

## March 2015 proposed approach for Minnesota's sulfate standard to protect wild rice

Minnesota Pollution Control Agency

March 24, 2015

### Introduction

Wild rice is an important plant species in Minnesota. Wild rice provides food for waterfowl, is economically important to those who harvest and market it, and is also an important cultural resource to many Minnesotans.

Sulfate is a natural chemical commonly found in surface and groundwater. It can also be found at varying concentrations in discharges from permitted facilities such as mining operations, municipal wastewater treatment plants, and industrial facilities.

This recognition of the importance of wild rice in Minnesota, and the observed positive relationship between wild rice and water bodies with lower sulfate levels, led to the adoption of a wild rice sulfate standard in 1973. Recent questions about implementation of the standard led to interest in further understanding the effects of sulfate on wild rice to inform a review of the wild rice sulfate standard.

In 2011, the Minnesota Legislature directed the Minnesota Pollution Control Agency (MPCA) to conduct research on the effects of sulfate and other substances on the growth of wild rice. The study began in 2012.

This document summarizes the MPCA's analysis of the study results and other available information, and outlines a proposed approach for protecting wild rice from sulfate pollution. In addition, this document discusses implementation questions related to the current standard, and a proposed approach to clarify where the standard applies.

### Summary

Following the development of a detailed research protocol in 2011, in 2012 the MPCA contracted with groups of scientists at the University of Minnesota's Duluth and Twin Cities campuses to undertake a Wild Rice Sulfate Standard Study.

The study's main hypothesis was that wild rice is affected by sulfate via the conversion of sulfate to sulfide dissolved in the water in the sediment, known as the sediment porewater. The study focused on collecting data on the relationship between sulfate, sulfide, and wild rice through multiple study components: field surveys, laboratory hydroponic experiments, and outdoor mesocosm experiments in containers.

The parallel study components each have a specific purpose and associated strengths and limitations (Table 1). The study was designed so that the individual components together provide a better understanding of the effects of sulfate on wild rice. The study components are:

- Field survey of wild rice habitats to investigate physical and chemical conditions correlated with the presence or absence of wild rice, including sulfate in surface water and sulfide in the sediment porewater of the rooting zone
- Controlled laboratory hydroponic experiments to determine the effect of elevated sulfate and sulfide on early stages of wild rice growth and development
- Outdoor container mesocosm experiments using natural sediments to determine the response of wild rice to a range of sulfate concentrations in the surface water, and

associated sediment porewater sulfide concentrations in the rooting zone, across the growing season.

- Collection and analysis of rooting zone depth profiles of dissolved chemicals in wild rice container experiments and field sites to characterize sulfate, sulfide, iron and other constituents.
- Sediment incubation laboratory experiments to explore the difference ambient temperature has on the rate that elevated sulfate concentrations in water enter underlying sediment and convert to sulfide, and to what degree sulfate is later released back into the overlying water.

Each of the reports for the study components may be accessed via the MPCA's wild rice sulfate standard web page at [www.pca.state.mn.us/ktqh1083](http://www.pca.state.mn.us/ktqh1083) (a link to an FTP site with all the reports and data is available on this page). A brief summary of the study is also available on the web page.

During the first half of 2014, MPCA staff integrated the study results, analyzed the data as a whole, received input from MPCA's Wild Rice Standards Study Advisory Committee, and reviewed existing monitoring data and other relevant scientific studies/information. Based on these inputs, MPCA developed a draft analysis that was the subject of a scientific peer review conducted during summer 2014 (ERG 2014, available at [www.pca.state.mn.us/kppq38rq](http://www.pca.state.mn.us/kppq38rq)).

Following the peer review, MPCA scientists completed additional analyses based on the recommendations of the peer reviewers and feedback received from the Wild Rice Standards Study Advisory Committee (a list of committee members is available at [www.pca.state.mn.us/u3uw4ya](http://www.pca.state.mn.us/u3uw4ya)).

Through the study and subsequent analysis, MPCA has learned the following:

- Wild rice is vulnerable to elevated sulfate concentrations because sulfate can be converted to sulfide by bacteria in the sediment where wild rice is rooted. Sulfide's toxicity to animals and plants, including wild rice, varies with its concentration.
- The protective threshold of sulfide in porewater is 0.165 milligrams per liter, or 165 micrograms per liter; the likelihood of wild rice being present in a lake or stream declines as sediment porewater sulfide levels increase above that concentration.
- Data from the mesocosm container studies demonstrate that as sulfate concentrations in surface water increase, the sulfide concentrations in the sediment also increase.
- In Minnesota lakes and streams, the efficiency of this conversion of sulfate to sulfide is highly variable due to environmental differences. The most important of these differences are the concentrations of iron and organic carbon in the sediment.
- Elevated sulfate has the potential to negatively impact wild rice. However, no single concentration of sulfate is protective of wild rice in all water bodies; sulfate is converted to sulfide at a different efficiency in each water body, depending on iron and total organic carbon concentrations in the sediment.
- The different efficiency of sulfate conversion among water bodies can be characterized by an equation. The equation can then be used to calculate a protective sulfate concentration for a water body that will still allow the wild rice population to self-perpetuate over the long term.
- The equation is founded in a model that considers the variability in sediment iron and total organic carbon levels among wild rice water bodies. The inputs for the equation are the concentrations of iron and organic carbon in sediment (Equation 1).

$$\text{Sulfate} = 0.0000136 \text{ Organic Carbon}^{-1.410} \text{ Sediment Iron}^{1.956} \quad (\text{Equation 1})$$

(Sulfate is expressed in milligrams per liter; organic carbon is percent total organic carbon in the sediment; sediment iron is micrograms extractable iron per gram sediment.)

Equation-based approaches for identifying a protective value of a chemical have been incorporated into water quality standards for other chemicals of concern, including ammonia and some metals. A general process to calculate the protective sulfate threshold is shown in Figure 1.

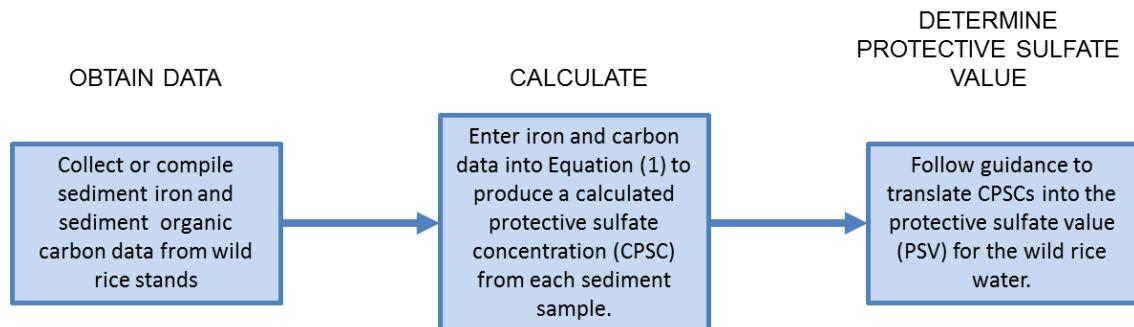


Figure 1. Flowchart of a process to calculate the protective sulfate value (PSV) for each wild rice water. This proposed approach to determining a PSV will be further discussed and refined prior to, and during, rulemaking.

Table 1. Purpose, strengths, and limitations of study components.

	Field survey	Laboratory hydroponic experiments		Outdoor container experiments	Collection and analysis of rooting zone depth profiles	Sediment incubation laboratory experiments
		Sulfate ( $\text{SO}_4$ )	Sulfide ( $\text{H}_2\text{S}$ )			
<b>Main purpose</b>	Expand understanding of environmental conditions correlated with presence/absence of wild rice	Evaluate effects of sulfate on wild rice seed germination and growth of sprouts	Evaluate effects of sulfide on wild rice seed germination and growth of sprouts	Evaluate effects of sulfate on wild rice plants over full life cycle, and multiple years	Characterize sulfate, sulfide, and iron in the rooting zone of wild rice container experiments and field sites	Evaluate effect of temperature on movement of sulfate into and out of underlying sediment
<b>Endpoints</b>	Concentrations of chemicals in surface water & rooting zone (e.g. $\text{SO}_4$ & $\text{H}_2\text{S}$ vs. wild rice occurrence)	Growth of wild rice sprouts (biomass, root and shoot elongation); germination rate of seeds	Growth of wild rice sprouts (biomass, root and shoot elongation); germination rate of seeds.	Growth of wild rice (biomass, plus number and weight of seeds); sulfide concentrations in rooting zone	Concentrations of sulfate, sulfide, and iron in porewater	Sulfate concentrations in overlying water over time; $\text{SO}_4$ , iron, $\text{H}_2\text{S}$ , and anion tracers in sediment porewater; simple model
<b>Key strengths</b>	Most reflective of actual environmental conditions; multiple wild rice stands and breadth of characteristics sampled	Controlled dose-response experiment; controlled exposure to known concentrations of $\text{SO}_4$	Controlled dose-response experiment; controlled exposure to known concentrations of $\text{H}_2\text{S}$	Controlled dose-response experiment. Includes natural sediment matrix as rooting environment; involves entire growth cycle, multiple years	Provides additional data to understand and interpret container experiments and field sites	Controlled experiment with natural sediment and water
<b>Key limitations</b>	Least controlled; annual visit for most sites, 3x/year for a subset; not definitive on cause and effect	Only evaluates early growth stages; leading hypothesis is that sulfate is converted to sulfide, which is directly toxic	Only evaluates early growth stages; unable to simultaneously keep roots anaerobic and shoots aerobic	Full effect of sulfate may take longer than several years to realize; no groundwater movement	Utility lies in the integration of this data with the other study components, not in this data set alone	Provides preliminary assessment of sediment from two sites that may inform but is not fully transferrable to other sites; no groundwater movement; no wild rice plants grown

## Supporting scientific information

### Definitions

**Sulfate** always refers to sulfate in surface water, which can diffuse into sediment and be converted to sulfide by bacteria.

**Sulfide** always refers to sulfide in porewater (with the minor exception of acid-volatile sulfide, or AVS, which is mentioned once in this report). Sulfide refers to the sum of several different forms that vary according to pH: Below pH 7.0 hydrogen sulfide ( $H_2S$ ) is dominant, and above pH 7.0 bisulfide ( $HS^-$ ) is dominant. It is thought that hydrogen sulfide is the more toxic form.

Two forms of **iron** in the sediment of wild rice waters are discussed in this report: iron in the porewater of sediment (which is always called porewater iron) and sediment iron. Sediment iron, which includes porewater iron, is the iron that is thought to potentially interact with sulfide (it is the iron that goes into solution when a sediment sample is extracted with 0.5 N hydrochloric acid for half an hour at 80 degrees C). Porewater iron is a very small proportion—less than 3%—of extractable iron, which is the main reservoir of iron that can interact with sulfide.

**AVS (acid-volatile sulfide)** is liberated from a sediment sample when 6 N hydrochloric acid is added to a sediment sample.

**Sediment Total S** is the concentration of sulfur in a sediment sample.

**Total Organic Carbon (TOC)** is a measure of the organic matter in the sediment that is available for decomposition by bacteria.

### **1) The dose-response relationship between sulfide and wild rice**

Wild rice grows in aquatic systems (lakes and rivers) where it germinates and roots itself on the bottom substrate (otherwise known as sediment) that is perpetually saturated with water.

Water saturation of soil has profound consequences for plants; the lack of oxygen greatly alters the chemistry and presents a challenging environment. When oxygen is not available, natural bacteria respire other chemicals. When bacteria respire sulfate, they release sulfide into the sediment porewater, which is potentially toxic to virtually all plants and animals. In a review article, Lamers et al. (2013) found that, in general, freshwater plants are more sensitive to sulfide than marine plants and that white rice experiences sulfide toxicity at sulfide concentrations of 10 micromolar sulfide (320 micrograms of sulfide per liter). If a protective sulfide concentration were developed for white rice, it would therefore have to be lower than 320 micrograms per liter, and would perhaps be similar to MPCA's proposed protective concentration for wild rice of 165 micrograms per liter.

It's therefore expected that at some concentration, sulfide is toxic to wild rice. The question is, what is the critical concentration of porewater sulfide that allows wild rice to germinate, grow, reproduce, and perpetuate over many generations?

The relationship between the concentration of a chemical and the effects of that chemical on the growth or survival of an organism is termed by toxicologists to be the *dose-response relationship*, which is generically represented in Figure 2 as a logistic curve. Biological response data are fitted to curves and these curves may be used to represent the response of an organism to a chemical. Curves are routinely used to derive the concentration associated with a particular level of negative effect on the organism. For instance "Effect Concentration<sub>percent</sub>" values can be derived from such curves. EC<sub>10</sub>, for example, is the concentration estimated to reduce the response (expressed as an endpoint such as growth, survival, reproduction, presence, etc.) of the organism by 10% relative to the control. Effect concentrations can be

calculated for a variety of response variables. Different response variables, as quantified by effect concentrations, will not necessarily produce similar thresholds. For instance, reproduction (e.g., seed production) may be more sensitive to impacts from a chemical than growth (e.g., change in biomass), so that for a given chemical the EC<sub>10</sub> may be lower for reproduction than for growth.

The MPCA uses the calculation of EC<sub>10</sub> values as a way to establish the proposed protective concentration of sulfide for wild rice. The agency had originally calculated this concentration based on the EC<sub>20</sub>, but the peer reviewers suggested that using EC<sub>20</sub> was not adequately protective.

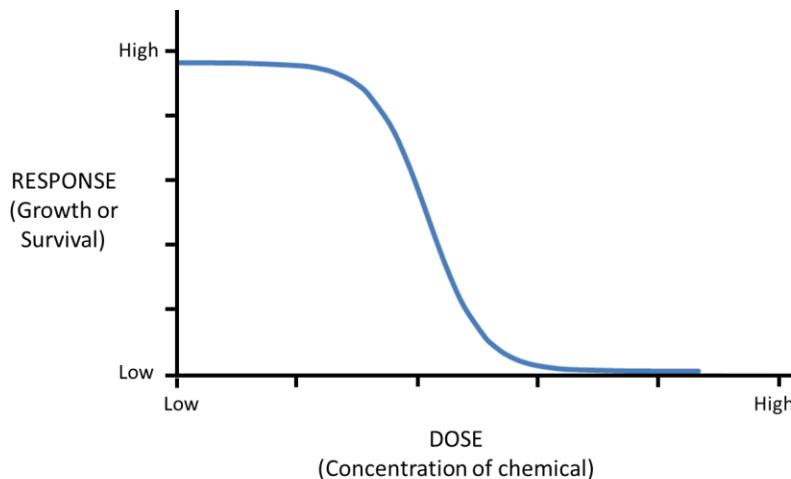


Figure 2. Generic schematic representation of a dose-response relationship for the concentration of a chemical on the measured effect (response) of an organism. At low chemical concentrations, the organism can tolerate the chemical, but toxicity (as measured by the response) increases as chemical concentrations rise.

The MPCA wild rice sulfate study collected data from three different study components, laboratory hydroponic experiments, outdoor mesocosm experiments, and field survey data. EC<sub>10</sub> sulfide concentrations can be estimated for different responses from all three components. MPCA relies on the EC<sub>10</sub> from the field survey to determine the protective concentration of sulfide, because the field data best characterize the conditions under which wild rice populations are self-perpetuating over many generations. The hydroponic and mesocosm experiments examined specific response variables, for which EC<sub>10</sub> sulfide values can be estimated. The EC<sub>10</sub> values from all three study components can be compared to each other, but are not estimates of the same responses, and therefore would not necessarily be expected to converge on a common concentration.

In the field survey, the biological response measured was the density of wild rice stems around the boat at the location where sediment was sampled to measure porewater sulfide. For the logistic curve fitting, the response variable was the presence or absence of wild rice at sites, with presence defined as at least 2 stems per square meter. The dose variable was the concentration of sulfide in the sediment porewater at the site. The EC<sub>10</sub> for the field survey is the porewater sulfide concentration at which there is a 10% reduction in the probability that wild rice would be observed at any given site (Figure 3). The field survey data EC<sub>10</sub> is 165 micrograms sulfide per liter, which MPCA proposes as the porewater sulfide concentration that is protective of growth and reproduction for wild rice populations.

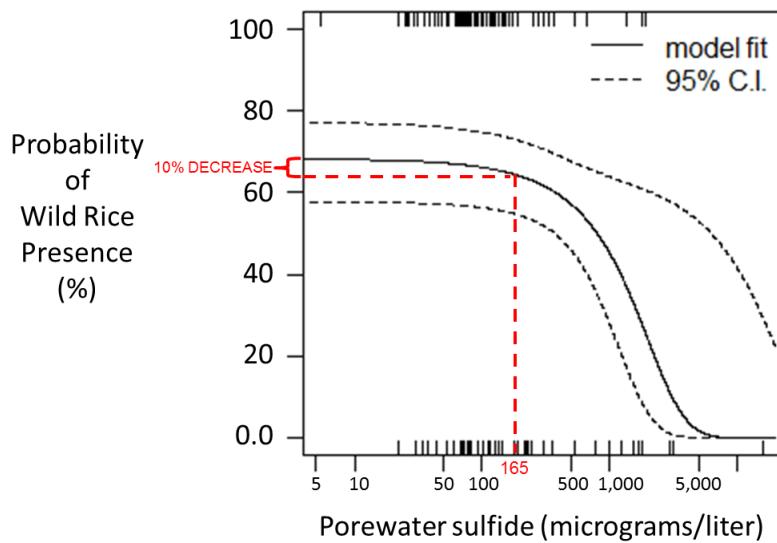


Figure 3. Logistic regression of wild rice presence (at a minimum of 2 stems per square meter) for 112 different field sites (cultivated paddies are not included). A sulfide concentration of 165 micrograms per liter is associated with a 10% reduction in the probability of wild rice presence, compared to the maximum observed probability. The 95% confidence interval is larger at higher sulfide concentrations because there are fewer data points above 500 micrograms per liter.

Estimates of effect concentrations are described individually for the mesocosm, hydroponic, and field study components because each are unique in their measured responses. Figure 4 shows estimated EC<sub>10</sub> values for each of the three study components plotted in comparison to the 165 micrograms per liter sulfide concentration. While they are quantifying different biological responses and therefore show different results, all the results are relevant to wild rice. It is notable that all of the EC<sub>10</sub> values are of similar magnitude (Table 2). The field survey EC<sub>10</sub> value is relied upon for the MPCA proposal because it best represents the full lifecycle of wild rice.

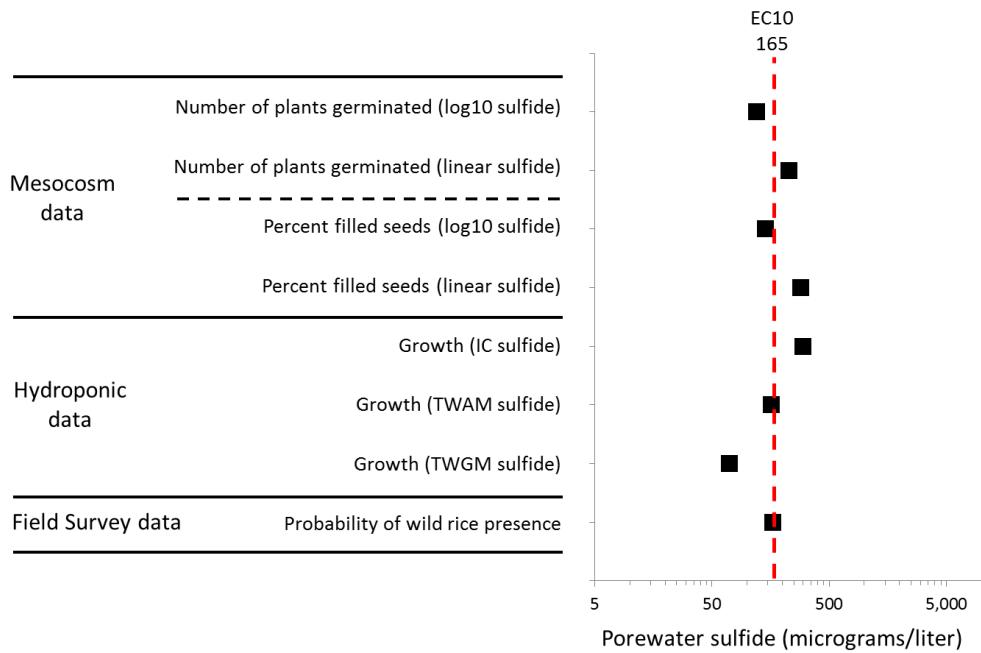


Figure 4. Comparison of EC<sub>10</sub> values from the field survey (165 micrograms sulfide per liter) to EC<sub>10</sub> values produced by other study components. The mesocosm EC<sub>10</sub> values were derived from linear regressions of 2013 biological data against sulfide data (either linear or log10-transformed) obtained August 28, 2013 (all p< 0.05). The three hydroponic EC<sub>10</sub> values were produced by combining normalized growth data from multiple experiments and performing logistic regressions using three different measures of sulfide exposure concentrations (IC = initial concentration; TWAM = time weighted arithmetic mean; TWGM = time weighted geometric mean).

The regression analysis of the mesocosm data with log-transformed or non-transformed sulfide data were of similar statistical quality, so EC<sub>10</sub> values are presented from both regressions (Figure 4). For the two biological response variables (number of plants germinated and percent filled seeds), the two regression methods bracket the field survey EC<sub>10</sub>, the log transformation is less than 165 micrograms/liter, and the non-transformed regression is greater than 165 micrograms/liter.

Multiple estimates of the EC<sub>10</sub> for seedling growth were also calculated from the hydroponic experiment. During the 11-day experiment, the sulfide concentration declined during the 2 to 3 days of exposure between sulfide renewals, probably due to oxygen released by the photosynthesizing seedlings (details are presented in MPCA, 2014). Figure 4 and Table 2 present effect concentrations based on three different assumptions about the sulfide concentration that affected the biological response. The issue is, what sulfide concentration should be used to calculate the regression curves for the hydroponic experiment? There are three choices:

- Initial sulfide concentration (which the peer reviewers concluded was inappropriate because it would underestimate the toxicity of sulfide)
- Time-weighted arithmetic mean sulfide concentration
- Time-weighted geometric mean sulfide concentration

The reviewers were divided on which of the latter two methods would be the most appropriate estimate of sulfide exposure.

Table 2. Calculated 10% effect concentrations ( $EC_{10}$ ) for the wild rice study components.

<b>Study component</b>	<b>Biological endpoint</b>	<b>Sulfide concentration (micrograms per liter)</b>
		<b><math>EC_{10}</math></b>
Mesocosm	Number of plants germinated (log10)	121
Mesocosm	Number of plants germinated (linear)	226
Mesocosm	Percent filled seeds (log10)	143
Mesocosm	Percent filled seeds (linear)	288
Hydroponic	Growth (initial concentration)	299
Hydroponic	Growth (time-weighted arithmetic mean)	160
Hydroponic	Growth (time-weighted geometric mean)	71
Field Survey	Probability of wild rice presence	165

## **2) The relationship between sulfide and sulfate**

Sulfide found in the sediment porewater of lakes, streams, and wetlands is primarily generated from sulfate that diffuses into the sediment from the surface water. The relationship between elevated sulfate in a water body and porewater sulfide impacts on wild rice is affected primarily by two factors:

- The rate of conversion of sulfate to sulfide by bacteria in the sediment varies from one water body to the next. This variability is primarily due to different levels of total organic carbon that occur in the sediment of each site; total organic carbon is the food for the bacteria.
- As sulfide is produced from sulfate, if iron is available in the sediment it can interact with the sulfide and form a solid that does not affect wild rice.

In other words, higher levels of organic carbon in the sediment can lead to more sulfide being produced from a given amount of sulfate in the overlying water; conversely, higher levels of iron in the sediment can lead to less sulfide being available to impact the wild rice plants at a given sulfate level.

MPCA developed a structural equation model (SEM) based on the relationships in Figure 5. The model is used to predict the sulfide concentration in sediment porewater, from the concentrations of surface water sulfate, sediment iron, and sediment organic carbon, which can be expressed as:

$$Sulfide = 7.873 \cdot Sulfate^{0.345} \cdot Organic\ Carbon^{0.486} \cdot Sediment\ Iron^{-0.675} \quad (Equation\ 2)$$

(Sulfate and sulfide are expressed in mg/L; organic carbon is percent total organic carbon in the sediment; iron is micrograms extractable iron per gram sediment).

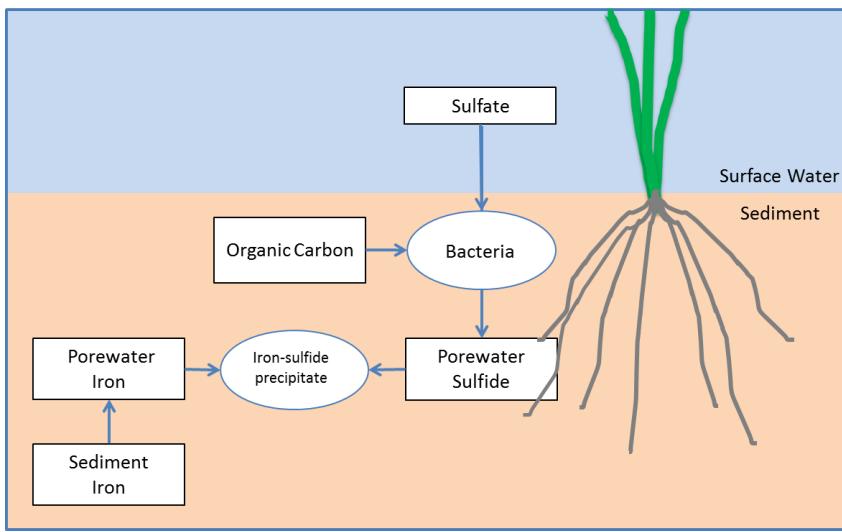


Figure 5. A simplified diagram of the ways sulfate, sulfide, iron, and organic carbon interact in the sediment of wild rice waters. Sulfate in surface water diffuses into sediment, where wild rice grows. Bacteria use organic carbon in the sediment as food and simultaneously respire sulfate, which is released into sediment porewater as sulfide. Sulfide may be toxic to wild rice if the roots, stems, or leaves are in contact with elevated concentrations. However, porewater sulfide may be reduced to tolerable concentrations if it combines with iron in the sediment to form a solid iron sulfide compound (a precipitate) that ties up the sulfide.

For purposes of model development and use of the field data, it is assumed that the concentrations of these variables are relatively stable over the long term, representing at least one-year averages. SEM is useful for modeling processes that involve indirect effects and feedback between variables like dissolved iron and sulfide. The use of SEM was recommended by the scientific peer review.

The model predicts that a given concentration of surface water sulfate can produce different concentrations of porewater sulfide depending on the concentrations of iron and total organic carbon in the sediment at a given site. For instance, relatively high concentrations of porewater sulfide will be produced when iron concentrations are low and organic carbon is high—the bacteria make a high concentration of porewater sulfide, which is potentially toxic to wild rice, and there is little iron available to convert it to a solid iron sulfide compound.

Given the strong predictive relationship between sulfate, sulfide, iron, and total organic carbon, the model can be used to derive an equation that identifies a sulfate threshold based on the sediment porewater sulfide level that is protective of wild rice, and the iron and total organic carbon measured in the sediment at a site.

The relationship between sulfate in surface water and sulfide in the porewater of underlying sediment is complicated. Sulfide is primarily produced by bacterial respiration of sulfate in their metabolism of organic carbon in anaerobic sediments, which can only occur if there is a source of sulfate. In the absence of groundwater movement upward through the sediment, the only significant source of sulfate is the overlying water.

The working conceptual model is that sulfate in surface water diffuses into anoxic sediment, where bacteria use organic carbon as food and simultaneously respire sulfate, releasing sulfide (Figure 5). The bacterial activity may be limited by the concentration of organic carbon in the sediment. So, sulfide production may be lower in sediment poor in organic carbon, and higher in sediment high in organic carbon. Sulfide may accumulate in the sediment porewater to concentrations that affect wild rice. However, if sufficient iron is present in the sediment, much

of the sulfide may react with the iron, forming an insoluble precipitate that is not toxic. Therefore, even though sulfide is made from sulfate, because of variation among field sites in the concentrations of organic carbon and iron, one would not expect a strong correlation between sulfate and sulfide in the field data.

However, if the carbon and iron are held relatively constant, such as would be the case in a particular lake, then one would expect a correlation between the concentration of sulfate in the surface water and the concentration of sulfide in the porewater. Just such an experiment was conducted as the mesocosm component of the study (MPCA 2014). Sulfate was added to the mesocosms at five different concentrations, with six replicates at each concentration. As sulfate concentrations increased, more sulfide accumulated in the porewater (Figure 6A). And, consistent with the conceptual model (Figure 5), the concentration of iron in the porewater decreases as the porewater sulfide increases (Figure 6B).

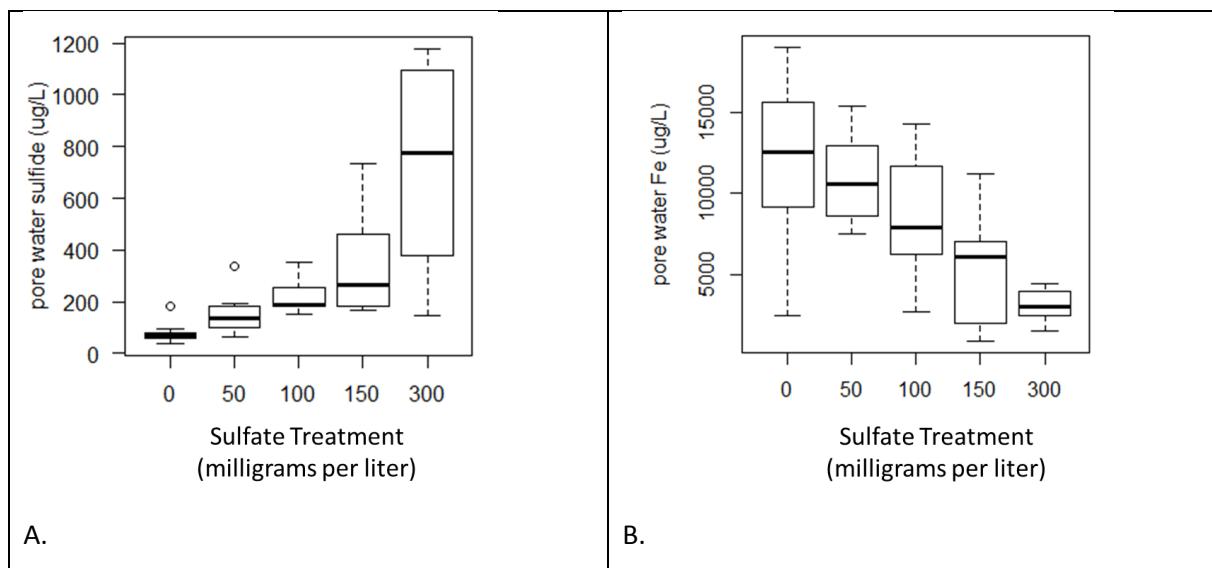


Figure 6. Response of (A) porewater sulfide and (B) porewater iron to sulfate treatments in the mesocosm experiment, as assessed in the sampling carried out August 28, 2013, when all 30 mesocosms were sampled.

Because of the complicated relationship between sulfate and sulfide, the scientific peer review recommended that MPCA investigate the factors that control sulfide concentrations by using a statistical tool that can simultaneously evaluate an expanded set of variables (e.g. several forms of iron, sulfur, and organic carbon) from the field survey, such as structural equation modeling (SEM). SEM is essentially linked linear regressions between variables, where predicted variables can in turn become variables that predict a third variable.

SEM is appropriate for modeling processes that involve indirect effects and feedback between variables. For instance, dissolved iron and sulfide affect each other, because they precipitate each other. SEM evaluates complex hypotheses of multivariate relationships that can be statistically compared to field data (Gough and Grace 1999). To statistically evaluate models that contain many variables requires relatively large data sets. In this case, where six or more variables were included in proposed models, the field survey of 184 site visits (not including cultivated wild rice paddies) was adequate for the task.

Using the field survey data, multiple structural equation models were developed and evaluated using the Stata Data Analysis and Statistical Software package ([Stata.com](http://www.Stata.com)). The Stata output for the best model is given in Appendix 1, and presented as a path diagram in Figure 7, where the connections between variables are indicated by arrows. Other SEM models were evaluated

that included additional variables that are potentially involved in the relationship between sulfate and sulfide, including acid volatile sulfide (AVS), dissolved organic carbon (DOC), phosphorus, and nitrogen. The adopted model (Figure 7) was chosen for its goodness of fit, simplicity, and ease of practical application. Aside from sulfate, the other statistically important variables affecting the net concentration of porewater sulfide in the model are the concentration of sediment organic carbon, the concentrations of iron in both sediment and porewater, and the total concentration of sulfur in the sediment. The model can be reduced to a single equation, where sulfide can be predicted by inputting sulfate, sediment iron, and sediment organic carbon, as in Equation 2.

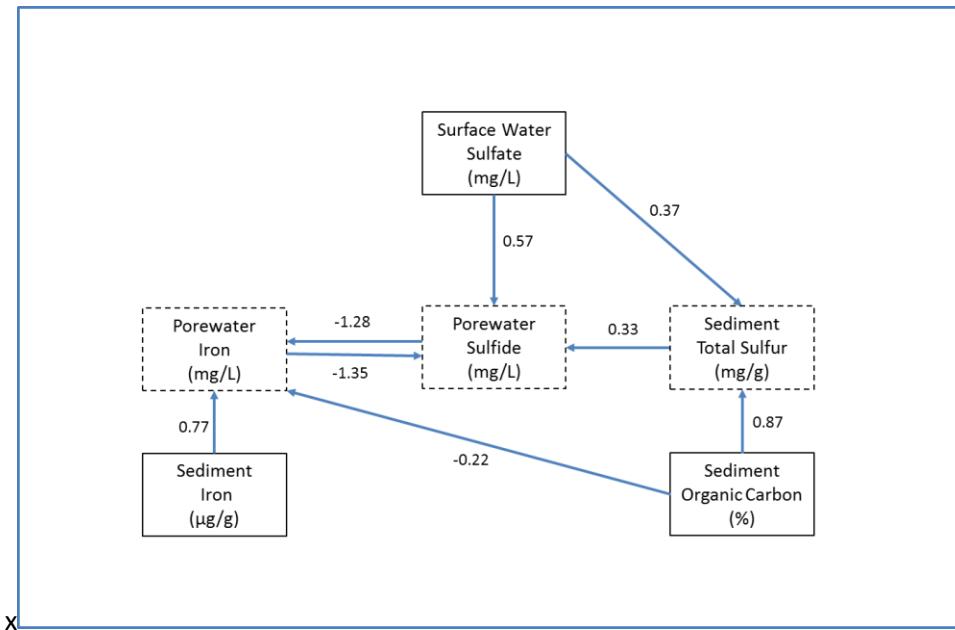


Figure 7. The structural equation model (SEM) that was used to develop Equation 1 is based on the relationships shown. Standardized coefficients, which represent the relative strength of the variables, are given. The model was calibrated with data from 184 sites sampled during the MPCA field survey. All coefficients are significant at the  $p < 0.001$  level. Field data for each variable was used to calibrate the model, but the model is implemented by inputting sulfate, sediment iron, and sediment organic carbon (exogenous variables, in solid boxes). The variables in the dashed boxes are predicted in the model (endogenous variables). All variables were transformed by log base 10 to approach normality. Option ADF in the Stata SEM package was employed, which does not require variables to be normally distributed.

The SEM-derived Equation 2 can be compared to predictions produced by a multiple linear regression (MLR) model of the same variables, using the same data set. The MLR model (Table 3) yields the following equation:

$$\text{Sulfide} = 7.777 \text{ Sulfate}^{0.3464} \text{ Organic Carbon}^{0.5295} \text{ Sediment Iron}^{-0.6841} \quad (\text{Equation 3})$$

(units as in Equation 2)

Although the coefficients of the MLR model (Equation 3) are different from the coefficients of the SEM model (Equation 2), the predictions are very similar (Figure 8). The slope is close to one, the intercept is close to zero, and the  $R^2$  value is 0.996.

Table 3. Results of multiple linear regression modeling.

Porewater sulfide ←	Coefficient	P value
Sulfate	0.3464982	<0.001
Sediment Iron	-0.6841846	<0.001
Sediment TOC	0.5295977	<0.001
Constant	0.8908034	<0.001

N = 184

F (3, 180) = 49.09

Prob > F = 0.0000

R<sup>2</sup> = 0.4500

Adjusted R<sup>2</sup> = 0.4408

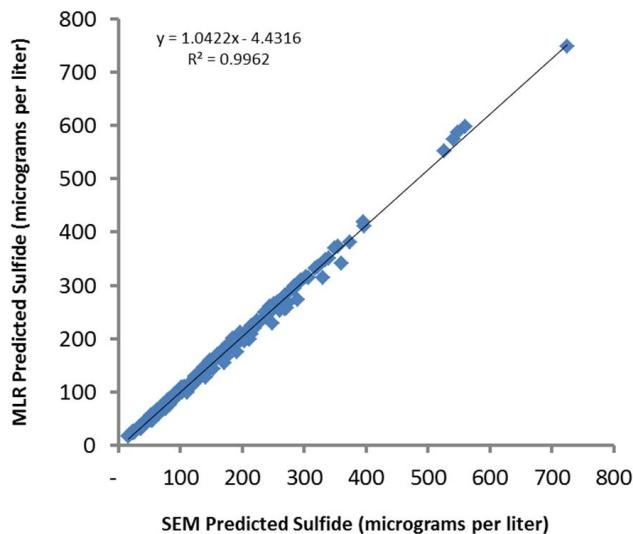


Figure 8. Comparison between porewater sulfide predicted by the structural equation model (SEM) and the multiple linear regression model (MLR).

It is important to understand the degree to which models are accurate in predicting the conversion of sulfate to sulfide. First, all of the SEM models, and the MLR model, tend to over-predict porewater sulfide at observed concentrations below about the proposed protective concentration of sulfide of 165 micrograms per liter (Figure 9). This over-prediction can be viewed as a safety factor that is incorporated into the calculation of protective sulfate concentrations. Such a safety factor is welcome because use of any model to translate porewater sulfide to surface water sulfate works on the central tendency of the data, introducing the possibility that a predicted protective sulfate concentration is under-predicted.

Second, all of the models under-predict sulfide concentrations for sites with high sulfide levels (above about 500 micrograms per liter of sulfide, Figure 9). However, this under-prediction does not affect the utility of the model, since the central tendency of the predictions region of goal-setting—around 165 microgram per liter—is the most accurate region. Under-prediction above 500 micrograms per liter does not affect the determination that the sulfide would be too high for wild rice.

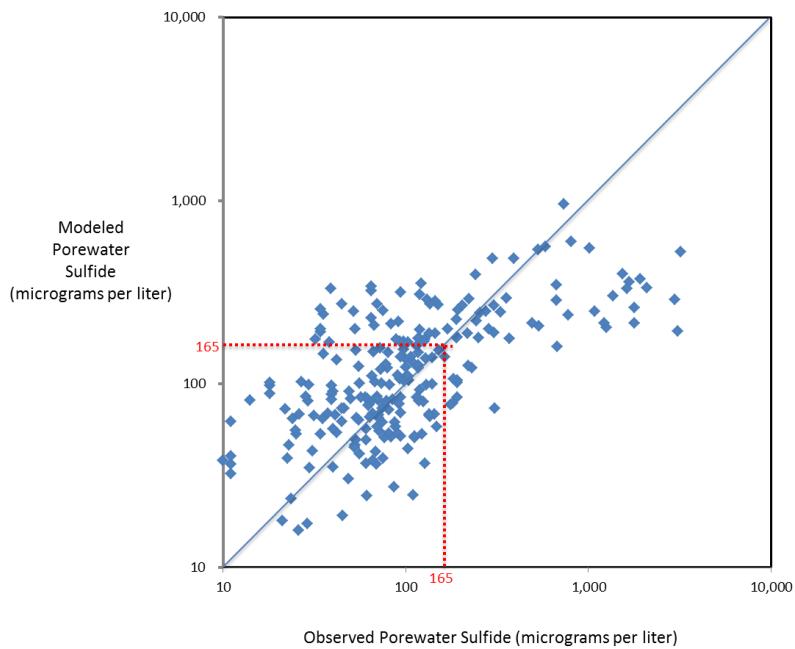


Figure 9. Modeled porewater sulfide concentrations (based on Equation 2) compared to observed porewater sulfide for the data that was used to calibrate the model. (Excluded data were commercial wild rice paddies and two samples with unusually high sulfide concentrations: 14,840 and 16,000 micrograms sulfide per liter. The next highest observed sulfide concentration was 3,190 micrograms sulfide per liter.) The dashed red lines correspond to the protective sulfide concentration, 165 micrograms per liter.

### **3) Calculation of a sulfate concentration that is protective of wild rice**

The information from the above two sections can be combined to produce an equation that allows the calculation of a surface water sulfate concentration that is protective of wild rice. Sulfate concentration above the protective concentration are predicted to produce porewater sulfide concentrations above 165 micrograms per liter (the protective sulfide concentration), given the sediment organic carbon and iron concentrations of a given wild rice water.

First, Equation 2 is solved for sulfate:

$$\text{Sulfate} = 0.002525 \text{ Sulfide}^{2.899} \text{ Organic Carbon}^{-1.410} \text{ Sediment Iron}^{1.956} \quad (\text{Equation 4})$$

Since the goal is to calculate the sulfate concentration that is associated with a sulfide concentration of 165 micrograms per liter, that sulfide concentration is substituted into Equation 4, producing Equation 1:

$$\text{Sulfate} = 0.0000136 \text{ Organic Carbon}^{-1.410} \text{ Sediment Iron}^{1.956} \quad (\text{Equation 1})$$

A calculated sulfate concentration that would be protective of wild rice can be calculated from every sediment sample that is analyzed for organic carbon and sediment iron. Figure 10 plots all of the sediment organic carbon and sediment iron data pairs from the field survey sites against a background of isopleths of surface water sulfate concentrations that would be required for that site to produce a protective porewater sulfide concentration. An important conclusion to be drawn from Figure 10 is that there is a large range in protective surface water sulfate concentrations.

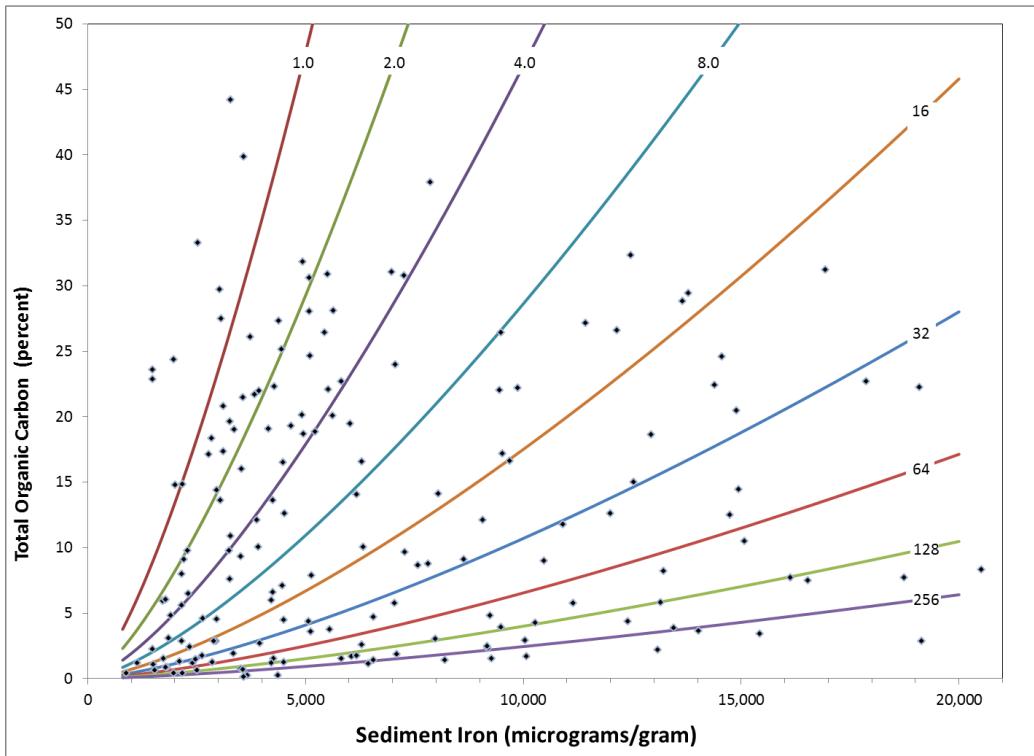


Figure 10. Isopleths (lines of combinations of iron and organic carbon that describe a constant sulfate-to-sulfide conversion efficiency) of surface water sulfate concentrations (1 to 256 mg/L) that would produce porewater sulfide concentrations of 165 micrograms per liter (calculated using Equation 1). An isopleth is the calculated protective sulfate concentration for the combination of iron and organic carbon concentrations that it traces. The individual data points show the observed sediment iron and organic carbon at each of the surveyed sites. The vulnerability of a site to elevated sulfate increases as one moves upward and leftward on this graph (towards higher sediment organic carbon and lower sediment iron). A site can be considered protected if its observed sulfate concentration is less than the sulfate value for the isopleth that goes through its position on this graph.

Figure 11 shows the importance of quantifying the concentrations of sediment iron and organic carbon present at a given site to determine its vulnerability to a particular concentration of sulfate. The concentration of sulfate that would be protective of wild rice at that site can be calculated with Equation 1.

If sediment organic carbon and sediment iron data are available from a wild rice site, the protective concentration of surface water sulfate can be calculated. Given that the field data show that iron and total organic carbon vary among sites and are independent of each other, calculating the protective level of sulfate based on these variables is a more appropriate approach to protecting wild rice from the impacts of elevated sulfate than relying upon a single sulfate concentration as a protective threshold for all sites. Because of differences in iron and carbon in sediments, any given concentration of sulfate can produce vastly different concentrations of porewater sulfide (Figure 11).

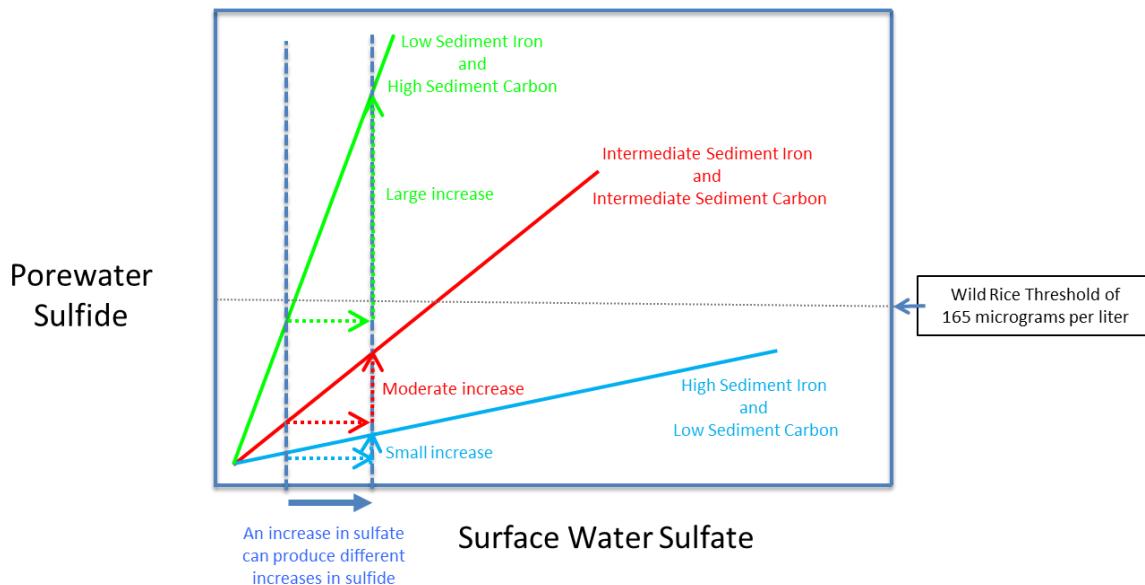


Figure 11. The relationship between sulfate in surface water and sulfide in porewater, as influenced by sediment concentrations of iron and organic carbon. Because of differences in iron and carbon, any given concentration of sulfate (the vertical dashed line, for example) can produce vastly different concentrations of sulfide. The solid red line represents a site that is relatively efficient in producing porewater sulfide from sulfate, and the solid blue line represents a site that is relatively inefficient in producing porewater sulfide from sulfate.

The large range in protective sulfate concentrations can be illustrated by calculating the sulfate thresholds for the sites sampled during the MPCA wild rice field survey. For instance, 58% of the field sites have a predicted sulfide concentration less than 165 micrograms per liter at a surface water sulfate concentration of 10 mg/L (Table 4). However, 42% of the field sites have a predicted sulfide concentration greater than 165 micrograms at a sulfate concentration of 10 mg/L in the overlying water, and the wild rice populations in those waters would have a greater likelihood to decline over time if the sulfate concentration were 10 mg/L. Even a concentration as low as 2.5 mg/L would leave some sites unprotected, while other sites — those high in iron and low in organic carbon — would have tolerable porewater sulfide concentrations even at a sulfate concentration of 200 mg/L (Table 4). In other words, any given sulfate concentration would be protective for some sites while not protective for other sites, depending on the total organic carbon and iron concentrations in the sediment.

Table 4. Proportion of sites that would be protected and under-protected by various potential sulfate values based on using Equation 1 for the 112 different sites that were surveyed. Note that the calculations do not incorporate the observed sulfate concentration in the surface water.

Sulfate Concentration (mg/L)	Proportion of sites protected	Proportion of sites under-protected
2.5	77%	23%
10	58%	42%
20	40%	60%
50	26%	74%
200	11%	89%

It is possible to use Equation 1 and the sediment data from the field survey to calculate potential protective sulfate values at each of the field survey sites (Figure 12). By doing so, we can look for regional patterns. The wide variability of values across the state further demonstrates that no one statewide, or even regional, sulfate concentration would be

protective due to the variability of sediment iron and total organic carbon among sites. An appropriate level of protection requires sediment sampling and analysis.

Because a single concentration of sulfate is not an appropriate tool for protection of wild rice in different water bodies, MPCA proposes that whenever a protective sulfate concentration needs to be determined for a given wild rice water, sediment concentrations of iron and organic carbon be measured. The data, through Equation 1, will then be used to determine the protective sulfate value for that wild rice water.

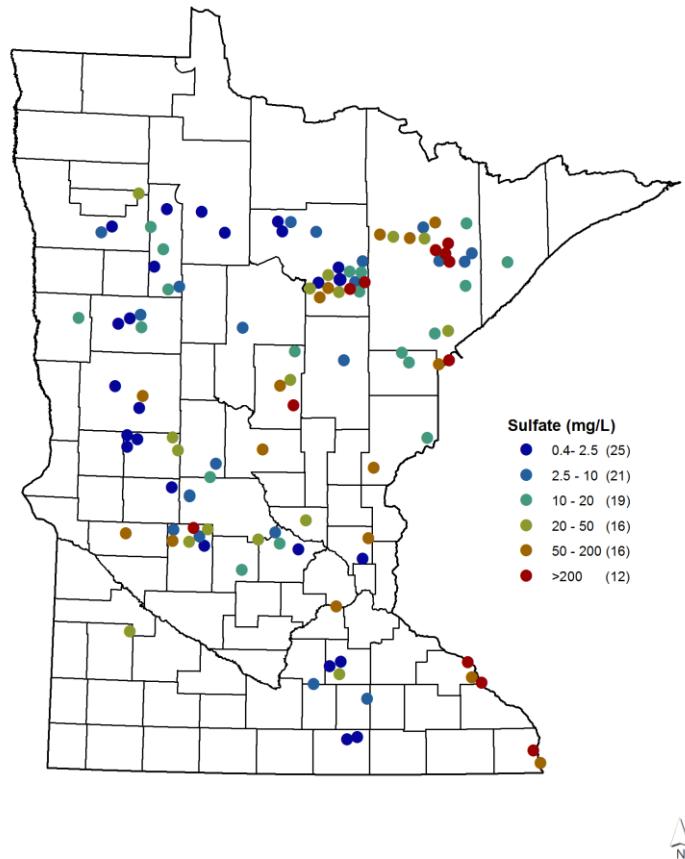


Figure 12. Protective sulfate concentrations calculated with Equation 1 for the water bodies in the MPCA field survey. Numbers in parentheses are the number of sites in the indicated sulfate range. Overlapping point symbols have been moved slightly from their true position so as to be visible. Point values were averaged when multiple values were available from a water body, an approach that requires further review.

To further illustrate the calculation of protective sulfate concentrations, Equation 1 was applied to three different MPCA field survey sites where total organic carbon and iron data are available: Little Round Lake, Elk Lake, and Rice Lake. These sites are minimally disturbed watersheds, with widely varying calculated protective sulfate concentrations (Table 5).

Table 5. Example calculations of protective surface water sulfate concentrations for three study sites: Little Round Lake, Elk Lake, and Rice Lake, using Equation 1. The sediment data for these three lakes can be compared to the 82 lakes of the field survey: The 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> percentiles of the field survey of organic carbon were, respectively, 5.8, 13.9, and 22.0 percent, and the corresponding percentiles of sediment iron were 2,300, 4,300, and 9,500 micrograms per gram. Note that these examples are for illustrative purposes only.

Study Site	State ID	Sediment Total Organic Carbon (%)	Sediment Iron (micrograms/gram)	Calculated Protective Sulfate Concentration (mg/L)
Little Round Lake	03-0302	27.5	3,069	0.8
Elk Lake	15-0010	10.2	8,480	25
Rice Lake	18-0053	35.6	50,389	140

The three lakes had medium-to-high total organic carbon to support bacteria that convert sulfate to sulfide (Table 5). Of the three lakes, Little Round had the lowest sediment iron at 3,069 micrograms per gram and is calculated to be the most sensitive to sulfate. Rice Lake had the highest sediment iron at 50,389 micrograms per gram and is calculated to be the least sensitive to sulfate. Elk Lake had an intermediate sediment iron concentration of 8,480 micrograms per gram and is calculated to be intermediate in sensitivity to sulfate.

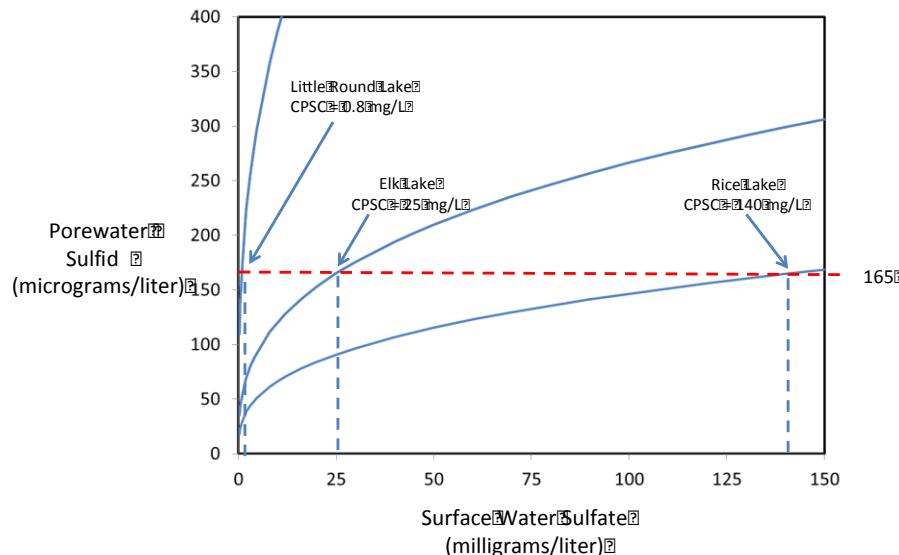


Figure 13. Three wild rice lakes of contrasting sensitivity to sulfate in surface water, showing the modeled increase in porewater sulfide as sulfate increases in the surface water, using Equation 2. The vertical dashed lines show the calculated protective sulfate concentrations of 0.8, 25, and 140 milligrams per liter. The horizontal dashed line is the protective concentration of sulfide of wild rice (165 micrograms/liter), and the solid lines show the calculated increase in porewater sulfide associated with theoretical increases in sulfate in each of the three lakes. All three lakes had wild rice populations, and observed sulfate in the surface water of less than 0.5 mg/L. Note that these examples are for illustrative purposes only.

Figure 13 shows the calculated change in sediment porewater sulfide in the three lakes given theoretical increases in surface water sulfate concentrations. For instance, the curve representing the most sensitive lake (Little Round) is nearly vertical and a very small increase in sulfate is predicted to result in relatively high concentrations of sulfide. In contrast the curve representing the least sensitive lake (Rice Lake) has a much lower slope, and it is predicted that sulfate concentrations could increase to 140 mg/L before sulfide concentrations reach 165 micrograms per liter. The curve for the lake of intermediate sensitivity (Elk Lake) has a medium slope and it is predicted that sulfate concentrations could increase to 25 mg/L before sulfide concentrations reach 165 micrograms per liter.

Fifteen of the wild rice waters were sampled three or more times during the field survey. This allowed an examination of the range in calculated protective sulfate concentrations that is produced by analyzing multiple sediment samples from a water body (Figure 14, Table 6). Figure 14, which contains a subset of the data in Figure 10, is similar except that it is on a log-log scale which makes it easier to see the data point clusters. It is clear that there is variability within wild rice waters, but the difference *between* waters is much greater than the variability *within* a specific wild rice water.

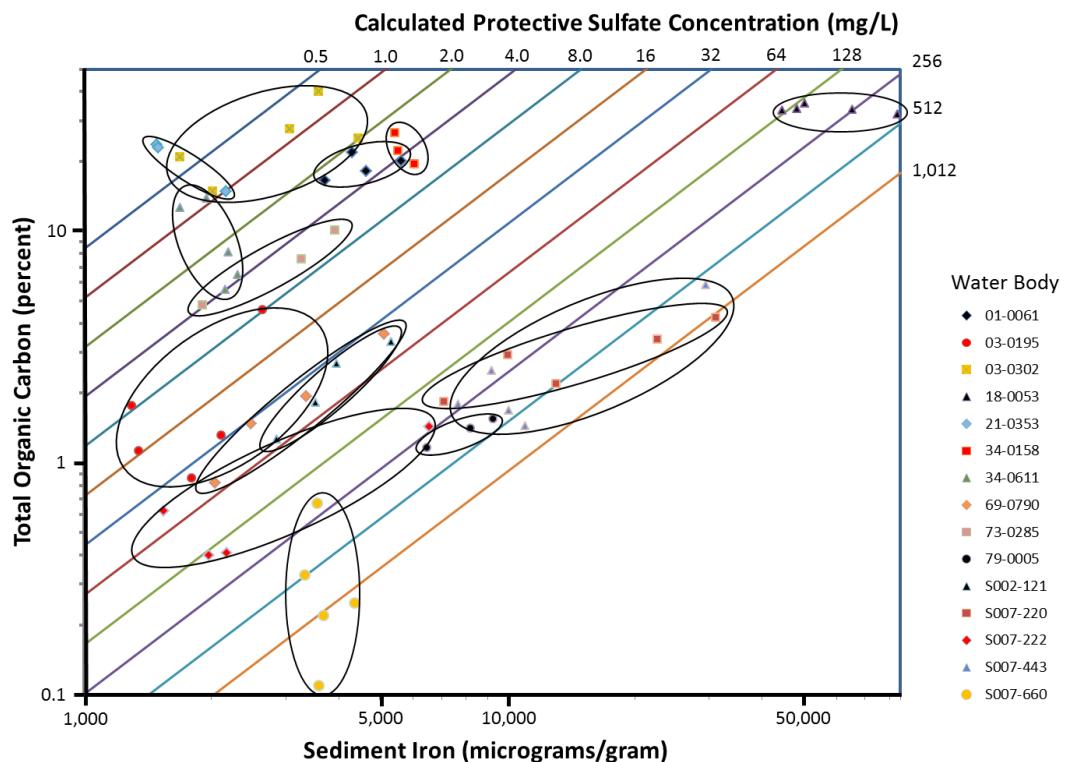


Figure 14. Data from water bodies with wild rice where three or more sediment samples were taken within 1,000 feet of each other. Ellipses encompass the range in calculated protective sulfate concentrations, which are based on sediment iron and total organic carbon data as modeled with Equation 1. The log-log display allows both a greater range of sediment concentrations and better separation of the sites than in Figure 10. Additional water body information is given in Table 6.

Table 6. Information about the sites displayed in Figure 14.

State ID	Site name	Latitude	Longitude
01-0061	Flowage	46.6895	-93.3380
03-0195	Height of Land	46.9129	-95.6095
03-0302	Little Round	46.9759	-95.7404
18-0053	Rice	46.3392	-93.8918
21-0353	Anka	46.0769	-95.7292
34-0158	Monongalia	45.3334	-94.9293
34-0611	Unnamed	45.2675	-94.8650
69-0790	Dark	47.6389	-92.7781
73-0285	Raymond	45.6286	-95.0225
79-0005	Mississippi Pool 4/Robinson Lake	44.3593	-91.9881
S007-220	Second Creek	47.5205	-92.1925
S002-121	Clearwater River	47.9372	-95.6907
S007-222	Mississippi Pool 8 at Genoa	43.5766	-91.2341
S007-443	Partridge River	47.5212	-92.1901
S007-660	Mississippi Pool 5 / Spring Lake	44.2018	-91.8444

### **Sediment sample considerations**

Protecting a wild rice water from elevated porewater sulfide depends on calculating the protective value for that water body's sulfate based on iron and organic carbon sediment data collected where the wild rice is growing. If iron and organic carbon concentrations were relatively constant in wild rice waters, the protective concentration would also be relatively constant. However, iron and organic carbon vary dramatically among wild rice waters, and as a result the calculated protective concentrations of sulfate also vary a great deal (Figure 10).

Prior to formally proposing changes to the existing wild rice sulfate standard through rulemaking, MPCA intends to define the number of organic carbon and iron sediment samples needed to characterize a water body, and to adequately calculate the protective sulfate value. Protocols to collect and analyze sediment samples for iron and organic carbon are being prepared and will be made available on MPCA's web site in coming months, as well as included in a Technical Support Document prior to formal rulemaking.

### **Consideration of commercial wild rice paddies**

The human management of the water environment in wild rice paddies likely produces conditions in the sediment that are rarely seen in natural wild rice waters. In particular, sediment dewatering from July through September may oxidize the sediment, potentially reducing conversion of sulfate to sulfide or oxidizing sulfide that has been produced. Both of these conditions may reduce the production of sulfide from sulfate, or the impact of sulfide on plants. Therefore, MPCA proposes that a sulfate standard is not needed to prevent sulfide impacts to commercial wild rice paddies. Data from commercial wild rice paddies were not used to calibrate the model and develop the equation discussed above.

### **Wild rice waters – Where the standard applies**

The 2011 Minnesota Legislature directed the MPCA to identify the specific surface waters "to which the wild rice water quality standards apply" (Laws of Minnesota 2011, 1st Special Session, Chapter 2, Article 4. Section 32). A draft list of wild rice waters has been developed, and they are identified on a map on the MPCA web site at [www.pca.state.mn.us/r6wxpf9](http://www.pca.state.mn.us/r6wxpf9). This

draft list of 1,268 wild rice waters was developed using information from various wild rice water inventories. MPCA also sought and received input from the Minnesota Department of Natural Resources (DNR) and Minnesota Indian Tribes while developing the draft list. MPCA considered acreage, density, and the importance of wild rice to humans and waterfowl when developing the proposed approach to identifying and listing specific Minnesota water bodies as wild rice waters. The sources of wild rice information considered included wild rice harvester and field survey databases and responses to a 2013 formal call-for-data completed by MPCA. Short descriptions of the information resources used by MPCA to formulate the draft list of wild rice waters are available on the MPCA web site. MPCA also intends to replace the existing rule language of “water used for the production of wild rice” with “wild rice waters” as the term describing the beneficial use that the standard is intended to protect.

#### **Updating the list of wild rice waters**

Given that a comprehensive inventory of Minnesota’s natural wild rice stands does not exist, and that both monitoring and restoration projects are underway in some water bodies, MPCA recognizes that the list of wild rice waters will require periodic update as new information on density and acreage of wild rice stands become available. After the initial rulemaking to identify and list wild rice waters, MPCA intends to consider listing additional waters in Minnesota Rules as wild rice waters approximately every five years. Through the public rulemaking process, a new water body will be added for which there is information demonstrating that the water meets the following proposed definition of “wild rice water.”

*“Wild Rice Water” means a surface water of the state that contains a self-perpetuating population of wild rice plants, either currently present or that have been present in the given water body since November 28, 1975. The self-perpetuating wild rice population must be represented by a minimum of 8,000 wild rice stems over the surface of a lake, wetland, or reservoir water body or a minimum of 800 wild rice stems over a river-mile reach for a riverine water body. Waters designated as wild rice waters are specifically listed as such in Minn. R. 7050.0470 and are identified with the symbol [WR] preceding the name of the water body.*

To provide some context to the proposed definition of wild rice waters, 8,000 stems in a lake roughly equate to 2 stems per square meter over one acre (see Figure 15). Seed from 8,000 stems theoretically has the potential to feed approximately 12 ducks during a one week migratory stop.



Figure 15. A wild rice water with about 2 stems per square meter, or about 8,000 stems in one acre.

### **Implementation questions and considerations**

The MPCA intends to begin rulemaking beginning in 2015 to refine the existing wild rice sulfate water quality standard to reflect the most up-to-date science on the understanding of how sulfate and sulfide impact wild rice. Rule revision would also add wild rice waters to those currently listed in rule.

Prior to rulemaking, MPCA will consider how to use this updated understanding to inform regulatory decisions. MPCA believes it is important to consider this new science when making regulatory decisions to more precisely protect wild rice waters from potential sulfate impacts and better ensure efficient and effective use of resources.

The MPCA will engage with interested stakeholders to discuss:

- The proposed approach for revising the sulfate standard, to protect wild rice
- Approaches to monitor for wild rice and sediment conditions
- Consideration of the new science for the purposes of making regulatory decisions

Toward that end, MPCA will schedule meetings with Minnesota Tribes, the Wild Rice Standards Advisory Committee, and EPA in April and May of 2015 to further describe and get input on the proposed approach. MPCA also welcomes opportunities to meet with other interested parties about this proposal.

The MPCA will continue to refine this proposal based on feedback and any new information received, including an examination of wild rice population dynamics. At the same time, MPCA technical staff will continue to develop the more detailed technical documentation needed for the formal rulemaking proposal.

As noted above, the MPCA will be developing further details about the data collection protocol to calculate a protective level of sulfate, per the proposed approach to the standard. Additional field data is expected to be collected in the summer of 2015 to help in developing those details.

The MPCA anticipates having a formal rulemaking package, including draft rule language and the detailed Statement of Need and Reasonableness, ready for discussion toward the end of 2015. The rulemaking process is governed by the Minnesota Administrative Procedures Act and includes multiple opportunities for informal and formal public comment.

### **Literature cited**

ERG. 2014. Summary Report of the Meeting to Peer Review MPCA's *Draft Analysis of the Wild Rice Sulfate Standard Study*. Eastern Research Group, Inc., Lexington Massachusetts. <http://www.pca.state.mn.us/kppq38rq>

Gough, L and JB Grace. 1999. Effects of environmental change on plant species density: comparing predictions with experiments. *Ecology*. 80(3):882-890.

Lamers, LPM, LL Govers, ICJM Janssen, JJM Geurts, MEW Van der Welle, MM Van Katwijk, T Van der Heide, JGM Roelofs, and AJP Smolders. 2013. Sulfide as a soil phytotoxin - a review. *Frontiers in Plant Science* 4:1-14.

MPCA. 2014. Analysis of the Wild Rice Sulfate Standard Study: Draft for Scientific Peer Review. Minnesota Pollution Control Agency. June 9, 2014.  
<http://www.pca.state.mn.us/kppq38rq>

**Appendix 1. Coefficients and characteristics of the SEM model that was used to develop Equation 1.**

Model Variable	Coefficient, Unstandardized	Coefficient, Standardized	P value
Porewater Sulfide ←			
Porewater Iron	-0.4504578	-0.7085618	<0.001
Sediment Total S	0.147297	0.1720401	<0.001
Sulfate	0.1421145	0.2345237	<0.001
Constant	0.5129075	1.050636	<0.001
Porewater Iron ←			
Porewater Sulfide	-1.055696	-0.6711435	<0.001
Sediment Iron	0.7855547	0.4020308	<0.001
Sediment TOC	-0.2655787	-0.1868744	<0.001
Constant	-0.089077	-0.1159993	0.795
Sediment Total S ←			
Sulfate	0.2634474	0.3722258	<0.001
Sediment TOC	0.9197721	0.8716147	<0.001
Constant	-0.5637775	-0.9887471	<0.001

**Model characteristics and goodness of fit**

N	184
Degrees of freedom	3
$\chi^2$	3.23
$p > \chi^2$	0.3572
RMSEA	0.020
Lower bound	0.000
Upper bound	0.128
pclose	0.544
CFI	0.999
TLI	0.996
SRMR	0.020
CD	0.961

**Total Effects**

Model Variable	Coefficient, Unstandardized	Coefficient, Standardized	P value
Porewater Sulfide ←			
Porewater Sulfide	0.9067471	0.9067471	<0.001
Porewater Iron	-0.8589092	-1.351048	<0.001
Sediment Total S	0.2808581	0.3280369	<0.001
Sulfate	0.3449677	0.5692812	<0.001
Sediment Iron	-0.6747201	-0.5431629	<0.001
Sediment TOC	0.4864334	0.5383982	<0.001
Porewater Iron ←			
Porewater Sulfide	-2.012946	-1.279701	<0.001
Porewater Iron	0.9067471	0.9067471	<0.001
Sediment Total S	-0.2965008	-0.2201598	<0.001
Sulfate	-0.3641811	-0.3820693	<0.001
Sediment Iron	1.497854	0.766571	<0.001
Sediment TOC	-0.7791045	-0.5482168	<0.001
Sediment Total S ←			
Sulfate	0.2634474	0.3722258	<0.001
Sediment TOC	0.9197721	0.8716147	<0.001

## Information Sources Used to Develop the Draft List of MPCA Wild Rice Waters

During the 2011 Legislative Special Session, the Minnesota Legislature passed a law requiring the MPCA to designate which surface waters of the state are considered wild rice waters “to which the wild rice water quality standards apply”. To comply with this Session law requirement, MPCA staff has compiled a draft list of wild rice waters where the numeric and narrative water quality standards will apply. These wild rice waters will either be specifically listed in classifications section of Minnesota Rules Chapter 7050 (Minn. R. 7050.0470) or the list of wild rice waters will be incorporated by reference directly into the rule. The waters specifically listed in the classifications section will be identified as wild rice waters by the symbol [WR] preceding the name of the water body.

The MPCA draft list of wild rice waters was developed from various wild rice water inventories, biological monitoring and survey databases, and a formal call-for-data solicitation asking other state and federal agencies as well as the general public to identify additional wild rice waters to supplement previously identified listings. Generally, the wild rice information from these resources was originally gathered to serve a specific program interest and was not necessarily intended for regulatory use. As such, MPCA placed certain restrictions on, and made certain assumptions regarding, these data when it developed its draft list of MPCA wild rice waters.

In 2008 the Minnesota Department of Natural Resources (MDNR) submitted a report to the Minnesota Legislature which required the Commissioner of the MDNR to prepare a study for natural wild rice that included an effort to consolidate and update existing natural wild rice information and produce an inventory of those waters (*Natural Wild Rice in Minnesota – A Wild Rice Study document submitted to the Minnesota Legislature by the Minnesota Department of Natural Resources, February 15, 2008*). Appendix B of the 2008 MDNR report is the list of wild rice waters developed through input received from a Technical Team comprised of state, federal, and tribal representatives. Even though this wild rice inventory is considered the most comprehensive list available, it does under-represent rivers, streams, and ditches with wild rice and a large number of listed waters do not contain wild rice acreage estimates.

Short descriptions of the wild rice information resources used by MPCA in formulating its list of water where the wild rice water quality standards will be applicable are listed below:

1. **(MDNR 2008)** This is a Minnesota Department of Natural Resources (MDNR) wild rice report titled *Natural Wild Rice in Minnesota – A Wild Rice Study document submitted to the Minnesota Legislature by the Minnesota Department of Natural Resources, February 15, 2008*. Appendix B of this report contains an inventory of 1286 wild rice water body locations, approximately 60% of which have estimated wild rice cover acreages. Waters listed in this report with wild rice acreage estimates greater than 2 acres are included on the MPCA wild rice water list. In addition, waters with either no reported acreage estimates or those with a one-acre entry were included on the list if additional wild rice information was available from one of the other resource references that follow.
2. **(MDNR 2007)** This is a MDNR report tabulating the results of a wild rice harvester survey conducted in 2006 that includes wild rice waters that were harvested.
3. **(MDNR 2010)** This is a list, compiled by the Minnesota Interagency Wild Rice Management Workgroup, which was convened as a result of a recommendation contained in the 2008 wild rice report to the Legislature. This list contains 350 significant wild rice resources throughout the state, most of which were listed in the MDNR 2008 report.
4. **(MCBS 2011)** The MDNR’s Minnesota County Biological Survey (MCBS) program maintains a database of surveyed sites with references to plant species observed during the surveys. The narrative descriptions contained in the database for wild rice waters was reviewed for information relating to references to the amount of wild rice observed at a particular water body. Waterbodies with descriptors such as “thick wild rice present” or “emergent aquatic plant community dominated by wild rice” were added to the MPCA draft list of wild rice waters.

5. **(MDNR 2013)** During the spring of 2013 the MPCA put out a “Call for Data” for locational information on wild rice stands and sulfate analytical results. Waters from this list that have estimated wild rice acreage of greater than one acre are included in the MPCA draft wild rice list.
6. **(MDNR APM)** MDNR has an Aquatic Plant Management (APM) permitting program that permits the limited removal of wild rice from waters of the state (primarily to allow for boat access from shore to open water). This program also issues permits for individuals and organizations who are attempting to restore or introduce wild rice in a given water body. The APM database contains multi-year wild rice permit information regarding permits for the removal of wild rice or restoration permits for seeding wild rice.
7. **(MPCA 2014)** The MPCA Biomonitoring field sample site database was queried for wild rice records covering the period from 1999 to 2014.
8. **(1854 List)** The 1854 Treaty Authority is an Inter-Tribal Natural Resource Management Organization that manages the off-reservation hunting, fishing and gathering rights of the Grand Portage and Bois Forte Bands of the Lake Superior Chippewa in the territory ceded under the Treaty of 1854 (<http://www.1854treatyauthority.org/>). This organization conducts surveys on lakes and rivers within the ceded territory and maintains a list of wild rice waters. Water bodies from the 1854 list of wild rice waters are included in the draft MPCA wild rice list.
9. **(7050.0470)** This source reference refers to the part of Minnesota Rules Chapter 7050 which contains the list of wild rice waters specifically listed in the rule in the Lake Superior watershed. These wild rice waters were first included in the rule in 1998.
10. **(UofM/MPCA 2013)** In the summers of 2011, 2012, and 2013 the MPCA had contracted with the University of Minnesota, LacCore / Limnological Research Center to conduct field surveys of water bodies across the state measuring a suite of water column and sediment pore water, and sediment samples in connection with wild rice /sulfate studies. Part of the surveys included estimated plant coverage at the sampling sites.
11. **(Permittee Monitoring)** Certain permittees, (to date, primarily mining companies), have conducted multi-year field surveys of selected waters in northeast Minnesota collecting water quality and wild rice data. The results of these studies are contained in a number of reports and summarized in an ArcMap GIS layer, both of which were used in the development of the MPCA draft wild rice listing.

Draft List of MPCA Wild Rice Waters - March 2015

OBJECTID *	County	Name	IDNUM	Z	Acres	MDNR2008AcreEst	Sources	UTM_X	UTM_Y	LON_DD	LAT_DD
1	Aitkin	Aitkin Lake	01004000	z	850	298	2007, 2008	477939	5183443.304	-93.289124	46.804171
2	Aitkin	Anderson Lake	01003100	z	97	30	2008	482216	5176078.092	-93.232786	46.738019
3	Aitkin	Big Sandy Lake	01006200	z	9380	94	2007, 2008, MDNR APM	478182	5178683.569	-93.285713	46.761346
4	Aitkin	Birch Lake	01020600	z	449	5	2008	437882	5135031.607	-93.807566	46.366008
5	Aitkin	Blind Lake	01018800	z	323	39	2007, 2008, MDNR APM	442906	5166747.223	-93.746152	46.651852
6	Aitkin	Brown Lake	01007800	z	97	34	2008	474849	5179261.622	-93.32939	46.766431
7	Aitkin	Camp Lake	01009800	z	127	30	2008	463124	5152762.441	-93.480825	46.52742
8	Aitkin	Cedar Lake	01020900	z			MDNR APM	438607	5148614.692	-93.799927	46.488305
9	Aitkin	Clear Lake	01010600	z	123	20	2008	461269	5178048.159	-93.507133	46.754861
10	Aitkin	Cornish Lake	01042700	z	600	30	2008	483388	5193210.296	-93.218067	46.892222
11	Aitkin	Davis Lake	01007101	z	76	30	2007, 2008	472043	5166659.982	-93.365372	46.652917
12	Aitkin	Deer Lake	01008600	z	47	3	2008	460729	5131617.198	-93.510272	46.336992
13	Aitkin	Elm Island Lake	01012300	z	656	30	2007, 2008, MDNR APM	451851	5145174.961	-93.62702	46.458427
14	Aitkin	Farm Island	01015900	z	2025	20	2007, 2008, MDNR APM	440679	5141202.121	-93.771989	46.421786
15	Aitkin	Fleming Lake	01010500	z	326	1	2008, MDNR APM	461997	5164147.578	-93.496453	46.629813
16	Aitkin	Flowage Lake	01006100	z	720	432	2007, 2008, UofM/MPCA 2013	475631	5172396.581	-93.318785	46.704681
17	Aitkin	Gun Lake	01009900	z	735	60	2008, MDNR APM	459923	5166135.608	-93.523718	46.647582
18	Aitkin	Hanging Kettle Lake	01017000	z			MDNR APM	445515	5146575.411	-93.709688	46.470548
19	Aitkin	Hickory Lake	01017900	z	183	10	2008, MDNR APM	443790	5143170.439	-93.731744	46.439765
20	Aitkin	Horseshoe Lake	01003400	z			MDNR APM	483602	5173788.536	-93.214562	46.71745
21	Aitkin	Jewett State WMA - Impoundment	01038300	x	180	30	2008	469220	5139211.647	-93.400446	46.405777
22	Aitkin	Johnson Lake	01013100	z	27	6	2008	450792	5152850.898	-93.641621	46.527427
23	Aitkin	Killroy Lake	01023800	z	23	4	2008	452227	5139460.76	-93.621538	46.407031
24	Aitkin	Kimberly State.WMA - Lower Pool	01041100	x	300	30	2008	468839	5156592.551	-93.406566	46.562177
25	Aitkin	Kimberly State.WMA - UpperPool	01041000	x	900	76	2008	469434	5157286.007	-93.398849	46.568445
26	Aitkin	Krilwitz Lake	01028300	z	30	6	2008	446732	5169785.833	-93.696506	46.67951
27	Aitkin	Lily Lake	01008800	z	50	2	2008	462978	5149696.843	-93.482484	46.499824
28	Aitkin	Little Hill River WMA - Impounddm	01043300	z	135	18	2008	445082	5205654.83	-93.722392	47.002137
29	Aitkin	Little McKinney Lake	01019700	x	26	6	2008	444399	5192574.182	-93.729774	46.884379
30	Aitkin	Little Pine Lake	01017600	z	126	1	2008, MDNR APM	442649	5143514.339	-93.746639	46.442764
31	Aitkin	Little Red Horse Lake	01005200	z	32	3	2007, 2008	480387	5193061.104	-93.257455	46.890797
1109	Aitkin	Little Willow R. WMA - Upper Pool	W0642001	x	50	20	2008	446953.839	5173660.162	-93.694052	46.714392
32	Aitkin	Mallard Lake	01014900	z	354	320	2007, 2008	444966	5140181.799	-93.716084	46.412968
33	Aitkin	Mandy Lake	01006800	z	107	27	2008	474016	5154190.593	-93.338887	46.540781
34	Aitkin	Minnewawa Lake	01003300	z	2451	130	2007, 2008	478835	5172977.312	-93.276899	46.710016
35	Aitkin	Monson Lake	01012600	z	48	25	2008	453888	5144397.697	-93.600417	46.451575
36	Aitkin	Moose Lake	01014000	z	148	117	2007, 2008	451608	5190753.476	-93.634968	46.86856
37	Aitkin	Moose River Pool	01035800	z	900	89	2008	460203	5197478.02	-93.522783	46.929641
38	Aitkin	Moose Willow WMA - Willow Pool	01043100	z	300	50	2008	459096	5199834.038	-93.537536	46.950774
39	Aitkin	Mud Lake	01019400	z	135	68	2008	444370	5184473.205	-93.729168	46.811482
40	Aitkin	Nelson Lake	01001000	z	71	1	2008, 1854 List	492776	5163282.953	-93.094359	46.62307

41	Aitkin	Newstrom Lake	01009700	z	97	76	2007, 2008		460434	5155971.662	-93.516172	46.556147
42	Aitkin	Pine Lake	01000100	z	391	4	2008		494634	5115303.981	-93.069539	46.191291
43	Aitkin	Portage Lake	01006900	z	387	5	2008		467734	5159298.872	-93.421172	46.586479
1156	Aitkin	Prairie River	01r6	z	0	0	2007, 2008, 2010, 1854 List		482765.552	5179933.589	-93.225737	46.772729
44	Aitkin	Rat House Lake	01005300	z	122	100	2007, 2008		482830	5190454.101	-93.225288	46.867405
45	Aitkin	Rat Lake	01007700	z	442	45	2007, 2008, MDNR APM		473429	5174047.3	-93.347685	46.719452
46	Aitkin	Red Lake	01010700	z	97	4	2007, 2008, MDNR APM		459947	5176728.892	-93.524327	46.742911
47	Aitkin	Rice Lake	01000500	z	83	50	2007, 2008		489579	5160179.947	-93.136048	46.595103
48	Aitkin	Rice Lake	01006700	z	3635	1700	2008		471901	5151420.601	-93.366303	46.515768
49	Aitkin	Ripple Lake	01014600	z	676	50	MDNR APM		448549	5145723.224	-93.670077	46.463117
1154	Aitkin	Ripple River	01r3	z	0	0	2007, 2008, 2010		446315.221	5148632.832	-93.699503	46.489127
50	Aitkin	Rock Lake	01007200	z	366	50	2008		470339	5164610.679	-93.38751	46.634401
51	Aitkin	Salo Marsh State WMA Imp.	01041500	z	690	76	2008		493184	5160044.791	-93.088982	46.593933
52	Aitkin	Sanders Lake	01007600	z	55	36	2008		469154	5178567.211	-93.403926	46.759943
1153	Aitkin	Sandy River	01r2	x			2008		474986.499	5181843.763	-93.327731	46.789673
53	Aitkin	Sandy River Lake	01006000	z	368	200	2007, MDNR APM		475787	5174201.216	-93.316839	46.720927
54	Aitkin	Savanna Lake	01001400	z	86	1	2007, 2008		486173	5188042.391	-93.181352	46.84578
1155	Aitkin	Savanna River	01r5	x			2007, 2008		483448.791	5180635.912	-93.216814	46.779067
55	Aitkin	Section Ten Lake	01011500	z	440	52	2007, 2008		454235	5147952.365	-93.596249	46.483588
56	Aitkin	Section Twelve Lake	01012000	z	167	1	2007, 2008, 2010		455234	5147673.465	-93.583207	46.481145
57	Aitkin	Shovel Lake	01020000	z	230	207	2007, 2008		442053	5198922.193	-93.761372	46.941299
58	Aitkin	Sisabagamah Lake	01012900	z	386	39	2008		453464	5150231.833	-93.606521	46.504048
59	Aitkin	Sistas Lake	01013200	x	59	5	2008		451564	5151323.753	-93.631397	46.51374
60	Aitkin	Sjodin Lake	01031600	z	43	28	2007, 2008		452634	5143475.345	-93.616651	46.443188
61	Aitkin	Spirit Lake	01017800	z	523	26	2007, 2008		445669	5143570.786	-93.707332	46.443522
62	Aitkin	Split Rock Lake	01000200	z	27	1	1854 List		487055	5139035.436	-93.168411	46.404769
63	Aitkin	Spruce Lake	01015100	z	80	80	2008		439419	5137850.104	-93.787951	46.39151
64	Aitkin	Steamboat Lake	01007102	z	59	15	2008		472783	5165450.982	-93.35563	46.642067
65	Aitkin	Stony Lake	01001700	z	52	5	2008		489141	5184427.785	-93.142338	46.813307
66	Aitkin	Swamp Lake	01009200	z	270	1	2008, MDNR APM		464360	5143109.597	-93.46397	46.440618
1157	Aitkin	Tamarack River	01r7	x			2008		488340.68	5180290.564	-93.152724	46.776063
67	Aitkin	Twenty Lake	01008500	z	153	119	2007, 2008		459342	5135171.835	-93.528602	46.368899
68	Aitkin	Unnamed - Little Willow River WM	01033200	z	140	50	2008		446450	5172402.319	-93.700497	46.703033
69	Aitkin	Unnamed (Round Lake Pothole)	01028500	z	15	12	2008		449577	5173975.74	-93.659768	46.717434
70	Aitkin	Upper Blind Lake	01033100	z	14	3	2008		444451	5168083.758	-93.726124	46.664009
71	Aitkin	Washburn Lake	01011100	z	73	4	2008		464776	5202770.026	-93.463124	46.97752
72	Aitkin	Waukenabo Lake	01013600	z	819	49	2008, MDNR APM		452496	5175933.291	-93.621779	46.735264
73	Aitkin	West Lake	01028700	z	51	20	2007, 2008		451527	5177391.214	-93.634615	46.748313
74	Aitkin	White Elk Lake	01014800	z	780	350	2007, 2008		446503	5184526.405	-93.701218	46.812135
75	Anoka	Amelia Lake	02001400	z			MDNR APM		495872	4997623.194	-93.052496	45.13207
1110	Anoka	Carlos Avery WMA - Pool 1	W9001001	z	180	15	2008		492793.083	5018394.452	-93.091952	45.319019
1116	Anoka	Carlos Avery WMA - Pool 13	W9001013	z	586	2	2008		490610.266	5014446.331	-93.119728	45.283454
1117	Anoka	Carlos Avery WMA - Pool 14	W9001014	z	749	15	2008		489657.765	5012038.618	-93.131823	45.261768
1111	Anoka	Carlos Avery WMA - Pool 2	W9001002	z	683	20	2008		491142.08	5020018.997	-93.113046	45.333623
1118	Anoka	Carlos Avery WMA - Pool 22	W9001022	z	141	10	2008		496001.163	5021607.293	-93.051047	45.347964
1119	Anoka	Carlos Avery WMA - Pool 24	W9001024	z	35	2	2008		496007.257	5019304.428	-93.05095	45.327236

1120	Anoka	Carlos Avery WMA - Pool 26	W9001026	z	200	5	2008		497651.374	5019885.016	-93.029973	45.332469
1112	Anoka	Carlos Avery WMA - Pool 3	W9001003	z	186	120	2008, 2010		493905.403	5019101.228	-93.077769	45.325391
1113	Anoka	Carlos Avery WMA - Pool 5	W9001005	z	52	25	2008		494978.555	5020447.43	-93.064089	45.337518
1114	Anoka	Carlos Avery WMA - Pool 7	W9001007	z	240	3	2008		494850.223	5020964.355	-93.065732	45.34217
1115	Anoka	Carlos Avery WMA - Pool 9	W9001009	z	269	120	2008, 2010, UofM/MPCA 2013		495666.995	5018376.888	-93.055284	45.318884
76	Anoka	Hickey Lake	02009600	z	41	0	2007, 2008, 2010		472995	5019465.975	-93.344609	45.328181
77	Anoka	Little Coon Lake	02003200	z	486	10	2008		491484	5017355.35	-93.108637	45.309651
78	Anoka	Pickerel Lake	02013000	z	303	25	2008		464869	5020661.538	-93.448387	45.338583
79	Anoka	Swan Lake	02009800	z	273	33	2008		478012	5018352.21	-93.280539	45.318331
1158	Anoka	Trott Brook	13UM044	x			MPCA_BioMon		465549.0322	5014477.336	-93.439278	45.282951
80	Anoka	Unnamed Lake	02010100	z			MDNR 2013		477385	5028505.121	-93.289004	45.4097
81	Becker	Abners Lake	03003900	x	100	80	2008		327956	5221078.439	-95.268133	47.120747
82	Becker	Acorn Lake	03025800	z			MCBS2011		289669	5180360.822	-95.753504	46.74366
83	Becker	Aspinwall Lake	03010400	z	178	18	2008		315998	5206892.305	-95.419861	46.989976
84	Becker	Balsam Lake	03029200	z	148	10	2008		295415	5204138.586	-95.689022	46.959186
85	Becker	Bass Lake	03008800	z	208	10	2008, MDNR APM		320303	5220721.435	-95.368797	47.115496
86	Becker	Big Basswood Lake	03009600	z	586	304	2007, 2008, MCBS 2011		322509	5216277.12	-95.337992	47.076134
87	Becker	Big Elbow Lake	03015900	z			MDNR APM		307136	5224036.247	-95.543619	47.141576
88	Becker	Big Floyd Lake	03038700	z			MDNR APM		282252	5194845.7	-95.857373	46.871472
89	Becker	Big Rat Lake	03024600	z	1102	110	2008		297948	5218801.108	-95.662315	47.091764
90	Becker	Big Rush Lake	03010300	z	1128	20	2008		316124	5208522.735	-95.418867	47.00467
91	Becker	Big Sugarbush Lake	03030400	z			MDNR APM		288669	5213760.336	-95.782074	47.043552
92	Becker	Blackbird Lake	03019700	z	284	42	2007, 2008		301067	5202366.44	-95.614037	46.944975
93	Becker	Blueberry Lake	03000700	z	160	2	2008		330927	5189532.716	-95.217232	46.837856
94	Becker	Booth Lake	03019800	z	48	43	2008		303309	5202768.662	-95.584781	46.949259
95	Becker	Buffalo Lake	03035000	z	444	89	2007, 2008, MDNR APM		287620	5205682.769	-95.792078	46.970614
1161	Becker	Buffalo River	03river	x			2007		258407.906	5202007.233	-96.173596	46.927587
96	Becker	Bullhead Lake	03031200	z	39	6	2008		289715	5210596.664	-95.766849	47.015449
97	Becker	Bush Lake	03021200	z	110	40	2008		304935	5212158.687	-95.567478	47.034153
98	Becker	Cabin Lake	03034600	z	38	0	2007, 2008, 2010		290297	5216369.546	-95.761879	47.067522
99	Becker	Camp Seven Lake	03015100	z	78	8	2008		311502	5216018.598	-95.482737	47.07076
100	Becker	Carman Lake	03020900	z	217	30	2007, 2008		300241	5212562.633	-95.629374	47.036383
101	Becker	Chippewa Lake	03019600	z	960	288	2007, 2008		303017	5204659.315	-95.589435	46.966169
102	Becker	Dinner Lake	03004400	z	53	11	2007, 2008		334091	5216647.407	-95.185682	47.082476
103	Becker	Eagen Lake	03031800	z	85	0	2007, 2008		289390	5207313.954	-95.769594	46.98584
104	Becker	Equay Lake	03021900	z	73	7	2008		301961	5206934.836	-95.604296	46.98631
105	Becker	Flat Lake	03024200	z	1970	197	2007, 2008		298054	5205761.238	-95.655096	46.974581
1160	Becker	Gull Creek	03r2	x			0 2007, 2008		293446.565	5224479.155	-95.724165	47.141398
106	Becker	Gyles Lake	03006600	z	42	16	2008, MDNR APM		322402	5199108.156	-95.332668	46.921734
107	Becker	Height Of Land Lake	03019500	z	3943	197	2007, 2008, UofM/MPCA 2013, MCBS 2011, MDNR APM		301472	5196402.037	-95.606118	46.891479
108	Becker	Hubbel Pond Lake	03024000	z	561	168	2007, 2008		297236	5194056.249	-95.660621	46.869113
109	Becker	Ida Lake	03058200	z			MDNR APM		263245	5180051.952	-96.098781	46.732044
110	Becker	Johnson Lake	03019900	z	181	40	2008		302285	5201672.577	-95.597747	46.939102
111	Becker	Johnson Lake	03037401	z			MDNR APM		283333	5179455.972	-95.835922	46.733502
112	Becker	Kane Lake	03004200	z			MCBS2011		334230	5218535.63	-95.184547	47.09949
113	Becker	Kneebone Lake	03009000	z	149	15	2008		319122	5219338.72	-95.383796	47.102741

114	Becker	Knutson Lake	03000400	z			MCBS2011	333028	5191656.281	-95.190477	46.857482
115	Becker	Little Basswood Lake	03009200	z	105	31	2007, 2008	322587	5218129.575	-95.337694	47.092811
116	Becker	Little Dinner Lake	03004500	z	12	5	2008	333256	5216497	-95.196619	47.080913
117	Becker	Little Flat Lake	03021700	z	235	211	2008, UofM/MPCA 2013	298017	5208240.423	-95.656686	46.996855
118	Becker	Little Floyd Lake	03038600	z			MDNR APM	284073	5195154.729	-95.833653	46.874844
119	Becker	Little Mud Lake	03002200	z	25	6	2008	333404	5209153.33	-95.191962	47.014915
120	Becker	Little Rice Lake	03023900	z	110	21	2008	302813	5216884.482	-95.597442	47.076006
121	Becker	Little Round Lake	03030200	z	565	0	2007, 2008, UofM/MPCA 2013, hydroponic seed stock lake	290954	5205451.911	-95.748193	46.969599
122	Becker	Little Toad Lake	03018900	z			MDNR APM	304393	5190186.08	-95.565148	46.836464
123	Becker	Long Lake	03038300	z			MDNR APM	278831	5187790.345	-95.898791	46.806934
124	Becker	Lower Egg Lake	03021000	z	171	75	2007, 2008	302376	5211998.024	-95.601054	47.031949
125	Becker	Many Point Lake	03015800	z			MCBS2011	308030	5217387.297	-95.529005	47.082064
126	Becker	Mary Yellowhead Lake	03024300	z	68	7	2008	296076	5210567.048	-95.683236	47.017174
127	Becker	Mud Lake	03002300	z	85	42	2008	333107	5208582.001	-95.195656	47.009703
128	Becker	Mud Lake	03006700	z	88	83	2008	323940	5199032.526	-95.312455	46.921464
1159	Becker	Ottertail River	03r1	x		0	2007, 2008	292534.466	5177175.515	-95.714597	46.715923
130	Becker	Rice Lake	03029100	z	245	196	2007, 2008	289865	5203294.579	-95.761494	46.949864
129	Becker	Rice Lake	03020100	z	245	245	2008, MCBS 2011, MDNR APM	303692	5200242.216	-95.578662	46.926661
131	Becker	Rock Lake	03029300	z	1198	240	2007, 2008, MDNR APM	289735	5201189.943	-95.762226	46.930905
132	Becker	Round Lake	03015500	z	1094	0	2007, 2008, MDNR APM, MCBS 2011	306876	5212543.211	-95.54212	47.03818
133	Becker	Saint Patrick Lake	03027700	z			MDNR 2013	287468	5191663.714	-95.787529	46.844559
134	Becker	Schultz Lake	03027800	z	103	82	2008	288336	5190624.523	-95.775676	46.835495
135	Becker	Shell Lake	03010200	z	3147	169	2007, 2008, MDNR APM, MCBS 2011	313777	5202077.739	-95.447067	46.946069
136	Becker	Sieverson / Sivertson Lake	03010800	z			MDNR 2013, MCBS 2011	307475	5195043.816	-95.526821	46.881034
137	Becker	Spindler Lake	03021400	z	185	125	2008	301440	5211633.194	-95.6132	47.028389
138	Becker	St. Clair Lake Lake	03043000	z			MCBS2011	285230	5211520.714	-95.826227	47.022314
139	Becker	Tamarack Lake	03038800	z			MDNR APM	281088	5195665.507	-95.873021	46.878458
140	Becker	Tamarack North Lake	03024102	z			2008	297364	5201952.742	-95.662458	46.940135
141	Becker	Tamarack South Lake	03024101	x			2008	296261	5197837.423	-95.675091	46.902805
142	Becker	Tea Cracker Lake	03015700	z	122	30	2008	305976	5207838.193	-95.551938	46.995619
143	Becker	Toad Lake	03010700	z			MDNR APM	310150	5193204.197	-95.490981	46.865265
144	Becker	Town Lake	03026400	z	117	35	2008	291986	5178796.4	-95.722498	46.730323
145	Becker	Trieglaff Lake	03026300	z	111	56	2008	294288	5181390.869	-95.693566	46.754358
146	Becker	Twin Island Lake	03003300	z	71	5	2007,	327312	5222862.358	-95.277301	47.136619
147	Becker	Two Inlets Lake	03001700	z	643	40	2007, 2008, MDNR APM	333308	5210787.684	-95.193827	47.029587
148	Becker	Unnamed - Big Slough Lake	03018500	z			MDNR 2013	298714	5191970.807	-95.640328	46.850815
149	Becker	Unnamed - Davis Lake Lake	03026800	z			MDNR 2013	296259	5196036.034	-95.674311	46.886611
150	Becker	Unnamed (Indian Creek impoundmen	03078600	z	13	0	2007, 2008, 2010	325070	5212780.125	-95.30293	47.045375
151	Becker	Unnamed Lake	03043400	z	21	17	2008	284243	5210644.872	-95.838781	47.014121
152	Becker	Unnamed Lake	03071600	z	25	12	2008	308956	5192838.584	-95.506479	46.861636
153	Becker	Unnamed Lake	03077600	z	20	10	2008	309052	5195727.684	-95.506431	46.887637
154	Becker	Unnamed Lake	03109300	x	72	7	2008	297840	5211511.157	-95.660473	47.026202
155	Becker	Upper Egg Lake	03020600	z	493	24	2007, 2008	302015	5213853.734	-95.606613	47.048523
156	Becker	White Earth Lake	03032800	z			MDNR APM	291100	5223129.654	-95.75445	47.128538
157	Becker	Winter Lake	03021600	z	117	43	2008	298815	5211321.648	-95.647571	47.024796
158	Becker	Wolf Lake	03010100	z	1453	10	2007, 2008	317955	5188610.35	-95.386835	46.826143

159	Beltrami	Andrusia Lake	04003800	z			MCBS2011		375331	5255986.904	-94.653641	47.445398
160	Beltrami	Big Lake	04004900	z	3565	250	2008		379185	5261969.593	-94.604179	47.499935
161	Beltrami	Big Rice Lake	04003100	z	642	96	2007, 2008		382936	5264773.235	-94.555137	47.525838
162	Beltrami	Blackduck Lake	04006900	x			MDNR APM		378767	5287838.498	-94.616886	47.732528
1164	Beltrami	Blackduck River	14RD122	x			MPCA_BioMon		369585.1084	5307534.694	-94.745216	47.907871
163	Beltrami	Bootleg Lake	04021100	z	308	185	2007, 2008		348675	5256720.908	-95.007261	47.446355
164	Beltrami	Buck Lake	04004200	z			MDNR APM		382473	5257439.002	-94.559331	47.459786
165	Beltrami	Burns Lake	04000100	z	131	105	2008		392998	5260175.408	-94.420397	47.486214
166	Beltrami	Campbell Lake	04019600	z	462	23	2008, MCBS 2011		353983	5276282.34	-94.943386	47.623477
167	Beltrami	Carr Lake	04014100	z	51	8	2007, 2008		357430	5255929.565	-94.890941	47.441213
168	Beltrami	Cass Lake	04003000	z	15958	10	2008		385151	5253522.861	-94.522796	47.425038
169	Beltrami	Clearwater Lake	04034300	x			MDNR APM		335793	5289066.356	-95.190117	47.734065
170	Beltrami	Cranberry Lake	04012300	z	77	46	2007, 2008		367634	5286470.873	-94.764881	47.718041
1121	Beltrami	Depressional Wetland	09Belt143				MPCA_BioMon		391923.8063	5285498.991	-94.440893	47.713822
171	Beltrami	Erickson NW Lake	04006801	z			2008		375040	5280949.556	-94.664597	47.669859
172	Beltrami	Erickson SE Lake	04006802	x			2008		375461	5280192.388	-94.658776	47.66313
173	Beltrami	George Lake	04017500	z	89	18	2008		355304	5286755.096	-94.929283	47.717951
174	Beltrami	Gourd Lake	04025300	z			UofM/MPCA 2013		352767	5297177.966	-94.966621	47.811103
1162	Beltrami	Grant Creek	04r1	z	0	0	2007, 2008		345146.006	5258600.519	-95.054699	47.462428
175	Beltrami	Gull Lake	04006400	z	170	34	2008		376509	5273230.666	-94.642859	47.600717
176	Beltrami	Gull Lake	04012000	z			UofM/MPCA 2013		370687	5281498.239	-94.722719	47.673937
177	Beltrami	Heart Lake	04027100	z	10	0	2007, 2008		353130	5304201.302	-94.964159	47.87434
178	Beltrami	Irving Lake	04014000	z	644	97	2008		357941	5257987.79	-94.884829	47.459834
179	Beltrami	Kitchi Lake	04000700	z	1850	185	MDNR APM		385967	5262108.525	-94.514197	47.502409
1168	Beltrami	Little Mississippi River	13UM122	x			MPCA_BioMon		339511.7426	5258107.403	-95.129227	47.456631
180	Beltrami	Little Puposky Lake	04019700	z	158	95	2008		354404	5285713.45	-94.940928	47.708382
181	Beltrami	Little Rice Lake	04001500	z	123	60	2008		384214	5262661.724	-94.537611	47.507075
182	Beltrami	Little Turtle Lake	04015500	z	464	23	2008		357984	5277542.238	-94.890574	47.635697
183	Beltrami	Long Lake	04022700	x			MDNR APM		350758	5280135.429	-94.987596	47.65739
184	Beltrami	Manomin Lake	04028600	z	288	144	2007, 2008		343683	5256967.01	-95.07352	47.44739
185	Beltrami	Marquette Lake	04014200	z	578	0	2008, MDNR APM		356240	5254686.677	-94.906312	47.429774
186	Beltrami	Medicine Lake	04012200	z	458	69	2008		369745	5287683.687	-94.737111	47.729377
1163	Beltrami	Mississippi River	04r2	x		0	2007, 2008		393208.726	5255518.899	-94.416474	47.444362
187	Beltrami	Moose Lake	04001100	z	617	96	2008		389820	5266685.482	-94.464197	47.544242
188	Beltrami	Moose Lake	04034200	z	133	0	2007, 2008, MCBS 2011		335721	5259745.763	-95.180091	47.470417
189	Beltrami	Movil Lake	04015200	x			MDNR APM		359279	5272085.194	-94.871592	47.586904
190	Beltrami	Norman Lake	04002900	z	61	8	2008		390313	5333448.579	-94.474573	48.144825
1165	Beltrami	North Turtle River	13UM131	x			MPCA_BioMon		384213.1699	5273054.241	-94.540359	47.600552
191	Beltrami	Pimushe Lake	04003200	z	1350	135	2007, 2008, MCBS 2011		385543	5265748.511	-94.520771	47.535075
192	Beltrami	Puposky Lake	04019800	z	2120	236	2008		355115	5283666.338	-94.930776	47.690133
193	Beltrami	Rabideau Lake	04003400	z	723	217	2007, 2008, MDNR APM, MCBS 2011		386447	5277393.612	-94.511778	47.639978
194	Beltrami	Rice Lake	04012100	x	36	0	2008, MCBS 2011		369002	5289569.759	-94.747582	47.746189
195	Beltrami	Rice Lake	04017400	x	55	0	2008, MCBS 2011		356493	5287504.842	-94.913686	47.724959
196	Beltrami	Rice Pond	04005900	z	247	123	2008		379763	5275917.133	-94.600324	47.625491
1166	Beltrami	Tamarac River	14RD139	x			MPCA_BioMon		388818.8497	5334496.597	-94.494926	48.153992
197	Beltrami	Three Island Lake	04013400	z	836	125	2007, 2008		363610	5275222.397	-94.814996	47.616043

198	Beltrami	Turtle Lake	04015900	z			MDNR APM, MCBS 2011	359665	5275495.49	-94.867552	47.617657
1167	Beltrami	Turtle River	13UM153	x			MPCA_BioMon	379733.3386	5266969.714	-94.598267	47.54501
199	Beltrami	Turtle River Lake	04011100	z	1664	0	2007, 2008, MDNR APM	372588	5270611.437	-94.694238	47.576401
200	Beltrami	Whitefish Lake	04030900	z	126	0	2007, 2008	341999	5283889.826	-95.105527	47.689069
1277	Buffalo, WI	Mississippi Pool 5 / Spring	S007-660	z			UofM/MPCA 2013	592333.97	4894937.05	-91.84441	44.20181
1151	Buffalo, WI - Wabasha	Mississippi Pool 5 / Spring	S007-690	z			2008, UofM/MPCA2013	592210	4894656	-91.846011	44.199296
201	Carlton	Bang Lake	09004600	z	58	1	2008, 1854 List	522587	5168263.411	-92.704729	46.667549
202	Carlton	Bob Lake	09002600	z	78	1	2008, 1854 List	529521	5164472.153	-92.614328	46.633161
203	Carlton	Cedar Lake	09003100	z	62	10	2008, 1854 List	529880	5175922.195	-92.608895	46.736185
204	Carlton	Cross Lake	09006200	z	110	6	2008, 1854 List	507924	5174574.372	-92.896303	46.724677
205	Carlton	Dead Fish Lake	09005100	z	153	115	2007, 2008, UofM/MPCA 2013, 1854 List	523631	5177167.97	-92.690624	46.747646
206	Carlton	Flower Lake	09006400	z	14	10	2008, 1854 List	507606	5169891.747	-92.900542	46.68254
207	Carlton	Hardwood Lake	09003000	z	100	25	2008, 1854 List	526165	5178804.878	-92.657356	46.762282
208	Carlton	Hay Lake	09001000	z	103	1	2007, 2008, MDNR APM, 1854 List	541085	5160924.123	-92.463573	46.600623
209	Carlton	Island Lower Lake	09006002	x			2007, 2008, 1854 List	509407	5168147.817	-92.877028	46.666823
210	Carlton	Island Upper Lake	09006001	z			2007, 2008, 1854 List	509568	5169936.615	-92.874886	46.682919
211	Carlton	Jaskari Lake	09005000	z	74	74	2008, 1854 List	522901	5169408.127	-92.700567	46.677839
212	Carlton	Kettle Lake	09004900	z	611	415	2007, 2008, 1854 List	517110	5164265.57	-92.776475	46.631733
213	Carlton	Kettle Lake	09007400	z	22		1854 List	495344	5164007.88	-93.060824	46.629617
1174	Carlton	Kettle River	KR	x			1854 List	514628.987	5164248.373	-92.808888	46.631637
214	Carlton	Little Kettle Lake	09007700	z			1854 List	515756	5166856.511	-92.794075	46.655083
215	Carlton	Long Lake	09006600	z	17	4	2008, 1854 List	504103	5169103.011	-92.946355	46.675473
216	Carlton	Miller Lake	09005300	z	156	156	2008, 1854 List	522709	5174871.753	-92.702808	46.727014
217	Carlton	Moose (Little) Lake	09004300	z	133	0	2008, 1854 List	522484	5142144.383	-92.707342	46.432498
1169	Carlton	Moose Horn River	MHR	z			2007, 1854 List	515179.816	5141196.507	-92.802445	46.424171
218	Carlton	Moosehead Lake	09004100	z	279	0	2008, 1854 List	518613	5143832.297	-92.75766	46.447806
219	Carlton	Perch Lake	09003600	z	796	597	2008, 1854 List	525073	5170615.25	-92.672103	46.688625
220	Carlton	Rice Portage Lake	09003700	z	832	120	2007, 2008, 1854 List	523385	5171869.963	-92.694114	46.699977
221	Carlton	Sawyer WMA(Sawyer P)	09014500	z			2008, 1854 List	528113	5165975.252	-92.632631	46.646748
1122	Carlton	Sawyer WMA, Sterly Pool	W0854002	z	29	2	2008, 1854 List	528489.2109	5165461.148	-92.627746	46.642106
222	Carlton	Tamarack Lake	09006700	z	228	11	2008, 1854 List	500620	5167526.75	-92.991896	46.6613
1170	Carlton	Tamarack River	09r1	z			1854 List, in MDNR 2008 as 09r1	500608.521	5167846.489	-92.992046	46.664177
223	Carlton	unnamed (FDL1)	09017800	z			1854 List	524500	5176121.235	-92.679303	46.738195
224	Carlton	unnamed (SWTorchlight)	09002700	z			1854 List	525422	5165164.862	-92.66784	46.639563
225	Carlton	Walli Lake	09007100	z			1854 List	495828	5164761.589	-93.054508	46.636403
226	Carlton	Wild Rice Lake	09002300	z	54	36	2008, 1854 List, MCBS 2011	530340	5169066.826	-92.603326	46.674472
227	Carlton	Woodbury Lake	09006300	z	59	10	2008, 1854 List	505296	5169850.825	-92.930749	46.682194
228	Cass	Baby Lake	11028300	z	736	7	2008	396664	5202808.765	-94.358494	46.970745
229	Cass	Bergkeller Lake	11044700	z	120	5	2008	373018	5175943.42	-94.66176	46.724977
230	Cass	Beuber Lake	11035300	z	135	15	2007, 2008, MCBS 2011	384458	5191943.192	-94.516144	46.870986
231	Cass	Big Birch Lake	11001700	z	255	45	2008	433753	5211093.349	-93.872195	47.050034
232	Cass	Big Boy Lake	11014400	z			MDNR APM	412536	5237784.242	-94.156685	47.287696
233	Cass	Big Portage Lake	11030800	z	956	30	2008, MDNR APM, MCBS 2011	391451	5189986.752	-94.423946	46.854564
234	Cass	Big Rice Lake	11007300	z	2717	1411	2007, 2008, MCBS 2011	428990	5204897.898	-93.933922	46.993796
235	Cass	Big Sand Lake	11007700	z	752	10	2008, MCBS 2011	426094	5212718.611	-93.973284	47.063845
236	Cass	Big Vermillion Lake	11002900	z			MDNR APM	434433	5224617.12	-93.865213	47.171783

237	Cass	Birch Lake	11041200	z	1262	1	2008, MDNR APM		382050	5199893.243	-94.54979	46.942079
238	Cass	Boy Lake	11014300	z	5544	340	2007, 2008, MDNR APM		416786	5219556.854	-94.097104	47.124261
1172	Cass	Boy River	11r2	z	0	0	2007, 2008		409569.409	5225163.599	-94.193357	47.173752
1171	Cass	Boy River	00UM012	x			2008, MPCA_BioMon		416443.8644	5214510.825	-94.100677	47.078819
239	Cass	Brockway Lake	11036600	z	182	55	2007, 2008, MCBS 2011		390695	5186269.043	-94.43297	46.820995
240	Cass	Bullhead Lake	11018400	x	88	0	2008, Aquatic veg map/lake depth map 1993		409848	5205073.312	-94.185663	46.993044
241	Cass	Cat Lake	11050900	z	108	5	2008		371975	5140349.11	-94.665572	46.404585
242	Cass	Cedar Lake	11044400	z	17	4	2008		376785	5177699.794	-94.612954	46.741482
243	Cass	Cedar Lake	11048100	z	34	3	2008		374998	5219629.966	-94.647868	47.118319
244	Cass	Cedar Lake	11008200	z			MCBS2011		427848	5221264.49	-93.951557	47.140929
245	Cass	Child Lake	11026300	z	295	12	2008, MDNR APM, MCBS2011		397516	5200074.066	-94.346679	46.946275
246	Cass	Chub Lake	11051700	z	57	51	2008		421620	5235025.271	-94.036088	47.264023
247	Cass	Ding Pot Lake	11056500	z	29	29	2008		394163	5183062.757	-94.386778	46.79271
248	Cass	Drumbeater Lake	11014500	z	376	5	2008		412134	5235169.824	-94.161485	47.264121
249	Cass	Esterday Lake	11051100	z	43	3	2008		365673	5147990.214	-94.749721	46.472097
250	Cass	Farnham Lake	11051300	z	142	71	2007, 2008		363556	5151970.477	-94.77845	46.507475
251	Cass	Five Point Lake	11035100	z	265	13	2008, MDNR APM		389637	5192803.648	-94.448416	46.879606
252	Cass	Flaherty Lake	11049200	z			MCBS2011		381991	5235773.071	-94.559967	47.264817
253	Cass	George Lake	11010100	z	720	262	2007, 2008, MCBS 2011		421242	5193200.146	-94.03378	46.88767
254	Cass	Girl Lake	11017400	z			MDNR APM		407115	5204144.355	-94.221409	46.984309
255	Cass	Goose Lake	11009600	z	844	844	2007, 2008, MCBS 2011		426196	5230142.262	-93.974802	47.220621
256	Cass	Gull Lake	11030500	z	9541	15	2008, MDNR APM		396218	5144489.956	-94.351197	46.445999
1173	Cass	Gull River	11r1	z	219	110	2007, 2008		395963.524	5134285.84	-94.352239	46.354152
257	Cass	Hardy Lake	11033200	z	89	2	2008		386346	5146131.063	-94.480084	46.459173
258	Cass	Hattie Lake	11023200	z	592	40	2008, MDNR APM		393567	5185846.818	-94.395232	46.817661
259	Cass	Hay Lake	11019900	z	364	36	2008		402335	5191424.508	-94.281516	46.869186
260	Cass	Hunter Lake	11017000	z	189	2	2008		406488	5197569.192	-94.228297	46.925065
261	Cass	Inguadona Lake	11012000	z	935	19	2007, 2008, MCBS 2011		413770	5201326.43	-94.13338	46.959856
262	Cass	Island Lake	11010200	z	390	10	2008		420760	5197734.182	-94.040895	46.928408
263	Cass	Island Lake	11036000	z	117	30	2007, 2008, MCBS 2011		383952	5190202.818	-94.522338	46.855242
264	Cass	Jack Lake	11040000	z			MCBS2011		390113	5213038.348	-94.447073	47.061715
265	Cass	Kelly Lake	11042800	z	50	10	2008		380682	5157300.397	-94.556684	46.558677
266	Cass	Kid Lake	11026200	z	167	3	2008		394747	5200993.425	-94.383267	46.954112
267	Cass	Laura Lake	11010400	z	1424	854	2007, 2008, MCBS 2011		422942	5203803.392	-94.013267	46.983272
268	Cass	Leech Lake	11020300	z	109415	4000	2007, 2008		393360	5224310.271	-94.406998	47.163648
269	Cass	Lind (Lindsey) Lake	11036700	z	462	95	2007, 2008		387006	5186594.61	-94.481397	46.823308
270	Cass	Little Birch Lake	11001800	z	25	25	2008, MCBS 2011		434096	5209636.757	-93.867467	47.036963
271	Cass	Little Boy Lake	11016700	z	1396	10	2008		409427	5199543.088	-94.190095	46.943232
272	Cass	Little Hattie Lake	11023201	z			MCBS2011		394182	5186730.303	-94.387377	46.825707
273	Cass	Little Swift Lake	11013100	z	62	16	2008		420676	5213322.001	-94.044729	47.068645
274	Cass	Little Vermillion Lake	11003000	z	138	15	2008		436523	5226246.879	-93.837867	47.186652
275	Cass	Little Woman Lake	11026500	z			2008, MCBS2011		398419	5199760.639	-94.334746	46.943595
276	Cass	Lizotte Lake	11023100	z	75	50	2008		396558	5178995.781	-94.354487	46.756496
277	Cass	Lomish Lake	11013600	z	282	197	2008, MCBS 2011		414105	5214231.723	-94.131428	47.076008
278	Cass	Long Lake	11014200	x			MDNR APM		410549	5208125.316	-94.177049	47.020598
279	Cass	Lower Hand Lake	11025100	z	122	50	2008		400675	5188552.313	-94.302667	46.8431

280	Cass	Lower Milton Lake	11008000	z	80	5	2008		428852	5221329.623	-93.938328	47.141625
281	Cass	Lower Trelipe Lake	11012900	z	618	20	2007, 2008, MDNR APM		418744	5204594.201	-94.068601	46.989885
282	Cass	Margaret Lake	11022200	z	230	3	2008, MDNR APM		395317	5149052.766	-94.363949	46.486912
283	Cass	McCarthey Lake	11016800	z	194	78	2008		411562	5198769.238	-94.161897	46.936558
284	Cass	McKeown Lake	11026100	z	171	3	2008		399157	5201675.745	-94.325477	46.960936
285	Cass	Middle Sucker Lake	11031700	z			MCBS2011		392520	5244823.77	-94.423014	47.348043
286	Cass	Moon Lake	11007800	z	58	5	2008		422984	5212715.655	-94.014233	47.063463
287	Cass	Moose Lake	11042400	z	92	1	2007, 2008, 2010		379070	5161854.741	-94.578896	46.59936
289	Cass	Mud Lake	11030900	z	18	18	2008		392571	5187155.241	-94.408592	46.829272
288	Cass	Mud Lake	11010000	z	1440	1300	2007, 2008, MCBS 2011		425769	5233588.024	-93.981013	47.251575
1175	Cass	Norway Brook	11000000	z			MDNR APM		393084.885	5176098.802	-94.399277	46.729887
290	Cass	Norway Lake	11030700	z	498	10	2007, 2008, MDNR APM		393234	5177058.225	-94.397549	46.738542
291	Cass	Nushka Lake	11013700	x	78		2008,		417415	5242362.175	-94.093023	47.329515
292	Cass	Ododikossi Lake	11007400	z	20	10	2008		423850	5210071.22	-94.002384	47.039771
293	Cass	Oxbow Lake	11007500	z	172	4	2008		424382	5209169.421	-93.995232	47.031718
294	Cass	Peterson Lake	11015400	z	139	3	2008		409687	5186414.937	-94.184077	46.825153
295	Cass	Pick Lake	11026700	z	36	1	MCBS 2011		397209	5199081.263	-94.350487	46.937296
296	Cass	Pillager Lake	11032000	z	213	10	2008		386313	5136026.298	-94.478055	46.368258
297	Cass	Pine Mountain Lake	11041100	z	1657	40	2008		383064	5186740.463	-94.533097	46.823939
1176	Cass	Pine River	11river_1	x			2007		397051.537	5171628.625	-94.346376	46.690293
298	Cass	Pleasant Lake	11038300	z			UofM/MPCA 2013		387688	5195980.525	-94.47477	46.907859
1177	Cass	Portage Creek	12UM100	x			MPCA_BioMon		401801.4129	5241055.282	-94.299332	47.315601
301	Cass	Portage Lake	11047600	z	277	0	2007, 2008, 2010		381961	5207408.954	-94.552916	47.00967
299	Cass	Portage Lake	11013400	z			MDNR 2013		415460	5214685.786	-94.113668	47.080268
300	Cass	Portage Lake	11020400	x			MDNR APM		401990	5243838.691	-94.29745	47.340669
302	Cass	Potshot Lake	11014900	z	28	14	2008		404057	5191029.496	-94.258843	46.865882
303	Cass	Rabbit Lake	11013500	z			MDNR 2013		413030	5214727.503	-94.145681	47.080328
304	Cass	Rat Lake	11028500	x	104		2008, Aquatic Veg map/lake depth map		395428	5211113.269	-94.376657	47.04526
305	Cass	Ray Lake	11022000	z	183	37	2008		397903	5152986.426	-94.331128	46.5227
306	Cass	Rice (Carrol's) Lake	11022700	z	46	46	2008		396902	5174204.307	-94.348909	46.713442
307	Cass	Rice (Pillager) Lake	11032100	z	232	100	2007, 2008		385160	5136777.517	-94.493224	46.374822
308	Cass	Rice Lake	11016200	z	342	137	2008		411666	5201881.534	-94.161137	46.964573
309	Cass	Rice Lake	11040200	z	188	5	2008		386459	5218130.89	-94.496458	47.106908
310	Cass	Rice Pad	11072000	z	14	4	2008		437306	5190697.249	-93.822604	46.866859
311	Cass	Rock Lake	11032400	z	249	10	2008, MDNR APM		386342	5142477.599	-94.479246	46.426304
312	Cass	Sailor Lake	11001900	z	42	10	2008		438603	5208112.843	-93.807942	47.023685
313	Cass	Schafer Lake	11000400	z	44	2	2008		434038	5187373.963	-93.864998	46.83664
314	Cass	Scribner Lake	11044100	z	93	5	2008		382121	5183172.442	-94.544536	46.791676
315	Cass	Six Mile Lake	11014600	z	1288	70	2008		414440	5239761.833	-94.13189	47.305739
316	Cass	Skunk Lake	11002700	z	145	30	2008		438918	5227042.075	-93.806366	47.194034
317	Cass	Spring Lake	11002200	z	86	12	2008		433199	5219178.869	-93.880686	47.122729
318	Cass	Steamboat Bay	11049100	z	146	0	2007		377372	5235934.745	-94.621046	47.265424
1178	Cass	Steamboat River	11river_2	x			2007		377664.39	5235243.342	-94.616993	47.25926
319	Cass	Swift Lake	11013300	z	359	51	MDNR APM, MCBS 2011		417191	5217611.865	-94.091407	47.106813
320	Cass	Sylvan Lake	11030400	z			MDNR APM		393373	5136404.036	-94.386382	46.372806
321	Cass	Tamarack Lake	11018900	z	63	6	2008		410545	5203877.423	-94.176262	46.98238

322	Cass	Tamarack Lake	11034700	z	46	4	2008		387970	5176571.916	-94.466312	46.733305
323	Cass	Thiebault Lake	11002000	z	37	5	2008		437170	5207904.04	-93.826769	47.021671
324	Cass	Third Guide Lake	11000100	z	44	14	2008		440862	5192248.048	-93.776152	46.881139
325	Cass	Thunder Lake	11006200	z	1316	2	2008		425797	5200978.897	-93.975269	46.958184
326	Cass	Twin (East Twin) Lake	11012300	z	297	50	2008, MCBS 2011		419720	5208727.682	-94.056501	47.027194
327	Cass	Unnamed (Pistol Lake Rice Bed)	11073800	z	22	20	2008		417199	5186611.19	-94.085643	46.827895
328	Cass	Unnamed Lake	11078000	z	10	4	2008		395478	5131468.971	-94.35792	46.328733
329	Cass	Upper Gull Lake	11021800	z	345	2	2008, MDNR APM		396849	5153421.453	-94.344963	46.526453
330	Cass	Upper Hand Lake	11024200	z	316	20	2008		399815	5189715.916	-94.314198	46.853439
331	Cass	Upper Trelipe Lake	11010500	z			MDNR APM		421211	5202926.93	-94.035873	46.975182
332	Cass	Wabedo Lake	11017100	z	1272	5	2008, MCBS 2011		408369	5196481.41	-94.203376	46.915541
333	Cass	Wabegon Lake	11040300	z	42	4	2008		387140	5216850.172	-94.487164	47.095504
334	Cass	Washburn Lake	11005900	z	1768	60	2008, MDNR APM		424741	5190277.681	-93.987377	46.861781
335	Cass	Wax Lake	11012400	z	95	10	2008		420810	5207854.102	-94.042006	47.019466
336	Cass	West Twin Lake	11012500	z	200	11	2008		418471	5208824.604	-94.072952	47.027913
337	Cass	Winnibigoshish Lake	11014700	z	69821	1000	2007, 2008		409410	5255217.046	-94.201572	47.4441
338	Cass	Woman Lake	11020100	z	5360	54	2007, 2008, MDNR APM		402002	5199532.757	-94.28763	46.942084
339	Cass	Rainy Lake	11035600	x			MDNR APM		389653	5189067.78	-94.447302	46.846001
340	Cass	Unnamed Lake	11077700	z	40	0	2008, multi-year MDNR WR observations		394445	5131129.987	-94.37126	46.325523
341	Chisago	Carlos Avery WMA - Mud	13005902	z			MDNR 2013		502519	5027701.383	-92.967813	45.402826
342	Chisago	Carlos Avery WMA - North Sunrise Pool	13005903	z			MDNR 2013		506277	5030889.671	-92.919753	45.431501
343	Chisago	Carlos Avery WMA - Peterson Slough	13006000	z			MDNR 2013		506813	5032628.268	-92.912877	45.447146
344	Chisago	Carlos Avery WMA - South Sunrise Pool	13005901	z			MDNR 2013		502358	5025201.372	-92.969882	45.380323
345	Clay	Cromwell Lake	14010300	z	27	0	2007, 2008, UofM/MPCA sampled		247758	5206538.371	-96.315776	46.964333
346	Clearwater	Anderson Lake	15007400	z	53	3	2008		318076	5240809.297	-95.406285	47.295486
347	Clearwater	Bagley Lake	15004000	z	106	0	2007, 2008		332496	5292044.135	-95.235204	47.75999
1278	Clearwater	Clearwater	S004-204	z			UofM/MPCA 2013		320050.87	5265465.74	-95.3902	47.5177
1179	Clearwater	Clearwater River	15r1	z	0	0	2007, 2008, 2010, UofM/MPCA 2013		312363.061	5309216.543	-95.511051	47.908805
348	Clearwater	Elk Lake	15001000	z	305	0	2008, UofM/MPCA 2013		331991	5228538.192	-95.21777	47.188864
349	Clearwater	Falk Lake Lake	15003800	z			MCBS2011		327881	5286316.707	-95.294472	47.707283
350	Clearwater	First Lake	15013900	z	60	3	2008		315069	5265724.603	-95.456419	47.518629
351	Clearwater	Gill Lake	15001900	z	380	38	2008		329031	5238339.508	-95.260558	47.276229
352	Clearwater	Itasca Lake	15001600	z	1065	0	2008, UofM/MPCA 2013		333342	5231531.816	-95.201063	47.216126
353	Clearwater	Lomond Lake	15008100	z	108	5	2008		318818	5266855.535	-95.407133	47.529852
1279	Clearwater	Lower Rice	S006-985	z			UofM/MPCA 2013		312015.68	5250694.24	-95.490546	47.382638
1280	Clearwater	Lower Rice	S007-164	z			UofM/MPCA 2013		311809.76	5250596.49	-95.49323	47.3817
354	Clearwater	Lower Rice Lake	15013000	z	2375	1568	2007, 2008		313549	5247497.168	-95.468909	47.354336
355	Clearwater	Mallard Lake	15001800	z	123	25	2008		328546	5241142.074	-95.268043	47.301301
356	Clearwater	Minerva Lake	15007900	x	239	36	2007, 2008		325071	5249585.233	-95.317294	47.376294
357	Clearwater	Minnow Lake	15013700	z			MDNR APM		313968	5267288.858	-95.471691	47.532377
1181	Clearwater	Mississippi River	15r3	x		0	2007, 2008		335026.777	5246339.319	-95.184305	47.349697
358	Clearwater	Mud Lake	15006100	z	294	103	2007, 2008		326651	5255390.011	-95.298651	47.428905
359	Clearwater	Pine Lake	15014900	z	1465	220	2008, UofM/MPCA 2013		310448	5285328.869	-95.526215	47.693523
361	Clearwater	Second Lake	15014000	z	68	7	2008, MCBS 2011		313617	5265736.148	-95.475692	47.518319
360	Clearwater	Second Lake	15009100	z			UofM/MPCA 2013		322963	5299770.333	-95.365457	47.8269
362	Clearwater	Spike Lake Lake	15003500	z			MCBS2011		329322	5289645.376	-95.276583	47.737591

363	Clearwater	Sucker Lake	15002000	z	90	14	2007, 2008, MCBS 2011		327944	5236574.953	-95.274239	47.260079
364	Clearwater	Third Lake	15014100	z	38	2	2008		310469	5266496.501	-95.517793	47.524244
365	Clearwater	Unnamed (Rice Bed)	15002100	z	150	45	2008		328208	5249642.602	-95.275794	47.377642
366	Clearwater	Upper Rice Lake	15005900	z	1860	1116	2007, 2008, MCBS 2011		326784	5251501.243	-95.295369	47.393977
367	Clearwater	Walker Brook Lake	15006000	z	94		MCBS2011		326823	5262284.979	-95.299075	47.490942
1180	Clearwater	Wild Rice River	15r2	x		0	2008		308776.691	5252670.745	-95.534268	47.399466
368	Cook	Baker Lake	16048600	z			1854 List		663218	5301603.156	-90.818349	47.847034
369	Cook	Bigsby Lake	16034400	z	89	1	2008, 1854 List		677617	5289134.612	-90.63115	47.731127
408	Cook	Bower Trout Lake	16017500				1854 List		690284	5313057.461	-90.451865	47.942549
1188	Cook	Brule River	BR	x			1854 List		714757.693	5309836.609	-90.12614	47.905872
370	Cook	Caribou Lake	16036000	z	714	7	2008, 1854 List		675863	5286953.185	-90.655403	47.711996
371	Cook	Christine Lake	16037300	z	192	19	2008, 7050.0470, 1854 List		670295	5289023.644	-90.728765	47.732103
372	Cook	Cuffs Lake	16000600	z	16	0	2008, 1854 List		743183	5315491.393	-89.743163	47.946525
409	Cook	Dick Lake	16015700				1854 List		687918	5304348.687	-90.48731	47.864967
373	Cook	East Pipe Lake	16038600	z			1854 List		672421	5306214.167	-90.693598	47.886085
374	Cook	Elbow Lake	16009600	z	415	124	2007, 2008, 1854 List		702582	5304647.789	-90.291313	47.863199
375	Cook	Fente Lake	16074100	z	35	0	2008, 1854 List		654345	5318211.698	-90.930919	47.998561
376	Cook	Fourmile Lake	16063900	z	593	42	2008, 7050.0470, 1854 List		652392	5283899.572	-90.969166	47.690504
377	Cook	Grassy Lake	16039000	z	22	0	1854 List		674709	5315312.071	-90.659329	47.967255
378	Cook	Gust Lake	16038000	z			1854 List		673252	5303225.968	-90.68369	47.858997
379	Cook	Iron Lake	16032800	z	125	0	2007, 2008, 1854 List		678342	5326412.679	-90.606082	48.06604
380	Cook	Jack Lake	16052100	z	127	12	2008, 1854 List		664694	5307663.101	-90.796325	47.901141
381	Cook	John Lake	16003500	z			2008, 1854 List		718907	5328280.26	-90.061288	48.070193
382	Cook	Kelly Lake	16047600	z	188	56	1854 List		663516	5304253.318	-90.813366	47.870785
383	Cook	Kelso Lake	16070600	z			MDNR 2013		656720	5306869.811	-90.903233	47.896006
384	Cook	Little John Lake	16002600	z			1854 List		719551	5326973.339	-90.053325	48.058229
385	Cook	Mark Lake	16025000	z	126	0	2007, 2008, 2010, 1854 List		680306	5295320.846	-90.592754	47.785993
387	Cook	Marsh Lake	16004800	z			1854 List		710212	5305867.568	-90.188825	47.87171
386	Cook	Marsh Lake	16048800	z	62	31	2007, 2008, 7050.0470, 1854 List		662874	5299621.248	-90.823689	47.829302
410	Cook	Merganser Lake	16010700				1854 List		704791	5310627.476	-90.258975	47.916239
388	Cook	Moore Lake	16048900	z	64	48	2008, 7050.0470, 1854 List		665463	5300270.349	-90.788874	47.834477
1123	Cook	Mt. Maud Wetland	16-wetland2	z	0	0	2008, 1854 List		443104.374	5318347.225	-93.762958	48.015884
389	Cook	North Fowl Lake	16003600	z	297	0	2008, 1854 List		722022	5329451.707	-90.01892	48.079642
390	Cook	Northern Light Lake	16008900	z	443	133	2008, 7050.0470, 1854 List		706361	5309366.122	-90.238591	47.9044
391	Cook	Otter Lake	16003200	z			1854 List		723460	5319736.429	-90.004708	47.99185
392	Cook	Peterson Lake	16047800	z	104	1	2008, 1854 List		662862	5302360.554	-90.822819	47.853934
393	Cook	Phoebe Lake	16080800	z	758	1	2008, 1854 List		648910	5302470.03	-91.009173	47.858303
1184	Cook	Pigeon River	PR	z			1854 List T. 64, R. 4 - 5 E		755854.075	5321843.372	-89.569992	47.998639
394	Cook	Prout Lake	16001300	z	18	0	2008, 1854 List		730679	5318680.185	-89.908654	47.979798
395	Cook	Rib Lake	16054400	z			2008, 1854 List		665153	5322985.807	-90.7843	48.038782
396	Cook	Rice Lake	16045300	z	230	92	2007, 2008, 7050.0470, 1854 List		666273	5294621.514	-90.780224	47.783481
397	Cook	Richey Lake	16064300	z	114	0	2008, 1854 List		650915	5281157.185	-90.989784	47.66619
398	Cook	Royal Lake	16002500	x	22		1854 List		721468	5326289.369	-90.027986	48.051421
1182	Cook	Royal River	16r1	z	0	0	2008, 1854 List		722091.25	5327040.832	-90.019244	48.057957
399	Cook	South Fowl Lake	16003400	z	508	0	2008, 1854 List		724193	5326661.154	-89.991275	48.053811
400	Cook	Swamp Lake	16000900	z			2008, 1854 List		734981	5316078.112	-89.852514	47.954857

411	Cook	Swamp Lake	16025600			1854 List	680380	5302020.488	-90.588979	47.846199
1185	Cook	Swamp River	16r2	x		2008, 1854 List	729152.673	5321017.119	-89.927831	48.001342
401	Cook	Swamp River Reservoir	16090100	z	165	153 2008, 7050.0470, 1854 List	727021	5313511.783	-89.960331	47.934671
402	Cook	Teal Lake	16000300	z		2008, 1854 List	749328	5320737.8	-89.657967	47.991287
1183	Cook	Temperance River	16r3	z	0	0 2008, 1854 List	660875.145	5297849.418	-90.851036	47.813874
403	Cook	Toohey Lake	16064500	z	369	0 2008, 1854 List	653496	5287162.754	-90.953314	47.719585
404	Cook	Turtle Lake	16025100	z	61	0 2007, 2008, 1854 List	679009	5294468.987	-90.610406	47.778697
412	Cook	Two Island Lake	16015600			1854 List	689347	5305459.67	-90.467735	47.874534
1186	Cook	unnamed (Grd Portage)	URGP	z		1854 List	742535.722	5318119.529	-89.750336	47.970379
405	Cook	Unnamed Lake	16041600	z	14	14 2008, 1854 List	673503	5325056.925	-90.67153	48.055186
1187	Cook	Vern River	VR	z		1854 List T. 63, R. 3W	665638.009	5309068.713	-90.783164	47.913535
406	Cook	White Pine Lake	16036900	z	374	0 2008, 7050.0470, 1854 List	668178	5290608.672	-90.756365	47.746909
407	Cook	Wonder Lake	16066400	z		MDNR 2013	655810	5300813.115	-90.917583	47.841769
413	Crow Wing	Arrowhead Lake	18036600	z	285	40 2008	407125	5174359.833	-94.215217	46.71634
414	Crow Wing	Bass Lake	18001100	z	65	13 2008	432247	5115365.623	-93.877984	46.188496
415	Crow Wing	Bay Lake	18003400	z	2435	1 MDNR APM	434214	5137762.561	-93.85563	46.390236
416	Crow Wing	Big Bird Lake	18028500	z	205	10 2008	418188	5166955.615	-94.069176	46.651165
417	Crow Wing	Birchdale Lake	18017500	z	80	40 2008, MDNR APM	435532	5174523.727	-93.843601	46.721158
418	Crow Wing	Borden Lake	18002000	z	1038	31 2008	434649	5128218.514	-93.848643	46.304393
419	Crow Wing	Buffalo Lake	18015200	z	36	18 2008	405024	5130801.295	-94.233796	46.32413
420	Crow Wing	Bulldog Lake	18001400	z	151	5 2008, MDNR APM	432186	5113350.056	-93.878485	46.170352
421	Crow Wing	Camp Lake	18001800	z	537	22 2007, 2008, MDNR APM	431859	5121073.911	-93.883835	46.239825
422	Crow Wing	Caraway Lake	18017900	z	40	32 2008	435580	5178127.337	-93.843478	46.753589
423	Crow Wing	Clark Lake	18037400	z	309	3 2008, MDNR APM	403298	5151494.516	-94.260496	46.510074
424	Crow Wing	Clough Creek Lake	18041400	z		MDNR APM	399152	5182191.159	-94.321233	46.785641
425	Crow Wing	Crow Wing Lake	18015500	z	378	0 2007, 2008	397242	5121176.833	-94.332761	46.236399
1189	Crow Wing	Crow Wing River	18river_1	x		2007, 2008	394232.213	5121945.386	-94.371959	46.242853
426	Crow Wing	Dahler Lake	18020400	z	277	28 2007, 2008	426048	5174362.368	-93.967661	46.718724
427	Crow Wing	Deadmans Lake	18018800	z	28	5 2008	427949	5158426.236	-93.940302	46.575537
428	Crow Wing	Deer Lake	18018200	z	78	30 2008	431894	5159189.432	-93.888937	46.582816
429	Crow Wing	Dog Lake	18010700	z	71	71 2008	424675	5134348.406	-93.97913	46.358519
431	Crow Wing	Duck Lake	18031400	z	160	3 2007, 2008	411446	5166898.21	-94.157257	46.649791
430	Crow Wing	Duck Lake	18017800	z	310	175 UofM/MPCA 2013	432682	5178134.568	-93.88142	46.753368
432	Crow Wing	Eagle Lake	18029600	z	356	1 2008, MDNR APM	419762	5178689.504	-94.050656	46.756933
433	Crow Wing	Edward Lake	18055600	z		MDNR APM	410102	5148610.159	-94.171269	46.485064
434	Crow Wing	Emily Lake	18020300	z	675	2 2008	427719	5175044.77	-93.945907	46.725047
435	Crow Wing	Erskine Lake	18000900	z	186	7 2008	431076	5116708.956	-93.893353	46.200467
436	Crow Wing	Faupel Lake	18023700	z	42	25 2008	415694	5151943.45	-94.09903	46.51578
437	Crow Wing	Flanders Lake	18024700	z	181	20 2008	416729	5160521.715	-94.087081	46.593094
438	Crow Wing	Garden Lake	18032900	z	262	100 2007, 2008	407679	5152490.739	-94.203602	46.519652
439	Crow Wing	Gilbert Lake	18032000	z	391	7 2008, MCBS 2011, MDNR APM	408762	5137955.092	-94.186641	46.389013
440	Crow Wing	Goodrich Lake	18022600	z	382	5 2008	421642	5171386.784	-94.024798	46.691449
441	Crow Wing	Google Lake	18022300	z	107	11 2007, 2008	422257	5163078.838	-94.015356	46.616766
442	Crow Wing	Grass Lake	18023000	z	78	4 2008	421320	5174419.665	-94.029527	46.7187
443	Crow Wing	Greer Lake	18028700	z	384	20 2008	419321	5165839.659	-94.054177	46.641261
444	Crow Wing	Half Moon Lake	18023800	z	70	14 2007, 2008	416355	5150945.303	-94.090235	46.506881

445	Crow Wing	Happy Lake	18010100	z	51	36	2008		421143	5138151.183	-94.025675	46.392335
446	Crow Wing	Hay Lake	18044400	z	46	29	2008		417662	5141574.769	-94.071547	46.422726
447	Crow Wing	Hay Lake	18012000	z			MDNR APM		420632	5145136.368	-94.033508	46.455129
448	Crow Wing	Hole- in-the-Day Lake	18040100	z	217	90	2008		400966	5148644.021	-94.290279	46.484088
449	Crow Wing	Holt Lake	18002900	z	164	10	2007, 2008		435552	5122814.745	-93.836178	46.255852
450	Crow Wing	Horseshoe Lake	18031700	z	33	13	2008		411469	5141953.461	-94.152198	46.42535
451	Crow Wing	Island Lake	18005200	z	37	18	2008		429556	5131971.898	-93.915335	46.337659
452	Crow Wing	Island Lake	18038300	z	85	2	2008		398984	5129827.892	-94.31203	46.314499
453	Crow Wing	Jail Lake	18041500	z	190	2	2008		400677	5183743.055	-94.301596	46.799832
454	Crow Wing	Johnson Lake	18032800	z	129	25	2008		406997	5153080.451	-94.212609	46.524864
455	Crow Wing	Lily Pad Lake	18027500	z	47	30	2008		419001	5171293.04	-94.059316	46.690291
456	Crow Wing	Little Pine Lake	18017600	z	135	30	2007, 2008		437846	5182093.02	-93.814349	46.789488
457	Crow Wing	Little Pine Lake	18026600	z	384	20	2008		418642	5172915.63	-94.064297	46.704847
1190	Crow Wing	Little Pine River	18river_2	x			2007		420878.085	5161568	-94.033104	46.603011
458	Crow Wing	Lizzie Lake	18041600	z	384	100	2007, 2008, MCBS 2011		398917	5184093.675	-94.324731	46.802722
459	Crow Wing	Long Lake	18003100	z	80	4	2008		431446	5122558.211	-93.889407	46.253141
460	Crow Wing	Love Lake	18038800	z	88	18	2008, MDNR APM		398912	5143334.024	-94.315881	46.436008
461	Crow Wing	Lower Dean Lake	18018100	z	372	360	2007, 2008		432124	5161260.447	-93.886239	46.601475
462	Crow Wing	Lower Mission Lake	18024300	z	739	50	2008, MDNR APM		415650	5153756.757	-94.099933	46.53209
463	Crow Wing	Lows Lake	18018000	z	320	45	2007, 2008, MDNR APM		436442	5176575.595	-93.831978	46.739709
464	Crow Wing	Mallard Lake	18033400	z	73	4	2008		405304	5149298.714	-94.233908	46.490602
465	Crow Wing	Maple Lake	18004500	z	68	20	2008		432252	5135322.114	-93.880792	46.368082
466	Crow Wing	Mayo Lake	18040800	z			MDNR APM		398732	5158226.42	-94.321467	46.56997
467	Crow Wing	Middle Cullen Lake	18037700	z	405	2	2007, 2008		403251	5156209.636	-94.262091	46.552491
1124	Crow Wing	Mississippi River	18r1	z	0	1	2007, 2008, UofM/MPCA 2013, MDNR APM		413572	5143395	-94.125101	46.438593
468	Crow Wing	Mitchell Lake	18029400	z	460	3	2008		420030	5181072.625	-94.047563	46.778408
469	Crow Wing	Mollie Lake	18033500	z	421	17	2008		407908	5148579.818	-94.199842	46.484495
470	Crow Wing	Mud Lake	18009400	z	78	6	2008		428056	5152063.89	-93.937919	46.518298
471	Crow Wing	Mud Lake	18013700	z	132	40	2008		418283	5136185.125	-94.062525	46.374304
472	Crow Wing	Mud Lake	18019800	z	103	10	2008		427804	5167989.956	-93.943688	46.661577
473	Crow Wing	Mud Lake	18032600	z	82	60	2008		406188	5154611.921	-94.223464	46.538531
474	Crow Wing	Nelson Lake	18016400	z	323	100	2008		435311	5162617.307	-93.844821	46.613999
475	Crow Wing	Nisswa Lake	18039900	z	213	25	2008, MDNR APM		400457	5152603.65	-94.297756	46.519639
476	Crow Wing	North Long Lake	18037200	z	6178	10	2007, 2008, MDNR APM		404643	5143500.023	-94.241332	46.438335
477	Crow Wing	Olson Lake	18017100	z	28	3	2008		431885	5167124.717	-93.890224	46.654219
478	Crow Wing	Ossawinnamakee	18035200	x	739	1	2008, multi-year MDNR WR observations		408314	5164634.147	-94.197728	46.628999
479	Crow Wing	Pelican Lake	18030800	z			MDNR APM		409908	5158750.111	-94.175764	46.576274
480	Crow Wing	Perch Lake	18030400	z	181	8	2008		412510	5153584.353	-94.140838	46.530138
481	Crow Wing	Pine Lake	18026100	z	391	60	2008		415360	5165356.565	-94.105834	46.636426
1191	Crow Wing	Pine River	18river_3	x			2007		420634.305	5157281.197	-94.035551	46.564409
482	Crow Wing	Platte Lake	18008800	z	1768	350	2007, 2008, MDNR APM		428495	5112764.916	-93.926205	46.164709
483	Crow Wing	Pointon Lake	18010500	z	193	14	2008		424302	5135852.654	-93.984221	46.372013
484	Crow Wing	Rat Lake	18041000	z	100	2	2008		399533	5170263.34	-94.313634	46.678387
485	Crow Wing	Red Sand Lake	18038600	z	569	28	2008, MDNR APM		401355	5136297.553	-94.282603	46.373059
486	Crow Wing	Rice (Blomberg's) Lake	18012100	z	78	60	2008		426277	5144803.288	-93.959958	46.452773
487	Crow Wing	Rice (Clark Lake) Lake	18032700	z	181	124	2008		404190	5151585.631	-94.248891	46.511021

488	Crow Wing	Rice (Deerwood) Lake	18006800	z	185		170	2007, 2008		428839	5146051.806	-93.926793	46.464282
489	Crow Wing	Rice (Hesitation WMA) Lake	18005300	z	168		138	2007, 2008, UofM/MPCA 2013		431170	5132053.02	-93.894378	46.338555
490	Crow Wing	Rice (Lowell WMA) Lake	18040500	z	85		33	2008		402629	5161174.134	-94.271247	46.597067
491	Crow Wing	Rice (Pratt's) Lake	18031600	z	100		90	2008		410551	5142113.392	-94.164174	46.426668
492	Crow Wing	Rice Bed Lake	18018700	z	50		47	2008		424018	5163340.77	-93.992403	46.619325
493	Crow Wing	Rock Lake	18001600	z	210		10	2008		431041	5113765.601	-93.893377	46.173976
494	Crow Wing	Rogers Lake	18018400	z	249		4	2008		431354	5168309.583	-93.897339	46.664826
495	Crow Wing	Round (Round-Rice Bed WMA)	18003200	z	82		5	2008		436511	5131712.085	-93.824938	46.336008
496	Crow Wing	Round Lake	18014700	z	144		5	2008		405780	5118612.777	-94.221539	46.214565
497	Crow Wing	Round Lake	18037300	x				MDNR APM		401482	5145710.506	-94.282938	46.45777
498	Crow Wing	Roy Lake	18039800	z	310		5	MDNR APM		398746	5152561.599	-94.320048	46.519005
499	Crow Wing	Scott Lake	18003300	z				MDNR APM		433214	5131234.391	-93.867704	46.331393
500	Crow Wing	Sebie Lake	18016100	z	180		2	2008		397791	5113765.978	-94.324039	46.169802
501	Crow Wing	Sewells Pond	18044600	z	20		16	2008		407739	5119231.012	-94.196267	46.220397
502	Crow Wing	Sibley Lake	18040400	z	412		10	2008, MDNR APM		398290	5161243.053	-94.327895	46.597044
503	Crow Wing	Smith Lake	18002800	z	486		49	2008, MDNR APM		434075	5123647.141	-93.855455	46.2632
504	Crow Wing	South Long Lake	18013600	z	1380		4	2008		417419	5126660.907	-94.072081	46.288498
505	Crow Wing	Stewart Lake	18036700	z	254		5	2008		406892	5182492.553	-94.219915	46.789479
506	Crow Wing	Tamarack Lake	18031800	z	34		30	2008		409934	5141206.212	-94.172028	46.418423
507	Crow Wing	Terry Lake	18016200	z	102		55	2008		440264	5162860.462	-93.780174	46.616647
508	Crow Wing	Twentytwo Lake	18000800	z	169		42	2008		433292	5116345.246	-93.864582	46.197415
509	Crow Wing	Twin Island Lake	18010600	z	85		42	2008		420205	5136977.212	-94.037673	46.381661
510	Crow Wing	Unnamed (Blackies Slough)	18054400	z	33		20	2008		399144	5140200.505	-94.312185	46.407849
511	Crow Wing	Unnamed (Lost Rice)	18022800	z	157		80	2008		421235	5167106.735	-94.029388	46.65289
512	Crow Wing	Unnamed (Nokasippi R. Rice Bed)	18048500	z	166		40	2008		413880	5121549.762	-94.117082	46.242067
513	Crow Wing	Unnamed (Total's Pothole)	18054300	z	28		16	2008		399706	5138781.509	-94.304571	46.395166
514	Crow Wing	Unnamed Lake	18041300	z	103		27	2008		399739	5183150.019	-94.313755	46.794356
515	Crow Wing	Unnamed Lake	18055000	z	30		30	2008		413384	5146402.48	-94.128107	46.46563
516	Crow Wing	Upper Cullen Lake	18037600	z	459		23	2007, 2008, MDNR APM		403685	5157719.568	-94.256745	46.566138
517	Crow Wing	Upper Dean Lake	18017000	z	263		10	2008		432449	5165589.397	-93.882629	46.640461
518	Crow Wing	Upper Hay Lake	18041200	z	640		2	2008, MDNR APM		400305	5166294.402	-94.302685	46.642794
519	Crow Wing	Upper Mission Lake	18024200	z	895		5	2008, MDNR APM		417701	5156168.637	-94.07362	46.554046
520	Crow Wing	Upper Whitefish Lake	18031000	z	7969		50	20072008		407176	5171220.799	-94.213917	46.688105
521	Crow Wing	Velvet Lake	18028400	z	167		2	2008		420123	5167925.552	-94.044061	46.660126
522	Crow Wing	Whipple Lake	18038700	z	345		40	2008		399669	5135136.148	-94.304271	46.362361
523	Crow Wing	Whitefish Lake	18000100	z	709		30	2008, MDNR APM		437713	5117539.729	-93.807446	46.208583
524	Crow Wing	Williams Lake	18002400	z	47		3	2008		431144	5125858.111	-93.893807	46.282806
525	Crow Wing	Wilson Lake	18004900	z	63		4	2008		434259	5132839.234	-93.854354	46.345937
526	Crow Wing	Wolf Lake	18011200	z	218		25	2008		424130	5141044.029	-93.987299	46.418708
527	Douglas	Anka Lake	21035300	z				UofM/MPCA 2013		288605	5106358.918	-95.733949	46.078098
528	Douglas	Christina Lake	21037500	z				UofM/MPCA 2013		289030	5108476.346	-95.729398	46.097265
529	Douglas	Ida Lake	21012300	z				MDNR APM		312458	5093223.53	-95.420594	45.966942
530	Douglas	Ina Lake	21035500	z				UofM/MPCA 2013		289301	5105992.383	-95.724795	46.075018
531	Douglas	Irene Lake	21007600	z				MDNR APM		321532	5103456.523	-95.307401	46.061388
532	Douglas	Latoka Lake	21010600	z				MDNR APM		311107	5082993.218	-95.433987	45.874577
1281	Douglas	Long Prairie	S007-203	z				UofM/MPCA 2013		332643.39	5093305.53	-95.16029	45.9729

1282	Douglas	Long Prairie	S007-204	z			UofM/MPCA 2013	324764.81	5097340.41	-95.26339	46.00722
533	Douglas	Louise Lake	21009400	z			UofM/MPCA 2013,MDNR APM	312461	5089018.233	-95.418909	45.929127
534	Douglas	Mill Pond Lake	21003400	z			UofM/MPCA 2013	328960	5105504.426	-95.212175	46.081704
535	Douglas	Miltona Lake	21008300	z			MDNR APM	316698	5101320.053	-95.369024	46.040897
536	Douglas	Taylor Lake	21010500	z			MDNR APM	311592	5085752.949	-95.428826	45.899527
537	Douglas	Union Lake	21004100	z			MDNR APM	318048	5076374.275	-95.342125	45.816923
538	Douglas	Unnamed Lake	21041600	z			MCBS2011 , south of Miltona Lake	317571	5099797.909	-95.357169	46.027442
539	Freeborn	Spicer Lake	24004500	z	125	100	2008	455352	4851794.369	-93.555192	43.817872
540	Freeborn	Trenton Lake	24004900	z	184	18	2008	453854	4854962.273	-93.574092	43.846302
541	Goodhue	Sturgeon Lake	25001701	x	830		2008, Restoration efforts underway	528598	4943053.197	-92.639401	44.640268
542	Houston	Blue Lake	28000503	x	362		2008, see MDNR lake map veg.	637436	4852856.2	-91.291064	43.816002
543	Houston	Lawrence Lake	28000501	x	142		2008, see USGS Long Term Resource Management Program (LTRMP)	639343	4844564.424	-91.269517	43.741021
1125	Houston	Miss. River backwater	11HOUS044				MPCA_BioMon	639251.9346	4845550.104	-91.270391	43.749909
1283	Houston	Mississippi Pool 8 at Genoa	S007-222	z			UofM/MPCA 2013	642641.93	4826276.82	-91.2334	43.57581
1284	Houston	Mississippi Pool 8 at Reno Bottoms	S007-556	z			UofM/MPCA 2013	639739.64	4829176.84	-91.26858	43.60246
544	Houston	Target Lake	28000502	x	424		2008, see USGS Long Term Resource Management Program (LTRMP)	638430	4850127.56	-91.279415	43.79126
545	Hubbard	Bass Lake 2	29013200	z			MCBS2011	361068	5224718.773	-94.832984	47.161299
546	Hubbard	BelleTaine Lake	29014600	z			MDNR APM	354594	5199712.197	-94.910301	46.935
1193	Hubbard	Birch Creek	29r1	x		0	2008	348534.578	5232413.208	-95.000844	47.22773
547	Hubbard	Crow Wing Lake	29011600	z	47	0	2007, 2008	358741	5207562.883	-94.858294	47.006506
1194	Hubbard	Crow Wing River	29river	x		0	2008	355974.173	5185243.876	-94.88761	46.805172
548	Hubbard	Deer Lake	29009000	z	193	0	2008, MDNR APM	358127	5203181.654	-94.864995	46.96697
549	Hubbard	Duck Lake	29014200	z			MDNR APM	354539	5185673.968	-94.906545	46.808729
550	Hubbard	Eagle Lake	29025600	z	440	4	2008, MDNR APM	340211	5209562.962	-95.102608	47.020278
551	Hubbard	Eighth Crow Wing Lake	29007200	z	493	1	2008, MDNR APM, MCBS 2011	363426	5202213.872	-94.795081	46.959378
552	Hubbard	Fifth Crow Wing Lake	29009200	z	406	10	2007,2008, MDNR APM	356530	5198290.894	-94.884432	46.922638
553	Hubbard	First Crow Wing Lake	29008600	z	564	50	2008	359701	5188913.229	-94.839918	46.838971
1199	Hubbard	First Crow Wing River	29river_1	x		2007		357225.886	5187235.499	-94.871835	46.823355
554	Hubbard	Fish Hook Lake	29024200	z			MDNR APM	342910	5202423.593	-95.064642	46.95672
1197	Hubbard	Fishhook River	29r4	z	0	0	2008, MDNR APM	345031.953	5188304.714	-95.031967	46.830245
555	Hubbard	Fourth Crow Wing Lake	29007800	z	523	130	2007, 2008, MDNR APM	358015	5193032.557	-94.863298	46.875663
556	Hubbard	Garfield Lake	29006100	z	984	90	2007, 2008, MDNR APM	367705	5231755.335	-94.74754	47.225955
557	Hubbard	Hart Lake	29006300	z	236	118	2007, 2008, MCBS 2011	367431	5238878.179	-94.753271	47.289964
1200	Hubbard	Hay Creek	29river_2	x		2007		335210.241	5210603.366	-95.168743	47.028407
558	Hubbard	Horseshoe Lake	29005900	z	264	0	2008, MDNR APM, MCBS 2011	370882	5226002.213	-94.703935	47.174841
559	Hubbard	Island Lake	29025400	z	522	60	2007, 2008, MDNR APM	339884	5212455.342	-95.107932	47.046209
560	Hubbard	Kabekona Lake	29007500	z	2433	0	2007, 2008	366804	5224388.972	-94.757247	47.159518
1192	Hubbard	Kabekona River	290075T2	z	0	0	2007, 2008	364150.25	5226915.153	-94.793005	47.181697
561	Hubbard	Lake Alice Lake	29028600	z	150	15	2007, 2008	342322	5232023.36	-95.08272	47.222763
562	Hubbard	Lake George	29021600	z	882	18	2007, 2008, MCBS 2011	350366	5228553.304	-94.975376	47.193438
563	Hubbard	Little Gulch Lake Lake	29012300	z			MCBS2011	359511	5226457.755	-94.85406	47.176609
564	Hubbard	Little Sand Lake	29015000	z			MDNR APM	353088	5206018.117	-94.932117	46.991382
565	Hubbard	Lower Bottle Lake	29018000	z	712	10	2008	351892	5210252.497	-94.949222	47.029198
566	Hubbard	Lower Mud Lake	29026700	z	30	30	2008	340971	5214296.855	-95.09428	47.063031
567	Hubbard	Mantrap Lake	29015100	z	1770	200	2007, 2008	355458	5213917.269	-94.90349	47.062947
568	Hubbard	Mary Lake Lake	29028900	z			MCBS2011	335801	5228025.569	-95.167326	47.185217

1201	Hubbard	Mississippi River	29river_3	x			2007		338385.46	5253213.188	-95.142371	47.412345
1196	Hubbard	Mud Creek	29r3	x			0 2008		340213.436	5216302.45	-95.10496	47.080884
569	Hubbard	Mud Lake	29011900	z	146		30 2008		354968	5216461.876	-94.910757	47.085724
570	Hubbard	Mud Lake	29006500	z			MCBS2011		373056	5250895.86	-94.682344	47.399169
1195	Hubbard	Necktie River	29r2	z	0		0 2007, 2008		368547.967	5234974.115	-94.737356	47.255075
571	Hubbard	Ninth Crow Wing Lake	29002500	z	235		0 2008, MCBS 2011		365060	5203967.459	-94.774137	46.975485
572	Hubbard	Oak Lake	29006000	z	58		1 2007, 2008		369518	5225721.148	-94.721845	47.172044
573	Hubbard	Plantagenet Lake	29015600	z	2620		0 2008, MDNR APM		354761	5250255.306	-94.92446	47.389595
574	Hubbard	Potato Lake	29024300	z	2239		30 MDNR APM, MCBS 2011		343979	5207456.753	-95.052333	47.002236
575	Hubbard	Rice Lake	29017700	z	230		58 2007, 2008		345699	5210984.6	-95.030926	47.034366
576	Hubbard	Schoolcraft Lake	29021500	z	176		35 2007, MCBS 2011		347239	5224071.634	-95.015105	47.152416
577	Hubbard	Second Crow Wing Lake	29008500	z	228		5 2008		357077	5188849.831	-94.874291	46.837842
578	Hubbard	Seventh Crow Wing Lake	29009100	z	251		10 2008, MCBS 2011		360855	5200582.132	-94.828356	46.944167
579	Hubbard	Shallow Lake	29008900	z	295		9 2008		357273	5203299.951	-94.876252	46.96785
1198	Hubbard	Shell River	29r5	z	0		0 2007, 2008		355965.706	5185472.477	-94.887793	46.807226
580	Hubbard	Shingobee Lake Lake	29004300	z			MCBS2011		371619	5206965.933	-94.688791	47.00376
581	Hubbard	Sixth Crow Wing Lake	29009300	z	358		5 2007, 2008, MCBS 2011		358096	5198899.496	-94.864064	46.928449
582	Hubbard	Tenth Crow Wing Lake	29004500	z	185		9 2008, MDNR APM		366676	5205588.813	-94.753377	46.990396
583	Hubbard	Third Crow Wing Lake	29007700	z	636		40 2008, MDNR APM		358451	5191476.865	-94.857097	46.861764
584	Hubbard	Unnamed (Hay Creek) Lake	29055400	z	38		20 2008		336983	5210849.1	-95.145517	47.031056
585	Hubbard	Upper Bottle Lake	29014800	z	505		30 2007, 2008		353575	5211702.37	-94.927555	47.042612
586	Hubbard	Upper Mud Lake	29028400	z	50		50 2008		341047	5215575.232	-95.09373	47.074546
587	Isanti	German Lake	30010000	z	340		0 2007, 2008		469737	5036190.995	-93.387211	45.478591
1202	Isanti	Rice Creek	30river	x			2007		495854.082	5038811.947	-93.053069	45.502827
1203	Isanti	Stanchfield Creek	13UM047				MPCA_BioMon		476532.7862	5051643.375	-93.301003	45.617939
588	Isanti	Upper Rice Lake	30005700	z	208		208 2008		481917	5062231.446	-93.232336	45.713401
589	Itasca	Ann Lake	31030500	z	94		5 2008		468120	5277068.469	-93.424478	47.646228
590	Itasca	Aspen Lake	31069000	z	86		5 2007, 2008		450321	5284744.243	-93.66233	47.714166
591	Itasca	Bass Lake	31057600	z	2844		427 2007, 2008, UofM/MPCA 2013		449031	5243083.469	-93.674703	47.339231
1206	Itasca	Big Fork River	31r3	z	0		0 2007, 2008		424786.032	5289509.209	-94.003545	47.754564
592	Itasca	Big Sucker Lake	31012400	z			UofM/MPCA 2013		480152	5247968.867	-93.262964	47.384875
593	Itasca	Birdseye Lake	31083400	z	73		11 2008		426094	5273204.941	-93.983336	47.608036
594	Itasca	Blackberry Lake	31021000	z	240		50 2007, 2008		469777	5228332.001	-93.399087	47.207784
595	Itasca	Blackwater Lake	31056100	z	674		300 2007, 2008		449243	5233548.568	-93.670811	47.253456
596	Itasca	Blue Rock Lake	31091900	z			MDNR APM		411772	5291642.194	-94.177583	47.772102
597	Itasca	Bluebill Lake	31026500	z	144		14 2008		469437	5273113.316	-93.406667	47.610705
598	Itasca	Bosley Lake	31040300	z	41		10 2008		457225	5249190.814	-93.566829	47.394771
599	Itasca	Bowstring Lake	31081300	z	8900		1335 2007, 2008		431776	5264966.856	-93.906466	47.534543
1291	Itasca	Bowstring River	S007-219	z			2008, UofM/MPCA 2013 (31r4)		420416.19	5283765.7	-94.06079	47.70237
600	Itasca	Buckman Lake	31027200	z	222		33 2008		469250	5268678.288	-93.408844	47.570792
601	Itasca	Cameron Lake	31054400	z			MDNR 2013		456975	5278096.386	-93.572967	47.654832
602	Itasca	Canoe Lake	31051800	x			5 MDNR 2013		458311	5276139.699	-93.55499	47.637314
603	Itasca	Clearwater Lake	31040200	z	67		10 2008		464302	5248982.799	-93.473036	47.393324
604	Itasca	Coddington Lake	31088300	z	70		18 2008		418918	5290335.82	-94.08198	47.761289
605	Itasca	Crescent Lake	31029400	z	42		2 2008		468652	5279408.379	-93.417563	47.667308
606	Itasca	Crooked Lake	31020300	z	80		12 2007, 2008		466864	5220989.319	-93.437009	47.141572

607	Itasca	Cut Foot Sioux Lake	31085700	z	3222	322	2007, 2008		418411	5260926.27	-94.083263	47.496652
608	Itasca	Damon Lake	31094400	z	53	20	2007, 2008		393755	5273232.811	-94.413506	47.603792
609	Itasca	Decker Lake	31093400	z	292	58	2008		394935	5278069.406	-94.398972	47.64749
610	Itasca	Deer Lake	31033400	z	1854	0	2007 - (listed as 31034400 in the harvester survy report), 2008		471345	5298133.744	-93.382926	47.835912
611	Itasca	Dishpan Lake	31099200	z	15	15	2008		418186	5291000.952	-94.091871	47.76718
612	Itasca	Dixon Lake	31092100	z	666	67	2007, 2008		403582	5272521.965	-94.282644	47.598934
613	Itasca	Dora Lake	31088200	z	477	89	2007, 2008		421525	5287223.472	-94.046636	47.733612
614	Itasca	Egg Lake	31081700	z	118	11	2008		427469	5259342.009	-93.962757	47.483472
615	Itasca	Farley Lake	31090200	z	33	5	2008		409138	5268332.404	-94.207883	47.562048
616	Itasca	First River Lake	31081800	z	228	160	2007, 2008		424761	5258821.242	-93.998608	47.478479
617	Itasca	Fiske Lake	31091800	z			MDNR APM		412404	5292121.025	-94.169246	47.776495
618	Itasca	Grass Lake	31072700	x	117	0	2008, 1973 lake map - WR noted along south and eastern shore		447063	5276309.178	-93.70474	47.638017
619	Itasca	Gunny Sack Lake	31026700	z	81	8	2008		470497	5272619.044	-93.39253	47.606307
620	Itasca	Hamrey Lake	31091100	z	61	15	2008		406336	5285960.807	-94.248897	47.720228
621	Itasca	Hay Lake	31003700	z	21	0	2008, UofM/MPCA 2013		492444	5237025.206	-93.099923	47.28666
622	Itasca	Helen Lake	31084000	z	109	76	2008		426054	5283937.226	-93.985683	47.704583
623	Itasca	Herrigen Lake	31017400	z	27	3	2008		479822	5302610.092	-93.269856	47.876509
1289	Itasca	Hinken Creek	S007-207	z			UofM/MPCA 2013		425591.17	5286443.82	-93.99228	47.72708
624	Itasca	Hunters Lake	31045000	z	162	16	2008		465261	5265845.488	-93.461655	47.545102
625	Itasca	Island Lake	31075400	z	291	10	2008		445429	5253508.495	-93.723663	47.432739
626	Itasca	Kelly Lake	31029100	z	31	19	2008		471853	5281983.398	-93.375092	47.690624
627	Itasca	Lawrence Lake	31023100	z	382	19	2008, MDNR APM		471593	5253967.446	-93.376744	47.438534
628	Itasca	Leighton Lake	31003200	z	242	12	2008		489642	5244272.998	-93.137147	47.351839
629	Itasca	Lillian Lake	31075000	z	90	14	2008		445304	5243534.154	-93.72409	47.342985
630	Itasca	Little Ball Club Lake	31082200	z	181	10	2008		425054	5252515.451	-93.993651	47.421781
631	Itasca	Little Cut Foot Sioux Lake	31085200	z	1357	136	2008		421930	5262248.188	-94.036783	47.508976
632	Itasca	Little Drum Lake	31074100	z	89	22	2008		445854	5233576.341	-93.7156	47.253435
633	Itasca	Little Island Lake	31017900	z	26	3	2008		475269	5300681.466	-93.330635	47.858997
634	Itasca	Little Moose Lake	31061000	z	234	12	2008		450298	5250581.807	-93.658772	47.406796
635	Itasca	Little Rice Lake	31071600	x	157		2008, see 1976 MDNR lake map for WR locations		446675	5231642.595	-93.70452	47.236103
636	Itasca	Little Spring Lake	31079700	z	121	3	2008		435719	5274754.733	-93.855516	47.623005
637	Itasca	Little White Oak Lake	31074000	z	493	25	2008		442443	5235121.409	-93.760875	47.267046
638	Itasca	Lost Lake	31090000	z	26	5	2008		411359	5268970.561	-94.178493	47.568096
639	Itasca	Lower Pigeon Lake	31089300	z	53	20	2008, MDNR APM		412632	5268528.162	-94.161484	47.564289
640	Itasca	Marble Lake	31027100	z	155	20	2008		468222	5269384.048	-93.422563	47.577092
641	Itasca	Marie Lake	31093700	z	45	10	2008		393998	5274799.689	-94.410653	47.617926
642	Itasca	Middle Pigeon Lake	31089200	z	182	15	2008		412161	5270460.635	-94.168131	47.581609
1207	Itasca	Mississippi River	31r6	z	0	0	2007, 2008, 2010, UofM/MPCA 2013, MDNR APM		454534.498	5233656.675	-93.600893	47.254817
1288	Itasca	Mississippi River above Clay Boswell	S007-163	z			UofM/MPCA 2013, MDNR APM		445554.81	5231903.68	-93.71935	47.23836
1287	Itasca	Mississippi River below Clay Boswell	S006-923	z			UofM/MPCA 2013, MDNR APM		452042.47	5233689	-93.63383	47.25493
643	Itasca	Moose Lake	31024200	z			MDNR 2013		474439	5263860.782	-93.339574	47.52767
644	Itasca	Morph Lake	31092900	z	67	3	MDNR APM		396382	5267977.166	-94.377325	47.556941
645	Itasca	Mosomo Lake	31086100	z	47	5	2008		414477	5267839.061	-94.136827	47.558335
646	Itasca	Mud Lake	31020600	z	271	203	2008		468930	5230396.01	-93.410415	47.226316
647	Itasca	Munzer Lake	31036000	z	108	3	2008		459177	5221151.219	-93.538399	47.142597
648	Itasca	Nagel Lake	31037700	z	90	50	2008		457044	5236678.256	-93.568019	47.282174

649	Itasca	Natures Lake	31087700	z	2885	2499	2007, 2008		416202	5277514.368	-94.115752	47.6456
650	Itasca	O'Donnell Lake	31030300	z	47	10	2008		470342	5277453.732	-93.394919	47.6498
651	Itasca	Otter Lake	31030100	z	117	0	2007, 2008		473116	5278052.254	-93.358019	47.655307
652	Itasca	Ox Hide Lake	31010600	z			UofM/MPCA 2013		483985	5243184.764	-93.212009	47.341933
653	Itasca	Pigeon Dam Lake	31089400	z	511	500	2008		413534	5263950.761	-94.148596	47.523231
1209	Itasca	Pigeon River	31river_1	x			2007		413743.678	5264827.882	-94.145983	47.531149
654	Itasca	Pokekama Lake	31053200	z	15600	100	2008, MDNR APM		456068	5225963.423	-93.579871	47.185698
1285	Itasca	Popple River	S006-188	z			UofM/MPCA 2013		418812.91	5286306.77	-94.08263	47.72503
656	Itasca	Prairie Lake	31038400	z	1167	45	2008		458912	5240470.869	-93.543668	47.316419
655	Itasca	Prairie Lake	31005300	z	29	1	2007,2008, 2010		486535	5271203.412	-93.179106	47.594101
1290	Itasca	Prairie River	S007-209	z			2007, UofM/MPCA 2013		463044.02	5233273.13	-93.4884	47.2519
657	Itasca	Rabbits Lake	31092300	z	209	157	2008		401710	5259722.263	-94.304681	47.483512
658	Itasca	Raven Lake	31092500	z	97	70	2008		399836	5258772.011	-94.329333	47.474678
1204	Itasca	Rice Creek	31r1	x		0	2008		453682.118	5290983.714	-93.618186	47.770553
659	Itasca	Rice Lake	2008	z	115	6			473479	5223901.898	-93.349942	47.16808
660	Itasca	Rice Lake	31031500	z	37	15	2008		467254	5291794.696	-93.437115	47.778683
663	Itasca	Rice Lake	31087600	z	911	729	2007, 2008		420927	5279935.787	-94.053289	47.667978
662	Itasca	Rice Lake	31071700	x	959	0	2008, MCBS 2011		448289	5229174.869	-93.682912	47.214028
661	Itasca	Rice Lake	31070700	x	24	0	2008, see MDNR lake map for WR locations		449987	5276531.808	-93.665841	47.640253
1205	Itasca	Rice River	31r2	z	0	0	2007, 2008		451142.937	5288467.892	-93.65179	47.747731
1286	Itasca	Rice River	S006-208	z			UofM/MPCA 2013		450849.11	5280314.26	-93.65479	47.67435
664	Itasca	Ruby Lake	31042200	z	243	5	2008		458354	5263150.095	-93.553185	47.520444
665	Itasca	Sand Lake	31082600	z	3391	50	2008		424229	5273265.066	-94.008156	47.608361
666	Itasca	Shallow Pond	31091000	z	281	11	2008		405612	5289312.566	-94.259275	47.750273
667	Itasca	Simpson Lake	31086700	z	35	5	2008		414956	5266364.273	-94.130176	47.545131
668	Itasca	Sioux Lake	31090700	z	69	27	2008		405288	5271420.708	-94.259717	47.589279
669	Itasca	Skimmerhorn Lake	31093900	z	30	6	2008		393889	5281379.339	-94.413699	47.677092
670	Itasca	Soneman Lake	31027600	z	40	16	2008		475403	5268235.084	-93.327012	47.567066
671	Itasca	Spruce Lake	31034700	z	58	58	2008		466616	5272965.458	-93.44419	47.609236
672	Itasca	Stone Axe Lake	31082800	z	37	4	2008		424944	5278402.834	-93.999526	47.654666
673	Itasca	Swan Lake	31006700	z	2472	50	2007, 2008, UofM/MPCA 2013, Smith_Lakes		486095	5238510.269	-93.183931	47.299919
1208	Itasca	Swan River	SwanR	z			Smith_Streams, (07010103-506)		482436.144	5237287.864	-93.23228	47.288831
1210	Itasca	Third River	31river_2	x			2007		404829.526	5265473.042	-94.264525	47.535708
674	Itasca	Tuttle Lake	31082100	z	56	16	2008		424966	5253798.185	-93.995035	47.433312
675	Itasca	Unnamed Lake	31006600	z	23	3	2008		488537	5286464.158	-93.152877	47.731451
676	Itasca	Unnamed Lake	31020400	z	28	3	2008		467318	5219766.556	-93.430933	47.130592
678	Itasca	Unnamed Lake	31032200	z	28	2	2008		472123	5285947.1	-93.371747	47.726299
679	Itasca	Unnamed Lake	31081500	z	109	5	2008		425605	5250269.893	-93.985969	47.401642
680	Itasca	Unnamed Lake	31086000	z	24	5	2008		413045	5267885.706	-94.155868	47.558564
681	Itasca	Unnamed Lake	31096100	z	10	2	2008		468692	5282289.084	-93.417236	47.693229
677	Itasca	Unnamed Lake	31028800	z	27	4	MDNR 2013		470578	5282427.146	-93.392112	47.694559
682	Itasca	Upper Pigeon Lake	31090800	z	86	10	2008		411651	5271561.934	-94.175134	47.591447
683	Itasca	Walters Lake	31029800	z	120	18	2008		472230	5279270.638	-93.369895	47.666232
684	Itasca	Wart Lake	31085900	z	14	5	2008		413730	5269883.683	-94.147157	47.57663
685	Itasca	White Fish Lake	31014200	z	31	2	2008		479949	5258948.246	-93.266152	47.483661
686	Itasca	White Oak Lake	31077600	z	905	271	2007, 2008		439750	5240239.873	-93.797164	47.312857

687	Itasca	Whitefish Lake	31084300	z	493	10	2008		427563	5281636.987	-93.96519	47.68406
688	Itasca	Wilderness Lake	31090100	z	26	4	2008		407413	5269680.694	-94.231093	47.573933
689	Itasca	Wolf Lake	31015200	z	199	30	MDNR 2013		480337	5268100.653	-93.26141	47.566025
690	Kanabec	Ann Lake	33004000	z	363	18	2007, 2008		468541	5085058.294	-93.405681	45.918373
691	Kanabec	Knife Lake	33002800	x	1039	0	multi-year MDNR WR observations		476815	5091695.624	-93.299307	45.97844
692	Kanabec	Mud (Quamba) Lake	33001500	x	226	0	multi-year MDNR WR observations		486393	5082711.874	-93.175405	45.89784
1126	Kanabec	Riparian, stream wetland	Ann				MPCA_BioMon		470945	5081786	-93.374483	45.889028
693	Kanabec	Unnamed Lake	33011100	x	33	27	2008		460118	5079214.084	-93.513811	45.865337
694	Kandiyohi	Blaamyre Lake	34034500	z	121	0	2008, UofM/MPCA 2013		329190	5025978.068	-95.181175	45.366488
1127	Kandiyohi	Depressional Wetland	New London				MPCA_BioMon		346728.07	5019845.24	-94.955458	45.315373
695	Kandiyohi	Glesne Lake	34035200	z	205	0	2008, MCBS 2011		328231	5025322.682	-95.193184	45.360358
696	Kandiyohi	Glesne Slough (Unnamed) Lake	34035300	x	16	0	UofM/MPCA 2013		328522	5024578.071	-95.189212	45.353732
697	Kandiyohi	Monongalia Lake	34015800	z	2516	0	2008, UofM/MPCA 2013 seed stock lake		346922	5022003.889	-94.953653	45.334835
698	Kandiyohi	Ole Lake	34034200	x	66	0	2008, MCBS 2011		329743	5028043.007	-95.17483	45.385196
699	Kandiyohi	Unnamed Lake	34061100	z			UofM/MPCA 2013		353958	5014122.705	-94.861583	45.26543
700	Koochiching	Nett Lake	36000100	z	7369	0	2007, 2008		488854	5328221.129	-93.14973	48.107156
701	Koochiching	Rainy Lake	69069400	x	24349		2007, 2008		499903	5384070.224	-93.001316	48.609707
702	Koochiching	Rat Root Lake	36000600	z	734	0	2007, 2008		478807	5371500.164	-93.286868	48.496265
1211	Koochiching	Tilson Creek	36r1	z	0	0	2007, 2008		481924.598	5382258.667	-93.245135	48.593149
703	Lake	August Lake	38069100	z			MDNR 2013		604519	5290950.661	-91.605208	47.763445
704	Lake	Bald Eagle Lake	38063700	z	1243	0	2008, 1854 List		607545	5298400.273	-91.562992	47.829954
705	Lake	Basswood Lake	38064500	z	14610	485	2008, 1854 List		604113	5320990.03	-91.603375	48.033705
706	Lake	Bluebill Lake	38026100	z	44	11	2008, 7050.0470, 1854 List		635019	5273232.832	-91.203852	47.598438
707	Lake	Bonga Lake	38076200	z	138	138	2008, 1854 List		598914	5272658.766	-91.68413	47.599788
708	Lake	Cabin Lake	38026000	z	71	55	2007, 2008, 7050.0470, 1854 List		637377	5272021.297	-91.17288	47.587047
1212	Lake	Camp East Creek	CECr	z			1854 List, T.60, R.10W, S.11,12 trib to Stony River		607167.658	5283414.857	-91.571728	47.695227
709	Lake	Campers Lake	38067900	z	56	56	2007, 2008, 1854 List		605887	5279607.408	-91.589714	47.66119
710	Lake	Charity Lake	38005500	z	26	0	2008, 1854 List		640999	5278739.611	-91.122571	47.646687
711	Lake	Christianson Lake	38075000	z	158	0	2008, 1854 List		600240	5234541.371	-91.675129	47.256693
712	Lake	Clark Lake	38064700	z	49	0	2007, 2008, 2010, 1854 List		602336	5237422.151	-91.646773	47.282285
713	Lake	Cloquet Lake	38053900	z	176	0	2007, 2008, 2010, UofM/MPCA 2013, 1854 List		613881	5254870.826	-91.489687	47.437333
1213	Lake	Cloquet River	38r1	z	0	0	2008, 1854 List		612929.968	5252350.38	-91.502939	47.414827
714	Lake	Comfort Lake	38029000	z	42	0	2008, 1854 List, MCBS 2011		631742	5291717.982	-91.241846	47.765357
715	Lake	Cougar Lake	38076700	z	71	1	2008, 1854 List		598040	5267775.715	-91.696844	47.555996
717	Lake	Cramer Homestead Lake	38024600	z	26	0	1854 List		637828	5262300.925	-91.169931	47.499533
716	Lake	Cramer Lake	38001400	z	69	55	2007, 2008, 1854 List		643343	5264952.035	-91.095881	47.522182
718	Lake	Crooked Lake	38002400	z	272	0	2008, 1854 List		645059	5274491.589	-91.06995	47.607589
719	Lake	Crooked Lake	38081700	z	5229	0	2008, 1854 List		589234	5337989.194	-91.799363	48.188866
720	Lake	Cross River Lake	38000200	z			1854 List, MDNR 2013		648034	5282922.45	-91.027538	47.68273
721	Lake	Crown Lake	38041900	z	69	0	2008, 1854 List		622890	5268694.285	-91.366403	47.56003
722	Lake	Driller Lake	38065200	z	24	0	2008, 1854 List		604794	5256820.238	-91.609701	47.456393
723	Lake	Dumbbell Lake	38039300	z	476	48	2008, 1854 List		630275	5274939.842	-91.266424	47.614761
1214	Lake	Dumbbell River	14RN089	x			MPCA_BioMon		630040.2366	5283455.976	-91.267014	47.691399
724	Lake	Dumbbell River Pool	38027000	z	13	0	1854 List		630069	5277087.873	-91.268526	47.634121
725	Lake	Dunnigan Lake	38066400	z			1854 List		602691	5284780.077	-91.631051	47.708234
726	Lake	Eighteen Lake	38043200	z			1854 List		623958	5278175.332	-91.349532	47.6451

727	Lake	Ella Hall Lake	38072700	z	372		1	2008, 1854 List		600611	5316056.32	-91.651496	47.98989
728	Lake	Fall Lake	38081100	z	2322		23	2008, 1854 List		593978	5311532.686	-91.741366	47.950209
729	Lake	Farm Lake	38077900	z	1292		0	2007, 2008, 2010, 1854 List		595264	5305925.395	-91.725387	47.899581
730	Lake	Flat Horn Lake	38056800	z	52		0	2008, 1854 List, MCBS 2011		615742	5279632.979	-91.458497	47.659732
731	Lake	Fools Lake	38076100	z	14		14	2008, 1854 List		599440	5274479.998	-91.676721	47.616091
732	Lake	Gabbro Lake	38070100	z	927		0	2008, 1854 List		605684	5301193.918	-91.587169	47.855391
733	Lake	Garden Lake	38078200	z	4236		212	2007, 2008, 1854 List		593580	5308292.556	-91.747399	47.921121
734	Lake	Gegoka Lake	38057300	z	174		14	2007, 2008, MCBS 2011, 1854 List		614162	5278618.186	-91.479798	47.650885
735	Lake	Grass Lake	38063500	z				MDNR 2013		610142	5284622.862	-91.531796	47.705593
797	Lake	Green Wing Lake	38026400					1854 List		636736	5285283.423	-91.177255	47.706451
736	Lake	Greenwood Lake	38065600	z	1469		15	2007, 2008, 1854 List, MCBS 2011		602950	5263711.443	-91.63255	47.518676
737	Lake	Grouse Lake Lake	38055700	z				1854 List		616059	5282703.318	-91.453461	47.687291
738	Lake	Harriet Lake	38004800	z				MDNR 2013, 1854 List		641722	5280935.279	-91.112238	47.666274
739	Lake	Harris Lake	38073600	z	121		18	2008, 1854 List		599960	5290652.402	-91.666098	47.761485
740	Lake	Hjalmer Lake	38075800	z	109		2	2008, 1854 List		595462	5254581.219	-91.733959	47.437685
1215	Lake	Hoist Creek	HCr	x				1854 List		637134.216	5272342.256	-91.176007	47.589985
741	Lake	Hoist Lake	38025100	z	117		0	2007, 2008, 2010, 1854 List		637294	5275751.37	-91.172815	47.62061
1216	Lake	Horse River	38r5	z	0		0	2008, 1854 List, T.65, R. 11W, S.14,22,23,27,28		596214.685	5329413.789	-91.707401	48.110714
742	Lake	Hula Lake	38072800	z	121		121	2007, 2008, 1854 List		604255	5316952.65	-91.602452	47.997368
743	Lake	Isabella Lake	38039600	z	1318		0	2008, 1854 List		628107	5296798.348	-91.288835	47.81178
1217	Lake	Isabella River	38r4	z	0		0	2008, 1854 List		610310.091	5294993.905	-91.526925	47.798847
744	Lake	Island Lake Lake	38028900	z				MCBS2011		632289	5292017.18	-91.234459	47.767936
745	Lake	Island River Lake	38084200	z	49		49	2007, 1854 List T. 61N, R. 7 & 8W (T.61, R.8, S. 4)		626081	5292698.432	-91.317076	47.775307
746	Lake	Kawishiwi Lake	38008000	z	468		0	2008, 1854 List		641212	5300853.313	-91.112559	47.845503
1218	Lake	Kawishiwi River	38r2	z	0		0	2008, 1854 List		595853.161	5306590.988	-91.717358	47.90548
747	Lake	Kitigan Lake	38055900	z				1854 List		617931	5283192.642	-91.428393	47.691354
748	Lake	Kowalski Lake	38001600	z				MDNR 2013		644171	5263974.636	-91.085209	47.51321
749	Lake	Langley Lake	38064800	z	14		0	1854 List		606069	5243333.612	-91.596017	47.334868
798	Lake	Lax Lake	38040600					1854 List		628496	5244871.56	-91.298841	47.344681
750	Lake	Legler Lake	38064900	z				1854 List		604966	5242851.584	-91.610727	47.33071
751	Lake	Little Gabbro Lake	38070300	z	151		0	2008, 1854 List		602954	5301360.773	-91.623614	47.857335
752	Lake	Little Wampus Lake	38068400	z	16		0	2008, 1854 List		604417	5278462.834	-91.60956	47.651134
753	Lake	Lobo Lake	38076600	z	132		99	2008, 1854 List		597722	5270710.445	-91.700417	47.582443
754	Lake	Manomin Lake	38061600	z	455		23	2008		612720	5322054.342	-91.487676	48.041817
755	Lake	Middle McDougal Lake	38065800	z	104		0	2007, 2008, 2010, 1854 List		608818	5275801.965	-91.551636	47.626474
756	Lake	Moose Lake	38003600	z	201		0	2008, 1854 List		639692	5269271.955	-91.142982	47.561827
757	Lake	Moose Lake	38064400	z	1300		0	1854 List		611383	5316245.278	-91.507117	47.989804
758	Lake	Mud Lake	38074200	z	164		0	2008, 1854 List		599121	5314585.013	-91.671801	47.976888
759	Lake	Muskeg Lake	38078800	z	178		71	2008, 1854 List		598760	5315872.685	-91.676341	47.988527
760	Lake	Newton Lake	38078400	z	516		0	2008, 1854 List		595803	5315339.712	-91.716081	47.984182
761	Lake	Nine A M Lake	38044500	z	27		14	2008, 1854 List		628754	5290744.563	-91.281992	47.757207
762	Lake	North McDougal Lake	38068600	z	273		0	2008, 1854 List		609015	5276992.436	-91.548718	47.637149
763	Lake	Osier Lake	38042000	z				MDNR 2013, 1854 List		620829	5268342.058	-91.393886	47.557249
764	Lake	Papoose Lake	38081800	z	54		3	2008, 1854 List		589556	5334881.193	-91.795687	48.160865
765	Lake	Pea Soup Lake	38073900	z				MDNR APM		599963	5310915.058	-91.661375	47.943747
766	Lake	Perent Lake	38022000	z	1598		0	1854 List		639462	5295584.22	-91.137632	47.798501

767	Lake	Phantom Lake	38065300	z	70		0	2008, 1854 List		606330	5257259.26	-91.589223	47.460093
768	Lake	Polly Lake	38010400	z				1854 List		642063	5307373.495	-91.099046	47.903948
769	Lake	Railroad Lake	38065500	z	11		1	2008, 1854 List		609801	5258277.417	-91.542933	47.468676
770	Lake	Rat Lake	38056700	z				1854 List		616281	5280480.872	-91.451096	47.667262
771	Lake	Rice Lake	38046500	z	206		206	2008, 1854 List		622210	5297329.702	-91.367419	47.817706
1128	Lake	Riparian, stream wetland	11LAKE149					MPCA_BioMon		605428.9935	5277856.282	-91.596234	47.645514
772	Lake	Roe Lake	38013900	z	76		0	2008, 1854 List		639153	5320462.078	-91.133728	48.022284
773	Lake	Round Island Lake	38041700	z	58		58	2007, 2008, 7050.0470, 1854 List		628320	5274561.125	-91.292538	47.611745
774	Lake	Sand Lake	38073500	z	506		51	2007, 2008, 1854 List		600058	5270748.773	-91.669351	47.582432
1219	Lake	Sand River	38r3	x			0	2008, (flows through Stony Lake)		605308.988	5279804.021	-91.597362	47.663053
775	Lake	Scarp Lake	38005800	z				1854 List		640654	5277893.631	-91.127434	47.639154
776	Lake	Scott Lake	38027100	z	52		0	2008, 1854 List		635688	5277350.455	-91.193682	47.635329
777	Lake	Silver Island Lake	38021900	z	1239		0	2008, 1854 List		639118	5288318.345	-91.14455	47.733235
778	Lake	Sink Lake	38054000	z				1854 List		614975	5253252.172	-91.475604	47.422581
779	Lake	Slate Lake	38066600	z	293		0	2008, 1854 List		603185	5283176.626	-91.624847	47.693732
780	Lake	Snowbank Lake	38052900	z	4819		50	2008, 1854 List		617975	5316141.175	-91.418826	47.987686
781	Lake	Sonju Lake	38024800	z				1854 List		634959	5260398.033	-91.208588	47.48302
782	Lake	Source Lake	38065400	z	35		1	2008, 1854 List		609026	5259640.588	-91.552877	47.481068
783	Lake	Sourdough Lake	38070800	z	17		17	2008, 1854 List		602202	5313127.005	-91.630875	47.963289
799	Lake	South Farm Lake	38077800					1854 List		597772	5305276.844	-91.691986	47.89337
1220	Lake	South Kawishiwi River	SKR	z				1854 List		589991.92	5299992.283	-91.797146	47.846971
784	Lake	South McDougal Lake	38065900	z	277		3	2008, 1854 List		608732	5274762.596	-91.553038	47.61714
785	Lake	South Wigwam Lake	38000100	z				1854 List		648016	5284549.14	-91.027226	47.697362
786	Lake	Stony Lake	38066000	z	409		245	2007, 2008, 1854 List		603114	5274914.776	-91.627742	47.619427
1221	Lake	Stony River	38r6	z	0		0	2007, 2008, 1854 List		592143.369	5287882.191	-91.770967	47.737731
787	Lake	Surprise Lake	38055000	z				1854 List		610814	5285042.767	-91.522734	47.709254
788	Lake	Swallow L(Shallow,Deep)	38066800	z				1854 List		606384	5283584.381	-91.582127	47.696881
789	Lake	Sylvania Lake	38039500	z				1854 List		629692	5287008.856	-91.270595	47.723422
790	Lake	Twentythree Lake	38024700	z				1854 List		636499	5261393.997	-91.187849	47.491657
1222	Lake	unnamed (Scott)	Scott	z				1854 List		634665.776	5278123.967	-91.207045	47.642499
791	Lake	Upland Lake	38075600	z	74		1	2008, 1854 List		600927	5255695.816	-91.661246	47.446888
792	Lake	Vera Lake	38049100	z	262		0	2008, 1854 List		625807	5323923.873	-91.311618	48.056185
793	Lake	Wampus Lake	38068500	z	146		0	2008, 1854 List		603439	5277680.054	-91.622764	47.64425
794	Lake	Wind Lake	38064200	z	952		10	2008		609215	5318851.543	-91.535502	48.013619
795	Lake	Wood Lake	38072900	z	587		125	2008, 1854 List		605525	5315845.414	-91.585706	47.987201
796	Lake	Wye Lake	38004200	z				1854 List		640411	5284625.29	-91.128504	47.699744
1225	Lake of the Woods	Baudette River	39r2	z	0		0	2007, 2008		382703.286	5394586.919	-94.593936	48.69329
1224	Lake of the Woods	Bostick Creek	39r1	x				0 2008		370318.861	5411543.794	-94.767492	48.84331
800	Lake of the Woods	Lake of the Woods	39000200	z	305534		0	2007, 2008		353117	5437663.282	-95.011226	49.074297
1228	Lake of the Woods	Rainy River	39r5	z	0		0	2007, 2008, 2010		375160.744	5408495.264	-94.700602	48.816891
1223	Lake of the Woods	Roseau Flowage	39IMP001	z	200		100	2008, T.159, R.36, S.32		328978.708	5379529.07	-95.317261	48.545529
1226	Lake of the Woods	Silver Creek	39r3	z	0		0	2007, 2008		390613.166	5394076.665	-94.486353	48.690138
1227	Lake of the Woods	Winter Road River	39r4	z	0		0	2007, 2008, 2010		377982.18	5401922.82	-94.660233	48.758351
1129	Mahnomen	Depressional Wetland	07Mahn175					MPCA_BioMon		289320.7208	5234996.93	-95.783456	47.234633
1130	Mahnomen	Depressional Wetland	09Mahn139					MPCA_BioMon		304576.5509	5235261.725	-95.582233	47.241731
801	Mahnomen	Lone Long Lake	44000200	z	117		0	2007, 2008, MCBS 2011		306891	5248106.299	-95.557247	47.35788

802	Mahnomen	McCraney Lake	44008000	z			MDNR APM	295784	5227655.984	-95.694817	47.170691
803	Mahnomen	Roy Lake	44000100	x	689	0	MCBS 2011, Aquatic Veg. Reports 2011, 2014	307135	5243593.196	-95.552062	47.317382
1229	Mahnomen	Wild Rice River	14RD030				MPCA_BioMon	301297.9305	5251667.011	-95.632828	47.38821
1230	Mahnomen	Wild Rice River	14RD004				MPCA_BioMon	294585.5453	5246317.325	-95.719193	47.338051
1131	Mcleod	Depressional Wetland	05Mcle001				MPCA_BioMon	397270.16	4952966.08	-94.297182	44.72271
804	Meeker	Evenson Lake	47011800	z			MDNR APM	375196	4988879.58	-94.584668	45.042378
805	Meeker	Stella	47006800	z	596		UofM/MPCA 2013, MDNR 2013	388311	4991417.487	-94.418763	45.067406
806	Mille Lacs	Dewitt Marsh Lake	48002000	z	110	131	2008	465106	5093438.149	-93.450587	45.993627
807	Mille Lacs	Ernst Pool Lake	48003600	z	300	200	2008	460791	5100747.493	-93.506906	46.059178
1134	Mille Lacs	Mille Lacs WMA, Headquarters 2 P	W9004009	z	500	13	2008	455708.784	5089661.559	-93.571578	45.959096
1133	Mille Lacs	Mille Lacs WMA, Jones 1 Pool	W9004008	z	520	3	2008	454138.89	5091295.323	-93.591993	45.973696
1132	Mille Lacs	Mille Lacs WMA, Olson Pool	W9004007	z	85	2	2008	458029.15	5102732.48	-93.542785	46.076879
1135	Mille Lacs	Mille Lacs WMA, Townhall Pool	W9004010	z	110	3	2008	454123.015	5089668.132	-93.592042	45.959051
808	Mille Lacs	Ogechie Lake	48001400	x	732	0	2008, MCBS 2011	440451	5111154.183	-93.771152	46.151363
809	Mille Lacs	Onamia Lake	48000900	z	2250	1350	2007, 2008	447891	5103541.052	-93.673977	46.083458
810	Mille Lacs	Shakopee Lake	48001200	x	771	0	2008, MCBS 2011	444273	5106333.524	-93.721096	46.108303
813	Mille Lacs	Unnamed (Pool 3)	48005400	z	32	25	2008	459661	5080059.558	-93.51977	45.87292
811	Mille Lacs	Unnamed Lake	48004300	x	60	10	2008	456303	5092114.051	-93.564134	45.981206
812	Mille Lacs	Unnamed Lake	48004400	x	500	0	2008, Mille Lacs State WMA	454775	5090969.836	-93.583752	45.970809
814	Morrison	Alexander Lake	49007900	z			MDNR APM	382621	5117784.542	-94.521487	46.203512
815	Morrison	Coon Lake	49002000	z	75	75	2008	414737	5082062.304	-94.098894	45.886844
816	Morrison	Fish Trap Lake	49013700	z			MDNR APM	375278	5118853.576	-94.616913	46.211823
817	Morrison	Hannah Lake	49001400	z	109	27	2008	433306	5111648.016	-93.863739	46.155145
818	Morrison	Long Lake	49001500	z	128	32	MDNR APM	431353	5111611.071	-93.889023	46.154619
1233	Morrison	Long Prairie River	49river	x			2007	375832.305	5131360.658	-94.613028	46.324443
819	Morrison	Miller Lake	49005100	z	39	9	2008	389268	5111618.993	-94.433913	46.149153
821	Morrison	Mud Lake	49007200	z	83	5	2008	384261	5118901.132	-94.50051	46.213839
820	Morrison	Mud Lake	49002700	z	23	9	2008, MDNR APM	404213	5085567.327	-94.235199	45.916999
822	Morrison	Peavy Lake	49000500	z	140	0	2007, 2008	432004	5109154.926	-93.880241	46.132581
823	Morrison	Pelkey Lake	49003000	z	113	10	2008	404891	5093870.587	-94.228108	45.991809
824	Morrison	Placid Lake	49008000	z	537	0	2007, 2008	382874	5129200.676	-94.521046	46.306264
1232	Morrison	Platte River	49r2	x		0	(RiceLake 49-0025-00 outlets to the Platte River)	406226.548	5088725.511	-94.209858	45.945696
825	Morrison	Popple Lake	49003300	x	153	0	2008, Popple Lake State WMA	398628	5090657.653	-94.308278	45.962001
1231	Morrison	Rice Creek	49r1	x		0	2008, (connects Pelkey Lake 49-0003-00 with Rice Lake 49-0025-00)	404359.277	5088901.892	-94.233979	45.947025
826	Morrison	Rice Lake	49002500	z	323	250	2008	404129	5088072.971	-94.236783	45.939534
827	Morrison	Round Lake	49001900	z	134	14	2008	424838	5111854.239	-93.973423	46.15612
828	Morrison	Shamineau Lake	49012700	z			MDNR APM	376337	5123580.732	-94.604428	46.254544
829	Morrison	Skunk Lake	49002600	z	320	256	2008, MDNR APM	404937	5086553.873	-94.226061	45.925977
830	Morrison	Sullivan Lake	49001600	z	1199	20	2008, MDNR APM	427288	5109608.226	-93.941353	46.136174
831	Morrison	Twelve Lake	49000600	z	159	80	2008	436619	5109314.295	-93.820525	46.13446
832	Otter Tail	Amor (Mud) Lake	56038100	x	260	0	2008, MCBS 2011	287796	5146800.478	-95.762612	46.441398
833	Otter Tail	Beauty Shore Lake	56019500	x	233	0	2008, MCBS 2011	298120	5133051.597	-95.622425	46.320958
834	Otter Tail	Big Pine Lake	56013000	z			MDNR APM	308079	5165668.207	-95.506621	46.617108
835	Otter Tail	Boedigheimer Lake	56021200	x	169	0	MCBS 2011	301182	5154559.664	-95.591844	46.515231
836	Otter Tail	Bray Lake	56047200	z			UofM/MPCA 2013	279027	5148015.299	-95.877204	46.449504
837	Otter Tail	Crystal Lake	56074900	z			MDNR APM	274088	5166628.145	-95.95048	46.615154

838	Otter Tail	Dead Lake	56038300	z	7827		0	2008,MDNR APM		288054	5150610.564	-95.760989	46.475729
839	Otter Tail	Deer Lake	56029800	z				MDNR APM		287036	5137700.519	-95.768351	46.359358
1136	Otter Tail	Depressional Wetland	07Otte140					MPCA_BioMon		299675.3825	5123785.742	-95.598299	46.238114
1137	Otter Tail	Depressional Wetland	Field					MPCA_BioMon		272548.72	5156092.65	-95.965387	46.519947
840	Otter Tail	East Battle Lake	56013800	z				MDNR APM		305186	5130944.151	-95.529857	46.304078
841	Otter Tail	East Leaf Lake	56011602	z				MDNR APM		313132	5141272.721	-95.430883	46.399185
842	Otter Tail	East Lost Lake	56037800	z				MDNR APM		284482	5137373.84	-95.80136	46.355613
843	Otter Tail	East Red River Lake	56057300	z	292		0	2008, MPCA Lake Survey		275743	5141511.379	-95.916786	46.389964
844	Otter Tail	Emma Lake	56019400	x	473		0	2008, MCBS 2011		296768	5134758.152	-95.640708	46.335897
845	Otter Tail	Fish Lake	56076800	z				MDNR APM		270433	5173868.893	-96.00175	46.678986
846	Otter Tail	Fogard Lake	56057100	z				MDNR APM		276666	5144845.765	-95.906389	46.420239
847	Otter Tail	Head Lake	56021300	z	499		0	2008, MDNR APM		299470	5151264.564	-95.612718	46.4851
848	Otter Tail	Heilberger Lake	56069500	z				MDNR APM		273275	5146334.272	-95.951182	46.432488
849	Otter Tail	Hoffman Lake	56162700	z				MDNR APM		285476	5163049.501	-95.800277	46.586724
850	Otter Tail	Hoot Lake	56078200	z				MDNR APM		266496	5132396.928	-96.032351	46.304921
851	Otter Tail	Jim Lake	56036400	z				MCBS2011		292339	5172512.859	-95.715049	46.673949
852	Otter Tail	Lake Sixteen	56010000	z	107		0	2007, 2008, 2010		309058	5123861.955	-95.476751	46.241499
853	Otter Tail	LidaNorth Lake	56074701	z				MDNR APM		272481	5162882.78	-95.969599	46.58095
854	Otter Tail	Long Lake	56038800	z				MDNR APM		291145	5170134.096	-95.729564	46.652195
855	Otter Tail	Long Lake	56078400	z				MDNR APM		265382	5146385.089	-96.053801	46.430249
856	Otter Tail	Maria Lake	56049800	z				MDNR 2013		280851	5150252.982	-95.854536	46.470212
857	Otter Tail	Marion Lake	56024300	z				MDNR APM		297220	5156270.309	-95.644184	46.529428
858	Otter Tail	Middle Leaf Lake	56011601	z				MDNR APM		311477	5141767.318	-95.452591	46.403172
859	Otter Tail	North Turtle Lake	56037900	z				MDNR APM		284067	5131716.829	-95.804146	46.30463
1234	Otter Tail	Ottertail River	56r1	z	0		0	2007, 2008, 2010, MDNR APM		267132.591	5134785.633	-96.02528	46.326608
860	Otter Tail	Pelican Lake	56078600	z				MDNR APM		269128	5176086.63	-96.019902	46.698467
861	Otter Tail	Red River Lake	56071100	z				MDNR APM		268748	5141413.417	-96.007592	46.386728
863	Otter Tail	Rice Lake	56036300	x	350		0	2008, MCBS 2011		293525	5172615.644	-95.699606	46.67524
862	Otter Tail	Rice Lake	56021100	x	263		0	2008, part of Rice-Boedigheimer Aquatic Management Area (AMA)		299350	5154594.7	-95.615716	46.515003
864	Otter Tail	Rose Lake	56036000	z				MDNR APM		290586	5172330.498	-95.737859	46.671764
865	Otter Tail	Rush Lake	56014100	z	5340		0	2008, MDNR APM		305913	5151312.857	-95.528876	46.48742
866	Otter Tail	Scalp Lake	56035800	z				MDNR APM		287503	5174879.878	-95.779293	46.693709
867	Otter Tail	South Turtle Lake	56037700	x				MDNR APM		283976	5128790.758	-95.803982	46.278298
868	Otter Tail	Spitzer	56016000	z				MDNR APM		297155	5114289.96	-95.626881	46.151994
869	Otter Tail	Stalker Lake	56043700	z	1357			MDNR APM		281780	5121052.442	-95.828871	46.208036
870	Otter Tail	Star Lake	56038500	z	4809		0	2007, 2008, 2010, MDNR APM		284057	5155705.493	-95.815358	46.520257
871	Otter Tail	Stuart	56019100	z				MDNR APM		301122	5127940.382	-95.581308	46.275892
872	Otter Tail	Unnamed (Cemetery) Lake	56002400	z				MDNR APM		322707	5114519.727	-95.296352	46.161184
873	Otter Tail	Walker Lake	56031000	z				MDNR APM		294312	5145936.546	-95.677497	46.435648
874	Otter Tail	West Battle Lake	56023900	z	5565		0	2008, UofM/MPCA 2013		293262	5129758.626	-95.684013	46.28989
875	Otter Tail	West Leaf Lake	56011400	z				MDNR APM		309420	5142398.652	-95.479584	46.408272
876	Otter Tail	West Lost Lake	56048100	z	915		0	2008, MDNR APM		278491	5140749.135	-95.88073	46.384018
877	Otter Tail	Wright Lake	56078300	z				MDNR APM		266745	5131301.371	-96.028579	46.295161
878	Otter Tail	East Loon Lake	56052300	x				MDNR APM		282923	5166732.649	-95.835289	46.619009
1292	Pennington	Clearwater	S002-121	z				UofM/MPCA 2013		299115.16	5312766.66	-95.6898	47.9367
879	Pine	Crooked Lake	58002600	z	94		85	2007, 2008		534848	5107508.413	-92.548977	46.120262

1235	Pine	Grindstone River (SF)	96SC063	x			MPCA_BioMon	497353.4347	5098283.498	-93.034203	46.03812
1236	Pine	Hay Creek	58river	x			2007, 2008	545658.588	5103538.591	-92.409448	46.083897
880	Pine	Hay Creek Flowage	58000500	z	66	40	2008, UofM/MPCA 2013	546367	5105174.241	-92.400127	46.09857
1237	Pine	Kettle River	58r2	z	0	0	2007, 2008	520444.932	5078254.344	-92.736639	45.857551
881	Pine	Little Island Lake	58006100	z			1854 List	520676	5139618.839	-92.730987	46.409827
882	Pine	Little North Sturgeon Lake	58006600	z	20	0	2008, 1854 List	517203	5137235.08	-92.776261	46.388471
1293	Pine	Mission	S001-646	z			UofM/MPCA 2013	499892.18	5078727.27	-93.001389	45.862111
1238	Pine	Moose Horn River	58r3	z	0	0	2007, 1854 List	511948.727	5134490.65	-92.844667	46.363885
883	Pine	Net Lake	58003800	z			MDNR APM, 1854 List	542272	5140271.304	-92.449954	46.414692
1239	Pine	Pokegama Creek (Pokegama River)	58r5	z	0	0	2007, 2008	496748.736	5079301.339	-93.041888	45.86727
884	Pine	Pokegama Lake	58014200	z	1621	16	2008, MDNR APM	496882	5076798.382	-93.040155	45.844743
1138	Pine	Riparian, stream wetland	09Pine142				MPCA_BioMon	521556.6597	5090359.021	-92.721774	45.966464
1139	Pine	Riparian, stream wetland	Yacht				MPCA_BioMon	496438	5079671	-93.045895	45.870596
1140	Pine	Riparian, stream wetland	Yacht-B				MPCA_BioMon	496562	5079638	-93.044297	45.8703
1241	Pine	Snake River	58r4	z	0	0	2007	518283.206	5074539.826	-92.764626	45.824179
1240	Pine	Snake River Bay	58000000	z			MDNR APM	497318.255	5073832.05	-93.03452	45.818046
885	Pine	Stanton Lake	58011100	z	84	34	2008, MDNR APM	512997	5130170.705	-92.831159	46.324987
1242	Pine	Willow River	58r1	x		0	2007, 2008	521820.996	5132157.498	-92.716437	46.342641
886	Polk	Bee Lake	60019200	z			UofM/MPCA 2013	271067	5282699.825	-96.048978	47.657155
887	Polk	Eighteen Lake	60019900	z			UofM/MPCA 2013	270505	5280667.704	-96.055386	47.638697
1243	Polk	Hill River	14RD253	x			MPCA_BioMon	289151.1359	5291978.007	-95.812927	47.746681
1244	Polk	Poplar River	14RD218	x			MPCA_BioMon	298135.0632	5274263.362	-95.685028	47.59034
888	Polk	Unnamed (Round) Lake	60072100	z	9	2	2008	267696	5283892.263	-96.094441	47.666667
889	Pope	Grove Lake	61002300	z			MDNR APM	329211	5051906.589	-95.189928	45.59971
890	Pope	Signalness Lake	61014900	z			MDNR APM	303057	5046214.387	-95.522685	45.541606
891	Rice	Cedar Lake	66005200	z	927	93	2008	465760	4904693.849	-93.4292	44.29469
892	Rice	Hatch Lake	66006300	z	102	10	2008	461809	4928444.628	-93.480472	44.508311
893	Rice	Hunt Lake	66004700	z	190	19	2008	464439	4908874.237	-93.446044	44.332262
894	Rice	Mud Lake	66005400	z	269	54	2008	466056	4911924.702	-93.425961	44.359802
895	Rice	Weinberger Lake	66004100	z	53	8	2008	466093	4902438.077	-93.42488	44.274398
896	Rice	Willing Lake	66005100	z	53	5	2008	466584	4906728.699	-93.419002	44.313048
1141	Roseau	Bednar Impoundment	68IMP002	x	240	40	2008, Impoundment on the East Branch Warroad River T.161, R.35, S.34	342690.142	5399277.371	-95.139114	48.726653
897	Roseau	Roseau River WMA - Pool 2	68000600	z			MDNR 2013	263443	5430583.205	-96.233316	48.982807
898	Roseau	Roseau River WMA - Pool 3	68000700	z			MDNR 2013	259818	5428936.554	-96.281807	48.966621
1247	Saint Louis	Bear Island River	14RN058	x			MPCA_BioMon	582109.7988	5294870.13	-91.90345	47.801949
1248	Saint Louis	Bezhik Creek	14RN036	x			MPCA_BioMon	564744.9191	5323984.434	-92.130943	48.065849
1250	Saint Louis	Burntside River	14RN051	x			MPCA_BioMon	578203.5372	5307456.504	-91.953331	47.915661
899	Scott	Blue Lake	70008800	z	316	120	2008	465554	4961260.296	-93.435564	44.803913
900	Scott	Fisher Lake	70008700	z	396	190	2008, UofM/MPCA 2013	467309	4960742.975	-93.41334	44.799339
1245	Scott	Raven Stream W Branch	14MN132	x			MPCA_BioMon	451228.0359	4937445.351	-93.614433	44.588699
901	Scott	Rice Lake	70002500	z	328	160	2008	468925	4959736.099	-93.392846	44.790347
902	Sherburne	Big Mud Lake	71008500	z	263	100	2008, UofM/MPCA 2013	441606	5033565.385	-93.746807	45.453173
903	Sherburne	Boyd Lake	71011800	z			MDNR 2013	431410	5041113.409	-93.878246	45.520179
1145	Sherburne	Buck Lake	71IMP007	z	30	26	2008	444882.357	5039741.454	-93.705603	45.509027
904	Sherburne	Jim Lake	71011100	z	20	20	2008	436195	5037460.245	-93.816509	45.487754
905	Sherburne	Johnson Slough	71008400	x	65	10	2008	440952	5035284.746	-93.755377	45.468593

906	Sherburne	Josephine Pool	71006800	z	143	72	2008		446689	5034281.952	-93.681883	45.460029
907	Sherburne	Lower Roadside Lake	71037600	z	8	7	2008		438787	5037112.794	-93.783299	45.484859
1144	Sherburne	Muskrat Pool	71IMP003	z	299	15	2008		441986.487	5038146.675	-93.742483	45.494438
1147	Sherburne	Orrock Lake	71IMP010	z	215	162	2008		440779.985	5033856.448	-93.757406	45.455723
1142	Sherburne	Pool 1	71IMP001	z	2	2	2008		443252.521	5041410.978	-93.726659	45.523922
1143	Sherburne	Pool 2	71IMP002	z	30	15	2008, T.34, R.27, S.6		441565.799	5034943.887	-93.747485	45.465577
908	Sherburne	Rice Lake	71014200	z	187	2	2008		426997	5043575.043	-93.935111	45.541885
1146	Sherburne	Schoolhouse Pool	71IMP009	z	225	90	2008		444851.93	5036483.765	-93.705626	45.479704
909	Sherburne	Unnamed Lake	71014800	z			MDNR APM		419997	5034034.902	-94.023205	45.455257
910	Sherburne	Unnamed wetland	71015400	z			MDNR APM		418804	5034013.966	-94.038457	45.454931
911	Sherburne	Unnamed wetland	71015500	z			MDNR APM		419485	5033394.12	-94.029648	45.449432
912	Sherburne	Unnamed wetland	71021600	z			MDNR APM		418553	5034812.021	-94.041799	45.462084
913	St. Louis	Alden Lake	69013100	z	190	0	2008, 1854 List		573581	5212438.75	-92.031041	47.061363
914	St. Louis	Anchor Lake	69064100	z	316	32	2008, 1854 List		538908	5240987.414	-92.485131	47.3212
915	St. Louis	Andy Lake	69061800	z			1854 List		538560	5188032.603	-92.494265	46.844718
1149	St. Louis	Angell Pool	W0889001	x	500	80	2008, part of the Canosia State WMA T.51, R.15, S.15		557741.7081	5195603.48	-92.241747	46.911454
916	St. Louis	Artichoke Lake	69062300	z	306	0	2008, 7050.0470, 1854 List		535395	5203396.142	-92.534579	46.983145
917	St. Louis	Balkan Lake	69086000	z	36	2	2008		508881	5272572.641	-92.88184	47.6065
918	St. Louis	Bassett Lake	69004100	z			1854 List		582640	5246688.707	-91.905445	47.368432
1246	St. Louis	Bear Island River	69r8	z	0	0	2008, 1854 List		587665.052	5299216.038	-91.828398	47.84031
919	St. Louis	Bear Lake (Mudd)	69011200	z	125	125	2008		581289	5219028.956	-91.928366	47.119752
920	St. Louis	Beartrap Lake	69008900	z	131	0	2008, 1854 List		584103	5332527.239	-91.869466	48.140435
921	St. Louis	Beaver (Joker) Lake	69001500	z	46	5	2008, 1854 List		587877	5222824.32	-91.840792	47.153053
922	St. Louis	Big Lake	69019000	z	2049	20	2008, 1854 list		574850	5324844.771	-91.995175	48.072483
923	St. Louis	Big Rice Lake	69017800	z	416	416	2008, 1854 List		572586	5320158.076	-92.026358	48.030584
924	St. Louis	Big Rice Lake	69066900	z	2072	1700	2007, 2008, 1854 List		538336	5282562.63	-92.489082	47.695311
925	St. Louis	Birch Lake	69000300	z	7628	381	2007, 2008, 1854 List, UofM/MPCA 2013		581376	5287105.814	-91.914702	47.732194
926	St. Louis	Black Lake	69074000	z	118	0	2008, 1854 List		525609	5313024.989	-92.656894	47.97002
927	St. Louis	Blueberry Lake	69005400	z	130	13	2008, 1854 List		584055	5293981.718	-91.87765	47.793706
928	St. Louis	Bootleg Lake	69045200	z	352	0	2008, 1854 List		559470	5320703.34	-92.202196	48.036845
929	St. Louis	Breda Lake	69003700	z	137	135	2007, 2008, 7050.0470, 1854 List		585368	5243223.247	-91.869986	47.336904
1249	St. Louis	Bug Creek	BugCr	x			1854 List		546923.916	5224367.276	-92.380807	47.171129
930	St. Louis	Bug Lake	69053100	z	71	53	1854 List		547457	5221074.391	-92.374121	47.141461
931	St. Louis	Burntside Lake	69011800	z	7314	0	2007, 2008, 2010, 1854 List		576622	5309129.777	-91.974197	47.930904
932	St. Louis	Butterball (Long) Lake	69004400	z	442	400	2007, 2008, 7050.0470, 1854 List		585409	5257286.889	-91.866733	47.463421
933	St. Louis	Camp 97 Impoundment	69059400	z			2008, 1854 List, MDNR APM		544286	5332860.812	-92.404618	48.147455
1251	St. Louis	Camp Forty Creek	Camp40Cr	z			1854 List		537971.349	5345875.343	-92.488344	48.264948
934	St. Louis	Canary Lake	69005500	z	22	1	2008, 1854 List		583291	5294201.378	-91.887807	47.795781
935	St. Louis	Caribou Lake	69048900	z	569	3	2008, 7050.0470, 1854 List		552881	5194270.045	-92.305726	46.899861
936	St. Louis	Cedar Island Lake	69056800	z			1854 List		549489	5260174.763	-92.342977	47.493124
937	St. Louis	Comet Lake	69026700	z	28	0	2008, 1854 List		565650	5287165.302	-92.1244	47.734521
938	St. Louis	Cranberry Lake	69014700	z	69	0	2008, 1854 List		574154	5262260.089	-92.015212	47.509542
939	St. Louis	Crane Lake	69061600	z	3396	600	2007, 2008, 1854 List		538806	5348600.606	-92.476847	48.289415
1148	St. Louis	Deadmans	69IMP001	z	5	0	1854 List T.62, R.13, S.12		580046.428	5302315.708	-91.929624	47.869188
940	St. Louis	Dollar Lake	69053400	z	51	51	2008, 1854 List		549528	5236393.294	-92.345115	47.279146
941	St. Louis	Duck Lake	69019100	z	126	0	2008, 1854 List		571272	5324319.233	-92.043288	48.068165

1252	St. Louis	Dunka River	DunkaR	z			1854 List	584748.559	5285199.066	-91.870103	47.714607
942	St. Louis	Eagles Nest 3 Lake	69028503	z	1028		0 2008, 1854 List	568238	5296094.033	-92.088484	47.814579
943	St. Louis	East Stone Lake	69063800	z			2008, 1854 List	535104	5236843.446	-92.535794	47.284128
944	St. Louis	Echo Lake	69061500	z	1139		0 2008, 1854 List	538053	5335887.67	-92.48814	48.17509
1253	St. Louis	Echo River	EchoR	z			1854 List	539842.199	5346692.103	-92.463059	48.272181
945	St. Louis	Ed Shave Lake	69019900	z	90		0 2008, 1854 List	578793	5325166.038	-91.942192	48.074898
946	St. Louis	Elliott Lake	69064200	z	393		20 2008, 1854 List	542028	5240000.162	-92.443939	47.312124
947	St. Louis	Embarrass Lake	69049600	z			1854 List, MPCA Lakes	551184	5264310.562	-92.319995	47.530204
1254	St. Louis	Embarrass River	69r3	z	0		0 2007, 2008, 1854 List	548594.915	5258501.232	-92.355031	47.478134
948	St. Louis	Esquagama Lake	69056500	z			1854 List	548768	5257388.707	-92.352857	47.468111
1050	St. Louis	Fish Lake (east)	69049100				1854 List	555872	5199065.315	-92.265872	46.942765
949	St. Louis	Fivemile Lake	69028800	z	106		10 2008, 1854 List	563674	5296982.683	-92.149312	47.823042
950	St. Louis	Fourmile Lake	69028100	z	86		1 2008, 1854 List	562838	5297636.915	-92.160385	47.82901
951	St. Louis	Fourth Lake	69057300	z			1854 List	548511	5258536.092	-92.356141	47.478454
952	St. Louis	Gafvert Lake	69028000	z	33		1 2008, 1854 List	565752	5300790.791	-92.120974	47.857092
953	St. Louis	Gill Lake	69066700	z	18		0 2008, 1854 List	541424	5257206.07	-92.450322	47.466977
954	St. Louis	Grand Lake	69051100	z	1742		10 2008, 1854 List	545449	5191503.569	-92.403571	46.875517
955	St. Louis	Grass Lake	69077600	z	49		1 2008, 1854 List	515916	5251058.775	-92.789019	47.412786
956	St. Louis	Grassy Lake	69008200	z	257		0 2008, 1854 List	585092	5316953.774	-91.859275	48.000216
957	St. Louis	Grassy Lake	69021600	z	95		0 2008, 1854 list	571627	5294877.605	-92.043422	47.803268
958	St. Louis	Gull Lake	69009200	z	196		20 2008, 1854 List	585581	5330749.263	-91.84996	48.124245
959	St. Louis	Hay Lake	69015000	z	32		1 2008, 1854 List	576920	5284469.192	-91.974586	47.709021
960	St. Louis	Hay Lake	69041700	z	82		45 2007, 2008, 1854 List	554774	5237737.003	-92.27559	47.290819
962	St. Louis	Hay Lake	69043900	z	42		1 2008, 1854 List	557168	5284631.15	-92.237849	47.712529
963	St. Louis	Hay Lake	69044100	z	47		0 2008, 1854 List	559291	5286963.746	-92.209231	47.733324
964	St. Louis	Hay Lake	69057900	z	114		114 2008, 1854 List	545326	5268366.111	-92.397399	47.567129
961	St. Louis	Hay Lake	69043500	z	78		78 2008, 7050.0470, 1854 List, MPCA Lakes, MDNR APM	554678	5273015.275	-92.272496	47.608237
965	St. Louis	Hockey Lake	69084900	z	139		70 2007, 2008, 1854 List	510526	5180843.815	-92.862109	46.78106
966	St. Louis	Hoodoo Lake	69080200	z	252		252 2007, 2008	521117	5313857.841	-92.717035	47.977677
967	St. Louis	Horseshoe Lake	69025500	z	39		10 2008, 1854 List	566422	5293196.516	-92.113183	47.788702
1051	St. Louis	Hush Lake	69098800				1854 List	568442	5258621.417	-92.091624	47.477431
968	St. Louis	Indian Lake	69002300	z	57		0 2008, 1854 List	586848	5236231.025	-91.851763	47.273804
969	St. Louis	Island Lake Reservoir	69037200	z			1854 List	562185	5207363.714	-92.181792	47.016871
970	St. Louis	Jeanette Lake	69045600	z	612		0 2008, 1854 List	552706	5331986.698	-92.291536	48.138949
971	St. Louis	Johnson Lake	69011700	z	473		24 2008, 1854 List	581212	5295853.506	-91.915253	47.810909
972	St. Louis	Kabustasa Lake (Rice)	69067900	z			1854 List	535605	5335952.179	-92.521062	48.175812
973	St. Louis	King Lake	69000800	z	320		39 2008, 1854 List	587774	5226774.116	-91.841378	47.188602
974	St. Louis	Kingburg Lake	69077100	z			1854 List	518076	5189595.742	-92.762858	46.859657
975	St. Louis	Knuckey (Mud) Lake	69080000	z	71		18 2007, 2008	517625	5277368.042	-92.765311	47.649469
976	St. Louis	Kookoosh Lake	69000900	z			1854 List	588611	5226282.81	-91.830429	47.184069
977	St. Louis	Kylen Lake	69003400	z	16		2 2008, 1854 List	589915	5243344.166	-91.809786	47.337383
978	St. Louis	Lake George	69004000	z	42		0 2007, 2008, 1854 List	588665	5237720.434	-91.827449	47.28696
979	St. Louis	Lapond Lake	69017700	z	176		176 2008, 1854 List	573012	5322975.617	-92.020164	48.055881
980	St. Louis	Leeman Lake	69087500	z	284		90 2008, 1854 List	504510	5186811.885	-92.94086	46.834835
981	St. Louis	Lieuna (Lieung) Lake	69012300	z	476		10 2008, 7050.0470, 1854 List, MDNR APM	576907	5216563.874	-91.986546	47.098099
982	St. Louis	Little Birch Lake	69027100	z			2008, 1854 List	562384	5287256.169	-92.167942	47.735663

1255	St. Louis	Little Cloquet River	69r6	z	0	0	2008, 1854 List		575022.795	5217206.709	-92.011264	47.1041
1256	St. Louis	Little Indian Sioux River	69r7	z	0	0	2007, 2008, 2010, 1854 List		554999.561	5342966.279	-92.259287	48.237529
983	St. Louis	Little Mesaba Lake	69043600	z	207	0	2008, 1854 List		557089	5268194.502	-92.241047	47.564656
984	St. Louis	Little Rice Lake	69061200	z	266	266	2007, 2008, UofM/MPCA 2013, 1854 List		542095	5284497.116	-92.4388	47.712482
985	St. Louis	Little Sandy Lake	69072900	z	89	89	2008, Smith_Lakes, 1854 List		529922	5273933.683	-92.601806	47.618117
986	St. Louis	Little Stone Lake	69002800	z	163	0	2007, 2008, 1854 List		589147	5231969.115	-91.822224	47.235153
987	St. Louis	Little Vermillion Lake	69060800	z	558	0	2007, 2008, 1854 List		543832	5348054.433	-92.409151	48.284174
988	St. Louis	Low Lake	69007000	z	353	71	2007, 2008, 1854 List		587931	5314271.04	-91.821774	47.9757
989	St. Louis	Lower Pauness Lake	69046400	z	162	1	2008, 1854 List		555915	5338520.214	-92.247546	48.197451
990	St. Louis	Martin Lake	69076800	z	71	0	2008, 1854 List		523278	5186560.231	-92.694768	46.832179
991	St. Louis	Mogie Lake Lake	69039100	z			1854 List		559739	5179745.627	-92.217595	46.768586
992	St. Louis	Moose Lake	69079800	z	82	62	2007, 2008, 1854 List		520880	5276865.14	-92.721993	47.644847
993	St. Louis	Moose Lake	69044200	z			MDNR APM		557601	5286989.104	-92.231765	47.733705
1257	St. Louis	Moose River	69-river5	z	0	0	1854 List		568018.573	5334089.221	-92.085396	48.15641
996	St. Louis	Mud (Black Mallard) Lake	69004700	z	49	0	2008, 1854 List		585379	5260716.842	-91.866468	47.494281
997	St. Louis	Mud Hen Lake	69049400	z	165	0	2008, 1854 List		552279	5246088.48	-92.307604	47.366166
994	St. Louis	Mud Lake	69015100	z	51	0	2008, 1854 List		576089	5284071.409	-91.985732	47.705541
995	St. Louis	Mud Lake	69079700	z	43	43	2008, 1854 List		523033	5279370.719	-92.693195	47.667318
1052	St. Louis	Mud Lake	69065200				1854 List		535799	5252333.26	-92.525355	47.423466
998	St. Louis	Myrtle Lake	69074900	z	876	0	2008, 1854 List		523942	5325686.735	-92.67852	48.084002
999	St. Louis	Nels Lake	69008000	x	200	2	2008		582745	5319492.81	-91.890242	48.023364
1000	St. Louis	Nichols Lake	69062700	z	444	22	2008, 1854 List		535102	5215592.814	-92.537484	47.092911
1258	St. Louis	Nina Moose River	69-river3	z	0	0	2007, 1854 List		568535.904	5337322.602	-92.077919	48.185441
1001	St. Louis	One Pine Lake	69006100	z	369	37	2008, 1854 List		584091	5295921.586	-91.876793	47.811151
1002	St. Louis	Oriniack Lake	69058700	z	748	0	2008, 1854 List		549813	5318272.618	-92.33202	48.015804
1003	St. Louis	Papoose Lake	69002400	z	16	16	2008, 7050.0470, 1854 List		585724	5235444.036	-91.866771	47.266872
1298	St. Louis	Partridge	S007-443	z			UofM/MPCA 2013, 1854 List		560934.97	5263401.72	-92.190587	47.521186
1300	St. Louis	Partridge	S007-513	z			UofM/MPCA 2013, 1854 List		561032.47	5262723.51	-92.189386	47.515075
1259	St. Louis	Partridge River	04010201-552	z			MPCA Streams		558069.309	5260310.964	-92.229056	47.49364
1004	St. Louis	Pelican Lake	69084100	z	11944	119	2007, 2008		506959	5323213.469	-92.906598	48.062161
1005	St. Louis	Perch Lake	69068800	z	79	32	2008, 1854 List		533236	5238963.48	-92.560337	47.303301
1260	St. Louis	Petrel Creek	69r4	z	0	0	2007, 2008, 2010, 1854 List		582914.51	5240556.44	-91.902954	47.313228
1006	St. Louis	Picket Lake	69007900	z	78	7	2008, 1854 List		585709	5320191.793	-91.850358	48.029261
1296	St. Louis	Pike	S006-927	z			UofM/MPCA 2013		549037.04	5286596.46	-92.34602	47.73088
1261	St. Louis	Pike River	69r1	z	0	0	2007, 2008, 2010, 1854 List		544963.295	5290765.508	-92.399915	47.768686
1007	St. Louis	Pine Lake	69000100	z			1854 List		590892	5256960.66	-91.794064	47.459744
1008	St. Louis	Prairie Lake	69084800	z	807	16	2008, 1854 List		507342	5182043.386	-92.9038	46.791898
1262	St. Louis	Prairie River	PrairieR	z			1854 List		506146.247	5181608.571	-92.919474	46.787997
1009	St. Louis	Rat (Jamer) Lake	69073700	z	26	0	2008, 1854 List		529215	5277345.481	-92.610987	47.648847
1053	St. Louis	Rat Lake	69092200				2008		499331	5266637.818	-93.008892	47.55316
1010	St. Louis	Rice Lake	69057800	z	41	41	2008		547320	5268499.741	-92.370876	47.568189
1011	St. Louis	Rice Lake (d)	69018000	z			1854 List		576656	5319343.143	-91.971919	48.022777
1012	St. Louis	Round Lake	69004800	z	336	0	2008, 7050.0470, 1854 List		589648	5259341.67	-91.810082	47.481336
1054	St. Louis	Round Lake (b)	69064900				1854 List		533892	5238780.913	-92.551673	47.301625
1013	St. Louis	Ruth Lake	69001400	z	47	9	2008, 1854 List		588777	5224635.696	-91.828565	47.169228
1014	St. Louis	Sabin Lake	69043401	z			1854 List		552586	5270772.101	-92.300597	47.588228

1294	St. Louis	Sand	S003-249	z			UofM/MPCA 2013	543254.12	5275893.88	-92.4242	47.635
1264	St. Louis	Sand River	SandR	z			1854 List	543563.98	5276025.196	-92.420062	47.636161
1015	St. Louis	Sandy Lake	69073000	z	121		121 2008, UofM/MPCA 2013, Smith_Lakes, 1854 List	530746	5274340.965	-92.590812	47.621742
1297	St. Louis	Second	S007-220	z			UofM/MPCA 2013, 1854 List	560858.86	5263241.32	-92.19162	47.51975
1265	St. Louis	Second Creek	04010201-952	z			MPCA Streams	560835.225	5263250.326	-92.191933	47.519833
1016	St. Louis	Seven Beaver Lake	69000200	z	1508		1282 2007, 20008, 7050.0470, 1854 List	589441	5261318.018	-91.812428	47.499144
1017	St. Louis	Shannon Lake	69092500	z	135		108 2007, 2008,	502233	5274792.237	-92.970279	47.626529
1266	St. Louis	Shannon River	69river_1	x			2007, 2008	504630.652	5277793.925	-92.938335	47.653525
1267	St. Louis	Shiver Creek Impoundment	ShiverCrlImp	x			1854 List	573612.926	5250577.524	-92.024343	47.404498
1018	St. Louis	Side Lake	69069900	z	25		15 2008, 1854 List	527159	5180720.873	-92.644226	46.779484
1019	St. Louis	Simian Lake	69061900	z	81		5 2008, 1854 List	536293	5181643.593	-92.524504	46.787353
1020	St. Louis	Sixmile Lake Lake	69028300	z			2008, 1854 List	564754	5297973.252	-92.134736	47.831846
1021	St. Louis	Smith (Little Pequaywan) Lake	69011100	z			1854 List	582836	5223260.541	-91.907196	47.157631
1299	St. Louis	St. Louis Estuary	S007-444	z			UofM/MPCA 2013	558390.29	5166874.43	-92.236892	46.652885
1268	St. Louis	St. Louis R.(FR 1060)	StLR_2	z			1854 List	570254.085	5257285.83	-92.067789	47.465222
1263	St. Louis	St. Louis River	69r2	z	0		0 2007, 2008, 2010 headwaters, Norway Pt	556150.571	5167172.963	-92.266124	46.655763
1272	St. Louis	St. Louis River (FR 790)	StLR_4	x			1854 List	566174.235	5258137.391	-92.121791	47.473311
1269	St. Louis	St. Louis River (FR 791)	StLR_5	z			1854 List	562853.909	5258108.903	-92.165855	47.473384
1271	St. Louis	St. Louis River (hdwtrs)	StLR_1	z			7050.0470 (04010201-631), 1854 List	579886.535	5257627.53	-91.939934	47.467186
1270	St. Louis	St. Louis River (Norway Pt)	StLR_3	z			1854 List	564529.985	5254492.37	-92.144142	47.440682
1152	St. Louis	St.Louis Estuary (2)	Tallas				1854 List	562804.517	5174091.13	-92.178224	46.717424
1024	St. Louis	Stone (Tommila) Lake	69003500	z	87		85 2008, 7050.0470, 1854 List	590055	5242449.515	-91.808114	47.329315
1023	St. Louis	Stone Lake	69068600	z	160		24 2008, 7050.0470, 1854 List	533735	5237353.299	-92.553858	47.288787
1022	St. Louis	Stone Lake	69004600	z	230		173 2007, 2008, 2010, 7050.0470, 1854 List, MCBS 2011, UofM/MPCA 2013	583519	5261071.352	-91.89109	47.497712
1295	St. Louis	Sturgeon	S004-870	z			UofM/MPCA 2013	505162.15	5278056.16	-92.931254	47.65588
1025	St. Louis	Sturgeon Lake	69093901	z			2008, UofM/MPCA 2013	496260	5280874.62	-93.049831	47.681249
1026	St. Louis	Sturgeon Lake, Middle	69093902				UofM/MPCA 2013	495659	5279368.167	-93.057823	47.667691
1027	St. Louis	Sullivan Lake	69024600	z			1854 List	570478	5231854.9	-92.068852	47.236396
1028	St. Louis	Sunset Lake	69076400	z	309		6 2008, 1854 List	523197	5310837.137	-92.689327	47.950427
1029	St. Louis	Susan Lake	69074100	z	305		0 2008, 1854 List	525242	5314569.801	-92.66172	47.983933
1030	St. Louis	Turpela Lake	69042700	z	76		61 2008, UofM/MPCA 2013	557616	5256713.474	-92.235543	47.461313
1033	St. Louis	Twin (East Twin) Lake	69016300	z	224		2008, 1854 List	577235	5300441.446	-91.967547	47.852671
1031	St. Louis	Twin Lake	69050400	z	18		1 2008, 1854 List	544472	5181122.555	-92.417402	46.782169
1032	St. Louis	Twin Lake	69069500	z	115		0 2008, 1854 List	532150	5182702.513	-92.578708	46.797094
1034	St. Louis	Twin Lakes	69017400	z			1854 List	579656	5314016.136	-91.932681	47.974491
1036	St. Louis	Unnamed (FDL2) Lake	69145400	z			1854 List	530646	5183287.414	-92.598377	46.802429
1035	St. Louis	Unnamed Lake	69063400	z	101		20 2008, 1854 List	541178	5234569.787	-92.455686	47.263316
1037	St. Louis	Upper Bug Lake	69040600	z	23		0 2008, 1854 List	555052	5221908.024	-92.273861	47.148371
1038	St. Louis	Upper Pauness Lake	69046500	z	215		1 2008, 1854 List	555334	5337847.304	-92.255451	48.191449
1039	St. Louis	Vang Lake	69087600	z	126		3 2008, 1854 List	505713	5189952.072	-92.925045	46.863084
1273	St. Louis	Vermilion River	69-river4	z	0		0 2007, 2008	534398.008	5346238.468	-92.536463	48.268419
1040	St. Louis	Vermilion River Lake	69061300	z	1125		562 2008, 1854 List	540515	5318141.238	-92.456709	48.015279
1041	St. Louis	Vermillion (Rice Bay)	69037800	z	49110		250 2008, 1854 List	543449	5301351.719	-92.419062	47.864034
1042	St. Louis	Wabuse Lake	69040800	z	64		51 2008, 1854 List	554916	5233612.973	-92.27422	47.2537
1043	St. Louis	Wagon Wheel Lake	69073500	z	11		6 2008, 1854 List	529918	5277358.144	-92.601625	47.648928
1044	St. Louis	Washusk Number One Lake	69040900	z	51		40 2008, 1854 List	554347	5232962.431	-92.281819	47.247894

1045	St. Louis	Washusk Number Two Lake	69041000	z		24		1854 List		553649	5232179.383	-92.291136	47.240906
1046	St. Louis	White Iron Lake	69000400	z		3238		0 2008, 1854 List		591855	5305021.958	-91.77118	47.891951
1055	St. Louis	White Lake	69057100					1854 List		543756	5261050.785	-92.418998	47.501417
1047	St. Louis	Wild Rice Reservoir	69037100	z		2133		1 2008, UofM/MPCA 2013, 1854 List		562103	5193399.414	-92.184781	46.891229
1048	St. Louis	Wolf Lake	69014300	z		456		0 2008, UofM/MPCA 2013, MDNR APM, MCBS 2011, 1854 List		579750	5236656.905	-91.945514	47.278538
1049	St. Louis	Wynne Lake	69043402	z				1854 List, MPCA Lakes		553563	5267730.008	-92.287975	47.560778
1056	Stearns	Beaver Lake	73002300	z				MDNR APM		402601	5029629.684	-94.244773	45.413405
1057	Stearns	Goodners Lake	73007600	z				MDNR APM		392200	5026929.061	-94.377072	45.387577
1058	Stearns	Grand Lake	73005500	z				MDNR APM		395424	5032338.323	-94.337047	45.436743
1059	Stearns	McCormic Lake	73027300	z		211		0 2008, UofM/MPCA 2013		351778	5064485.882	-94.904572	45.718052
1060	Stearns	Ochotto Lake	73012200	z				MDNR APM		387121	5052876.072	-94.447906	45.620255
1061	Stearns	Padua Lake	73027700	z				UofM/MPCA 2013		342682	5054256.923	-95.018068	45.624032
1062	Stearns	Raymond Lake	73028500	z		126		0 2008, UofM/MPCA 2013		342341	5055083.88	-95.022707	45.631393
1063	Stearns	Restored Wedland	73007700	z				MDNR APM		392000	5050239.584	-94.384758	45.597307
1064	Stearns	South Twin Lake	73027600	z				MDNR 2013		352030	5070369.779	-94.903134	45.771036
1065	Stearns	Tamarack Lake	73027800	z		470		2008		336804	5036213.124	-95.087404	45.46037
1067	Stearns	Unnamed (Tower WMA)	73034300	z				MDNR 2013		334650	5060323.586	-95.123094	45.676734
1066	Stearns	Unnamed Lake	73027400	z				MDNR 2013		351727	5063836.352	-94.905028	45.712198
1068	Steele	Oak Glen Lake	74000400	z	350		4	2008		493772	4863983.813	-93.077588	43.928944
1069	Steele	Rice Lake	74000100	z	697		467	MDNR APM		495330	4881102.331	-93.05833	44.083082
1070	Todd	Beauty Lake	77003500	z				MDNR APM		368330	5096221.103	-94.700673	46.006908
1071	Todd	Beck Lake	77005600	z	57		25	2008		367052	5114621.246	-94.722318	46.172192
1072	Todd	Big Swan Lake	77002300	z				UofM/MPCA 2013, MDNR APM		364050	5082693.539	-94.752089	45.884376
1073	Todd	Cass County Lake	77000400	z	25		18	2008		373007	5122208.442	-94.647245	46.241585
1074	Todd	Charlotte Lake	77012000	z				MDNR APM		355602	5090406.557	-94.86323	45.952039
1075	Todd	Jaeger Lake	77007500	z	46		28	2008		365958	5119298.773	-94.73781	46.214056
1076	Todd	Little Birch Lake	77008900	z				UofM/MPCA 2013, MDNR APM		360683	5072185.748	-94.792422	45.789172
1077	Todd	Little Osakis Lake	77020100	z				MDNR APM		341454	5090861.527	-95.045826	45.95301
1078	Todd	Long Lake	77006900	z	356		338	2007, 2008		368641	5117576.976	-94.702563	46.19909
1079	Todd	Long Lake	77002700	z				MDNR APM		366269	5082867.272	-94.723553	45.886373
1274	Todd	Long Prairie River	77-river1	z	0		0	2007, UofM/MPCA 2013		374924.727	5130711.872	-94.62464	46.318439
1080	Todd	Mud Lake	77008700	z	398		318	2007, 2008		363098	5108397.931	-94.77172	46.115425
1081	Todd	Rice Lake	77006100	z	675		60	2008		365575	5110773.948	-94.740352	46.137292
1150	Todd	Robbinson Pond	771MP001	x	60		30	2008, Location: T.131, S.32, S. 24		372221.278	5111055.612	-94.654418	46.141103
1082	Todd	Rogers Lake	77007300	z	185		130	2007, 2008		370070	5118511.792	-94.684307	46.207774
1275	Todd	Turtle Creek	77-river2	z	0		0	2007		361625.569	5116380.566	-94.793097	46.186937
1083	Todd	Turtle Lake	77008800	z				MDNR APM		363416	5116822.71	-94.770035	46.191276
1084	Todd	Twin Lake	77002100	z	317		159	2008		365676	5077370.755	-94.729657	45.836809
1085	Todd	Unnamed Lake	77017600	z	40		2	2008		348114	5100775.781	-94.963092	46.043695
1086	Todd	Unnamed Lake	77017800	z	42		23	2008		347394	5099467.816	-94.971973	46.03177
1087	Todd	West Nelson Lake	77000500	z	84		70	2008		372539	5127999.216	-94.65488	46.293592
1088	Wabasha	Maloney Lake	79000103	z				UofM/MPCA 2013		585933	4899136.691	-91.923817	44.240396
1089	Wabasha	Mississippi Pool 4/Robinson Lake	79000502	z				UofM/MPCA 2013		579682	4912277.673	-92.000084	44.359397
1090	Wadena	Blueberry Lake	80003400	z	555		30	2008		340679	5183218.235	-95.087235	46.783475
1091	Wadena	Burgen Lake	80001800	z	92		86	2008		357258	5176716.257	-94.868139	46.728748
1276	Wadena	Crow Wing River	81river	x				2007		363179.772	5141863.075	-94.780384	46.41648

1092	Wadena	Finn Lake	80002800	z	148	30	2008		351163	5179532.363	-94.948774	46.752746
1093	Wadena	Granning Lake	80001200	z	50	50	2008		358222	5161121.999	-94.850735	46.588689
1094	Wadena	Jim Cook East Lake	80002702			2008			346676	5179298.406	-95.007409	46.749627
1095	Wadena	Jim Cook West Lake	80002701	z	238	0	2008		345500	5178714.759	-95.0226	46.744107
1096	Wadena	Lower Twin Lake	80003000	z	267	5	2008, MCBS2011		344465	5184775.792	-95.038196	46.798376
1097	Wadena	Round Lake	80001900	z	58	58	2008		357636	5185010.789	-94.865769	46.803433
1098	Wadena	Stocking Lake	80003700	z			MDNR APM		342163	5180743.178	-95.066954	46.761569
1099	Wadena	Strike Lake	80001300	z	76	76	2008		357402	5161847.264	-94.861657	46.595039
1100	Wadena	Unnamed Lake	80000700	z	16	16	2008		357065	5136898.9	-94.858395	46.370562
1101	Wadena	Yaeger Lake	80002200	z	384	346	2008		349082	5173916.867	-94.97416	46.701774
1102	Waseca	Lily Lake	81006700	z			UoF/MPCA 2013, MDNR APM		448853	4893433.815	-93.64002	44.192328
1103	Washington	Mud Lake	82016800	z			MDNR APM		498335	5012428.456	-93.021224	45.265351
1104	Washington	Rice Lake	82014600	z	116	0	MDNR APM		502714	5000543.805	-92.96547	45.158367
1105	Wright	Clearwater Lake	86025200	z			MDNR APM		412166	5017386.664	-94.120379	45.304489
1106	Wright	Sandy Lake	86022400	z	118	150	2008		416291	5017945.39	-94.067866	45.310021
1107	Wright	Sugar Lake	86023300	z			MDNR APM		418526	5018732.312	-94.039488	45.317367