate standard applies is exclusive instead of inclusive, and concern exists over this omission of wild rice waters.

Long-Term Wild Rice Monitoring

In 1998, the 1854 Treaty Authority initiated a wild rice monitoring program on numerous lakes and rivers within the 1854 Ceded Territory in northeastern Minnesota. The 1854 Treaty Authority's monitoring program documents wild rice abundance and identifies trends in production on this group of waters. Monitoring activities have been completed with some variation across years. Seven lakes have been included each year from 1998 to 2018. The monitoring program in 2002-2018 has included the same 10 lakes and rivers.

The focus of the program is to document wild rice biomass each season on a water. This gives a gauge on density, acreage, and plant height each year and ultimately shows changes across time. Protocol has been standardized in the "*Wild Rice Monitoring Handbook"* and "*Wild Rice Monitoring Field Guide"* completed in 2015. In addition to calculating biomass, other activities such as water level monitoring, water sampling, and photography are included in the program. The report *"Wild Rice Monitoring and Abundance in the 1854 Ceded Territory (1998-2017)"* referenced in the Appendix summarizes information from the monitoring program. A summary report including information from 2018 has not been completed to date.

One point to note is the potential long-term decline in wild rice. The summary graph below shows the abundance index (combination of wild rice acreage and density) from 1998-2017 on waters in the 1854 Treaty Authority program. Although it is difficult to determine an exact cause (perhaps climate change and related impacts), this highlights the need to protect a resource that is potentially declining. This decline in "natural" waters is on top of the likely immense amount of wild rice lost statewide due to development, water level changes, water quality issues, etc. since Minnesota statehood.



Total Abundance Index on all Waters in 1854 Treaty Authority Monitoring Program (1998-2017)

This type of monitoring also demonstrates the long-term data needed to begin to understand wild rice presence on a water. This information, along with other sources (oral histories, photographs, etc.) could inform lists of wild rice waters. However, given that long-term monitoring data does not exist on many waters across the state, it is impossible for the MPCA to make a determination to omit wild rice waters where the sulfate standard would apply.

Potentially Affected Dischargers

National Pollution Discharge Elimination System (NPDES) permits are required to include limitations consistent with effluent limitation guidelines for discharges that are causing or contributing to a violation of water quality standards. These limits are not water quality standards themselves, but are calculated so that the permitted discharge effluent will meet water quality standards in the receiving water, and if applicable, must conform to any Total Maximum Daily Load requirement that sets pollutant limits in order to meet water quality standard. 40 C.F.R. § 122.44. Unless end-of-the-pipe discharge concentrations cause or contribute to an exceedance of water quality standards in the *receiving or downstream* water bodies, permit limitations and additional treatment are not required.

In development of the proposed revised wild rice sulfate standard, the MPCA conducted a preliminary analysis on which facilities the new standard might apply. These potentially affected dischargers could adversely impact wild rice waters and if so, would need to comply with the standard. Further analysis of potentially affected dischargers in this section indicates that the wild rice standard would not generally be applied to domestic wastewater treatment plants. Industrial operations upstream of wild rice waters that discharge a much larger effluent volume with higher sulfate concentrations than most domestic discharges would need to add treatment technology to comply with the wild rice sulfate standard.

Water Body Sulfate Concentrations

Water column sulfate concentrations were analyzed to determine which water bodies or water body segments were exceeding the existing 10 milligrams per liter (mg/L) water quality standard. Results from this analysis were then used to identify dischargers to those waters.

Methods

Water column sulfate data was compiled from State and Tribal Agencies. Each dataset was sorted by unique locations. Data from each location was evaluated to determine the average and range of sulfate concentrations. An individual map was then generated for each dataset using the sulfate average or single measurement concentration for every location. The locations of large industrial dischargers were identified on the St. Louis and Itasca County map and the Mississippi River map.

GIS Methods

The maps were created using ESRI's ArcGIS 10.3 software. The power plant locational data was obtained from www.eia.gov, the Reservation boundaries from www.data.gov, and the watershed data from www.usgs.gov. All of the other base data layers came from https://gisdata.mn.gov. The monitoring data and associated locations were brought into ArcMap via Excel spreadsheets and converted to shapefiles. Differently colored and sized symbols were used to display the points based on their average sulfate concentration, with the break values of 5, 10, 30, 50, 100 and 200 mg/L.

As shown on the maps provided below, all of the waters exceeding the existing 10 mg/L sulfate wild rice water quality standard are downstream of mining operations and/or electrical generation power plants in St Louis and Itasca Counties and the Mississippi River.

An additional map was added to the analysis: "Mean Sulfate Concentrations Downstream of Mine Point Discharges", created by Scott Cardiff (working with the Great Lakes Indian Fish and Wildlife Commission), for the PolyMet Supplemental Draft Environmental Impact Statement, Appendix C, Tribal Cooperating Agencies Cumulative Effects Analysis, 2013.

Eight data sets were used for this analysis. A summary of the agencies that provided data, when the data was collected, the number of locations where measurements were taken, and the number of individual sulfate measurements are listed in the table below.

Table 1. Summary of Datasets Used to Analyze Average Water Body Sulfate Concentrations

Agency	Area of Data Collection	Number of Sulfate Measurements	Number of Discrete Locations	Years of Collection
Minnesota Pollution Control Agency	St. Louis and Itasca Counties	7,198	906	1974-2016
1854 Treaty Authority	1854 Ceded Territories	309	43	2007 - 2017
Fond du Lac Band of Lake Superior Chippewa	Fond du Lac Reservation	741	39	1998 - 2017
Leech Lake Band of Ojibwe	Leech Lake Reservation	644	80	2012 - 2018
Mille Lacs Band of Ojibwe	Mille Lacs Reservation	55	12	2010 - 2017
Grand Portage Band of Ojibwe	Grand Portage Reservation	1,547	32	2000 - 2018
Minnesota Pollution Control Agency	Mississippi River in Minnesota	1,808	87	1973 - 2017
Prairie Island Indian Community	Lower Mississippi River and backwater pools	325	8	2014 - 2017

Approximately seventy-five percent of the of the MPCA data sites in St. Louis and Itasca Counties were below the 10 milligram per liter (10 mg/L) sulfate water quality standard.

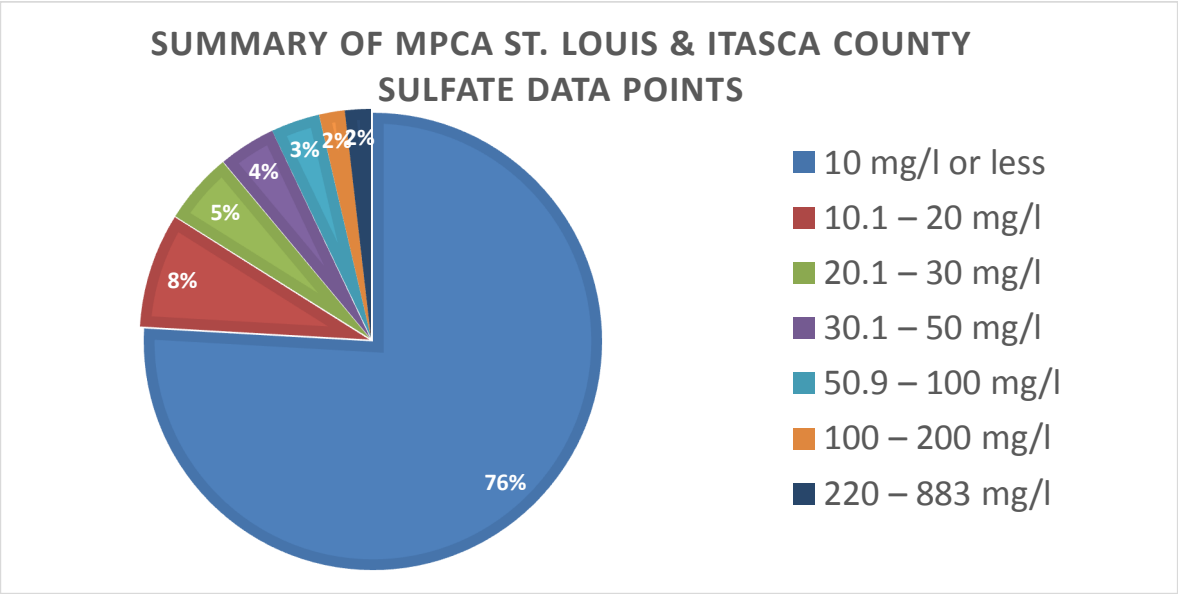


Figure 1. St. Louis and Itasca Counties Average Water Column Sulfate Concentrations

An analysis of sulfate concentrations below 10 mg/L from water column data collected in St. Louis and Itasca Counties demonstrates more than half of the data sites had concentrations of 2.5 mg/L or less.

Table 2. Breakdown of sulfate concentrations 10 mg/L or less (MPCA St. Louis & Itasca County Sulfate Data Points)	
Below Detection	**5 %**
2.5 mg/L	**48 %**
2.6 - 5 mg/L	**32 %**
5.1 - 10 mg/L	**15%**

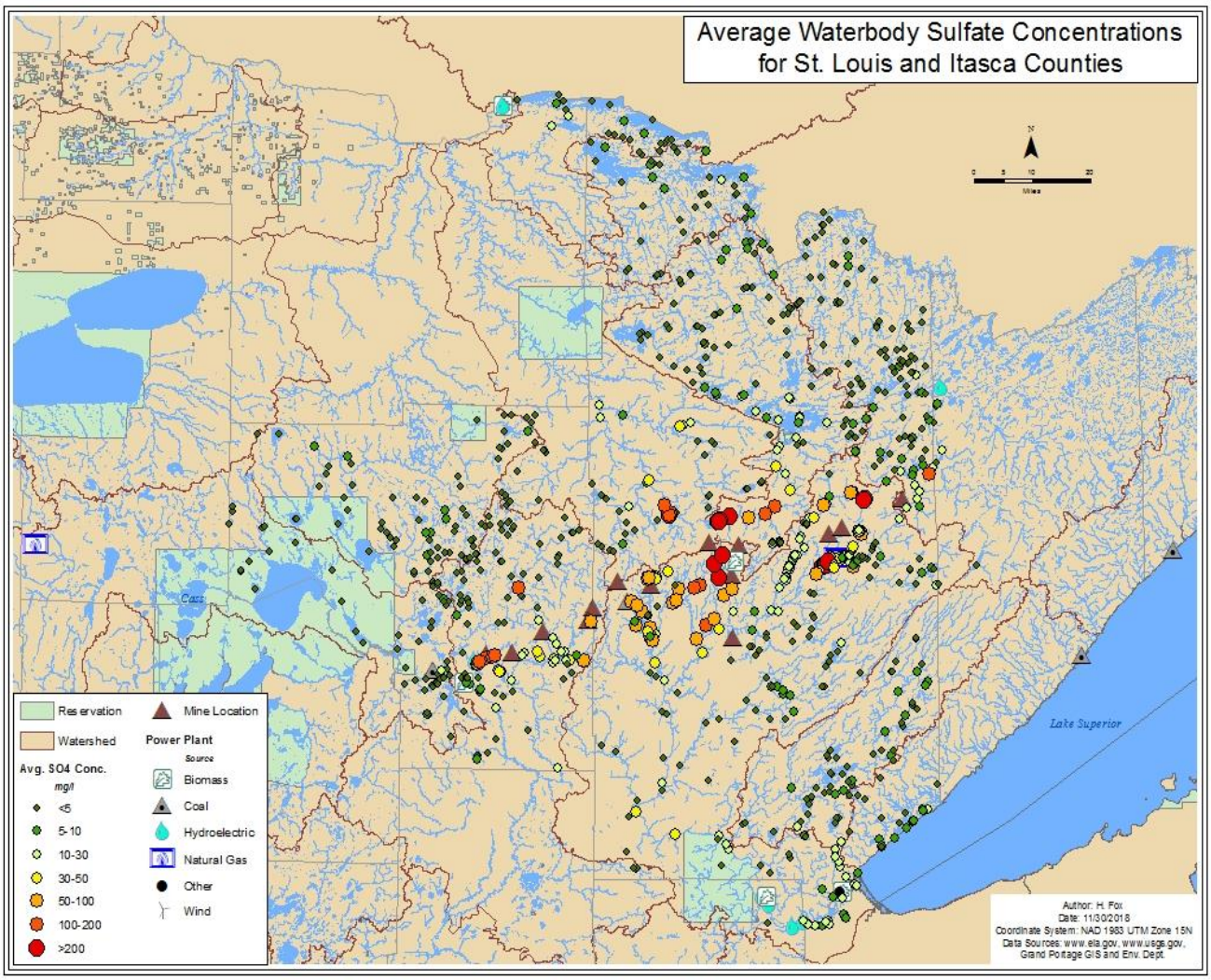


Figure 2. St. Louis and Itasca Counties Average Sulfate Water Column Concentrations

Water column sulfate concentrations are elevated in waters measured downstream of taconite mining operations and natural gas electrical generation facilities. In waters without mining and electrical facility discharges, sulfate concentrations are below 5 mg/L.

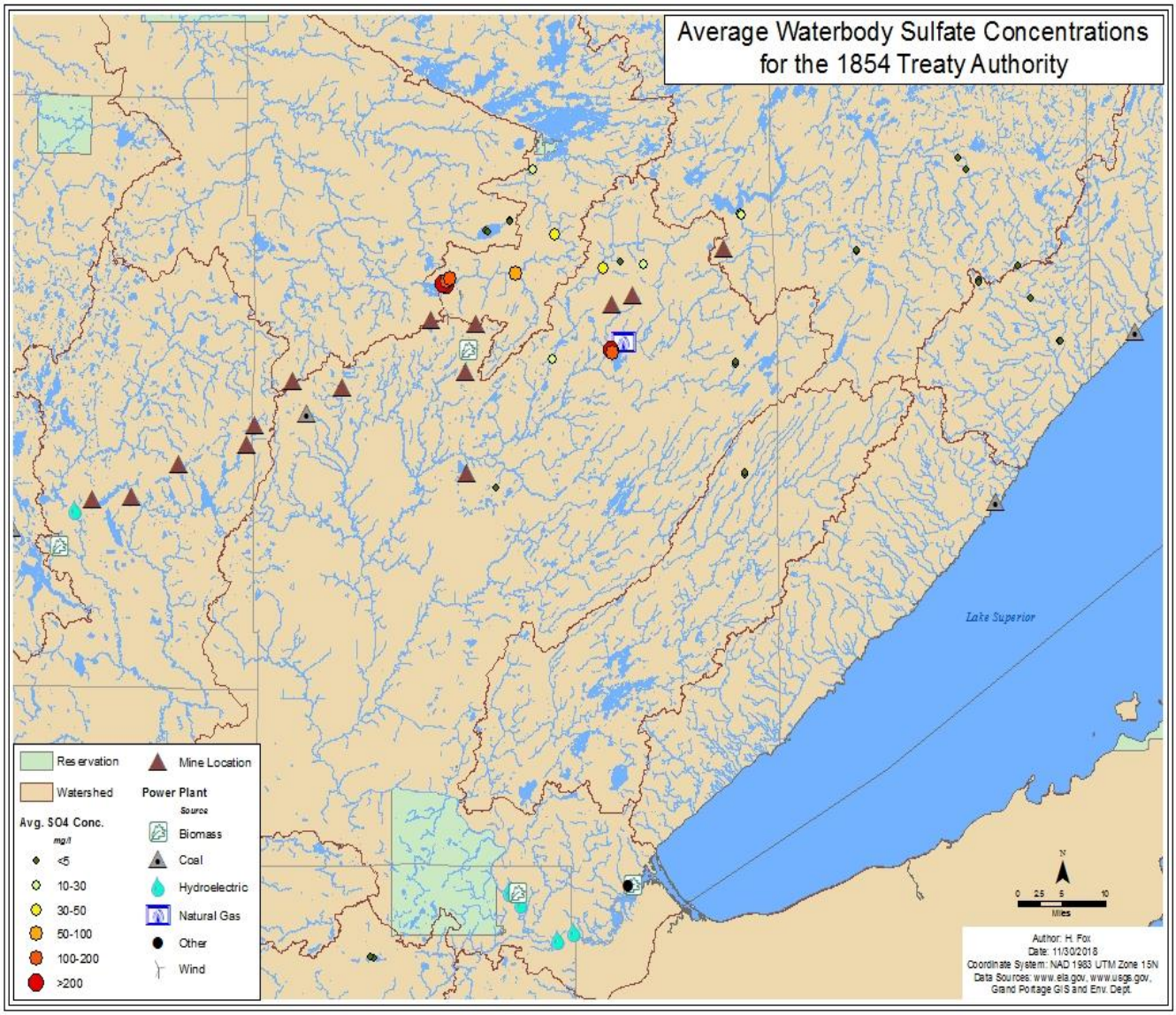


Figure 3. Average Water Column Sulfate Concentrations Measured in the 1854 Ceded Territory by the 1854 Treaty Authority.

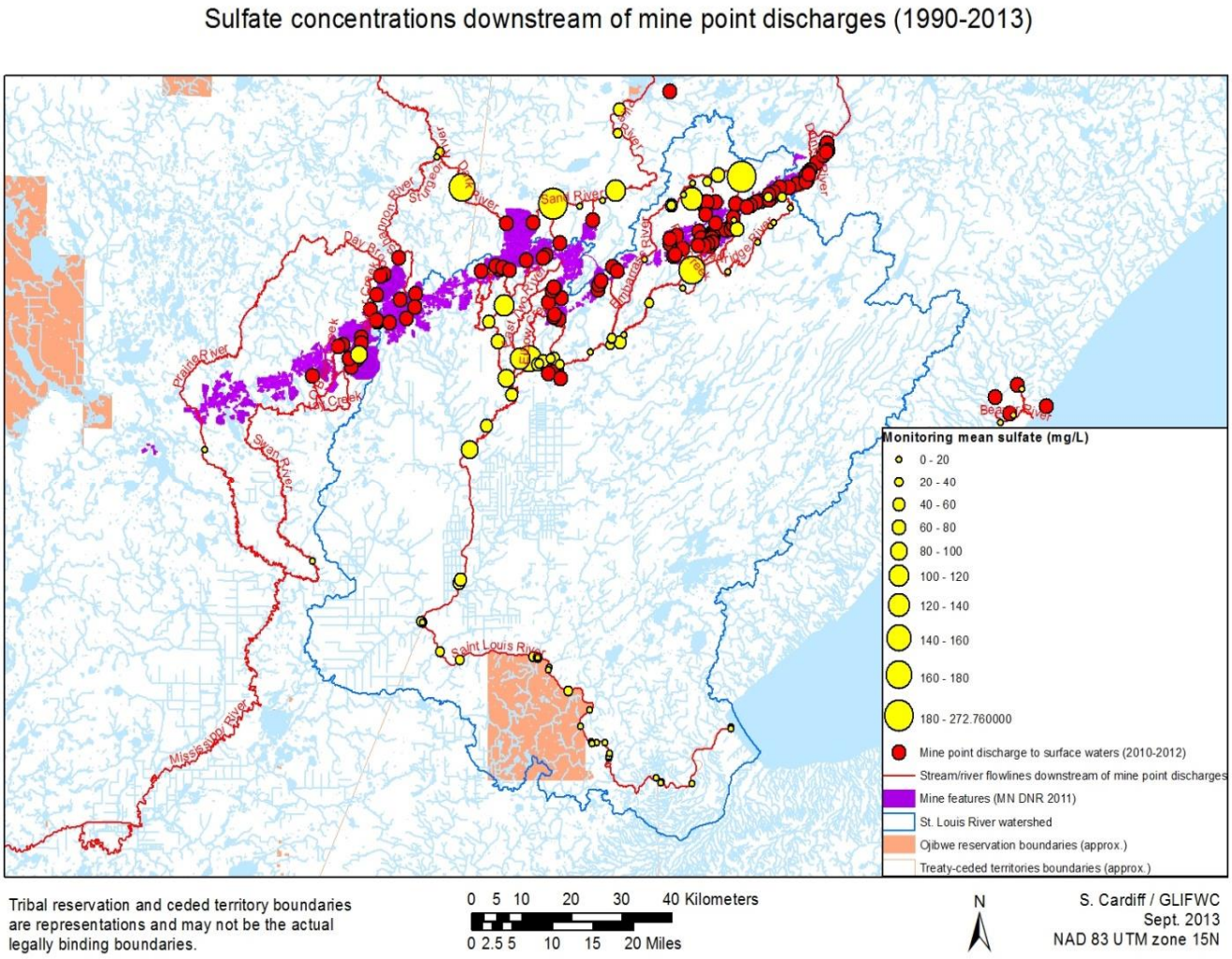


Figure 4. Mean Water Column Sulfate Concentrations Measured Downstream of Taconite Mining Facilities in Northern Minnesota.

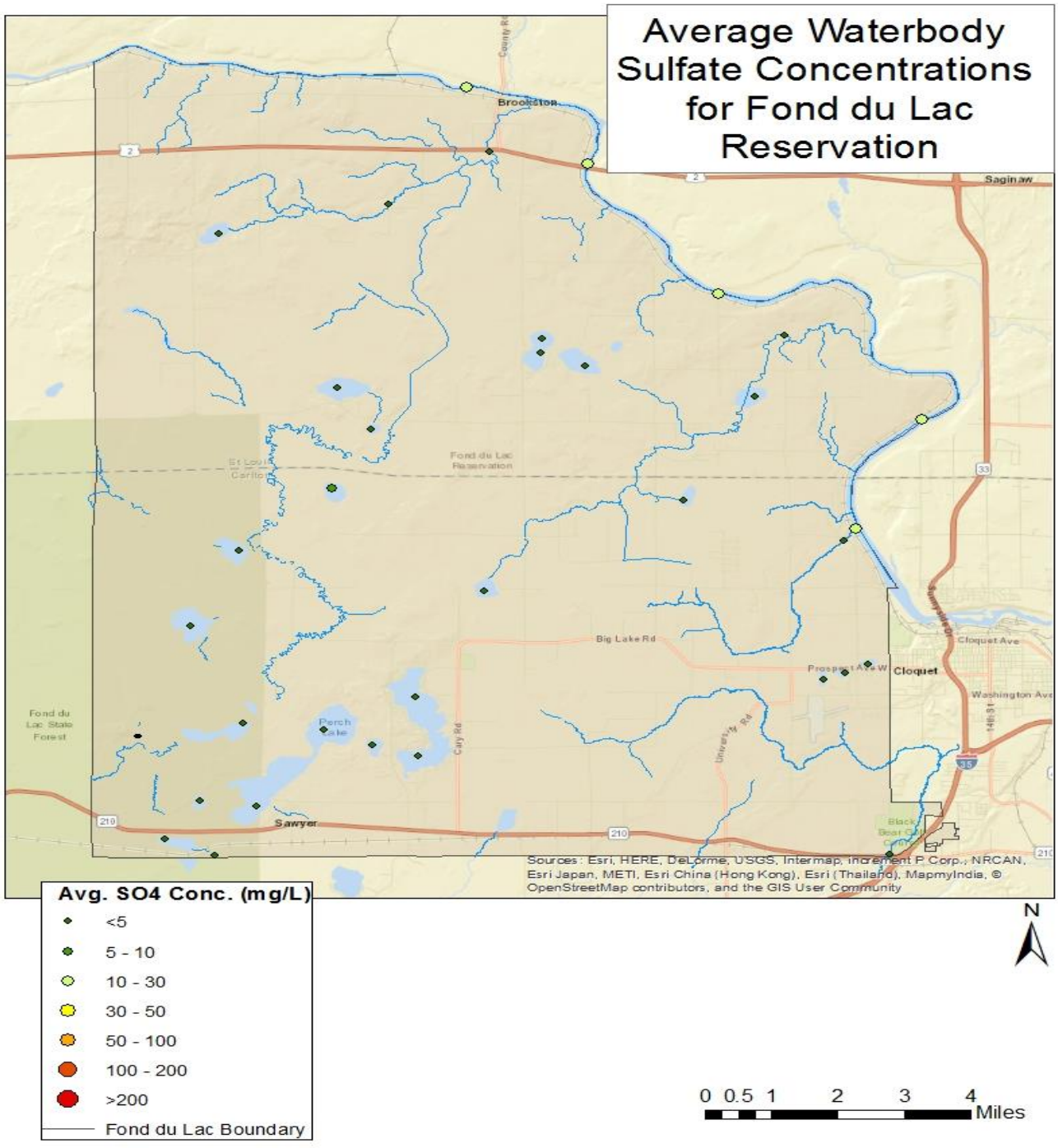


Figure 5. Fond du Lac Reservation Average Waterbody Sulfate Concentrations.

Average sulfate concentrations in reservation lakes and streams are all below 5 mg/L, with the exception of the St. Louis River. The higher sulfate concentrations in the St. Louis River are not naturally occurring; they are a result of high sulfate loadings from upstream facilities. Historic sulfate concentrations in this watershed were consistently below 10 mg/L.

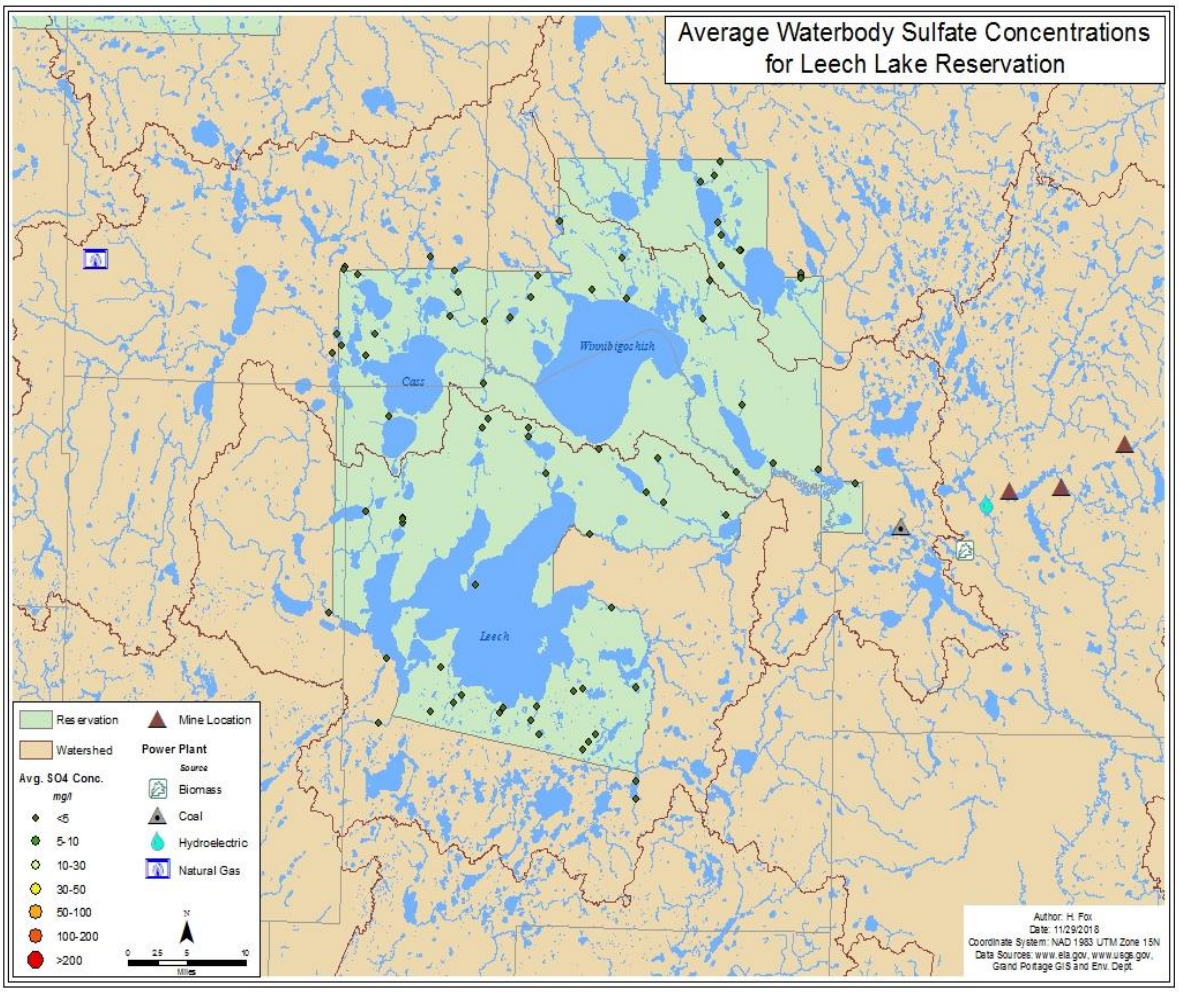


Figure 6. Leech Lake Reservation Average Waterbody Sulfate Concentrations.

All of the average sulfate concentrations measured within Leech Lake Reservation waters are below 5 mg/L.

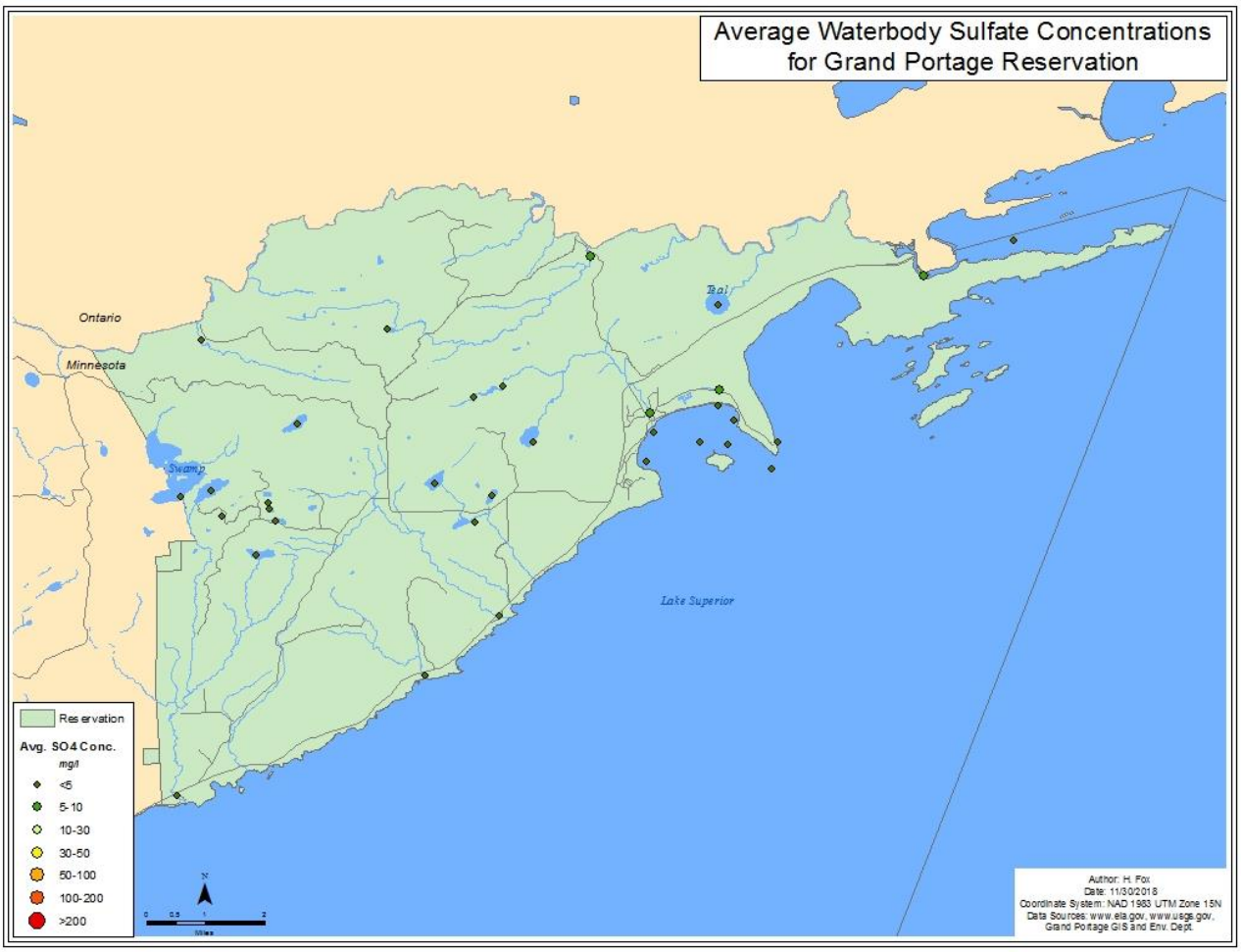


Figure 7. Grand Portage Reservation Average Waterbody Sulfate Concentrations.

The average sulfate concentration in all water bodies within the Grand Portage Reservation are below the federally approved 10 mg/L Grand Portage wild rice sulfate standard. Most waters within the Reservation have an average sulfate concentration below 5 mg/L.

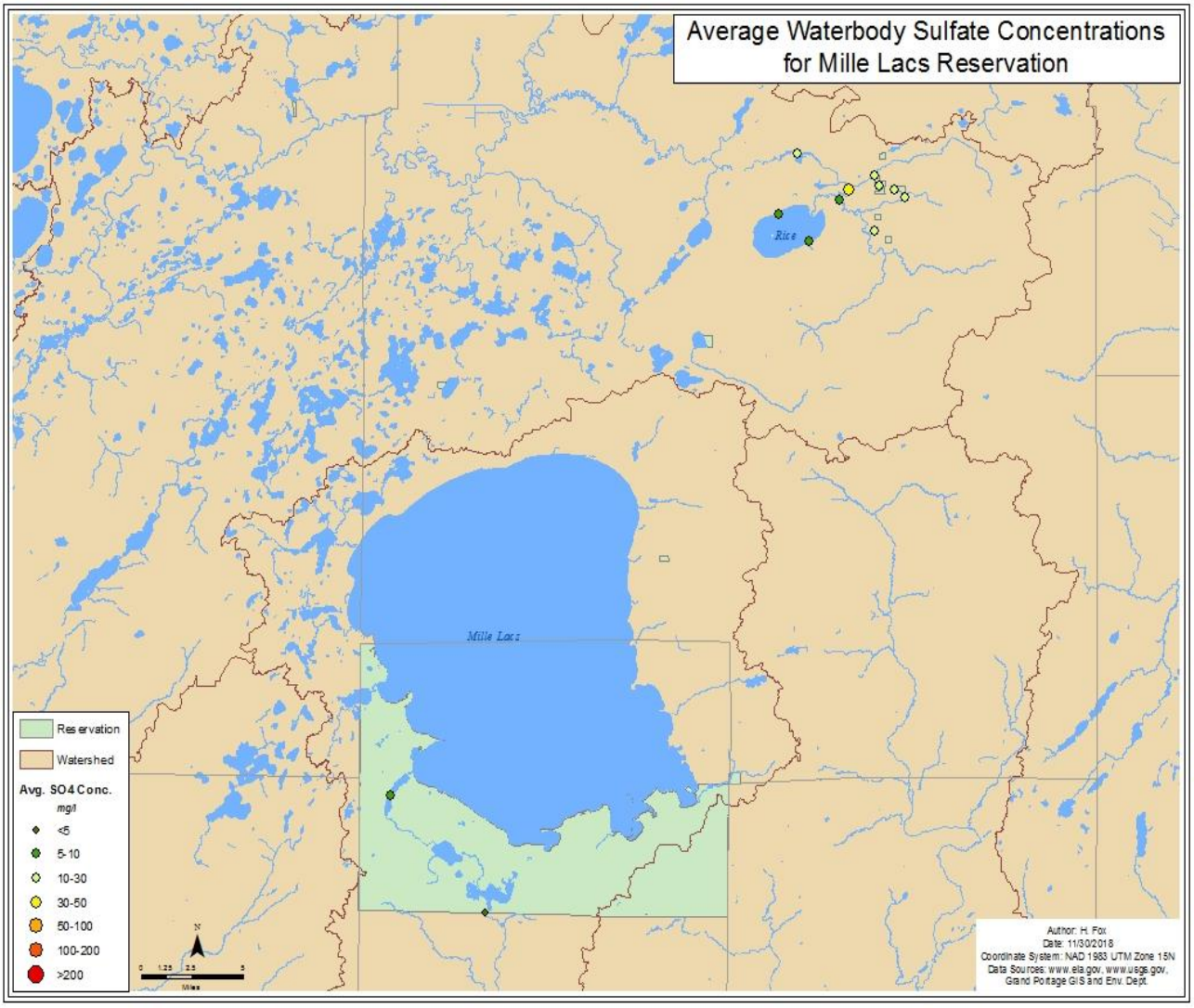
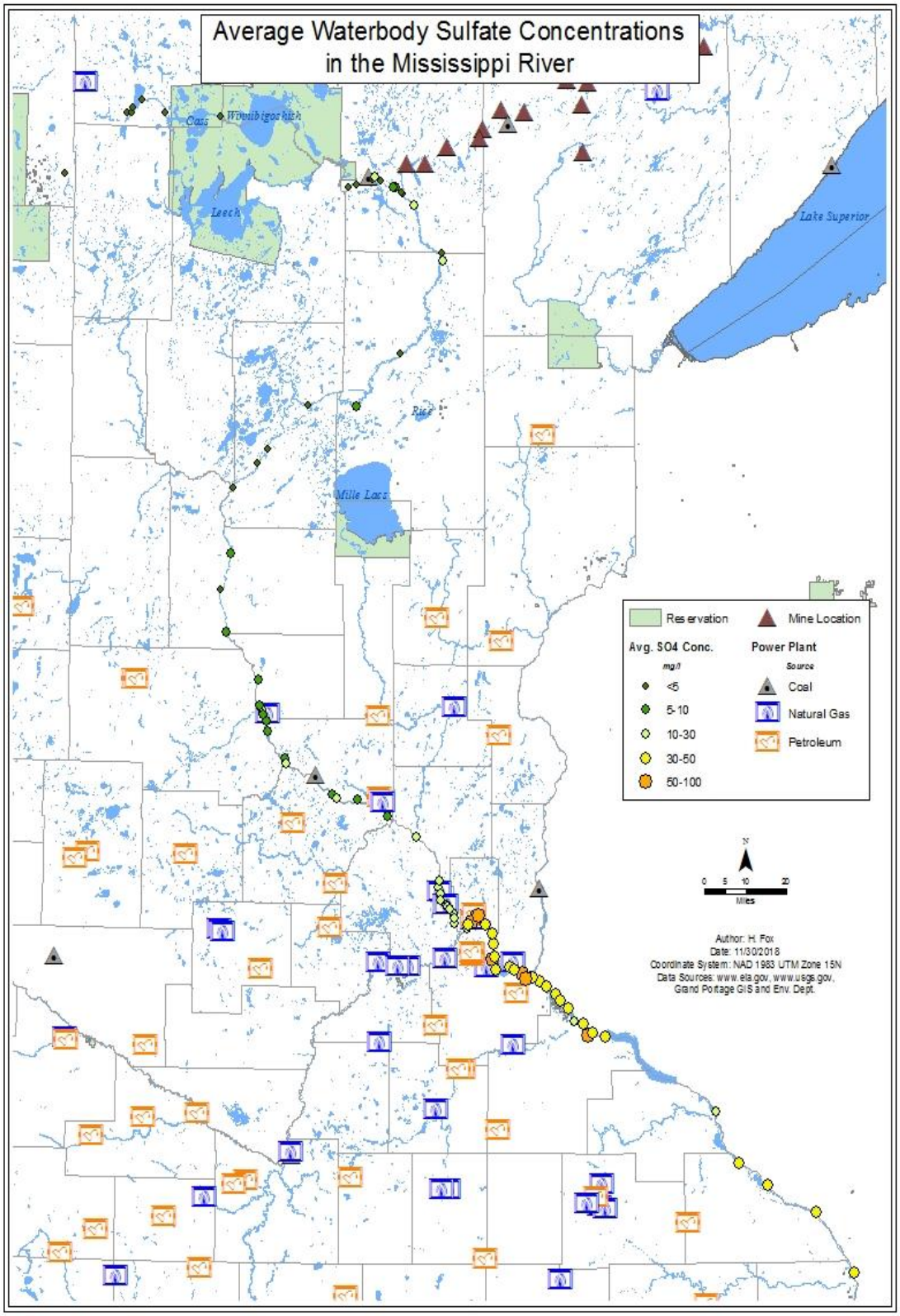


Figure 8. Mille Lacs Reservation Average Waterbody Sulfate Concentrations.

Sulfate concentrations range from less than 5 mg/L to 50 mg/L in waters within Mille Lacs Reservation. Wild rice waters do not exceed the 10 mg/L standard and therefore no treatment would be required for compliance.



Mississippi River sulfate concentrations are below 5 mg/l in the headwaters near the Leech Lake Reservation, and rise to concentrations between 10-30 mg/l as the river passes mine features and a coal-fired electrical generation plant. Sulfate concentrations fall back below 10 mg/l downstream of Grand Rapids. Average sulfate concentrations rise as the river passes inflows from industrial natural gas, coal and petroleum electrical plants between St. Cloud and Otsego to a range between 10-30 mg/l. Near Minneapolis, sulfate increases to concentrations between 30-100 mg/l as the river passes six natural gas and petroleum electrical generation power plants. Downstream of Minneapolis, sulfate concentrations remain between 10-50 mg/l to the southern border of Minnesota.

Figure 9. Mississippi River Average Sulfate Concentrations

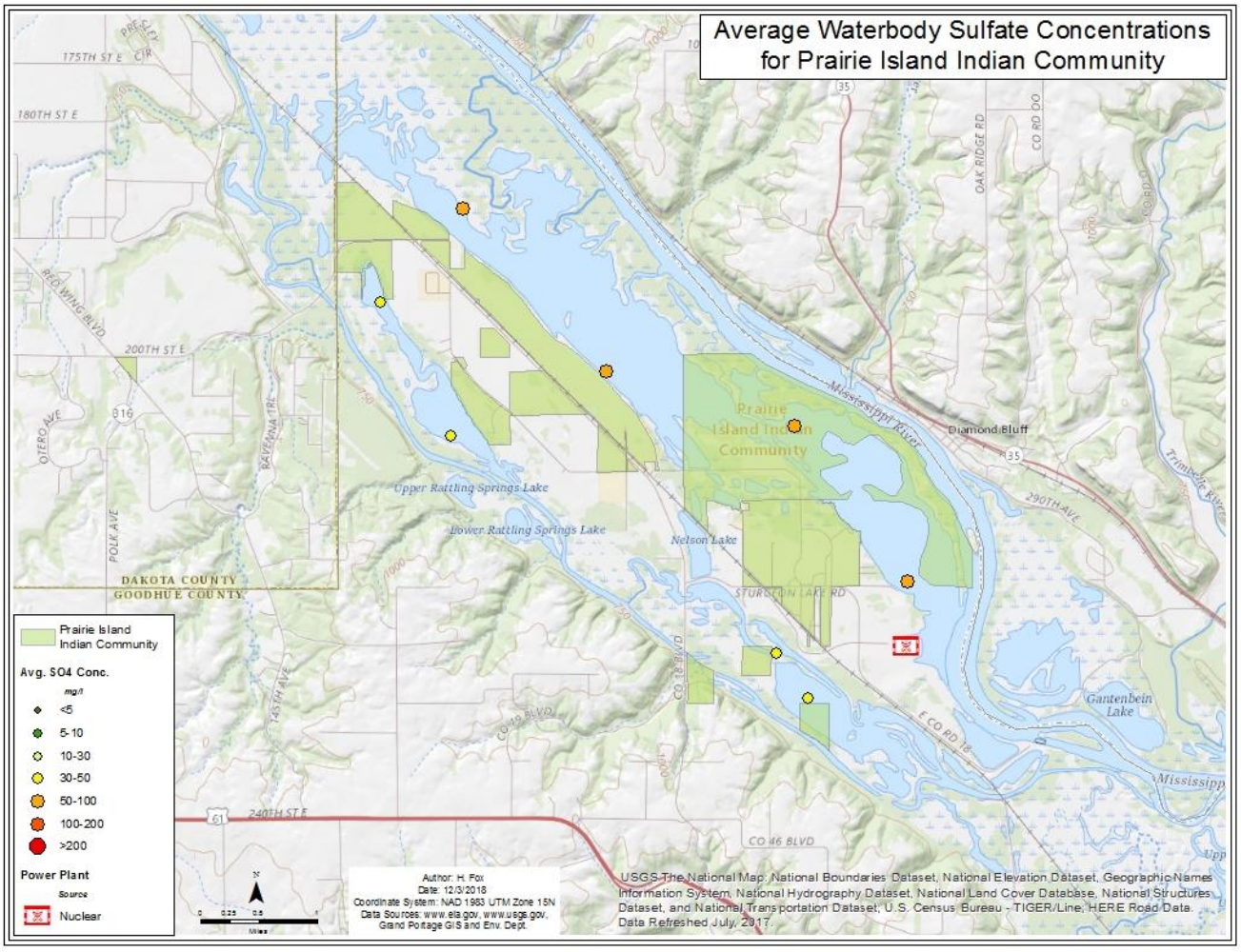


Figure 10. Prairie Island Indian Community Average Waterbody Sulfate Concentrations.

Utilizing multi-year data from reference sites and more disturbed sites seeks to provide a means by which to determine if water quality is different at locations within the lakes as distance from main channels increase. Much of the initial work over the past 10 years has produced data that describes baseline chemical conditions for these ecosystems. Prairie Island started its water quality monitoring program in 2007 which involved monitoring for sulfate annually. In 2014 the program was modified to include bi-weekly sampling for a total of 10 sulfate samples per year at each of the sample sites. This resulted in a more robust data set for sulfate in our backwater areas, providing additional information useful to our wild rice restoration work.

Sturgeon Lake and North Lake are direct backwater lakes of the Mississippi River. Direct flow comes from the Mississippi River into Sturgeon Lake through Brewers Lake inlet, with about 40% of the river flow coming through that inlet during normal water levels, and 60% of the river flow coming into Sturgeon Lake through Brewers Inlet during high water levels. Flow from the Mississippi River also comes directly into North Lake through Jackson Run and Miley Run. This is likely contributing to the higher sulfate levels found on those Mississippi backwaters, since the sulfate levels are comparative to those in the main channel of the river. On the Vermillion River backwaters, sulfate is shown to have higher levels than expected according to the averages of natural occurring sulfate levels in the region. Vermillion River receives surficial groundwater flow from the Mississippi River in a southwesterly direction across the island. This may be contributing to higher sulfate levels in the Vermillion River, in addition to the flashy nature of the river which leads to lower water levels in late summer.

Domestic and Industrial Discharger Assessment

This analysis is used to identify potentially affected dischargers categorized on the MPCA's SONAR list that would likely be affected by enforcement of the wild rice sulfate standard, identify those entities that would not be affected, and identify data gaps.

MPCA's list of "potentially affected dischargers" from the Statement of Need and Reasonableness ("SONAR") was developed solely by calculating which domestic and industrial facilities were within 25 miles of wild rice waters. For this analysis, MPCA provided the NPDES permits for each discharger from the SONAR list along with a spreadsheet that indicates the distance from a facility to wild rice waters, and the wild rice water body names. Some permits were listed two or three times on the MPCA list possibly due to discharges that flow into more than one water body. Therefore, a new spreadsheet tab was created that did not include duplicate permit numbers. Facilities were sorted into three categories based on the distance to wild rice waters: 25 miles; 10 miles; and 5 miles or less.

For each discharger the permitted average wet weather effluent volume was converted to millions of gallons per day and cubic feet per second. When sulfate discharge data was available in an electronic format from MPCA, the average and range of concentrations was calculated. If sulfate data was available from the water body that an entity discharged to, or if there was an average sulfate concentration for the closest wild rice waterbody, that data was also added to the spreadsheet. A column of permit issuance dates were added to the list of potentially affected dischargers.

Notes were taken from each permit regarding the type of discharge. Dischargers were eliminated from the list if the only pollutant added was heat, or if the permit specified that discharges were for pipeline and tank testing and the discharge was to take place in an upland vegetated area. Some potentially affected dischargers were removed from the list based upon GIS analysis, because water would have to flow uphill from the discharge to reach the specified wild rice water. Dischargers were eliminated from the list if the receiving or downstream water bodies were not exceeding the wild rice sulfate of standard of 10 mg/L.

Results

According to MPCA's potentially affected discharger list, thirteen of the top sixteen biggest discharges by volume and sulfate concentration are industrial. These sixteen dischargers are within ten miles of wild rice waters. The remaining three facilities that are not industrial include one facility that treats both industrial and domestic wastewater, and two facilities that appear to treat only domestic wastewater. No sulfate data is available for either of the domestic dischargers or the facility that treats both domestic and industrial wastewater. The range of volume of discharge is 7.29 – 161.8 million gallons per day. The range of average sulfate concentrations is 22.7 – 1054 mg/L.

Table 3. Top 16 Dischargers by Volume from MPCA SONAR

Permit Number	Facility Name	Facility Type	Discharge MGD	Discharge CFS	Average Discharge Sulfate Concentration (mg/l)	Distance to Wild Rice (miles)	Draft Wild Rice Water Name
MN0001007	Minnesota Power – Boswell Energy Center	Industrial	161.80	250.34	**586**	0	Blackwater Lake
MN0000990	Minnesota Power – Laskin Energy Center	Industrial	125.4	194.02	**489**	6	Partridge River
MN0049760	Hibbing Taconite Co – Tails Basin Area	Industrial	4.41 - 65	6.82 - 100.57	**62.6** (Little Fork River) **35** (Mississippi River at Grand Rapids)	2	Shannon Lake
MN0069078	Mesabi Mining Area	Industrial	58.4	90.36	**176**	1	Partridge River
MN0029882	Met Council – Blue Lake WWTP	Domestic	42	64.98		0	Blue Lake
MN0055948	Keewatin Taconite Operations – Tailings	Industrial	32.4	50.13	**177**	10	Hay Lake
MN0042536	Cliffs Erie – Hoyt Lakes Mining Area	Industrial	27.45	42.47	**269**	4	Second Creek
MN0044946	United Taconite LLC - Thunderbird Mine	Industrial	27.37	42.35			St. Louis River
MN0046981	Northshore Mining Co – Peter Mitchell	Industrial	24.11	37.3	**112.3** (Rainy River) **22.7** (St. Louis River)	3	Dunka River
MN0057207	US Steel Corp – Minntac Tailings Basin Area	Industrial	17.11	26.47	**1054**	2	Little Sandy Lake
MN0022080	Grand Rapids WWTP	87% Industrial 13% Domestic	15.2	23.52		1	Mississippi River - Grand Rapids
MN0031879	US Steel Corp – Keetac	Industrial	10.17	15.74	**64.8**	9	Leighton Lake
MN0030147	Winona WWTP	Domestic	9.6	17.84		6	Blue lake
MN0001465	Hibbing Taconite Co	Industrial	1.44 - 7.92	2.28 - 12.25		8	St. Louis River Mississippi River-Brainerd
MN0059633	ArcelorMittal Minorca Mine Inc - Laurentian	Industrial	7.9	12.22	**62.8** (Vermillion River), **274** (St. Louis River)	0	St. Louis River
MN0067687	Mesabi Nugget Delaware LLC	Industrial	7.29	11.28	**437**	7	Partridge River

Twelve major industrial dischargers identified through mapping sulfate concentrations in the Mississippi River between St. Cloud and Otsego and south of Minneapolis were not specified on the MPCA list of potentially affected dischargers. The table above that indicates the largest dischargers by volume and sulfate concentration are electrical utilities. Therefore, it is likely that some, if not all of these dischargers are major contributors to the excursions from the wild rice sulfate water quality standard and are potentially adversely impacting downstream wild rice waters.

Table 4. Major Industrial Dischargers on the Mississippi River between St. Cloud and Otsego Not Included in SONAR List of Potentially Affected Dischargers

Plant Name	Electric Utility Name	City	County	Primary Source	Source Description	Technical Description
Granite City	Northern States Power Co - Minnesota	St. Cloud	Benton	natural gas	Natural Gas = 52 MW	Natural Gas Fired Combustion Turbine
Elk River City of	City of Elk River	Elk River	Sherburne	petroleum	Biomass = 3.2 MW, Petroleum = 9 MW	Landfill Gas; Petroleum Liquids
Elk River	Great River Energy	Elk River	Sherburne	natural gas	Biomass = 34.8 MW, Natural Gas = 190.5 MW	Municipal Solid Waste; Natural Gas Fired Combustion Turbine
Sherburne County	Northern States Power Co - Minnesota	Becker	Sherburne	coal	Coal = 2238 MW	Conventional Steam Coal

Table 5. Major Industrial Dischargers South of Minneapolis on the Mississippi River Not Included in SONAR List of Potentially Affected Dischargers.

Utility Name	Sector Name	City	County	Primary Source	Source Description	Technical Description
Northern States Power Co - Minnesota	Electric Utility	St. Paul	Ramsey	natural gas	Natural Gas = 530 MW	Natural Gas Fired Combined Cycle
Northern States Power Co - Minnesota	Electric Utility	Inver Grove Heights	Dakota	natural gas	Natural Gas = 282 MW, Petroleum = 3.6 MW	Natural Gas Fired Combustion Turbine; Petroleum Liquids;
Northern States Power Co - Minnesota	Electric Utility	Minneapolis	Hennepin	natural gas	Natural Gas = 454 MW	Natural Gas Fired Combined Cycle
Northern States Power Co - Minnesota	Commercial Non-CHP*	St. Paul	Ramsey	petroleum	Petroleum = 4.8 MW	Petroleum Liquids
Cottage Grove Operating Services LLC	IPP CHP*	Cottage Grove	Washington	natural gas	Natural Gas = 251 MW	Natural Gas Fired Combined Cycle
Ziegler Power Systems	Commercial Non-CHP*	St. Paul	Ramsey	petroleum	Petroleum = 1.9 MW	Petroleum Liquids
Veolia Energy	Commercial CHP*	Minneapolis	Hennepin	natural gas	Natural Gas = 0.1 MW	Natural Gas Steam Turbine
Veolia Energy	IPP* CHP**	Minneapolis	Hennepin	natural gas	Natural Gas = 17 MW	Natural Gas Fired Combustion Turbine

*An independent **power** producer (**IPP**) or non-utility generator (NUG) is an entity, which is not a public utility, but which owns facilities to generate electric **power** for sale to utilities and end users.

Combined Heat and Power (CHP**) Combined heat and power (**CHP**) **systems**, also known as cogeneration, generate electricity and useful thermal energy in a single, integrated **system**. **CHP** is not a technology, but an approach to applying technologies.

Community wastewater treatment plants, or domestic dischargers, generally account for the smallest discharges by volume and sulfate concentrations. In fact, on average the volume of discharge water is six times less than industrial discharges and the concentration of sulfate from community waste water discharges are twenty times less concentrated than industrial discharges. The range of the volume of domestic discharges is 0.008 – 42 million gallons per day with an average discharge volume of 2.26 million gallons per day.

The average sulfate concentration of domestic discharges is 15.87 mg/L, with a range of 6.97 – 29.6 mg/L. Where data is available, it appears that domestic dischargers would not be required to provide sulfate treatment unless they discharge effluent to waters already exceeding the wild rice sulfate standard due to industrial discharges.

Table 6. SONAR Listed Domestic Dischargers With Sulfate Water Body Data Indicating Non-Compliance

Permit Number	Facility Name	Facility Type	Discharge MGD	Discharge CFS	Discharge waters	Distance to Wild Rice (miles)	Draft Wild Rice Name	Average Water Body Sulfate Concentration mg/l
MN0051381	Belgrade WWTP	Domestic	0.167	0.26	unnamed creek Middle Fork Crow River	3	Monongalia Lake	16.5 - Middle Fork Crow River @ Lake Monongalia
MN0053279	Biwabik WWTP	Domestic	0.212	0.33	Embarrass Unnamed wetland River	1	Cedar Island Lake	20.6 - Cedar Island Lake
MN0053562	Brownsville WWTP	Domestic	0.055	0.09	Mississippi River	1	Pool 8 at Reno Bottoms	18.1 - Pool 8 @ Reno
MN0022012	Keewatin WWTP	Domestic	0.18	0.28	Welcome Creek	11	Hay Lake	32.9 - Hay Lake
MNG580027	Kellogg WWTP	Domestic	0.06	0.09	Zumbro River	3	Mississippi Pool 5/Spring	32.5 - Mississippi Pool 5/spring
MN0020664	Lake City WWTP	Domestic	1.52	2.35	Lake Pepin	10	Mississippi Pool 4 Robinson Lake	29.6 - Pool 4 Robinson Lake
MN0029904	Met Council – Eagles Point WWTP	Domestic	10	15.47	Mississippi River	19	Sturgeon Lake	58.2 - Sturgeon Lake
MN0045845	Met Council – Empire WWTP	Domestic	28.61	44.27	Mississippi River	25	Sturgeon Lake	58.2 - Sturgeon Lake
MN0029955	Met Council – Hastings WWTP	Domestic	2.69	4.16	Mississippi River	14	Sturgeon Lake	58.2 - Sturgeon Lake
MNG580184	Nashwauk WWTP	Domestic	0.353	0.55	Hanna Reservoir #2	8	Hay Lake	28.4 - Hay Lake
MNG580215	Serpent Lake WWTP	Domestic	0.672	1.04	Rabbit Creek	6	Mississippi River	19 - Mahnomen Lake
MN0025143	Wabasha WWTP	Domestic	0.604	0.94	Mississippi Pool 4 Robinson Lake	0	Mississippi Pool 4 Robinson Lake	29.6 - Pool 4 Robinson Lake
MN0030147	Winona WWTP	Domestic	9.6	17.84	Mississippi River	6	Blue lake	36 above Winona 34 below Winona in Mississippi River

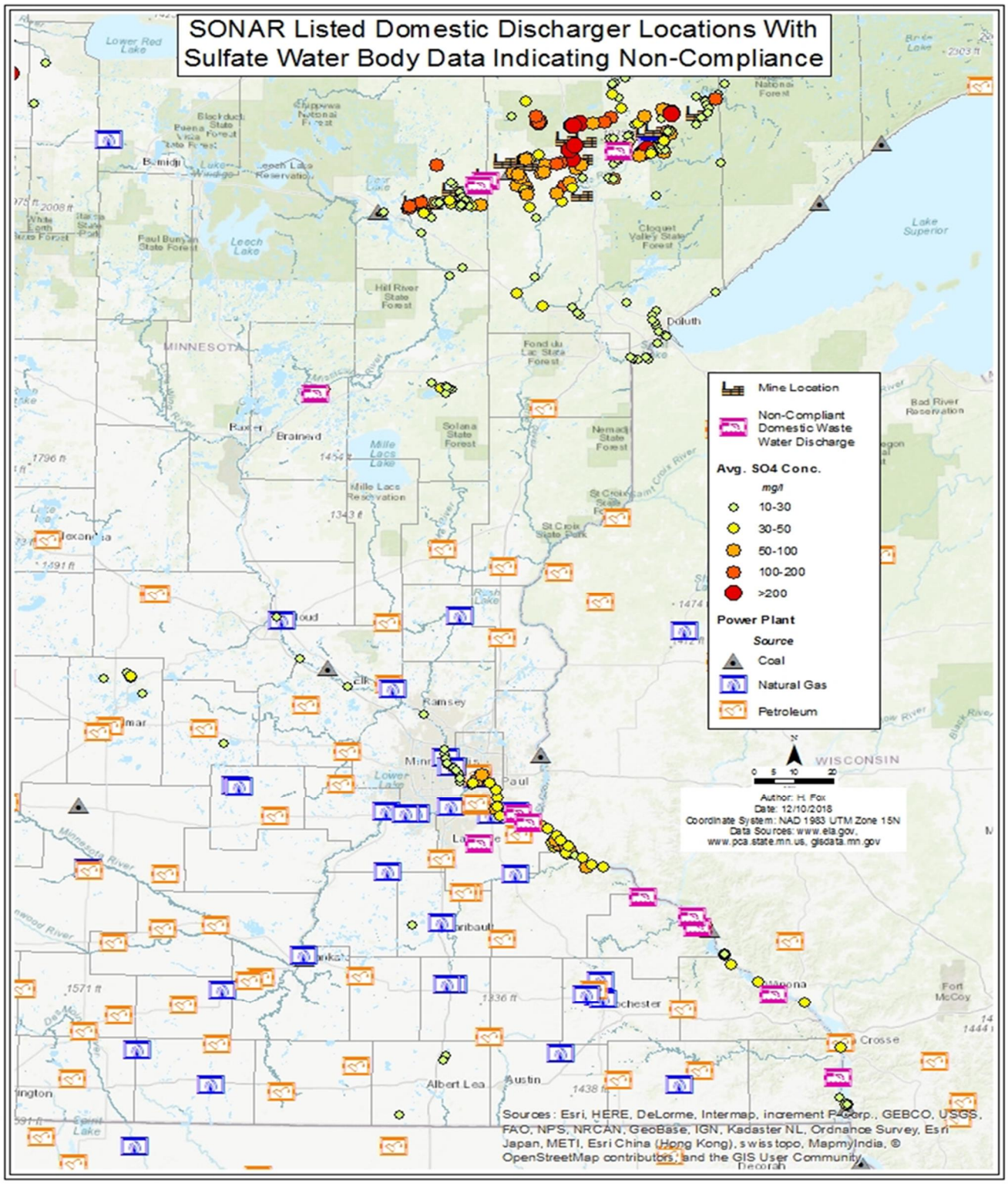


Figure 11. Sulfate Waterbody Data Indicating Non-compliance for SONAR Listed Domestic Dischargers

Table 7. SONAR Listed Domestic Dischargers With Sulfate Water Body Data Indicating Compliance

Permit Number	Facility Name	Facility Type	Discharge MGD	Discharge CFS	Discharge waters	Distance to Wild Rice (miles)	Draft Wild Rice Name	Average Water Body Sulfate Concentration mg/l
MN0020656	Babbitt WWTP	Domestic	0.5	0.77	Hay Lake	0	Hay Lake	6 - Hay Lake
MN0022691	Bagley WWTP	Domestic	0.26	0.41	unnamed wetland Walker Brook Clearwater River	16	Clearwater River	1.5 - Clearwater River
MN0022462	Bemidji WWTP	Domestic	2.5	3.87	Mississippi River	19	Andrusia Lake	2.6 - Ose Lake (3 mi. upstream of Andrusia Lake)
MN0023019	Carlos WWTP	Domestic	0.064	010	unnamed wetland	8	Long Prairie River	7.71 - Long Prairie Rv
MN0066371	Crane Lake WWTP	Domestic	0.053	0.08	Crane Lake	0	Crane Lake	6.1 avg - Crane Lake
MNG580181	Deer River WWTP	Domestic	0.17	0.26	unnamed wetlands	5	White Oak Lake	0.93 - White Oak Lake
MN0020508	Ely WWTP	Domestic	1.5	2.32	Shagawa Lake	5	Fall Lake	4.5 - Shagawa Lake
MN0022080	Grand Rapids WWTP	Domestic	15.2	23.52	Mississippi River	1	Mississippi River - Grand Rapids	Avg. 6 - Mississippi River @ Grand Rapids
MN0023566	Grey Eagle WWTP	Domestic	0.09	0.14	Trace Lake	4	Little Birch Lake	Avg. 5.3 - Little Birch Lake
MN0020869	Jordan WWTP	Domestic	1.29	1.99	Sand Creek	22	Blue Lake	6.9 - Fisher Lake (Blue Lake flows into Fischer Lake) 20+ miles downstream from Jordan
MNG580027	Kellogg WWTP	Domestic	0.06	0.09	Zumbro River	3	Mississippi Pool 5/Spring	Avg. 32.5 - Pool 5/spring
MN0024023	McGregor WWTP	Domestic	0.073	0.11	County ditch #42 Rice Lake Sandy River Steamboat Lake	2	Steamboat Lake	Avg 0.7 - Sandy River Lake (~5 mi N of Steamboat Lake)
MN0064777	Met Council – Blue Lake GW Relief System	Domestic	5.44	8.42	Blue Lake	0	Blue Lake	6.9 - Fisher Lake (Blue Lake flows into Fischer Lake)
MN0029882	Met Council – Blue Lake WWTP	Domestic	42	64.98	Minnesota River	0	Blue Lake	6.9 - Fisher Lake (Blue Lake flows into Fischer Lake)
MN0024155	Miltona WWTP	Domestic	0.008	0.12	unnamed wetland	8	Long Prairie River	7.71 Long Prairie River
MN0024422	Orr WWTP	Domestic	0.099	0.15	unnamed ditch Pelican River Pelican Lake	0	Vermilion River	5.68 - Vermillion River
MNG580187	Winton WWTP	Domestic	0.024	0.37	Shagawa River	2	Fall Lake	3.7 – Shagawa River 1.3 mi SW Winton

No sulfate data is available from MPCA for many of the domestic wastewater dischargers and some of the industrial facilities found on the SONAR list. MPCA was also not able to provide sulfate data for many of the wild rice waters found on the SONAR list.

Table 8. SONAR Listed Domestic Dischargers Without Sulfate Water Body Data Available

Permit Number	Facility Name	Discharge MGD	Discharge CFS	Discharge waters	Distance to Wild Rice (miles)	Draft Wild Rice Name
MNG580148	Audubon WWTP	0.14	0.22	unnamed ditch	No data	Buffalo River
MN0046213	Anchor Bay Mobile Home Park	0.01	0.01	unnamed ditch Rainy River	11	Rainy River
MN0029599	Baudette WWTP	0.24	0.45	Unnamed Stream to Rainy River	14	Rainy River
MNT022985	Callaway WWTP	0.042	0.065	unnamed ditch	No data	Buffalo River
MNG580098	Clearbrook WWTP	0.13	0.19	unnamed tributary	9	Clearwater River
MN0051101	Cromwell WWTP	0.052	0.08	Flower Lake via ditch	0	Flower Lake
MN0020192	Detroit Lakes WWTP	1.64	2.54	unnumbered wetland to peat bog St Clair Lake	12	Pelican Lake
MN0059871	East Gull Lake WWTP	0.14	0.22	Gull River	4	Gull River
MN0023451	Foley WWTP	0.16	0.25	unnamed marsh to Stoney Brook	13	Rice Lake
MN0023515	Garfield WWTP	0.05	0.08	County Ditch #23	2	Ida Lake
MN0025691	Grasston WWTP	0.04	0.06	Snake River	11	Snake River Bay
MN0023701	Hinckley WWTP	0.68	1.06	Grindstone River	4	Kettle River
MN0021458	Hokah WWTP	0.10	0.19	Root River	6	Miss. River Backwater
MN0023736	Houston WWTP	0.25	0.39	Root River	19	Miss. River Backwater
MNG580208	Longville WWTP	0.06	0.09	Unnamed wetland	3	Rice Lake
MNG580032	Menahga WWTP	0.11	0.17	Unnamed stream	7	Yaeger Lake
MN0020699	Moose Lake WWTP	0.50	0.77	Unnamed ditch to Moosehorn River	0	Moose Horn River
MN0021156	Mora WWTP	0.8	1.24	Snake River	2	Rice Creek
MN0024244	Motley WWTP	0.43	0.67	Crow Wing River	1	Placid Lake
MNG580209	Pillager WWTP	0.07	0.11	Crow Wing River	6	Crow Wing River
MN0046388	Pine River Area Sanitary District	0.25	0.38	Pine River Upper White Fish Lake	0	Pine River
MNG580211	Rich Prairie Sewer Treatment Facility	0.23	0.35	Skunk Creek	10	Rice Lake
MNG580213	Sandstone WWTP	0.335	0.5183	unnamed creek	7	Kettle River
MN0024988	Staples WWTP	0.68	1.05	unnamed swamp	16	Placid Lake
MN0064564	Tamarack WWTP	0.01	0.01	Unnamed wetland	12	Flowage Lake

Table 9. Rationale for Domestic Dischargers Removed from SONAR List

Permit Number	Facility Name	Facility Type	Discharge MGD	List Removal Rationale
MN0051381	Belgrade WWTP	Domestic	0.17	Discharge is used as spray irrigation on 3 sites: 130 acres, 39 acres, and 30 acres.
MN0020192	Detroit Lakes WWTP	Domestic	1.64	Discharge is used as spray irrigation over a total of 54 acres
MN0057410	Kettle Falls Hotel & Guest Villas	Domestic	0.01	Spray discharge to 0.63 acre wooded area.
MN0022811	Bigfork WWTP	Domestic	0.08	Rice Creek flows into the Bigfork River and therefore water from the Bigfork would have to flow upstream to impact Rice Creek.
MN0020206	Hoyt Lakes WWTP	Domestic	0.68	Water would have to flow uphill to get to the Partridge River from Whitewater Lake.
MN0020869	Jordan WWTP	Domestic	1.29	Water would have to flow uphill to get to Blue Lake from Sand Creek at Jordan.

Twenty-one industrial facilities were removed from the SONAR list for various reasons listed in the table below.

Table 10. Rationale for Industrial Dischargers Removed from SONAR List

Permit Number	Facility Name	Discharge MGD	Discharge waters	Draft Wild Rice Name	NPDES Permit Removal Rationale
MN0001309	Aggregate Industries – Nelson Plant	13	Mooers Lake (backwaters of Mississippi), Baldwin Lake (backwaters of Mississippi)	Sturgeon Lake	Water is pumped to a sedimentation basin where it percolates into the ground or evaporates. No discharge since 2008. Discharge would only be used as an emergency overflow. Process water is from Mississippi and no chemical additives are used. (permit pg. 3)
MNG250004	Alexandria Light & Power	0.012	Lake Winona	Long Prairie River	This discharge consists solely of once through non-contact cooling water to which the only pollutant added to it is heat. (permit pg. 6)
MN0001431	Sappi Cloquet LLC	0.464	St. Louis River	St Louis River	Authorized discharge consists of non-contact cooling water/industrial stormwater/treated Lake Superior water for St. Louis River augmentation. Does not authorize discharge of process water.(permit pg.12)
MNG255070	Tate & Lyle Ingredients Americas LLC	0.928	Unnamed ditch to St. Louis River	St Louis Estuary (2)	The discharge consists solely of once-through non-contact cooling water to which the only pollutants added are heat and chemical additives consistent with a municipal potable water supply. (permit pg. 6)
MNG250102	USG Interiors LLC – Cloquet	0.13	St. Louis River	St Louis River	The discharge consists solely of once-through non-contact cooling water to which the only pollutant is heat. (permit pg. 6)
MN0070564	Jordan Aggregates LLC	no quantity listed	Sand Creek	Blue Lake	Facility crushes, screens, and washes unconsolidated sand and gravel. The wastewater is routed to a recycling basin. No wastewater expected to leave facility. Stormwater will only leave the site after a two year flood event. (permit pg. 3)
MNG490140	St Louis County Highway Dept	no quantity listed	Various gravel pits and stone quarries	St. Louis River	Stormwater discharges from gravel pits, stone quarries, chrushed rock, concrete mixing, asphalt production. Permit also authorized non-stormwater discharges that do not discharge to surface water. (permit pg. 5)
MNG490177	St Louis County Land Department	no quantity listed	Various gravel pits and stone quarries	Vermilion River	Stormwater discharges from gravel pits, stone quarries, crushed rock, concrete mixing, asphalt production. Permit also authorizes non-stormwater discharges that do not discharge to surface water. (permit pg. 5)

MNG490069	Ulland Brothers Inc	no quantity listed	Various gravel pits and stone quarries	Cloquet River St. Louis River	Stormwater discharges from gravel pits, stone quarries, crushed rock, concrete mixing, asphalt production. Permit also authorized non-stormwater discharges that do not discharge to surface water. (permit pg. 10-11)
MN0000361	Wisconsin Central Ltd – Proctor Railroad Yard	no quantity listed	Kingsbury Creek	St Louis Estuary (2)	Authorized to discharge stormwater associated with industrial activities. (permit pg. 12)
MNG790128	Becker County Sanitary Landfill – Closed	no quantity listed	Unnamed wetland	Big Floyd Lake	Authorized to discharge VOC contaminated groundwater general permit requiring removal of 95% of VOC contamination or greater. (permit pg. 7)
MN0067024	Farmington City of GW Discharges	9	Vermillion River	Fisher Lake	Authorized for short-term seasonal discharge of contaminated groundwater. (permit pg. 2-3) Fischer Lake average sulfate concentration is below the 10 mg/l criteria.
MNG790199	Former Morris Oil Bulk Plant	no quantity listed	Shagawa Lake	Fall Lake	Authorized to discharge VOC contaminated groundwater general permit requiring removal of 95% of VOC contamination or greater. (permit pg. 8) Shagawa Lake average sulfate concentration is below the 10 mg/l criteria.
MN0041556	Calumet Superior LLC – Duluth Petroleum	no quantity listed	unnamed ditch to Mission Creek tributary	St Louis River Estuary	Authorized to discharge stormwater & water used for hydrotesting fuel storage tanks to secondary containment basins. Containment basins are discharged to a grassy area which *could* flow overland eventually reaching unnamed ditch. (permit pg. 3)
MN0052540	Great Lakes Gas Transmission LP	no quantity listed	various locations	Grant Creek	Authorized to discharge waters used to hydrotest pipelines and to dewater pipeline trenches within the permittees right-of-way to upland vegetated areas where possible. Occasional discharges to surface waters with BMPs to control sediment, suspended solids, and erosion. (permit pg. 3-4)
MN0056472	Minnesota Pipe Line Co	no quantity listed	various locations	Sturgeon Lake	Authorized to discharge waters used to hydrotest pipelines and crude oil tanks to well vegetated uplands using BMPs to prevent erosion, sediment transport, and bottom scouring. (permit pg. 3-4)
MN0050041	Northern Natural Gas Co	no quantity listed	various locations	St Louis River Estuary	Permit is for pipeline trench dewatering & to *request* authorization to discharge waters used to test new or existing pipeline structural integrity. (permit pg. 6-7)
MN0060755	Viking Gas Transmission	no quantity listed	various locations	Pelican Lake	Authorized to discharge waters used to hydrotest pipelines and to dewater pipeline trenches within the permittees right-of-way to upland vegetated areas where possible. Occasional discharges to surface waters with BMPs to control sediment, suspended solids, and erosion. (permit pg. 3-4)
MN0067377	Prior Lake Spring Lake Ferric Chloride WTP	no quantity listed	Unnamed Creek to Spring Lake	Blue Lake	This permit authorizes the facility to inject ferric chloride into unnamed creek for the purpose of reducing the phosphorus load reaching Spring Lake. As water passes through the desiltation basin, solid waste by-product (phosphorus flocculent) settles out. The iron flocculent and fine particles are land applied. (permit pg. 3)
MN0068241	Essar Steel Minnesota LLC	5.6	Ann pit Sullivan pit Drapper Annex pit Snowball lake Oxhide lake Pickerel creek	Ox Hide Lake	This project hasn't been fully built yet. Original MN Steel plans included Reverse Osmosis treatment so the facility would not be impacted by wild rice rule.
MN0001007	Minnesota Power – Boswell Energy Center	161.80	Pokegama Reservoir on Mississippi River	Blackwater Lake	Boswell Energy has court-ordered site specific criteria to protect wild rice.

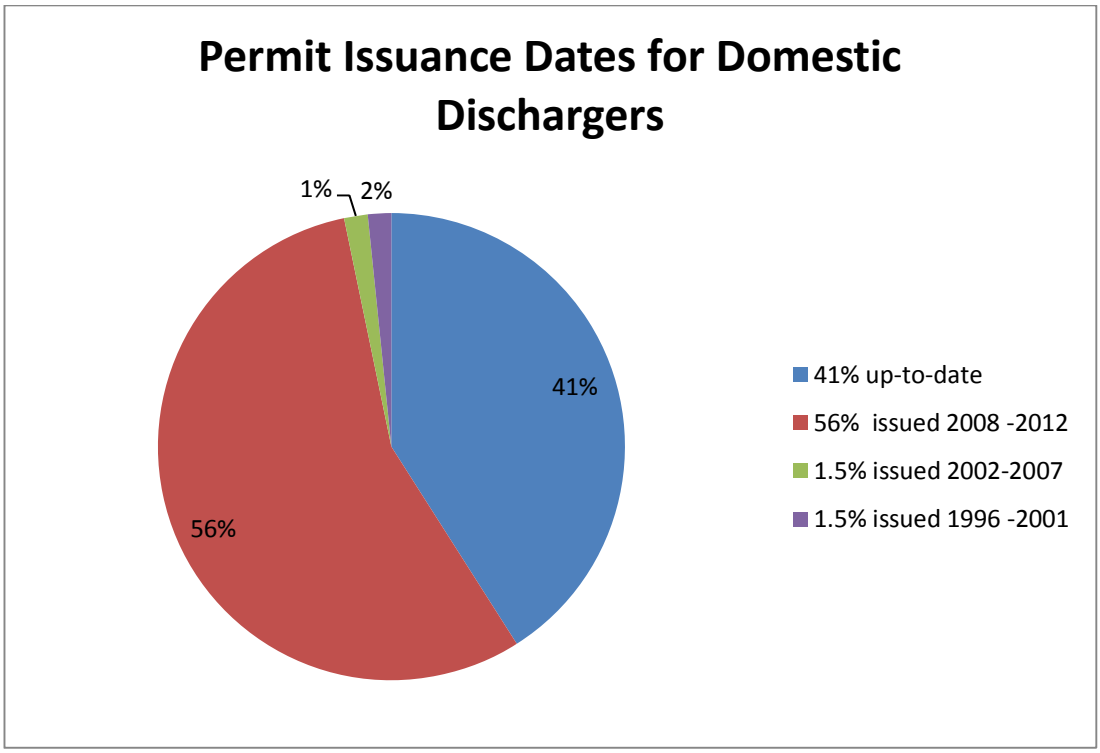


Figure 12. Domestic Dischargers NPDES Permit Issuance Dates

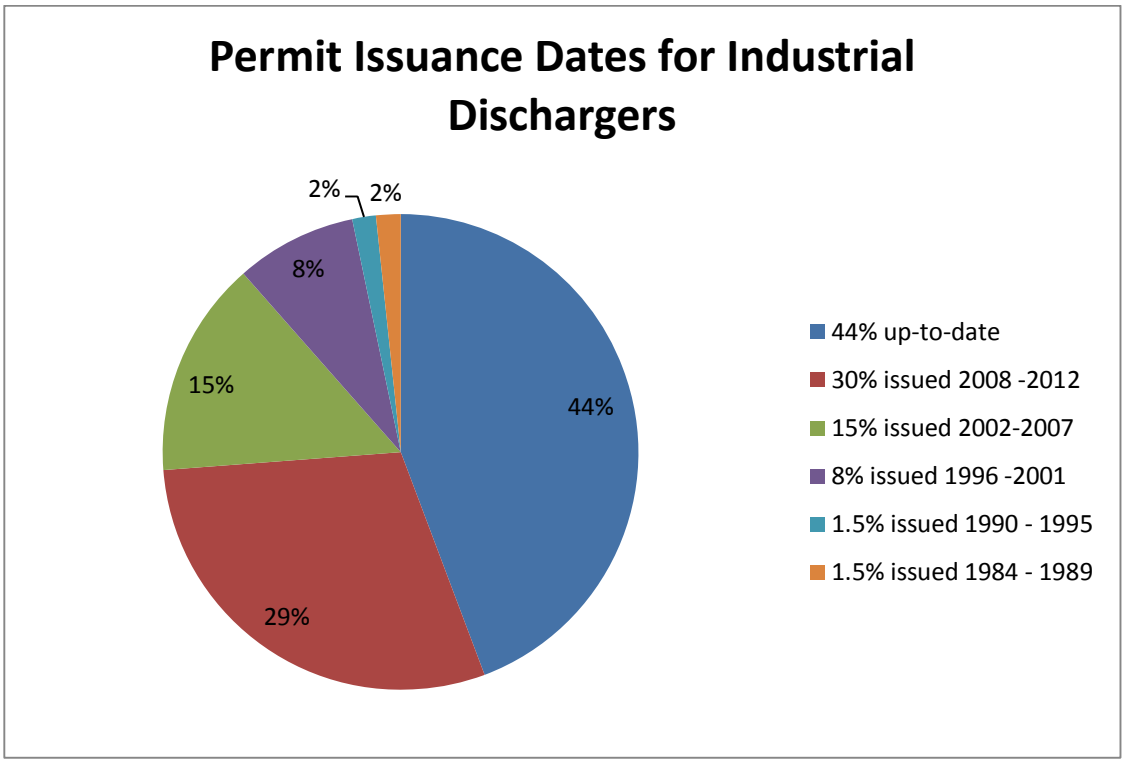


Figure 13. Industrial Dischargers NPDES Permit Issuance Dates

Comparing the proportion of up-to-date permits and those permits issued between 2008 -2012, domestic dischargers' permits comprise ninety-seven percent, demonstrating they are up-to-date or only a few years out of date. Reviewing the oldest two time categories for domestic dischargers indicate that only three percent were issued from 1984 - 2007. Reviewing industrial dischargers' up-to-date permits and those permits issued between 2008 -2012, seventy-three percent are up-to-date or only a few years out of date. Twenty-seven percent of industrial dischargers' permits were issued from 1984 - 2007. This demonstrates that domestic dischargers' are being held to higher permit compliance and/or oversight expectations by the MPCA.

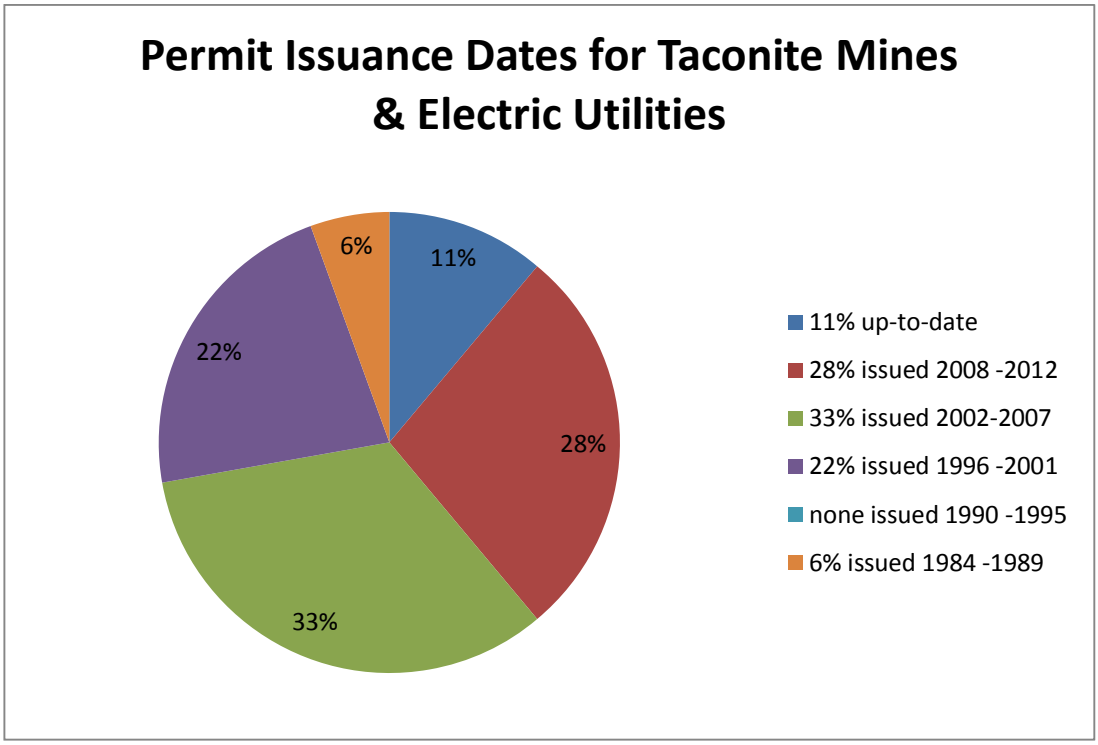


Figure 14. Taconite Mines and Electric Utility NPDES Permit Issuance Dates

By assessing the permit issuance dates for a subset of the industrial facilities, taconite mines and electric utilities included on the SONAR list, only thirty-nine percent are up-to-date or only a few years out of date. However, permits issued from 1984 – 2007 comprise sixty-one percent. This further demonstrates that even amongst industrial dischargers a reduced standard of oversight is applied to taconite and electrical utilities by MPCA. Yet, these are the largest by volume of industrial wastewater discharges and their discharges have the highest concentrations of sulfate.

Conclusions

Domestic dischargers receive more permitting oversight than much larger industrial dischargers. Where data is available, industrial facilities on average discharge six times more wastewater than domestic discharges. Average sulfate concentrations from industrial discharges are at least twenty times more concentrated than domestic discharges.

Table 11. Comparison of Industrial and Domestic Discharge Volumes and Sulfate Concentrations

Type of Facility	Discharge Volume Range (Million Gallons Per Day)	Average Discharge Volume (Million Gallons Per Day)	Average Sulfate Concentration Range (Milligrams per Liter)	Average Sulfate Concentration (Milligrams per Liter)
Industrial	0.0012 - 161.8	12.93	22.7 -1054	301.66
Domestic	0.0008 - 42	2.26	6.97 – 29.6	15.87

Virtually all of Minnesota waters that are not impacted by industrial discharges have sulfate concentrations below the 10 mg/L wild rice sulfate standard. Therefore, if industrial discharges were controlled in accordance with the law to meet Minnesota water quality standards, most domestic wastewater discharges would not require additional treatment to comply with the wild rice sulfate standard. Domestic dischargers that draw drinking water from source water where sulfate concentrations are elevated from industrial activities (e.g. mine pit lakes) could reduce the costs by treating potable water to reduce sulfate instead of adding treatment for wastewater. In addition to reducing costs, treating potable water would have community health benefits.

Comparison of Concentrations between southern and northern Minnesota

Sulfate is naturally higher in the SW part of the state, due to the history of glaciation in Minnesota. Glaciers moved from what are now parts of Canada and upper Minnesota, down and across Minnesota, scraping away large amounts of surface material and leaving behind this higher sulfate glacial till in the areas of SW MN. According to USGS & MNDNR, "*The high concentrations of sulfate in ground water in the west part of the State are probably caused by leaching of sulfate-rich minerals, such as gypsum and iron sulfide, from the drift. These were assimilated and later deposited here by glaciers that moved over Cretaceous [period]…sediments containing sulfate-rich minerals."* PIIC resides on the edge of the driftless region, an area of MN where the last period of glaciers never touched. Areas in MN where glaciers never reached during the last period still have naturally higher sulfate levels from pre-glaciation, such as the parts of SE MN where PIIC resides. USGS reports state in reference to both the St. Peter and Mount Simon-Hinckley aquifers that sulfate in the southwestern potions of the aquifer are naturally higher in sulfate because of the leakage from overlying Cretaceous deposits. This means that the SW portion of Minnesota has naturally higher sulfate levels in the groundwater. It is further important to note that groundwater concentrations of salts may be much higher and get diluted when mixed with surface water.

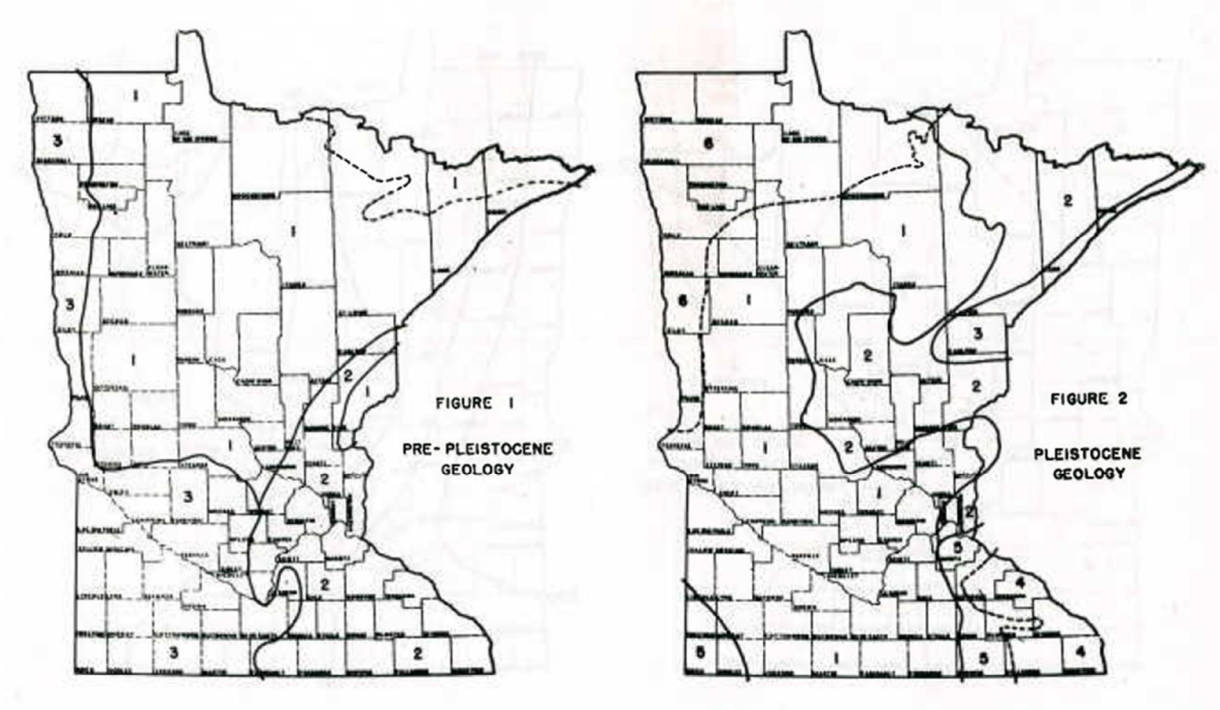


Figure above: Maps depicting geology of MN after last glaciation (Moyle, pg. 32)

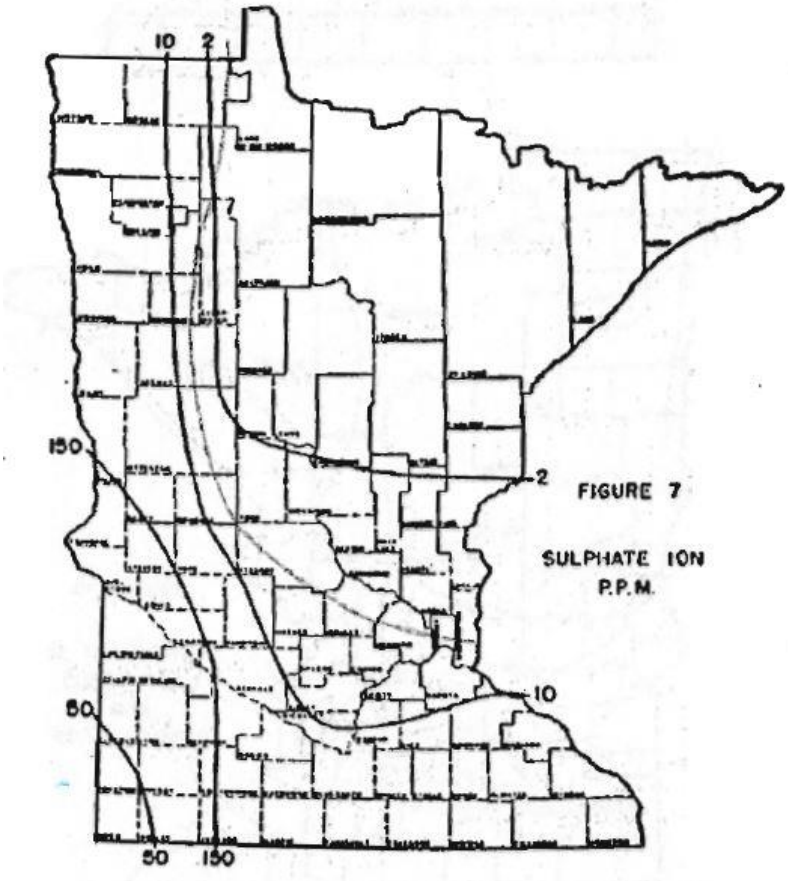


Figure above: Map depicting contours of surface water types in MN based on field measurements (Moyle, pg. 36).

The average surface water sulfate levels of Minnesota were mapped by Myrbo (2017) in a report using MPCA and DNR databases from current research on sulfate concentrations. The map below shows contours of predicted sulfate concentration in surface water using both actual and predicted measurements. Higher sulfate concentrations in southwest Minnesota are attributed to the glacial till deposits discussed previously.

However, in comparison with the map on pg. 44 depicting data from the Mississippi River, predicted sulfate concentrations don't entirely correspond to measured sulfate concentrations. The Mississippi River data shows higher sulfate concentrations in the range 30-50 mg/L in the area just north of, and running through, the Twin Cities. The predicted sulfate concentrations on the Myrbo map estimate this area should be between the 10-30 mg/L range. Records show wild rice grew, and in some places still grows, along the length of the Mississippi River.

However in comparison with the map on pg. 51 of this report depicting dischargers on or near the Mississippi River, there are some concerns about the high sulfate levels seen above and below the Twin Cities area where there are few remaining wild rice waters. Wild rice is not found to grow in the southwest portions of the state where sulfate concentrations are several hundred mg/L due to the naturally higher sulfate content in soils and surface water in that region.

Additionally, in looking at northern Minnesota on the Myrbo map evidence is seen of higher sulfate concentrations in the surface water in the iron range region. This region has sulfate bound along with the iron deposits. Undisturbed watersheds, with sulfate still bound in the glacial and bedrock geology, have low ambient sulfate concentrations. The disturbance of sulfate-rich lobes will cause higher sulfate concentrations to be evident in the surface water. Confirmation of this is shown in the following Myrbo map, where northern Minnesota with naturally low sulfate concentrations has a plume of higher sulfate concentration waters in areas surrounding industrial facilities that disturb the bedrock, releasing the sulfate trapped there.

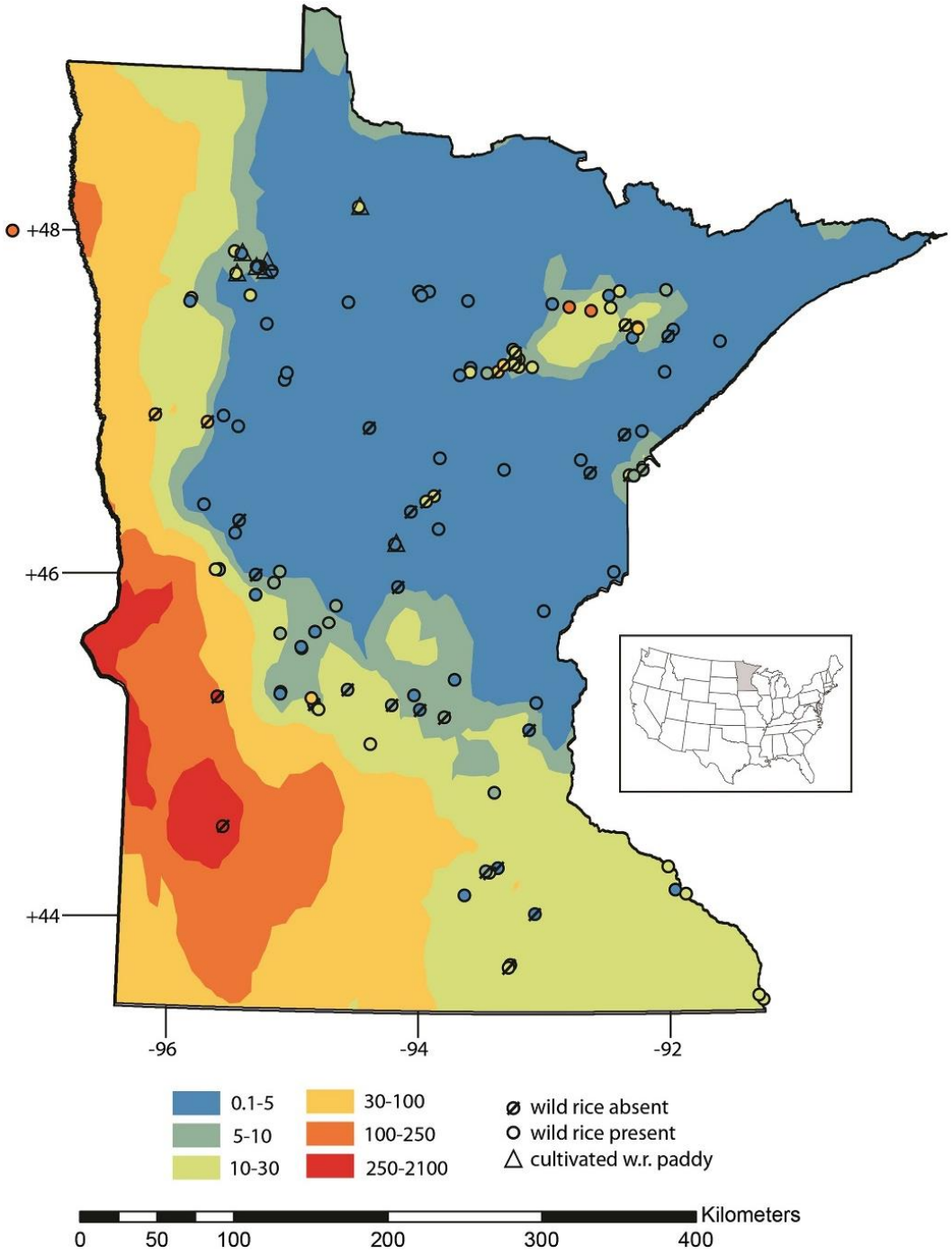


Figure above: Myrbo (2017) "Map of Minnesota showing field sites overlain on kriged contours of average surface water SO4 concentrations from 4,998 waterbodies (data from MPCA and DNR databases). The symbols are filled with the color corresponding to the site's surface water sulfate concentration. Site to the northwest of the Minnesota map is within the state of North Dakota, 40 km west of the border with Minnesota. Sites where wild rice was not found have a diagonal line through the symbol."

RECOMMENDATIONS

Per Minnesota Chippewa Tribe Resolution 107-18, *"the Tribal Wild Rice Task Force will review existing literature, including literature and information based on tradition, culture, and science, that is available to inform the understanding of the impacts of sulfate and other sulfur compounds on habitat conditions on wild rice, identify information gaps, make recommendations on priorities in a similar fashion to that included in Executive Order 18-08, and provide such report to the Governor by December 15, 2018."*

Recommendations are listed in bold, followed by description detailing the recommendation.

Widen the beneficial use of wild rice to include cultural and ecological values. Supporting materials such as the Statement of Need and Reasonableness (SONAR) and the Technical Support Document describe the beneficial use of wild rice as "the harvest and use of grains from wild rice as a food source for wildlife and humans." The scope of this beneficial use is too narrow. Wild rice provides a broad spectrum of services including cultural (importance to tribes and others) and ecological (fishery habitat, water quality, etc.) functions. The way that this can be accomplished for each agency is through MPCA including the wild rice designated use in Class 2 "aquatic life use" and the MNDNR providing a special designation for wild rice, similar to protections for trout streams and calcareous fens.

Include all waters identified by the Tribes, MNDNR, and MPCA as wild rice waters where the standard would apply. The MPCA has done a great job utilizing all information sources to compile a list of wild rice waters. However, the rule it proposed chose to omit approximately 1,000 wild rice waters out of the 2,300 on the list. Unless long-term monitoring data indicates otherwise, all waters on this list should be considered a wild rice water where the wild rice water quality standard applies. The list of wild rice waters should be inclusive instead of exclusive.[1]

[1] **This recommendation addresses EO 18-08 question a)**

Adopt a more comprehensive wild rice monitoring, assessment, and mapping strategy. Regulatory agencies should promote and advocate for a comprehensive and protective regulatory framework specifically for wild rice waters. A concerted and coordinated effort should be implemented among state, tribal and federal agencies to inventory all existing Minnesota wild rice waters. A coordinated and standardized approach for assessing the condition of wild rice water in Minnesota should also be implemented. Wild rice waters suffer from many risks including hydrological alterations, runoff, fragmentation, lakeshore development, and infrastructure development. These risks need to be quantified and explored so we are proactive in protecting wild rice waters. We recommend using the MN Sea Grant and University of MN "Wild Rice Monitoring Handbook" protocol among state and Tribal agencies.[2] (http://www.seagrant.umn.edu/downloads/sh016.pdf)

Adopt process for adding wild rice waters to list. No effort at identifying wild rice waters is perfect, and new information will feed into this effort. A straight forward and scheduled process for adding waters must be developed and implemented. This should be a collaborative process between tribal and state agencies. At a minimum, additions to the list could be made during the MPCA triennial review process.[3]

Communicate directly with each affected Tribal Government to determine their decision on listing wild rice waters within reservation boundaries. The MPCA has stated that it will not list waters within reservation boundaries if specifically requested by a tribe. Given the sovereignty of each tribe and their jurisdiction over reservation waters, a formal consultation process is required.[4]

Implement and enforce wild rice water quality standard. The current wild rice standard of 10 mg/L sulfate remains in place, but has not been enforced as required by the Clean Water Act. Existing water quality standards must be met and enforced. Regardless of what standard is in place, implementation is the key to preserve and protect wild rice. Previous state legislation that restricts state implementation of upholding the wild rice water quality standard should be rescinded.

[2] **This recommendation addresses EO 18-08 question a) and b)**
[3] **This recommendation addresses EO 18-08 question a)**
[4] **This recommendation addresses EO 18-08 question a)**

Examine and invest in sulfate reduction research and treatment technologies. Progress towards and ultimately compliance with the water quality standard must be accomplished. We are not opposed to economic development, but environmental standards must be met and enforced.[5]

Establish long-term funding. To accomplish long-term monitoring of wild rice waters, it is necessary to secure adequate long-term funding from general funds for both the MPCA and MNDNR. Additionally, a list of existing funding sources pertaining to wild rice should be created in order to draw from these sources if necessary. However, long-term funding should not rely on grants, as a steady funding stream is necessary to prioritize wild rice protection, management, and restoration.[6]

Seasonal or "flushing" discharges of sulfate should not occur. We agree with the MPCA proposed approach of allowing no seasonal discharge of elevated sulfate, as is allowed in the existing standard. Science has demonstrated that a seasonal application of the standard is not protective. However, the proposed approach that the calculated numeric standard be implemented as an annual average raises concerns. Dischargers could potentially "flush" their systems and release high concentrations of sulfate during certain times of the year, and attempt to reduce or stop discharges during other times. This essentially could function as a seasonal discharge. Annual average sulfate concentrations and permit requirements may be met, but concerns would exist about whether the spirit of the standard is being met and if wild rice and other resources are being adequately protected.

Recognize the value of wild rice and a healthy environment. The state's economic analysis only looks at one side of the equation, namely the economic costs to the regulated community. It does not assign value (or gives a value of zero) to clean water, healthy wild rice, reduced mercury in fish, and health and cultural benefits. These values are immeasurable and can be hard to quantify, but must be considered in regulatory decisions. Documents referenced in this report can be utilized to inform these decisions.

[5] **This recommendation addresses EO 18-08 question e)**
[6] **This recommendation addresses EO 18-08 question e)**

Address impaired waters of Minnesota. The MPCA maintains a list of impaired waters that do not meet water quality standards in the state. This list is updated and submitted to the USEPA every two years. Wild rice waters impaired from the sulfate standard have not been included to date. Impacted wild rice waters should be added to the Minnesota's impaired waters list, and activities should be implemented to remove impairments. Addressing other impairments will also improve other water quality issues that may be impacting wild rice waters.[7]

Recognize and support tribal sovereignty, culture, and treaty rights. Tribal sovereignty must be recognized, and proper consultation needs to occur on issues impacting natural resources and tribal populations. Tribal culture, and the importance of resources such as wild rice, must be appreciated and respected. Many Bands have signed treaties with the United States retaining rights to hunt, fish, and gather. Treaty rights are the supreme law of the land, and must be recognized and upheld.
For these rights to be exercised, wild rice and other resources must be available (protected and enhanced) to be utilized.

PRESERVE AND PROTECT MANOOMIN/PSIŊ/WILD RICE FOR FUTURE GENERATIONS.

[7] **This recommendation addresses EO 18-08 question b)**

APPENDIX

Appointed members of the Tribal Wild Rice Task Force (by their respective governments):

Deb Dirlam, Director of Environmental Programs, Lower Sioux Indian Community
Justice Wabasha, Environmental Technician, Lower Sioux Indian Community
Margaret Watkins, Water Quality Specialist, Grand Portage Band of Lake Superior Chippewa
John Morrin, Tribal Council Representative, Grand Portage Band of Lake Superior Chippewa
Tara Geshick, DNR Director, Bois Forte Band of Chippewa
Darren Vogt, Resource Management Division Director, 1854 Treaty Authority (representative for Bois Forte Band of Chippewa)
Nancy Schuldt, Water Projects Coordinator, Fond du Lac Band of Lake Superior Chippewa
Thomas Howes, Natural Resources Manager, Fond du Lac Band of Lake Superior Chippewa
Richard Robinson, DRM Director, Leech Lake Band of Ojibwe
Ben Benoit, Environmental Director, Leech Lake Band of Ojibwe
Bradley Harrington, Commissioner of Natural Resources, Mille Lacs Band of Ojibwe
Kelly Applegate, Wildlife Biologist, Mille Lacs Band of Ojibwe
Monica Hedstrom, Natural Resources Director, White Earth Nation
William Bement, Water Division Manager, White Earth Nation
Leya Charles, Water Resources Specialist, Prairie Island Indian Community

Other contributors:

Brandy Toft, Environmental Deputy-Director, Leech Lake Band of Ojibwe
Natalie Boyd, Environmental Technician, Mille Lacs Band of Ojibwe
Tony Swader, Trust Land Administrator, Grand Portage Band of Lake Superior Chippewa
Richard Jackson, GAP Coordinator, White Earth Nation
Michael Northbird, Environmental Program Manager, Minnesota Chippewa Tribe

Arthur Lockwood, Dakota Language Instructor, Prairie Island Indian Community
Franky Jackson, Tribal Historic Preservation Officer, Prairie Island Indian Community
Lars Lidahl, Environmental Technician, Prairie Island Indian Community
Heather Fox, GIS Specialist, Grand Portage Band of Lake Superior Chippewa

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Pertinent Tribal and State Correspondences with the Governor (2014-2018) ***Attachment 1A***

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Deloria, E. (1967). Museum News: The W. H. Over Dakota Museum. *University of South Dakota*, pg. 10-12 ***Attachment 3A***

Legislative Rules (2015, 2016, 2017) ***Attachment 4A***

Complete list of Wild Rice Waters developed by MPCA (Oct. 2017) ***Attachment 5A***

PUBLIC COMMENTS

Nancy Beaulieu, Leech Lake Band - when task forces get together we need to protect the issue from all threats. The TWRTF should be considering other pollutants and threats that affect our sacred wild rice. The TWRTF should expand the focus of their task at hand. Reports regarding wild rice should be inclusive and considerate of the importance of protecting it. Effects of climate change should be a part of the overall report. (11/28/18 Open meeting, Mille Lacs Grand Casino)

Michael Connor, Bois Forte - wild rice is not just a substance to eat, it builds relationships within different age group of a community. It's educational, we learn from each other, and all people can relate to the importance of maintaining protections of our culture and history. The diversity of the natural world that depends on this important issue as a long-standing relationship that we all have, from macro-invertebrates to all other species. (11/28/18 Open meeting, Mille Lacs Grand Casino)

Perry Bunting, Mille Lacs - the TWRTF should clarify what the 10mg/L standard really means. That it relates to the sulfate levels of water bodies and not the "end of the pipe". (11/28/18 Open meeting, Mille Lacs Grand Casino)

Debra Topping, Fond du Lac - a baseline, in regards to all pollutants in the lakes within our reservations and treaty-ceded territories, should be included in the report. (11/28/18 Open meeting, Mille Lacs Grand Casino)

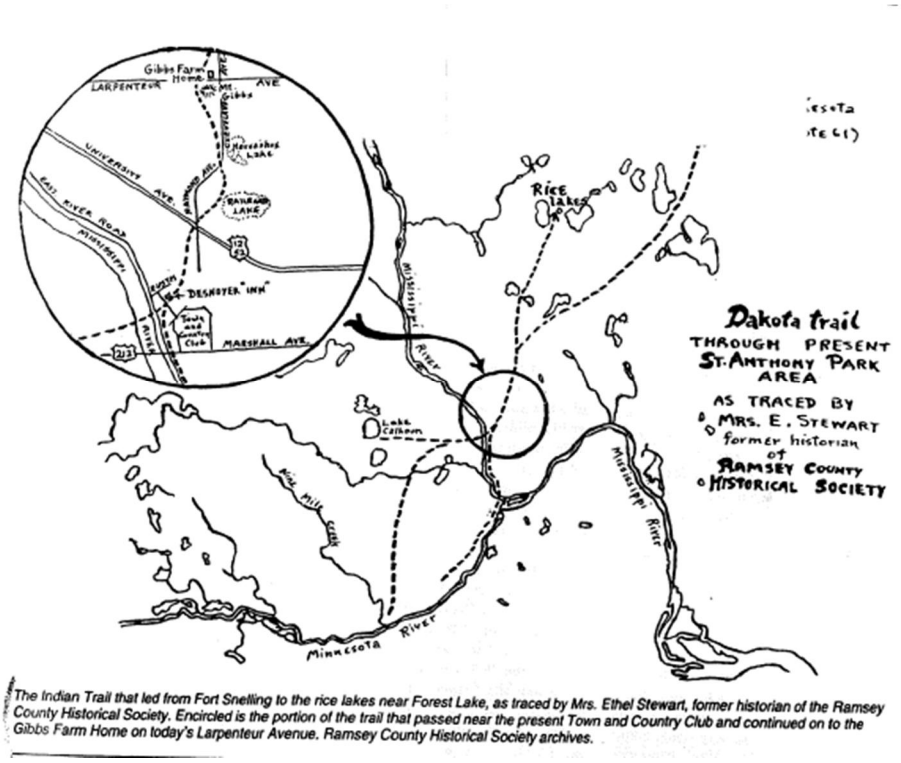
Nicole Buck, Prairie Island Indian Community - I work in land and environment as tribal garden assistant and work with our food sovereignty. Today I'm writing a letter in regards to the growth and production of protecting our wild rice. Wild rice is not only a huge part of my diet but many of our people as well. Wild rice plays many spiritual and physical roles to the Dakota people. From high nutrition for the nourishment of our bodies to the spiritual essence of our ceremonies. Wild rice has been a huge part of our diet prior to colonization, it connects to the land and water ways. Currently as we speak Prairie Island does not have viable wild rice for harvest for our people we have to get it from other tribes in the Northern Territory. Being able to grow and harvest our own wild rice for our people would help us strive with our food sovereignty. My health depends on sustainable wild rice so I hope this letter of support helps us, the people of Prairie Island get a voice in this crucial matter on wild rice. (11/26/18 Email received)

Tina Jefferson, Prairie Island Indian Community - I hope this letter finds its way to a greater cause in protecting our natural resources. In keeping with our traditions and understanding the dilemmas that the dams have created on our waterways on the Mississippi River bottom, we once had a population of wild rice. Since flooding has been prevalent on Prairie Island and decimates our abilities to grow a sustainable crop of wild rice and control of water quality! We have been forced to rely on our other Minnesota Native communities in northern Minnesota to supply our demand for our traditional wild rice and fresh walleye! I am in total support of our communities working together to make this a sustainable food source to our people and our traditions! Though we are not there physically there are many of us that use rice as a staple in our homes and it would be a shame not to have this resource available to us as a people! My father Joseph Campbell worked with and headed many organizations for the condition of our mighty Mississippi and down river alliance! (11/27/18 Email Received)

Cheyanne St. John, Lower Sioux Indian Community -

The Bdewakantunwan Dakota have long been known for their knowledge of harvesting and depending on wild rice. The food source is a staple in a long-existing traditional lifeway, many Dakota elders still make annual pilgrimages to the northern lakes of Minnesota to harvest wild rice, or *pśin*.

As stated by both Prairie Island Dakota Community and Lower Sioux's Office of Environment, numerous historic accounts detail the utility and significance wild rice has to Dakota people as early on as 1600. The image below identifies the Minnesota trails Santee Dakota took to access ricing areas, both Cloudman and Wabasha's Village sites were once situated in areas near present day Minneapolis. Dakota's from both villages actively harvested wild rice in lakes as near as the reclaimed Bde Maka Ska.



The Indian Trail that led from Fort Snelling to the rice lakes near Forest Lake, as traced by Mrs. Ethel Stewart, former historian of the Ramsey County Historical Society. Encircled is the portion of the trail that passed near the present Town and Country Club and continued on to the Gibbs Farm Home on today's Larpenteur Avenue. Ramsey County Historical Society archives.

A Study of Wildrice in Minnesota. Edman, Robert F. Minnesota Resource Commission (1969)

Lower Sioux's Tribal Historic Preservation Office has conducted numerous interviews will Dakota elders and spiritual leaders over the past decades capturing oral interviews, community histories and landscape/site knowledge. After assessing the responses pertaining specifically to where Lower Sioux/Mdewakanton harvested wild rice most elders replied, "historically, the Dakota of Lower Sioux went north until they reached the furthest south lake and harvested from there."

Overtime the advancement and progression of industry and agriculture resulted in many southern MN waterbodies being drained or tiled, presumably destroying historic-Dakota ricing areas.

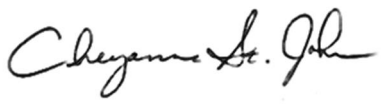
Lower Sioux Indian Community is concerned about the potential impact of infrastructure development on the natural resources we depend on for medicinal, cultural, and economic purposes. These concerns extend to proposals and/or permits that might have long-lasting impacts on LSIC's resources.

LSIC wants to prevent environmental degradation and environmental harm in all areas of our ancestral homelands. We do not support projects or policy that risk traditional foods being demolished, poisoned or altered. Wild rice areas (water tributaries, water bodies and adjacent streams) should remain protected and pristine for future access, harvest and establishment.

The State of Minnesota is responsible for issuing many of the permits necessary for infrastructure development to proceed, such as the crude oil Line 3 pipeline. LSIC needs this task force to advocate and evaluate the potential impacts on Treaty rights and our natural resources to ensure the sustainability of pśin for future generations.

On behalf of Lower Sioux Indian Community of Minnesota, we appreciate the opportunity to provide these comments.

Pidamaya ye,



Cheyanne St. John, THPO/Cultural Dept. Director
Lower Sioux Indian Community
(12/04/2018 Email Received)

Janice Erickson, Prairie Island Indian Community – My name is Janice Erickson. I am an enrolled Tribal member. My husband and my 5 children are all Tribal members too. Our family, friends, & community are connected to Wild Rice for many reasons. The most important reason is we regularly eat wild rice as a part of our natural diet. Our ancestors have been doing the same for countless generations! We also use our wild rice by culture and ceremonies. It is a part of who we are as a people. I am writing this to voice my concern that we need ensure our water is kept clean. The wild rice is dependent on it. It cannot grow or thrive in dirty water. People in general cannot grow or thrive in dirty water! It's really awful that mines aren't cleaning up their waste. Their pollution is deadly & hurting us all. Please make sure your report will fight for what is right! Our future, & future generations are counting on you!
(12/12/2018 Email Received)