

**Notes on the use of the spreadsheets:**

This workbook consists of the following worksheets:

1. testimony from the 10/23/17 St Paul hearing, including exhibits submitted at the hearing
2. testimony from the 10/24/17 Virginia hearing, including exhibits submitted at the hearing
3. testimony from the 10/25/17 Bemidji hearing, including exhibits submitted at the hearing
4. testimony from the 10/26/17 Cloquet hearing, including exhibits submitted at the hearing
5. testimony from the 10/30/17 Brainerd hearing, including exhibits submitted at the hearing
6. testimony from the 11/2/17 videoconference hearing, including exhibits submitted at the hearing
7. e-comments submitted to OAH before November 17, 2017
8. specific comments submitted to Office of the Administrative Hearing (OAH) before November 17, 2017
9. recurring comments submitted to OAH in the form of multiple identical letters or postcards before November 17, 2017

The Minnesota Pollution Control Agency (MPCA) considered the comments received and the transcripts of the testimony in preparing the worksheets and exercised discretion in identifying those portions that are excerpted here. The MPCA has attempted to accurately identify and document the comments for purposes of preparing responses, but does not intend that the information in these worksheets be considered a complete reflection of the comments. The Administrative Law Judge (ALJ) will consider all testimony and comments in their entirety. The worksheets are only for purposes of organizing the MPCA's responses and directing the ALJ to where the MPCA's responses can be found.

In some cases, where errors in the transcript language were obvious, the MPCA made corrections to transcript language.

In worksheet # 9 (Recurring comments), the number of recurring letters received are as they were available for viewing on the OAH website as of noon Friday, 11/17/17. The MPCA does not intend to update the totals of the recurring letters that have been received, but if additional recurring letters that identify different topics are received, they will be addressed in the MPCA's rebuttal response.

Comment ID	Part ID	Commenter Name	Topic	Relevant Excerpts/Summary of comment	Excerpt and Location of Comment (transcript line number)	Response or Response Location
1	A	Jennifer Lang	14	MPCA is not (or risks not) following the Clean Water Act.	Finally, and perhaps most pertinent, is that the MPCA is at risk of breaking the law. Eight years ago in 2009 the MPCA got an order from the U.S. EPA stating that we must enforce the 1973 wild rice sulfate rule. Currently as of 2015 the EPA is actively investigating Minnesota because of our failure to protect clean water.	There are a variety of reasons why a sulfate limit has not been included in historical NPDES permits for the current sulfate standard of 10 mg/L. MPCA recognizes and takes the responsibility seriously to uphold the Clean Water Act and fully intends to implement water quality based effluent limits where a wastewater treatment facility demonstrates the ability to cause or contribute to a downstream impairment.
1	B	Jennifer Lang	28	Mercury methylation	Currently one in ten infants in the Minnesota Lake Superior region are born with unsafe mercury levels. Mercury contamination in human fetus can lead to all sorts of complications, including an impact on brain development and neurological functioning. What astounds me is how closely linked mercury contamination is with sulfates. It has been proven that sulfate increases mercury in sediments, resulting in bioaccumulation and toxic contamination to fish. If already 10 percent of infants in this region are being born with unsafe mercury levels, I can only imagine that this number would increase if we were to neglect the sulfate standard. This strikes me as extraordinarily unfair to the people and unborn children of that region.	See topic 28 in Attachment 1.
1	C	Jennifer Lang	29	Increased sulfate can lead to increased phosphorus release and eutrophication.	Phosphorus release from sediments is something that can occur as a result of sulfate loading. So, when we are proposing to increase the sulfate limit, this to me is a sign of blatant disregard and unwillingness to look at the source of an ongoing problem, that is, the excess growth of algae upon our otherwise clear waters. It is a sign of disrespect for our lakes, for our very geological roots, and for our recreational and tourist industry that sustains us today.	The commenter assumes that MPCA is proposing to increase the sulfate standard, but about half of calculated standards produced by the proposed equation-based standard would be below the present standard of 10 mg/L, given that the median standard will be about 14 mg/L. (TSD Table 1-15, page 65). Any excessive increase in surface water phosphorus should be detected by ongoing monitoring and compared against existing phosphorus standards for lakes and streams.
1	D	Jennifer Lang	3.1	MPCA should keep the existing standard or risks violation of the Clean Water Act.	The fact that the MPCA is considering abandoning the Clean Water Act and upholding the wild rice sulfate standard is to me evidence of a blatant disregard for the health and well-being of our future generations.	The proposed standard is a better, more precise standard. The Clean Water Act supports regular revision of standards supported by scientific evidence. See also Attachment 1 response to topic area 3.1 and the Cover Memorandum to this Response.
2	A	Tony Kwilas	3.9	The error rate is too high; industry should not have to spend money to comply with a standard that is so likely to be wrong.	The equation, which uses iron and organic compound components contains an error rate of 20 percent. With such a high error rate, it's difficult for industry to justify the capital resources needed to be spent to meet this standard.	The overall error rate of 16-19% (depending on data set) is the sum of false positives and false negatives. The maximum rate that industry might erroneously be required to control sulfate is the false positive rate (9 to 11%). That rate would be significantly decreased by the implementation of the alternate standard in this proposed rule, which would calculate sulfate standards for false positive sites where the porewater sulfide is below 120 micrograms per liter even if average sulfate concentrations exceed the equation-calculated standard. Such cases are thought to be a result of upwelling groundwater. The TSD identified four wild rice waters where the likely explanation for the observed false positive was upwelling groundwater (TSD, page 67). See also Attachment 1 response to topic area 3.9.
2	B	Tony Kwilas	18	Variances are expensive and difficult to obtain.	Variances tend to be very expensive and come with a schedule of compliance and are only temporary. And right now I've been told, I think, there's only five, I think, in the state that have been granted.	The MPCA is committed to implementing variances where appropriate, when compliance with a limit to ensure the standard is met would cause widespread social and economic impacts. See response exhibit N27 for numbers of variances granted in Minnesota since 1971.
2	C	Tony Kwilas	18.4	Variance fee should be waived for industrial applicants.	The PCA has testified...that they anticipate numerous applications for variances and subsequently will waive the application fee for municipal applicants, but not for industrial applicants. We believe that this is unfair and should be addressed by the Pollution Control Agency.	A discussion of the MPCA's proposed variance fee exemption for municipalities is provided at SONAR page 109. The MPCA does not agree that the same conditions exist in regard to industrial permittees to establish the reasonableness of extending the exemption to all industrial permittees. However, the MPCA believes that permittees can request the waiver of any fee that causes a hardship, and industrial permittees could do so for these variances.

2	D	Tony Kwilas	19.4	Wait for LCCMR cost study to be complete.	The Pollution Control Agency did not include conclusions from an economic impact study that was requested by the legislature in 2016. That request for proposal included engineering feasibility studies and a cost analysis of the potential impacts of the rule. The legislature even extended the deadline during this last legislative session for the rulemaking until January of 2019 so this report could be incorporated in the supporting documents. The report, as mentioned by Ms. Lotthammer, is going to be due in June of 2018. It's very difficult for these impacted facilities to plan and invest in future economic plans and capital investment without a complete final cost analysis of how much this rule will cost.	A discussion of the LCCMR Study is provided in the MPCA's cover memo to this response
3	A	Kurt Anderson	4.2	Sulfide is not a problem until concentrations much higher than 120 ppb. Questions about impacts based on which part of the plant is exposed to sulfide.	The rule is centered around the 120 parts per billion protective value, which put another way means that it's unsafe for wild rice to have sulfide conditions greater than 120 parts per billion. When the MPCA first started testing this in the laboratory, they saw no effects until levels were over 3,000 parts per billion. So, almost 30 times higher than what they're saying is unsafe. They then chose to test the whole plant, not just the rooting zone. And their theory was that sulfide was impacting in the rooting zone. They tested the whole plant, and the impacts that they saw were only to the green parts of the plant, which aren't in the rooting zone, and do not have the likelihood that sulfide is actually present because of the oxygen in the water. And the peer reviewers saw that, they recommended changes. The MPCA chose not to implement those changes. Independent peer-reviewed published research did separate those. And again, there were no impacts unless levels were at least 12 and up to 30 times higher.	Mr. Anderson is suggesting that the stems of wild rice would never be exposed to elevated sulfide because stems would only occur in the water column, which usually contains oxygen, which detoxifies sulfide. However, as described in the TSD (pages 13-15), researchers have observed wild rice seeds germinating at a sediment depth of several inches, which would potentially expose the stems to elevated sulfide. See also Attachment 1 response to topic areas 4.1 and 4.2.
3	B	Kurt Anderson	37	Complying with the standard is expensive and there is no guarantee that the standard will protect wild rice.	Having that level set so low means that we may need to comply with a very expensive standard that has no guarantee for even a reasonable certainty that it's going to do anything to benefit wild rice.	The cost to treat sulfate does not negate the need to set a standard to protect wild rice from the impacts of sulfate. See Attachment 1, response to topic area 3.3. Also, see Attachment 1 response to topic area 37.
3	C	Kurt Anderson	4	There are stands of wild rice that thrive in high sulfate or high sulfide areas.	The other major line of evidence is the field research. And the major issues that I see there as a toxicologist, when you establish a safe level usually you don't see whatever organism you're looking at healthy and thriving in higher levels than that safe level. And I think this stand of natural wild rice in the state of Minnesota had levels ten times higher than what the MPCA is proposing is unsafe, that's Lake Monongalia. And it's not the only one, there's numerous other water bodies out there that have levels of sulfide in the porewater well above the 120 part per billion protective level that have thick wild rice.	The TSD identifies Lake Monongalia as the one known outlier that does not conform to the expectation that high porewater sulfide would discourage wild rice presence and density. For some unknown reason wild rice appears to thrive in this lake despite high porewater sulfide. Incidentally, the equation correctly predicts that this lake would have high sulfide; the anomaly is that the wild rice is dense (TSD, page 78). Three of the four samples from this lake were true positives, where sulfide was predicted to greater than 120—and it was. The Federal Clean Water Act and MPCA rules (as specifically mentioned in the proposed rule) allow for site-specific standards. If rice can thrive at higher levels of sulfide, a site-specific standard could be developed and implemented.
3	D	Kurt Anderson	33.1	Supports moving away from the 10 mg/L standard.	PCA did an excellent job looking at modern research, which showed that wild rice was growing in the natural environment at levels far above 10 parts per million, up to 80 times higher. Natural stands of wild rice in the laboratory, sulfate wasn't affecting wild rice seedlings until 160 to 250 times higher than the existing 10 part per million standard. So, they made excellent progress on that part. And they made the decision to not move forward with the existing 10 part per million standard based on those multiple lines of evidence. And that was excellent work.	Statement. However, the MPCA notes that the decision "not to move forward with the existing 10 part per million standard" is not a separate decision from the proposed equation-based sulfate standard.

4	A	Robin Richards	4	The standard should be based on a clearly defined dose response or toxic threshold.	I'd like to address a bit what was left out on the SONAR in Section 4A, Page 26 to 28. The EPA as they develop water quality criteria have a defined level of confidence in what is defined as a toxic amount to protect from this toxic response. Consequently there's an anticipation that when you implement this water quality criteria, not only will you protect the water body for its beneficial use, but that you will also anticipate if the water body is above that concentration, you go in and bring down to the level of concentration you've identified as safe, that you will see a response in the sense that the adverse impacts are gone away. One of the things that we would have wanted to see from the MPCA process is a clearly defined dose response or clearly defined toxic amount and what the resulting adverse impact was and be able to have confidence in implementing that to ensure that	The Technical Support Document Chapter 1C discusses in depth how the MPCA considered the technical information gathered from the wild rice study and used it to determine a sulfide concentration that is <u>protective</u> of the beneficial use described in the SONAR p. 13. We do not anticipate extirpation of wild rice in waters with sulfide concentration above 120 micrograms per liter; however, our data show that above this threshold, wild rice population density is significantly lower than the density below this threshold. Further discussion on the reasonableness of this decision can be found in the SONAR p. 66. See also the Attachment 1 response to topic area 4.3, particularly Comment C.
4	B	Robin Richards	4	The MPCA should have considered not establishing a water column based standard.	EPA has put forward developing water quality criteria...the use of fish tissue. So, like wild rice, the water column itself is not causing the adverse effect to aquatic life. So, for selenium, EPA figured out a fish tissue level for selenium that if the fish tissue concentration was below that, the aquatic use was protected. So, there is the ability to have a direct cause and effect that is not water column related. In looking at state-of-the-art methods, there's recognition that it's not always a water column concentration that can be directly related to adverse effect. And that, it is perfectly fine within the EPA process of developing water quality criteria to have it based on something intermediate... In other words, it's reasonable	The MPCA did consider creating a standard that focused on the sulfide concentration in porewater and in fact reflected this thinking in the proposed alternate standard (see pp. 67-71 of the TSD). Pages 72-73 of the SONAR describe the reasonableness of also adopting the equation to derive a numeric sulfate standard for the surface water of wild rice waters to maintain sediment porewater concentrations at or below 120 µg/L.. Clearly MPCA did consider the efficacy of adopting only a protective porewater sulfide concentration into Minnesota standards.
5	A	Mike Bock	2.4	Rice thrives in areas with sulfide higher than 120 micrograms/L.	in many water bodies we receive sulfide concentrations much above 120 micrograms per liter value that are healthy stands of wild rice. The big question is, why is that? What does that mean with respect to the standard? (pg 77, line 9) The take-home message is that we find that thresholds two to three times higher than the MPCA's threshold are just as protective of wild rice health as the MPCA threshold.	The MPCA acknowledges that wild rice sometimes occurs at sulfide concentrations above 120 micrograms per liter. However, the probability that wild rice will occur and have density declines progressively as sulfide increases above 120. See the discussion in the Response Cover Memo concerning protective concentrations.
5	B	Mike Bock	4.3	Test for the presence of multiple change points.	When you allow that analysis to include more change points, what we find is that there's nothing significant or unique about 120. When you allow multiple change points you can see that the overall health metric balances up and down as you go up in concentration. This means that that particular test fails the validation check. (pg. 78, line 14)	MPCA examined wild rice density against porewater sulfide using changepoint analysis, and observed that the single largest change in average density occurred at 112 ug/L; below that level wild rice density (stems/m2) averaged twice as high as sites with sulfide above 112 ug/L (68 vs 34). MPCA acknowledges that it is possible to identify multiple change points, but for the purposes of identifying a protective concentration, MPCA needed to identify the concentration associated with a single change.
5	C	Mike Bock	4.3	The MPCA's field data have very few waterbodies with higher levels of sulfide	Furthermore, we find that because of the relatively low number of water bodies with concentrations above the MPCA threshold, specifically about 300 or higher, it's very difficult to test the significance of higher thresholds. (pg. 79, line 7, line 11)	The TSD shows that it is possible to test the protectiveness of a potential protective sulfide concentration of 300 ug/L. (TSD pages 63-66) This concentration is found not to be protective because the density of wild rice would be significantly lower than under a protective sulfide concentration of 120 ug/L. Therefore, there is no reason to test sulfide concentrations even higher than 300 ug/L; it is immaterial that the commenter would prefer there to be more sulfide data above 300 ug/L.

5	D	Mike Bock	4.3	The equation does not always show that an increase in allowable sulfide increases the allowable sulfate value.	We tested the equation using different sulfide thresholds. What we found is that there's an illogical behavior in the equation; one would expect that as you increase the permissible sulfide value in the sediment that you'd also get an increase in the sulfate value. What we found is that for a large number of lakes, that's not what happens. Sometimes when you increase the permissible sulfide value, you actually get a decrease in the sulfide value, which is counterintuitive. You would expect that as you allow higher concentrations of sulfide, you should also see a lot higher concentrations of sulfate; one would expect that as you increase the permissible sulfide value in the sediment that you'd also get an increase in the sulfate value. What we found is that for a large number of lakes, that's not what happens. Sometimes when you increase the permissible sulfide value, you actually get a decrease in the sulfide value, which is counterintuitive. You would expect that as you allow higher concentrations of sulfide, you should also see a lot higher concentrations of sulfate. (pg. 79, line 22)	MPCA staff also observed this phenomenon, but do not agree that it applies to "a large number of lakes" at a significant magnitude. The reason the phenomenon occurs is that every time a different sulfide threshold is posed, a completely new equation is produced via multiple binary logistic regression (MBLR). Due to the calculation of a new regression equation at different sulfide thresholds (which shifts individual sites as sulfide concentrations rise, in a binary fashion, where a given site is suddenly below a threshold, when it had been below the slightly lower threshold), the exponents for iron and TOC in the equation change, which sometimes results in counterintuitive trends in the resulting calculated sulfate concentrations in a minority of particular sites.
5	E	Mike Bock	2.4, 4.3	The 120 microgram/L sulfide value isn't reasonable; piecewise approaches show other values.	There are statistical methods that you can use to pick up breakpoints. For example, piecewise fruition. I'll provide more information on that in written testimony. When you utilize piecewise fruition we find that when we exclude Bean, that's one of the places identified as potential outlier, we come up with a breakpoint that's two to three times higher than the value that the PCA comes up with. When you include Bean, you come up with a value a thousand times higher. So, this suggests that the 120 micrograms per liter threshold isn't a reasonable value. (pg. 77 line 20)	This comment likely refers to piecewise regression, a statistical method that MPCA did not use. There are several statistical tools that can potentially be used for identifying where there are statistically significant changes in the response of wild rice density to the range of porewater sulfide observed in the field study. The MPCA chose to use changepoint analysis rather than piecewise regression. Changepoint analysis, when restricted to identifying the single largest reduction in wild rice density, finds a significant reduction in wild rice density at 112 micrograms per liter, from an average of 68 stems per square meter below 112, to 34 stems per square meter above 112. When considering multiple lines of evidence, and in light of the uncertainty of all the estimates of a protective sulfide concentration, the MPCA determined that a changepoint of 112 supports the identification of 120 micrograms per liter as a protective concentration, since the two numbers are of similar magnitudes.
6	A	Mike Hansel	2.1, 2.4	Sulfide is not toxic at concentrations seen in Minnesota.	Sulfide is also not toxic to the parts of the wild rice plant that grow in the sediment at concentrations seen in Minnesota wild rice waters. This is borne out both by Pastor's research and by Fort Lab research. (pg 82, line 9)	Wild rice stems can be exposed to toxic levels of sulfide when the seeds germinate several inches deep in sediment (TSD, pages 13-15).
6	B	Mike Hansel	2.1	Sulfate and sulfide are not toxic to wild rice	The third issue is that the PCA has not adequately considered the cost of this proposed regulation. Sulfate and sulfide are not toxic to wild rice. I think with respect to sulfate, that's certainly the case at all concentrations seen in Minnesota wild rice waters. (pg 81, line 24)	Statistical analysis of sulfide concentrations observed in Minnesota show clear, consistent, evidence of toxicity of sulfide to wild rice (TSD Fig. 1-2 on p. 34). The Myrbo et al. (2017) peer-reviewed article demonstrates that sulfide is a primary controller of wild rice presence in waters that potentially could support wild rice (Response Exhibit N.2).
6	C	Mike Hansel	2.4	The 120 microgram/L sulfide value isn't reasonable.	First, MPCA has not demonstrated the need for or the reasonableness for two provisions of the rule. Those are proposed Minnesota Rules 7050.0224, Subpart 5A, Lines 7.17 to 7.21, the 120 micrograms per liter protective sulfide level. (pg. 80, line 15)	The need and reasonableness of the proposed protective level of 120 micrograms per liter in porewater is demonstrated in both the SONAR (pages 66-72) and TSD (pages 31-39).

6	D	Mike Hansel	2.5	Mesocosm studies are flawed because too many plants died.	In the third year of the experiment most of the -- most the wild rice plants died, including those in the controls which were not exposed to sulfate or sulfide, raising serious questions about that study, which the peer review panel clearly raised. (pg. 83, line 6)	MPCA staff can find no concern expressed by the peer review panel that the unusual mortality in the unusually cold spring of 2013 undermines the relationship between elevated sulfide and toxicity to wild rice. However, the Minnesota Chamber of Commerce, represented by Mike Hansel, did submit comments to the panel that expressed such a concern (page E-5 in the summary report). The relationship between sulfide and wild rice in the mesocosms, accounting for the unusual 2013 spring mortality, was published in the peer-reviewed journal "Ecological Applications" by Pastor et al. (Response Exhibit N.5), indicating that those peer reviewers did not identify the mortality as an issue that undermined the conclusion that sulfide increases significantly reduced wild rice seedling survival, seedling emergence, and percent viable seeds.
6	E	Mike Hansel	2.5	MPCA ignored confounding effects.	The mesocosm also had a tenfold lower protective level based on the PCA's statistical analysis. PCA's approach was to ignore all the confounding efforts or effects in the mesocosm field study and go ahead and use those while ignoring the controlled studies where only sulfide or sulfate was varied in the lab. (pg. 83, line 12)	MPCA found that the effect of sulfide on wild rice is relatively consistent among the multiple lines of evidence, with the exception of the research sponsored by the Minnesota Chamber of Commerce (SONAR, Fig. 3 on page 70). MPCA did not ignore the potential for confounding effects or limitations to a given line of evidence, and instead discussed those in the relevant parts of the TSD (see, for example, Table 1-1 and the discussion of the multiple estimates of protective sulfide concentrations on pp. 31-39). MPCA considered all available
6	F	Mike Hansel	3.3	The equation to calculate the protective sulfate level is not reasonable.	And 7050.0224, Subpart 5B1, Lines 7.25 to 8.17, the formula for calculating the protective sulfate level from sulfide.	See "Reasonableness of the specific equation" starting on page 75 in the SONAR.
6	G	Mike Hansel	4.3	Statistical methods were not robust.	The statistical methods that the agency used were not robust in this matter. As a result, there's large discrepancies between the data that the agency used.	The MPCA used rigorous statistical methods, as presented in the TSD; it is not possible to respond with specifics to this general comment.
6	H	Mike Hansel	2.5, 4.5	MPCA ignored confounding effects.	The numbers that they came up with for protective sulfide from the field surveys are some ten times lower than the cause and effect research that was done by Dr. Pastor and Fort Labs. Part of the reason for this is that in the field surveys there are other stressors on wild rice that will confound the impact of sulfide. PCA notes that several of these are statistically significant, yet it chose to ignore the effect of those stressors and scribe all of the ill effects to sulfide.	The effect of other stressors is extensively discussed in the TSD (Chapter 1B), and the peer-reviewed paper by Myrbo et al. (Response Exhibit N2 titled "Sulfide generated by sulfate reduction is a primary controller of the occurrence of wild rice (Zizania palustris) in shallow aquatic ecosystems." It is shown that porewater sulfide independently affects the wild rice, despite any negative effects of other stressors. The existence of other stressors does not negate the need to protect wild rice from the impacts of sulfide.
6	I	Mike Hansel	19.4	Wait for LCCMR cost study to be complete.	Require the agency to complete the cost analysis that was authorized by the LCCMR grant prior to completing this rulemaking.	A discussion of the LCCMR Study is provided in the MPCA's cover memo to this response
6	J	Mike Hansel	37	Standard will not protect wild rice	Unfortunately there's no evidence that reducing sulfate in the discharge will reduce sulfate in the water column, will reduce sulfide in the water pores or in the sediment or will protect wild rice. There's been absolutely no evidence for that. (pg. 84, line 4)	See Attachment 1 response to topic area 37.
7	A	Rob Beranek	3.9	Error rate	I want to make you aware that the first half of 2017 Robin Richards of Ramboll Environ, who was on the panel previous to my testimony, submitted recommendations on changes to both the protective toxic sulfide threshold as well as the field study waters that were included indeveloping the equation. As mentioned, these changes will reduce the error rate of the current proposed equation from 20 percent down to 4 percent. For a billion dollar treatment issue we think reviewing this further is prudent.	The TSD considered the Ramboll Environ recommendations (pages 63-66) and concluded that the proposed changes would not be protective of wild rice. See also Attachment 1 response to topic area 3.9.

7	B	Rob Beranek	4.3	Data analysis to support 120 micrograms/L standard is incomplete.	One pillar of technical support for 120 micrograms per liter as a visible assessment of a graph of the portion of wild rice stands sulfide above and below the graph values. These are on Page 69 of the SONAR. Using visible assessment of a graph for post-standard that could cost billions is simply reckless. The agency did back it up with additional statistical review, but as Mike Bock just commented, we believe that that review is incomplete. (pg.89, line 19)	It is not possible to respond to this comment without additional specific information as to how the commenter thinks the statistical analysis is incomplete.
7	C	Rob Beranek	2.7	The field dataset to determine sulfide level should not include non-wild rice waters.	The field data set includes both proposed wild rice waters and non-wild rice waters in that set. The data from the non-wild rice waters must be excluded from development of an equation based standard. The only support I could find for the agency's policy judgment to leave these waters in is a conjecture contained in a footnote on Page 68 of the SONAR, making this decision arbitrary and unreasonable.	See the TSD discussion on "Dataset used to perform the MBLR" beginning on page 63.
7	D	Rob Beranek	33	I find that the alternate standard and specific standard portions of the proposal are reasonable.	pg. 91 line 13	Statement - no response required
7	E	Rob Beranek	33.1	Supports moving away from the 10 mg/L standard.	I support the conclusion that the removal of the 10 milligram per liter sulfate standard is reasonable. To quote Page 35 of the SONAR, "Two important research efforts on the toxicity of the sulfate to wild rice," that's Pastor, et al, 2017, Exhibit 19, and Fort, et al, 2014, "has shown that sulfate is not directly toxic to wild rice at levels commonly found in wild rice waters of Minnesota. (page 88, line 13)	Statement. However, the MPCA notes that the decision "not to move forward with the existing 10 part per million standard" is not a separate decision from the proposed equation-based sulfate standard.
8		Lowell Carlon	31	Thank you for having hearings on this issue, especially in Virginia.	pg. 92, line 3.	Statement - no response required
9	A	Lea Foushee	14.2	The standard is not being enforced.	The existing standard of 10 milligrams per liter sulfate has never been enforced. I'll repeat myself, it has never been enforced. We're talking 44 years of violations. The State of Minnesota has been turning a blind eye for the mining industry. So, why is there a big push to change it all now?	There are a variety of reasons why a sulfate limit has not been included in historical NPDES permits for the current sulfate standard of 10 mg/L. MPCA recognizes and takes the responsibility seriously to uphold the Clean Water Act and fully intends to implement water quality based effluent limits where a wastewater treatment facility demonstrates the ability to cause or contribute to a downstream impairment.
9	B	Lea Foushee	15	Concern about how long it will take to implement the standard. Recipe for delay.	The MPCA has said it will take more than ten years just for them to determine what limits on sulfate discharge would be for water bodies and that they would plan to give variances for exceedances and the long schedule to comply to industry. This is just confusing for the common community person, but it seems that the main thing this rule would do is create a recipe for more and more delay in the actual limit of sulfate pollution.	It is not uncommon for many years of data gathering to be necessary before a standard can be fully implemented in permits. Even if the MPCA set a single number as the sulfate standard, it would take time to gather data about sulfate levels in surface water and effluent.
9	C	Lea Foushee	15.4	Concerns about duration and frequency	What is said in the fine print is that the new proposed standard discharge is averaged over a year. And one exceedance can be allowed over ten years without killing the wild rice in question. There's no factual basis for this presumption, it's theory, it's the column of water in an experiment. (pg. 95,line 14)	The MPCA's discussion of the reasonableness of the one in ten year frequency is provided on page 82 of the SONAR. The duration and frequency are based on what is needed to protect rice.
9	D	Lea Foushee	16	Industry should not be allowed to collect and analyze samples.	Under the proposed wild rice rule language permits the mining industry would along that company to collect and analyze sediment and water samples from the wild rice bodies their project would contaminate...I can testify that that was not the proposal discussed. I spoke directly to the MPCA water quality staff and asked who would be responsible for going lake to lake and collecting the samples. I was informed by the staff that staff would be doing that work. The polluter pays was one solution mentioned, but not to do the material work. We know that sampling results depend on where and when and how the sediment samples are taken and that the samples for the MPCA's proposed rules are much more complicated than sampling the amount of sulfate in the water. Letting dischargers do their own sampling puts another big loophole right in the middle of a proposed rule and creates a direct and obvious conflict of interest.	In its presentation to the wild rice advisory committee on July 6, 2017, the MPCA shared a slide that discussed how water quality standards become permit limits. The slide stated "Gather ambient water quality and sediment data: MPCA for existing facilities, permittee for new or expanding facilities." A key reason for incorporating the sediment sampling procedures into the rule is to ensure that sampling is done correctly and to ensure that permittees follow the procedures.

9	E	Lea Foushee	19.1	Mining industry should account for all costs of their extraction.	If the mining industry did full cost accounting of their extraction, i.e., clean up the discharge and not contaminate the water, then their blue-collar workers would indeed have legitimate employment. Employment based on the permanent destruction of land and the pollution of water for over 150 years is for all purposes a one-time harvest. (pg. 94, line 4)	Statement - no response required
9	F	Lea Foushee	23	Environmental racism	Environmental racism runs rampant in these circumstances. The Anishinabe, Ojibway or Chippewa, whichever word you recognize, and their primary food source will be sacrificed in this extraction, just like the Buffalo slaughter in the Wild West days to subdue the Dakota, Lakota, and Nakota nations.	See Attachment 1 response to topic area 23.
10	A	George Crocker	10	More water bodies should be protected for wild rice. Wild Rice is variable from year to year.	The identified lakes were those that managed a specific number of stands in a specific area at a specific time of measurement. Wild rice may be absent for one year and bountiful the next in any given waterway that has ever had rice. Under the proposed rule this variability has a potential of eliminating many water bodies that should be included. (pg 99, line 3)	While the MPCA considered stem density and acreage, the MPCA is not proposing a strict stem density or acreage threshold to define wild rice waters. It was clear throughout consultation that the tribes were against such a threshold and therefore the MPCA removed a draft threshold from the proposed rule in favor of a more flexible approach as described in the SONAR. See Attachment 1 response to topic area 10.1 and SONAR pp. 41-57 for a detailed discussion of how the MPCA evaluated sources to determine proposed wild rice waters.
10	B	George Crocker	23	Treaty rights	Indigenous people contend with legitimate validity that the 1854 treaty guarantees their human right to the wild rice beds for cultural, spiritual, and physical livelihood, be it economic or nutritional....In short, war has been declared against indigenous people over the right to wild rice. (pg 98 , line 9)	See Attachment 1 response to topic area 23.
10	C	George Crocker	10.1	All DNR waters should be wild rice waters.	protect all of the wild rice waters already listed by the DNR, include any additional data on wild rice lakes and their existence provided by Minnesota's indigenous peoples.	See Attachment 1 response to topic area 10.1
11	A	Paula Maccabee	6	Alternate standard allows for higher sulfate, but not lower.	Under the proposed rules MPCA could set a less stringent alternative sulfate limit if the data showed a lower than expected sulfide level. It could not set a more stringent sulfate limit if sulfate limits were higher than expected or if rice was being harmed. (pg. 104, line 24)	The rule does allow for a site-specific process. If it is demonstrated that rice was being harmed by sulfate or sulfide levels lower than those in rule, a site-specific standard could be developed.
11	B	Paula Maccabee	10.4	MPCA should not use a density threshold to define wild rice waters.	PCA's proposed sulfate rule would only apply to wild rice with an undefined subjective density or lushness. This unprecedented constraint applying density to a beneficial use is unreasonable. (pg 104, line 11)	While the MPCA considered stem density and acreage, the MPCA is not proposing a strict stem density or acreage threshold to define wild rice waters. The MPCA removed a draft threshold from the proposed rule in favor of a more flexible approach as described in the SONAR, pg 41 - 51. "Lush wild rice" is simply one example of the type of evidence that would support a designation as a wild rice water based on density and acreage.
11	C	Paula Maccabee	14	MPCA has not enforced the existing standard.	For most of the past 44 years since Minnesota's wild rice sulfate standard was adopted the job that MPCA has been doing is clear, avoid imposing sulfate limits on polluters upstream of wild rice waters. Only once in Minnesota's entire history has the MPCA used the wild rice sulfate standard to limit pollution. In 1975 the MPCA tried to apply the 10 parts per million standard to sulfate discharge from Minnesota Power's Clay Boswell coal plant. Minnesota Power got a variance with a higher limit on sulfate. However, by about 2000, with no explanation in the PCA files, Clay Boswell permits no longer limited sulfate. (pg 102, line 14)	There are a variety of reasons why a sulfate limit has not been included in historical NPDES permits for the current sulfate standard of 10 mg/L. MPCA recognizes and takes the responsibility seriously to uphold the Clean Water Act and fully intends to implement water quality based effluent limits where a wastewater treatment facility demonstrates the ability to cause or contribute to a downstream impairment.
11	D	Paula Maccabee	14	MPCA has not enforced the existing standard.	In 2010 the EPA wrote letters to the PCA advising that Minnesota must apply its 10 parts per million wild rice sulfate standards in upcoming mine permits. In 2011 two United States Steel permits for mine expansion did have a wild rice sulfate permit, but one permit delayed its application for six years, the other for seven years. Since 2011 no permits issued by MPCA have included a limit on sulfates to protect wild rice. (pg. 102, line 25)	There are a variety of reasons why a sulfate limit has not been included in historical NPDES permits for the current sulfate standard of 10 mg/L. MPCA recognizes and takes the responsibility seriously to uphold the Clean Water Act and fully intends to implement water quality based effluent limits where a wastewater treatment facility demonstrates the ability to cause or contribute to a downstream impairment.

11	E	Paula Maccabee	15.4	Concern about duration and frequency.	Sulfate pollution would be averaged over the entire year before it could be considered a violation. No other standard does this, it's unreasonable. Even if a polluter discharged too much sulfate averaged over an entire year the MPCA rules would only count an exceedance that took place at least two years out of ten. No other rule allows years of effluent violation. (pg. 104, line 19)	The MPCA's discussion of the reasonableness of the one in ten year frequency is provided on page 82 of the SONAR. The duration and frequency are based on what is needed to protect rice. Effluent limits are different than standards and this rule does not allow violations of effluent limits once they are set.
11	F	Paula Maccabee	17	Inappropriate to not require an effluent limit if there is not an impact to wild rice.	The proposed rules have a provision I've never seen anywhere in law, that if the MPCA determines that a polluter's effluent will not affect "wild rice beneficial use" the Commissioner must not establish a water quality based effluent limitation for sulfate to protect wild rice. This type of plan is unprecedented in setting standards. And it really creates an individualized view rather than an overall standard and creates multiple opportunities at every step of this rule for the interested parties, the polluters, to interfere with application of the standard.	See Attachment 1, response to topic area 17. The MPCA will remove this rule language.
12	A	Rob Beranek	33	Supports option for developing alternate standard	We need to preserve alternate methods when new information comes to light for developing different standards than what the proposed equation predicts...make sure that this rule provides the opportunity when new information or site specific information is presented that that can be incorporated into development of the sulfate water quality standard...research project that was done on Second Creek found that there were elevated sulfate levels above what the proposed equation would predict, would be toxic to wild rice and the sulfide in the sediment was significantly lower than the toxic threshold. (page 108 line 17)	Statement - no response required
12	B	Rob Beranek	32	MPCA's listing of wild rice waters needs to be based on history of harvest and acreage and density.	The legislature in 2011 directed the agency to develop criteria and include at a minimum a history of harvest, acreage, and density. In my written comments the word "and" will be bolded and underlined. The agency is proposing a system whereby any one of these three criteria may be used. To point you directly to where I see this in the proposal, there's the word "or" is in the ruling, which is at 7050.0471, Subpart 2.C and that's on Page 122 of the SONAR. So, I believe that that "or" that's on Page 122 of the SONAR is not consistent with the directive of the legislature, which by my reading of the 2011 legislation on this matter requires that order be an "and." (pg 109, line 25)	Laws of Minn. 2011, 1st Special Session, ch. 2, article 4, section 32 states: <i>The criteria shall include, but not be limited to, history of wild rice harvests, minimum acreage, and wild rice density.</i> The MPCA has correctly interpreted the legislative directive to mean that all of these criteria can be considered in evaluating whether a water is a wild rice water to which the standard applies, but that the determination of a waterbody being a wild rice water does not require that the waterbody show a history of harvest <u>and</u> a certain acreage of rice <u>and</u> a certain density of rice. The usual statutory construction of the term "include" is that an illustrative example follows.
12	C	Rob Beranek	11	Day Brook should not be a wild rice water	Certain water bodies of interest to Cliffs do not have sufficient information to be listed. For example, Day Brook (Water ID Number 07010103-542) is proposed for listing. There is one report that was prepared in the listings as permittee, that was Hibbing Taconite Company. And I reviewed the report that's referenced. The report referenced as support and concluded insufficient information is present to assess if it meets the listing criteria. (page 110, line 16)	Day Brook (WID 07010103-542) was proposed as a wild rice water based on information from a 2011 wild rice survey report completed for Hibbing Taconite Company by Barr Engineering on 12/22/2011 (SONAR Exhibit 30). See response detailing results of wild rice surveys in Attachment 1 response for topic 11.
12	D	Rob Beranek	3.9	Reduce the error rate.	Robin Richards from Ramboll made recommendations earlier in this year that greatly improve the error rate of the proposed equation from an area of 20 percent down to 4 percent. (pg 112, line 22)	The TSD considered the Ramboll Environ recommendations (pages 63-66) and concluded that the proposed changes would not be protective of wild rice. See also Attachment 1 response to topic area 3.9.
13	A	Kurt Anderson	4.1	Concern about hydroponic design and exposing the right part of the plant	When the original study was submitted from the MPCA to their own peer reviewers, the peer reviewers recommended various changes, including they should redo the hydroponic studies, they should do the exposure so that only the rooting zone is impacted, and they should look at the effects of iron, further hypothesis....the MPCA has stated that no design is necessarily more correct than the other. And I would disagree with that. sulfide by its very nature doesn't exist in the water column when there's oxygen present. The only parts of the plants in the MPCA study would show that whole level, the 120 level of impact, were the green parts of the plant, the shoots and leaves. So, you need to be very careful to expose the right part of the plant or correct part of the animal. Otherwise, the results aren't going to be accurate or aren't going to give you a clear picture of what's actually happening. (pg 114, line 1)	As discussed on p. 67 of the SONAR, the Agency considered results from the hydroponic study as part of a weight of evidence in support of its proposed standard to protect wild rice from too much sulfate. See also the Attachment 1 response to topic areas 4.1 and 4.2.

13	B	Kurt Anderson	4.1	Concerns about mesocosm studies - namely death of plants in controls	These outdoor container studies had significant challenges in front of them from a test design standpoint. And that includes the size of the containers, the water flow, the renewal rates, et cetera. When I was working in the laboratory business we had a threshold of only 20 percent of our controls, which is no toxic added. Only 20 percent basically could suffer mortality otherwise the test was invalid, you had to throw it out. You could never use it to register a chemical product or to submit to an effluent testing permit requirement for the State. And in the outdoor container study 72 to 84 percent of the seedlings in the controls died. And the MPCA has still chosen to take that data and use it as part of their multiple lines of evidence. (pg. 114, line 25)	Outdoor studies should not be judged on the same basis as indoor short-term laboratory experiments. The outdoor studies were conducted for 6 consecutive years, allowing the wild rice populations to self-seed, and the effect of sulfide on wild rice was consistent among years, including 2013, the year of the excessive mortality of seedlings in the spring. It would not be reasonable to discount the findings of this experiment because of unusual mortality in one year. Despite the unusual mortality, the 2013 results were similar, and neither the peer review panel nor the journal's peer reviewers raised any concerns about including the data and conclusions that relied on the data.
13	C	Kurt Anderson	2.4	Field data shows that wild rice increases as sulfide increased	But on the field studies the one thing I do want to say is that when you look at a conventional metric, basically as sulfide increases, do you get a toxic response. The MPCA's field data has a wealth of information on this, fantastic source of information....if you look at the stem density and you remove a couple high sulfide waters that have a lot of recreational development, you actually see wild rice increase as sulfide increases. (115, line 22)	It is not clear about which set of the field data the commenter is citing that seems to imply a positive relationship between increasing sulfide concentration and wild rice presence or density.
13	D	Kurt Anderson	2.4	The data does not support the 120 microgram/L sulfide level.	So at 120, as MPCA is proposing in this rule, anything above that is unsafe. Yet, 57 percent of the water bodies in the state that are above 120 have wild rice present to some degree. So, that doesn't make a lot of sense. I don't think that's a reasonable interpretation of that field data. (116, line 10)	The commenter appears to be implying that wild rice should not be present in waterbodies where the sulfide concentration is above 120 micrograms per liter, which is not the intent of setting 120 as a protective sulfide concentration. We do not anticipate extirpation of wild rice in waters with sulfide concentration above 120 micrograms per liter, yet MPCA study data show that above this threshold wild rice population density declines significantly. Further discussion can be found in the SONAR p. 66 and the response to Topic Area 4.3 in Attachment 1.
13	E	Kurt Anderson	2.1	Rice grows better downstream of Boswell than upstream, where there are lower sulfate levels.	The Boswell Energy facility does indeed have a sulfate limit, it's a mass based limit, and it was increased from the proposed 10 to a seasonal limit of 40 to 60 parts per million. The most recent studies we have on that show that downstream of our discharge the wild rice is actually growing better than it is upstream of our discharge point, where upstream there's lower sulfate levels. (116, line 16)	The statement that rice grows better in higher sulfate water does not make pertinent comparisons between what the equation-based standard would be and the actual measured sulfate in the surface water where wild rice grows. Therefore, there is insufficient information available to respond to this comment.
13	F	Kurt Anderson	19	The proposed standard would have meant Boswell's customers would have had to pay for sulfate treatment	For a real life example of what this proposed regulation can do, based on the information we have thus far, had we had this regulation with 120 part per billion sulfide limit back in the 1970s, if that was implemented, our customers at Minnesota Power, residential, industrial, would have had to help pay for sulfate treatment to reduce sulfate. That's what this equation would have meant back then to Boswell. And it could have been millions of dollars. And yet, we would have reduced sulfate and the wild rice wouldn't have benefited. (117, line 2)	This comment cannot be evaluated without knowing the calculated sulfate standard that the proposed rule would set for the waters to which Boswell discharges. If the downstream waters are higher iron, then the equation would calculate a higher sulfate standard. The tailored nature of the proposed approach is designed to ensure that sulfate is reduced where needed to protect wild rice.
14	A	Alex Spitzer	21	Impossible to value cultural significance	it is impossible to value the cultural significance. This is because wild rice is priceless to the tribes of Minnesota. It is sacred to their culture and needs to be considered as such.	The MPCA has described the cultural significance in the SONAR.
14	B	Alex Spitzer	30	Even small isolated stands of wild rice are imperative to promoting biodiversity.	119, line 22	Maintenance of biodiversity in wild rice waters is not explicitly a beneficial use to be maintained. However, depending on what the commenter means by "small stands," it is quite possible that such waters will be designated as wild rice waters, which would protect that population of wild rice from excess sulfate and toxic levels of porewater sulfide.
14	C	Alex Spitzer	1	Rule change misunderstands the beneficial use.	Changing the rule would also require a misunderstanding of the beneficial uses of wild rice. The 1854 and 1837 treaty reserved the tribes' pre-existing sovereign to hunt, fish, and gather wild rice in territories that were ceded by the tribes of the United States. One needs to acknowledge the unique ecological and cultural values of wild rice when determining its true beneficial uses. (119, pg 10)	On treaty rights, see Attachment 1 response to topic area 23. While the MPCA understands that some parties support a beneficial use for wild rice based on cultural aspects, the MPCA chose (as described in the SONAR beginning on page 33) not to change the existing Class 4 beneficial use. The use does recognize human harvest or gathering of wild rice.

15	A	Paula Maccabee	3.1	The MPCA studies supported the initial Moyle research of a 10 ppm standard	What's really one of the interesting things about the field study that was done by the University of Minnesota under the PCA's control in this situation is they found almost the same thing that John Moyle did. Almost all the waters that had wild rice were clustered at 10 parts per million or less. And if you just look at the data on where there was wild rice at anything greater than 5 percent of coverage, there are few -- less than 5 percent situations where a lake or a stream had wild rice in that higher sulfate. So, what is important in looking at this standard is that it's a concentration standard, it's a concentration of how much sulfate you can have in the water. (123, line 11)	The proposed approach is a better, more precise standard. See Attachment 1 response to topic area 3.1 and the Cover Memorandum to this Response. An evaluation of the available field data suggest that about half of the sulfate values calculated via the proposed equation would be below the present standard of 10 mg/L.
15	B	Paula Maccabee	33	The mesocosm studies are the most important	You heard several comments from industries disparaging the outdoor container or mesocosm studies...The mesocosm studies, from my perspective and the perspective of the tribal scientists, the most important research base in this entire huge study that was done by the Pollution Control Agency. And the idea that they should be discounted because there was mortality of certain tanks in one year, John Pastor's article, which I think several Pollution Control Agency staff were also co-authors, was published. And that one-year mortality is explained. In the peer review committee that was responsible for publishing that article did not believe that that discounted the results. And I think that is somewhat cynical to discount them. (124, line 11)	MPCA staff can find no concern expressed by the peer review panel the unusual mortality in the unusually cold spring of 2013 undermines the relationship between elevated sulfide and toxicity to wild rice. However, the Minnesota Chamber of Commerce, represented by Mike Hansel, did submit comments to the panel that expressed such a concern (page E-5 in the summary report). The relationship between sulfide and wild rice in the mesocosms, accounting for the unusual 2013 spring mortality, was published in the peer-reviewed journal "Ecological Applications" by Pastor et al. (Response Exhibit N.5), indicating that those peer reviewers did not identify the mortality as an issue that undermined the conclusion that sulfide increases significantly reduced wild rice seedling survival, seedling emergence, and percent viable seeds, including in 2013.
15	C	Paula Maccabee	4.2	There are available studies done with iron	The peer review committee did say that there should be experiments done with iron. Unfortunately, those were done after the study was ended. So, they weren't funded by the State, but there are those studies done. (125, line 24)	No response necessary.
16	A	Jane Reyer	33		All three of the studies do point to porewater sulfide as a causative factor in the decline of wild rice, but the three studies are not all equally indicative of the long-term survival of wild rice in the field. My recollection of the peer panel discussion was that the field study was well designed and had a sufficient number of data points to be scientifically defensible and really gave the best indication of what actually happens in the field. (128, line 16)	The Agency agrees with this statement.
16	B	Jane Reyer	3.5	Choosing a protective level of sulfide by EC10 analysis will only protect 90% of wild rice waters.	I'd like to point out the differences between what EC10 means when -- in the context of the hydroponic and mesocosm studies versus in the context of field study. When applied to the hydroponic and mesocosm studies that EC10 measures... a level at which 90 percent did not see a difference in any of these measurements. And that's the EC10 that the MPCA's ... proposing. That's really the EC10 that they're referring to...and that the proposed standard is based on. But that's a different EC10 than the EC10 that applies to the field study. And that EC10 is...the number at which 90 percent of wild rice waters will be protected. In other words, 10 percent of the waters themselves will not be protected based on the way that EC10 is being used in the context of the field study. It's a very different factor than the number of plants that will survive, which is kind of the idea behind the hydroponics and the mesocosm. ... MPCA's analysis has confused the two.... the Clean Water Act is written to protect all of our waters and not just 90 percent of them....They are making the decision to allow 10 percent of the waters to eventually lose their wild rice. (129, Line 2)	The commenter misunderstands the impact of identifying a protective sulfide concentration by calculating the EC10 concentration from dose-response curves. There is a scientific consensus that EC10 concentrations represent levels that constitute a negligible exposure of a toxicant to a species, including endangered species (see discussion in the TSD, pages 31-32). Basing a protective concentration on EC10 would protect all wild rice waters, not 90% of them.

16	C	Jane Reyer	3.8		<p>just want to repeat that the peer review panel felt the survival of wild rice over time, over decades rather than a one-year growing season was necessary to account for these types of factors. And it seems to me that they might also be the reason why we might see a decline in wild rice in particular water bodies, even though the sulfide level in the porewater and the sulfate level in the water might be at a level that these hydroponic and mesocosm studies indicate perhaps should be protective. (131, line 6)</p>	<p>When identifying the protective sulfide concentration of 120 ppb, the MPCA relied primarily on the field data, but found that Dr. Pastor's mesocosm and hydroponic results supported the conclusions from the field study. It is assumed that the field chemistry is largely in steady state that has persisted for decades among sulfate, sulfide, iron, and TOC, and that wild rice occurrence and density are indicative of those conditions. See also TSD pp. 38 and 43 and SONAR pp. 80-81 .</p>
16	D	Jane Reyer	14		<p>we think the standard is simply unlikely as a practical matter to be enforced in a way that will protect and restore wild rice...Minnesota Pollution Control Agency has become immobilized in its attempts to renew waste water discharge permits for taconite facilities in the situation where the sulfate standard is relatively straightforward as it is today. I cannot imagine how creating a situation where no standard applies to any water until MPCA does the field studies and takes the action to set the standard is going to actually improve conditions for wild rice. (Page 131, Line 20)</p>	<p>MPCA fully intends to implement water quality based effluent limits where a wastewater treatment facility demonstrates the ability to cause or contribute to a downstream impairment. The proposed sulfate wild rice standard applies to all wild rice waters identified in rule regardless if all data collection has occurred. MPCA discusses its proposed implementation plan to collect all necessary data in the TSD (pgs. 84-98) and SONAR (pgs. 83-87 and 96-105).</p>
16	E	Jane Reyer	5		<p>The agency has been looking for the highest level of sulfide, and by extension sulfate, that wild rice is able to tolerate in order to allow the highest possible level of discharge. And I really think that's what the PCA is about when they're doing this. But instead the agency should be setting the standard at the lowest level that is justified based on the science in order to actually protect wild rice. (Line 133, Line 3)</p>	<p>The Agency is looking for a level of sulfide that is protective of wild rice. About half of calculated standards produced by the proposed equation-based standard would be below the present standard of 10 mg/L, given that the median standard will be about 14 mg/L.</p>

Comment ID	Part ID	Commenter Name	Topic	Paraphrase/Summary of Comment	Excerpt and Location of Comment (transcript line number)	Response or Response Location
1	A	David Tommasoni	2.1	Sulfate does not harm wild rice at concentrations found in Minnesota.	The science has proven that sulfate alone doesn't harm wild rice except at maybe very high levels or maybe under ideal conditions if the sulfate converts to sulfide, but these ideal conditions are very difficult to find anywhere but in the laboratory.	MPCA-sponsored research readily found a highly significant statistical relationship between wild rice occurrence and sulfide in an analysis of 108 different Minnesota water bodies, as published in a peer-reviewed science journal by Myrbo et al. (2017, Response Exhibit N.2).
1	B	David Tommasoni	3.9	Error rate is too high	it is my understanding that the proposed formula will be incorrect up to 20 percent of the time, and this is just not acceptable. (pg. 55, line 22)	See responses about error rate in the cover memo to this response and in Attachment 1 response for topic area 3.9.
1	C	David Tommasoni	12	Sulfate can be beneficial for cultivated rice	Many farmers grow wild rice commercially and actually add sulfate as fertilizer.	Unlike natural stands of wild rice, cultivated wild rice is extensively managed, which makes it inappropriate to extrapolate from one scenario to another. The proposed rule addresses natural stands of wild rice. Wild rice waters do not include cultivated wild rice waters. See 7050.0130 Subp. 6C.
1	D	David Tommasoni	19	Sulfide standard is too costly and unnecessary	The one thing we do know is that a new sulfide standard will result in unnecessary taxpayers' expenses to try to find the justification for the sulfide standard and will unnecessarily burden our already overburdened communities or our businesses with huge expenses to comply with the findings. We don't need another burden on our municipalities or our industries, nor can we afford one.	MPCA-sponsored research readily found a highly significant statistical relationship between wild rice occurrence and sulfide. A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
1	E	David Tommasoni	19.4	MPCA should wait for the cost study	The state legislature allowed another year for this process to take place into 2018, with the goal of slowing down the process until we can quantify the actual cost. We haven't followed the rule since 1973. Another year or two is totally justifiable and prudent as this rule is neither reasonable nor needed.	The MPCA's discussion of the LCCMR Study is provided in the cover memo to this Response.
1	F	David Tommasoni	2	Sulfide standard is a solution looking for a problem.	The proposed wild rice sulfide standard is quite simply a solution looking for a problem. The wild rice is growing just fine. The DNR just declared that we have a bumper crop this year. (54, line 16)	The need for the proposed revisions is discussed in the SONAR (pg. 19). Also see the cover memo to this Response.
1	G	David Tommasoni	37	MPCA cannot even say that the proposed standard will help wild rice.	The new sulfide standard has no assurance that it will result in more wild rice growth.	See Attachment 1 response to topic area 37.
2	A	Charles Baribeau	2	Sulfide is not dangerous to humans.	You mentioned before that sulfides are dangerous to humans. They aren't, because a lot of your drugs have sulfides in them and we take them internally and we don't die from them unless it is in excess concentration.	SONAR pg. 65 provides a discussion of the toxic effect of sulfate on wild rice in relation to the effect of sulfate on humans.
2	B	Charles Baribeau	4.1	Questions about bacterial activity and the half life of sulfide.	Now, they have not proven to me when they look at the sediment how much bacterial activity is there. It is called an anaerobic reaction, which is without oxygen. How long does it sit there? They have not answered this question in the past. What is the half-life of sulfide? Half-life means one-half of it goes in how many days, and then the next half goes until there is nothing left. They cannot answer that question, and it hasn't been answered to this date...What happens with the flow of water from surfaces coming into a lake or a stream? What are the sulfates that are coming into the streams? How deep is the sediment? They need to test every single lake and stream all the way down to find out how much sulfide is actually being created through this anaerobic reaction or without oxygen. (pg 56, line 22)	The MPCA looked at levels of sulfide in the top 10 cm of sediment, which is where the wild rice roots. The TSD on pages 92 to 94 discusses the reactions of sulfate and sulfide in the porewater. The MPCA believes that the proposed equation accurately represents the relationship of sulfate to sulfide (based on iron and carbon in the sediment) and testing of every lake and stream is not necessary.
2	C	Charles Baribeau	12	Sulfate can be beneficial for cultivated rice	We had the wild rice paddies up in northwestern Minnesota. What did they do up there to grow wild rice? And I'm not saying we want to grow wild rice because of the native population, but they added sulfate to that and the wild rice grew much more proficiently.	Unlike natural stands of wild rice, cultivated wild rice is extensively managed, which makes it inappropriate to extrapolate from one scenario to another. The proposed rule addresses natural stands of wild rice. Wild rice waters do not include cultivated wild rice waters. See 7050.0130 Subp. 6C.
2	D	Charles Baribeau	19.4	MPCA should wait for the cost study	You're putting the standard in front of the cost analysis that is required by the legislation that has passed, and also from the federal PCA that if it is an economic hardship on communities, et cetera, they need to be looking at this as part of their overall thing when they set their pollution standards.	The MPCA's discussion of the LCCMR Study is provided in the cover memo to this Response.

2	E	Charles Baribeau	36	Only technology for removing sulfate is RO and that removes all chemicals; what will happen to the waste stream?	The only technology you have right now is reverse osmosis, and...everything out, all your chemicals including sulfate. What are they going to do for the discharge? Because they are going to have to combine it with iron to make it insoluble. Where are they going to put it, and what is going to happen to that? Where is the discharge going to be? Where are they going to take the dry form, because they will have to do it in dry form, not a wet form. They will have to dry it out or compress it.	A discussion of the problems associated with reverse osmosis is provided in Part 10 D. of the SONAR (pg.178) and in the cover memo to this Response.
2	F	Charles Baribeau	2.1	Lake Monongalia has a high concentration of sulfate and very dense wild rice.	There is a lake called Monongalia Lake...If you take a Hula-Hoop, it has the most number of strands of wild rice in that Hula-Hoop, 180 strands of wild rice in that Hula-Hoop distribution, and it has the highest concentration of sulfate in the state of Minnesota that has wild rice. So figure that one out. Why is that growing at such a prolific rate? (58, line 12)	The TSD identifies Lake Monongalia as the one known outlier that does not conform to the expectation that high porewater sulfide would discourage wild rice presence and density. For some unknown reason wild rice appears to thrive in this lake despite high porewater sulfide. Incidentally, the equation correctly predicts that this lake would have high sulfide; the anomaly is that the wild rice is dense (TSD, page 78). Three of the four samples from this lake were true positives, where sulfide was predicted to greater than 120—and it was. The Federal Clean Water Act and MPCA rules (as specifically mentioned in the proposed rule) allow for site-specific standards. If rice can thrive at higher levels of sulfide, a site-specific standard could be developed and implemented.
3		Lory Fedo	19	The proposed rule is too costly and threatens the economy	The business community in northeastern Minnesota stands united in their comments to the MPCA that this proposed wild rice sulfate rule has the potential to devastate our cities, our communities, our important industries, and our way of life. (pg. 61, line 5)	Statement - no response required
4	A	Melissa Cox	19	The proposed rule is too costly and threatens the economy	We are extremely concerned about the proposed wild rice sulfate rule and the detrimental impacts it would have to our regions, our industries, our communities, our way of life to those who proudly make a living there.	Statement - no response required
4	B	Melissa Cox	39	Request that the state work with others to develop a better proposal to support wild rice.	We are requesting that the state work with local government, industry and labor to replace the MPCA proposal with one that would be more effective and economically responsible in supporting healthy wild rice.	See Cover Memorandum to this Response.
5	A	Jonathan Holmes	19	The proposed rule is too costly and threatens the economy	The proposed sulfate wild rice rule in its present form threatens the economic viability of the taconite industry with a cascading downstream impact on the domestic steel industry as a whole.	Statement - no response required
5	B	Jonathan Holmes	19, 37	The rule is too costly, particularly as the MPCA cannot show a benefit to wild rice.	In order to mine the ore, the pits must be kept dry. We dewater pits at significant rates of thousands of gallons per minute of naturally occurring groundwater each year to enable iron ore mining. This water that we pump out of the pits and discharge into ditches and streams has sulfate levels in excess of 10 milligrams per liter. The equation in the proposed rule could set a limit even less than the current 10 milligrams per liter of sulfate depending on the soil chemistry at the discharge points. Removing naturally occurring sulfate from water that must be discharged to maintain mining operations is prohibitively expensive and provides no scientifically proven benefit to wild rice.	The proposed equation-based standard may also result in a standard higher than the current 10 mg/L standard. In addition, limits are not the same as standards. An effluent limit is determined taking into account factors such as dilution, and may be higher than a water quality standard. It is inappropriate to assume that a limit will equal the standard. The formation of sulfate from mining activities is discussed on pages 171 - 172 of the SONAR; it is inappropriate to assume that the sulfate in dewatering discharge is all naturally occurring. See also Attachment 1 response to topic area 37.
5	C	Jonathan Holmes	19	MPCA should have done a cost-benefit analysis.	The reality is that a cost benefit analysis will be required at the end of the day. If the sulfate wild rice is promulgated in its present form or if the original 1973 standard were to apply, the costs of either rule would likely result in difficult decisions, and there is a high probability that Minorca mining will have to be discontinued in certain locations.	The MPCA's analysis of the potential costs of the proposed rule is provided beginning on page 165 of the SONAR. In the discussion of procedural issues (Topic 31.7), the MPCA has responded to the suggestion that a cost/benefit analysis must be conducted.
5	D	Jonathan Holmes	37	The proposed standard would not improve wild rice	Scientific consensus indicates that neither the current standard nor the proposed rule would have little, if any, beneficial impact on wild rice populations.	See Attachment 1 response to topic area 37.

6	A	Kelsey Johnson	3.9	The error rate is too high	The rule that is proposed before us today has an astounding 15 to 20 percent error rate. That means the standard predicts the wrong outcome up to one in five times. When you consider the extremely high costs to comply with this rule, there is simply no room for error.	See responses about error rate in the cover memo to this response and in Attachment 1 response for topic area 3.9.
6	B	Kelsey Johnson	4.2	MPCA did not adopt recommendations from the peer review panel	the MPCA chose not to adopt the recommendations that were identified during the peer review and, instead, moved ahead with this rulemaking process. (pg 69, line 5)	The MPCA reviewed all the suggestions of the peer review panel and implemented several of them - such as the suggestion to look more at the field data. See the Cover Memorandum to this Response and pp. 216-218 of the SOBAR regarding external peer review.
6	C	Kelsey Johnson	36	RO results in water that is too clean	Reverse osmosis strips all nutrients and organisms out of the water, including the nutrients needed for plants to grow and fish to remain healthy. The result is that many of these facilities would be sending down stream water that is too clean.	A discussion of the problems associated with reverse osmosis is provided in Part 10 D. of the SONAR (pg.178) and in the cover memo to this Response.
6	D	Kelsey Johnson	37	MPCA cannot even say that the proposed standard will help wild rice.	the MPCA has said they don't know if the proposed rule would result in a more abundant rice crop.	See Attachment 1 response to topic area 37.
7	A	Larry Sutherland	2	Sulfate is not toxic to wild rice and MPCA rushed to propose a theory that sulfide is a problem.	MPCA found that sulfate in and of itself is not toxic to wild rice. Rather than conclude a sulfate standard specifically for wild rice is not necessary, the MPCA generated a new theory that sulfide is a problem, and based on limited research, MPCA has rushed and proposed the equation approach regulating sulfide. (pg. 73, line 18)	The theory that sulfide can be toxic to wetland plants is not new, but rather was first observed in white rice in the 1950s. White rice also grows in mucky anoxic sediment, and is related to wild rice. In a review of the toxicity of sulfide to plants, Lamers et al. (Response Exhibit N.24) wrote: "Research on sulfide toxicity and physiological stress originally focused on rice ( <i>Oryza sativa</i> ) as a crop plant in relation to acid sulfate soils that accumulate high concentrations of sulfide during anaerobiosis (Okajima and Takagi, 1955; Vámos, 1959; Hollis et al., 1972). Seedlings appeared to be particularly sensitive to sulfide (Joshietal., 1975). Since then, sulfide toxicity has also been reported for many other wetland species in both fresh water and saline systems, with a wide range of threshold levels for different species." See also the cover memo to this response. Also see the Cover Memorandum to this Response.
7	B	Larry Sutherland	25	Rule is not based on sound science	A rule should be developed based on sound science and justifiable data showing the benefits of the rule and the costs of compliance.	The MPCA's proposal is based on sound peer reviewed science as described in the cover memo. A discussion of how costs can be considered in relation to the proposed sulfate standard is also provided in the MPCA's cover memo to this response.
7	C	Larry Sutherland	19	Costs are too high	At Keetac alone the costs are expected to be over \$200 million. That cost is supposedly to protect the rice that, by the way, is flourishing downstream where we have discharged for 50 years. (pg. 74, line 11)	The area downstream of Keetac might have high levels of iron in the sediment, and thus not be producing harmful levels of sulfide. The statement that rice is flourishing downstream does not make pertinent comparisons between what the equation-based standard would be and the actual measured sulfate in the surface water where wild rice grows. Therefore, there is insufficient information available to respond to this comment.
8	A	James Larson	33.1	Moyle's research was not real science	This Moyle -- we were talking about where this limit kind of originated from. When you read his stuff, I mean, it's -- it is very much thoughts. You know, thoughts, hypothesis; not real science. He just kind of went out and did his thing, you know. (pg. 75, line 14)	While Doctor Moyle's work was based on observation of correlation and not lab studies, it is inappropriate to call it not real science.
8	b	James Larson	38	There is more rice now that the maximum Moyle estimate there could be in Minnesota	Moyle back in the forties said there was 15,000 -- he estimated 15,000 acres of wild rice, and he said a high estimate if you included every little bit of wild rice anywhere would be about 30,000 acres. The most recent DNR number I saw was 64,000 acres now of wild rice. (pg. 75 line 20)	It is important to protect water quality and keep it from degrading to a point where the beneficial use is lost. See cover memo to this response.

8	C	James Larson	2.3	Nutrient rich soil matters for wild rice.	From what I have looked into with Moyle, all these other numbers and stuff and looking at the stuff, one thing he was saying, not just -- not just the levels, but the nutrient rich soil is a big thing. (pg. 76, line 15)	It is not clear what the commenter is referring to when mentioning nutrient rich soil. However, as noted elsewhere, just because other factors (such as availability of nutrients) affect wild rice does not negate the need to ensure that wild rice is protected from the adverse impacts of sulfate/sulfide.
8	D	James Larson	25	MPCA should take its time to get the science right.	The biggest thing is for you guys just to take your time and really look into seeing what really correlates here, you know, because we all have too much at stake. (pg. 77, line 8)	The MPCA's proposal is based on sound peer reviewed science as described in the cover memo.
9	A	Chrissy Bartovich	2.3	Objects to the proposed sulfate standard; factors other sulfate affect rice	We support disapproval of 7050.0224, subpart 5, as the MPCA has failed to consider additional factors that impact rice. MPCA itself admits that they did not evaluate other factors, such as water depth, because they were not legislatively mandated to do so and they do not have the resources to look at them. These are unacceptable reasons...It is premature for MPCA to develop a rule based on a single factor while ignoring others that have a far more significant impact on wild rice.	MPCA evaluated 65 field variables for potential impact on the presence of wild rice, including water depth at the time of the sampling (TSD Table 1-6, pages 24-28; Myrbo et al. Response Exhibit N2). For logistical reasons, seasonal change in water depth was not evaluated as a controlling variable. Based on the 65 variables, MPCA concluded that three variables significantly control the presence of wild rice: sulfide, water transparency, and temperature (TSD p. 9; Exhibit N.2). Based on the field data, Myrbo et al. concluded that at average temperatures, wild rice has a 90% probability of being present if porewater sulfide concentrations are very low and water transparency is very high (Exhibit N.2), a finding that does not support the thought that other, unknown, variables are important in controlling the occurrence of wild rice. Just because other factors affect wild rice does not negate the need to ensure that wild rice is protected from the adverse impacts of sulfate/sulfide.
9	B	Chrissy Bartovich	11	MPCA's list of wild rice waters is not sufficiently supported; MPCA did not do proper designation process	We support disapproval of 7050.0471 because a proper designation process was not followed. The MPCA describes its criteria for that listing in lines 11.18 to 12.6. The Clean Water Act requires that designation be based on evidence that the use existed since November 28th, 1975. That specific information related to Minntac receiving waters cannot be found in the SONAR or in the TSD. Although MPCA provided a list of proposed waters downstream of Minntac in 7050.0471 at lines 25.6 and 25.15, there is no evidence to prove the water bodies actually meet the criteria for designation. Instead, MPCA provides vague information, such as lists of reports, and those reports merely contain other lists of wild rice waters without any data to back up the designation related to the criteria that is listed in the proposed rule.	The MPCA's process for identifying waters as wild rice waters is described in the SONAR, pages 41 to 58. This constitutes an appropriate use and value demonstration for each water. The waters identified as lines 25.6 and 25.15 are Little Sandy and Sandy Lake. In SONAR Attachment 2 the MPCA stated that these waters were listed based on information from the following sources. <b>Little Sandy Lake:</b> 1) Natural Wild Rice in MN - 2008 Report, 2) MN Wild Rice Management Workgroup List of 350 Important Wild Rice Waters, 3) 1854 Treaty Authority. <b>Sandy Lake:</b> 1) Natural Wild Rice in MN - 2008 Report, 2) MN Wild Rice Management Workgroup List of 350 Important Wild Rice Waters, 3) 1854 Treaty Authority, 4) U of M/MPCA Wild Rice Study/Field Survey Sites.
9	C	Chrissy Bartovich	15	Questions about how effluent limits will be established	I can't tell them how far downstream do we need to look when we are evaluating waters. Well, if we are subject, like we are listed as being subject to the rule, well, what does that actually mean? There is a standard, but it is in milligrams per liter. Is that what our limit is? Is it mass based? Is it loading it? Do you get both? What does it mean for treatment? What does it mean for compliance? There is so many details that are not provided. As a discharger, you can't even begin to say how you would comply with that rule because the information merely doesn't exist. (pg. 82, line 1)	The MPCA understands that dischargers want immediate clarity about how the standard will affect them, but these issues need to be addressed in the an individualized permitting process. Effluent limits are not the same as water quality standards. Effluent limit setting requires evaluating multiple factors as described beginning on page 96 of the SONAR.
9	D	Chrissy Bartovich	33.1	Remove the existing standard	We support MPCA's rule or vision to delete the existing 10-milligram per liter standard as outlined in the proposed changes to 7050.0220 and 7050.0224.	Statement. However, the MPCA notes that the decision to remove existing 10 part per million standard is not a separate decision from the proposed equation-based sulfate standard.
10		Bill Whiteside	25	Comments about politicized science	Comments relating to global warming and acid rain, the demonization of sulfur when it turns out sulfur wasn't the problem (page 83)	Statement about topics generally out of scope for this rulemaking - no response required
11	A	O'Neill Tedrow	2.3	Should focus on biological stressors, not chemical ones	Current increased focus on specific chemical characteristics of surface waters and associated sediment porewaters of wild rice areas may currently be non-warranted. Although chemical characteristics of these media can be of critical importance to wild rice plant health, the initial focus should be proper management of a primary biological characteristic of waters intended for wild rice production, competing vegetation, and a primary physical characteristic of waters intended for wild rice production, water depth. (pg. 89, line 13)	The MPCA agrees that factors other than sulfide may also have an effect on wild rice. In the TSD (Chapter 1, part A) and the SONAR (Section E, parts 1-3) the MPCA has established the adverse effect of sulfide in the sediment where wild rice grows and therefore, the need for the proposed standard. The existence of other stressors does not negate the need to protect wild rice from the impacts of sulfide.

11	B	O'Neill Tedrow	2.3	Removing cattails/competing vegetation immediately improved wild rice growth.	Simply removing cattails from that area -- regardless of the fact that water depths were much, much lower in 2015 in this area compared to 2014, simply removing that competing vegetation resulted in extraordinary wild rice growth, abundance, productivity back in this area right in here.	The MPCA agrees that factors other than sulfide may also have an effect on wild rice; this does not negate the need to protect wild rice from the impacts of sulfide.
11	C	O'Neill Tedrow	2.3	Removing cattails/competing vegetation immediately improved wild rice growth. Seeds may be viable in the sediment for a long time.	In the area of cattail removal, wild rice was denser than in open water areas. This means two different very important things. One, competing vegetation, removal of that particular component of this system was critical for wild rice growth, productivity and abundance, but, secondly, the seed in that area had not germinated. These seeds were in that sediment for several years, detailing the extraordinary resilience of wild rice seeds to sustain viability in aquatic sediments for years on end even in the presence of competing vegetation that all but excluded it from its entire kind of dominant area. (pg. 91, line 23)	The MPCA agrees that factors other than sulfide may also have an effect on wild rice; this does not negate the need to protect wild rice from the impacts of sulfide.
11	D	O'Neill Tedrow	2.3	Should focus on biological stressors, not chemical ones	So factors outside of chemical characteristics, outside of the debate about sulfate, water depth, competing vegetation and a viable seed source in the sediment.	The MPCA agrees that factors other than sulfide may also have an effect on wild rice; this does not negate the need to protect wild rice from the impacts of sulfide.
12		Jack Croswell	3.9	The error rate is too high	Ramboll Environ analyzed the MPCA data and discovered an opportunity to reduce the error rate of the proposed equation from nearly 20 percent to four percent. Regulated entities, including taconite facilities on the Iron Range, deserve greater assurance that this Minnesota water quality standard is accurate and based on best sulfate/wild rice science available. (pg. 99, line 1) It is imperative that the MPCA reduce the error rate of the proposed equation and, therefore, adopt the recommendations of RambollEnviron.	See responses about error rate in the cover memo to this response and in Attachment 1 response for topic area 3.9.
13	A	Jason Metsa	4.2	Define peer review	I would ask the MPCA if they could define "peer review" which they described today in their outline and opening statements.	The MPCA response is at transcript pg. 100, line 8. A discussion of the MPCA's peer review of the research and analysis on which the proposed standard is based is provided in Part 10. G of the SONAR (pp. 216-218) and in the Cover Memorandum to this Response. The Cover Memo also includes a general description of peer review.
13	B	Jason Metsa	4.2	Peer review means a study can be replicated.	think in their minds the Fort Labs research, for example, was published in the "Environmental Toxicology and Chemistry Journal," and the science was able to be reviewed. And I think, you know, when I hear peer-reviewed, I think the science can be replicated. And it is my understanding that the research commissioned by the MPCA and the State of Minnesota through the University of Minnesota-Duluth done by John Pastor has some pretty glaring things that cannot be replicated within that peer review process that I just described with a singular meaning of it can't be replicated	A discussion of the MPCA's peer review of the research and analysis on which the proposed standard is based is provided in Part 10. G of the SONAR (pp. 216-218) and in the Cover Memorandum to this Response. The Cover Memo also includes a general description of peer review.
13	C	Jason Metsa	4	Concerns about mesocosm studies and error rates	What really didn't work for me was the outside plants that were kept, and I don't think that that was done in a way that we just saw from O'Neill...But I think that that was a far better example of how to do some outside research where there weren't going to be error rates at a level that would, you know, lead people to be emotional like they have been today around the jobs	See responses about error rate in the Cover Memorandum to this Response and in Attachment 1 response for topic area 3.9.
13	D	Jason Metsa	3.9	The error rate is too high	In regard to the... 5 to 20 percent error rate in this, I think that with science, if we were looking at, say, a heart machine that kept someone alive at a hospital, if it were not working one in five times and caused the death, I don't think that would be an acceptable outcome for the general public, and so in looking at, you know, issues like this, I think we have to kind of draw that same correlation where we want our science to be a little more accurate, and if there were reviewable science in the same field that were able to be replicated and they are non-disputable that could be incorporated in place of that, which I know that our chamber commission and that we pushed to, you know, have incorporated into this, I think that that would be a good first step, and so I would encourage the agency to go back and look how to lower that error rate down to a four percent, which the Fort Labs research was able to help nudge along to that level	See responses about error rate in the cover memo to this response and in Attachment 1 response for topic area 3.9.

13	E	Jason Metsa	19.4	The MPCA wait for the cost study.	in fact, this year when we introduced an extension to 2018 for allowing the MPCA to do their due diligence and ask these questions, there was pushback saying, "No, we will come up with the answer sooner." And so I would just urge the MPCA not to make an error in judgment by pushing too hard with coming up with this this year, because you do have the time to get this right, if it is needed at all.	The MPCA's discussion of the LCCMR Study is provided in the cover memo to this Response.
13	F	Jason Metsa	33.1	MPCA should ask the EPA to get rid of the existing standard	From what I can gather from your research and talking to folks who are very knowledgeable in the area, I would think that the first recommendation that should be done by the MPCA would be to ask the Federal Government to get rid of the 10 standard out of the Clean Water Act. And whether we need to replace it or not I think is yet to be determined, but we know that a 10 part per million standard is just not reasonable. (pg. 104, line 2)	The removal or revision of any federally approved standard requires documentation of the methods and scientific analyses to support the revision and a demonstration that the revised standard is sufficient to protect the use. (See response exhibit N.30.) The MPCA does not believe the research supports the complete removal of a standard to protect wild rice from the impacts of sulfate. See also the Cover memorandum to this response.
13	G	Jason Metsa	36	RO has waste products that are difficult to manage	The waste product that comes from this, and when we have a brine or highly concentrated sulfide material, I would ask...Are we setting ourselves up in the future as a state to fill our solid waste landfills in areas outside of here, where it is a lot safer for us to store these, are we creating a problem for other parts of the state where, in fact, we could see serious sulfate-related -- or sulfide-related issues in groundwater tables because of the solid waste disposal?	A discussion of the problems associated with reverse osmosis is provided in Part 10 D. of the SONAR (pg.178) and in the cover memo to this Response.
14	A	David Zelinski	3.9	Error rate is too high	This proposed standard has too high of an error rate to really be useful and provide protection for the wild rice. (106, line 6)	See responses about error rate in the cover memo to this response and in Attachment 1 response for topic area 3.9.
14	B	David Zelinski	3.3	There is lots of carbon in the area, which means that sulfate discharges will have to be almost zero	I think that the interaction of the carbon with the sulfide -- sulfate to sulfide, we live in a world of carbon up here. Swamps, any time it goes through a swamp, it is going to hit and it is going to change that. Otherwise, if you use a formula-based limit, you're going to have to allow for all that carbon, reduce the sulfide -- sulfate discharges to almost zero.	Higher carbon in the sediment of wild rice waters does promote the more efficient conversion of sulfate to sulfide. However, the MPCA did not find any geographic pattern to the levels of carbon in sediment from the field data that would support this statement.
14	C	David Zelinski	36	Having to reduce sulfate discharges so much will mean using reverse osmosis which has a difficult waste stream	That is not an acceptable way to go through osmosis and to make a waste stream that is 40 percent of your total stream, and the waste stream you cannot get rid of.	A discussion of the problems associated with reverse osmosis is provided in Part 10 D. of the SONAR (pg.178) and in the cover memo to this Response.
15	A	Paul Pinkoski	15.1	MPCA should collect all the data before proposing the standard	One of the things that I find flawed is the fact that they want to tailor-make for 1300 streams and why can't they identify them and what the rates would be on each of those in this process before they bring it forward?	To be efficient with resources, the MPCA plans to collect sediment iron and carbon data to develop the protective sulfate levels using our existing 10 year intensive watershed monitoring program. Setting the standard - even where information is not yet known to determine the specific sulfate level - will ensure that wild rice is protected particularly from the impacts of new dischargers because they will be required to figure out the sulfate standard before beginning operation. See also the Cover memorandum to this Response.
15	B	Paul Pinkoski	39	Is this really need to protect wild rice?	Another thing is, do we need it? Where is the real proof that says we do need this? I would like to see where wild rice has been affected.	See Cover Memorandum to this Response.
16	A	Steve Giorgi	2.1	Sulfate is not toxic to wild rice and MPCA is now trying to show that sulfide is a problem.	in the MPCA's own reports, it states very clearly that sulfate is not toxic to wild rice, so now we are going into the sediments looking for other possible answers to this existing standard. And I think we have heard some very critical testimony here tonight about the science that was used to reach the outcomes that have been reached to have this moving standard. (pg. 111, line 15)	See other responses to Topic Area 2.1 comments in this Attachment 2 and in the Cover Memorandum to this Response.
16	B	Steve Giorgi	10	Incomplete list of wild rice waters	This incomplete list of wild rice waters which is determined by 12 wild rice strands in a three-meter circle. (pg. 111, line 15)	It is not clear what the commenter is referring to when mentioning 12 wild rice strands in a three-meter circle.

16	C	Steve Giorgi	19	Stop the rulemaking until legislature decides what to do	Resolved, that the Governor of the State of Minnesota and the Minnesota State Legislature must take action to stop the MPCA rulemaking until our state-elected officials determine whether requiring cities and industries to spend a billion dollars or more on wastewater treatment infrastructure and operations to provide speculative protection to a small percentage of the rice beds in Minnesota is an appropriate action for the State of Minnesota to take in light of the devastating impacts on our communities.	Statement. However, response exhibit N.30 provides information on how EPA might view legislative changes to the MPCA's existing standard and the processes that would be needed to make those changes effective.
16	D	Steve Giorgi	39	Request that the state work with others to develop a better proposal to support wild rice.	Resolved, that wild rice is an important resource in northeastern Minnesota and the State of Minnesota should replace the MPCA proposal with a more effective and economically responsible program to promote healthy wild rice in Minnesota.	See Cover Memorandum to this Response.
16	E	Steve Giorgi	19.4	MPCA should wait for the cost study	Resolved, the MPCA should immediately suspend its rulemaking process until after May 2018, until it completes its analysis of wastewater treatment alternatives to inform the development and implementation of the wild rice sulfate standard and can include the results of that analysis in the rulemaking documents available for public comment.	A discussion of the LCCMR Study is provided in the MPCA's cover memo to this response
16	F	Steve Giorgi	36	RO results in brine that is difficult to dispose of	What they come down to is reverse osmosis. Well, when you take reverse osmosis, which is filtration after filtration after filtration and a high energy process and you put it into a wastewater facility, now you have got to start with pre-filtration, because you can't put sludge through a reverse osmosis system. So we have got to add expenses. Now after we push it through the reverse osmosis filtration, we have a brine, a salty residue that is left over. We are not sure if it is toxic, and we are not sure where we can dispose of it. The recommendation of the engineers is when they look at it in the country, the best thing to do is deep well inject it. New Mexico and some other states have this process, and they use it for a number of purposes. In Minnesota that is forbidden. So where are we going to put the brine?	A discussion of the problems associated with reverse osmosis is provided in Part 10 D. of the SONAR (pg.178) and in the cover memo to this Response.
16	G	Steve Giorgi	36	RO results in water that is too clean	Now, again, we have got now distilled water coming out of the end of the reverse osmosis, which you heard tonight is not good, there is no nutrients, so it is not going to help the lakes, the wildlife, the fish. So guess what? We have to bring some polluted water back around and provide more nutrients to it. This whole thing is not ready for the real world. We need the MPCA to step back and admit that there are other parameters that may really be impacting that wild rice if, in fact, it is sulfate; if, in fact, it is any of our municipality waste treatment plants or the industry, and make sure we get it right.	A discussion of the problems associated with reverse osmosis is provided in Part 10 D. of the SONAR (pg.178) and in the cover memo to this Response.
17	A	Meaghan Blair	3.7	Impact of groundwater	I'm quoting here, "Did the MPCA consider how sulfate loadings from groundwater may influence sulfate and sulfide concentrations in surface waters and sediment porewaters?" ... the MPCA responded by saying, "We recognize that groundwater movements into or out of surface waters may influence surface water and sediment porewater concentrations, but did not have a reliable method of assessing groundwater movement." The MPCA was operating from the start on the hypothesis that sulfate was diffusing down from the surface water into the sediment....The MPCA acknowledged that these data were quantified for a number of parameters, but they haven't fully analyzed and interpreted it. So this is the peer reviewers early on in the process identifying this as an omission. (pg. 117, line 17)	MPCA hearing testimony from Ed Swain provided a summary of the role of groundwater in regards to developing this standard (page 120, line 3); TSD Chapter 1, part B. See also the Attachment 1 response to topic area 3.7.

17	B	Meaghan Blair	3.7	Impact of groundwater	The equation specifically back-calculates sulfate in the water column from -- from sulfide in the sediment and from iron in the sediment and from carbon in the sediment. And so what I'm suggesting and what Dr. Arts identified early on in the technical peer review panel was that -- was that there is an additional source of sulfate. And we have heard in the testimony tonight a number of times that people refer to sulfate as naturally occurring. I'm specifically talking here about why sulfate is naturally occurring. It is occurring because rain, which is basically devoid of sulfide, falls -- or sulfate falls on the ground and interacts with sediments and then is discharged to surface water bodies. That's a pretty fundamental understanding of groundwater. (pg. 119, line 5)	No response necessary.
17	C	Meaghan Blair	3.7	Impact of groundwater	the MPCA's own ambient groundwater database could have lended some -- some technical rigor to addressing those as extra factors. (pg. 123, line 19)	MPCA staff investigated the use of the database of ambient groundwater, and found that it would not be a useful representation of the chemistry that might upwell through wild rice beds for multiple reasons: First, it is unusual for any well to be situated within miles of a wild rice water, let alone a well that would sample the surficial groundwater that might enter surface water. Second, the MPCA ambient groundwater network is very sparse where most wild rice is observed. MPCA monitors about 50 wells that are even located in the regions where wild rice grows (Figure 1 in Response Exhibit N.38). Third, Ng et al. (2017, MPCA Hearing Exhibit L.2) used wells within 100 meters of the wild rice bed for which they were modeling the effect of groundwater flow on porewater sulfide. These wells were specifically installed for an intensive study--which would not have been possible for the MPCA study of 108 different waterbodies.
17	D	Meaghan Blair	4.1	Revisit peer review comments related to sulfate and groundwater	I don't know that there is good justifiable reason for regulating from a fundamentally flawed -- basically illogical fallacy, so I think that's where we need to be focused on now is trying to understand and open up the system and revisiting the peer review comments that identified this as an omission.	The MPCA addressed the issue of potential upward groundwater flow in the TSD, and proposed an Alternate standard that addresses that issue by creating a path to an appropriate sulfate standard for wild rice waters where it can be shown that surface water sulfate is not related to porewater sulfide. See also the Attachment 1 response to topic area 3.7.

17	E	Meaghan Blair	3.7	MPCA's assertion that sulfate diffuses down into porewater may have misconceptualized the system - groundwater upwelling is dominant in Minnesota.	Worried that we have sort of mis-conceptualized the system and how sulfate is delivered to the rooting zone of wild rice....the mechanism for this delivery is identified...in a hypothesis that higher sulfate in the water column leads to higher sulfate in the underlying porewater. However, groundwater advection from below leading to surface water gaining conditions is the dominant condition in Minnesota, especially in northern and central parts of the state where wild rice is found...So the groundwater system especially in northern Minnesota and central Minnesota where wild rice is found is generally higher than adjacent surface water bodies, and that favors hydraulic pressure towards surface water body systems...So that condition suggests that this chemical diffusion method, this big blue arrow on the MPCA's conceptual model, would dominate advection in those environments, and ...that sort of speculated mechanism or hypothesis is a little bit improbable, and I think that it would need some sort of mathematical or theoretical basis. (115, line 16)	The commenter is over-simplifying the interaction of groundwater with surface water, and perhaps is mainly thinking about the gaining parts of streams where groundwater is emerging. If wild rice is found in such an area, and the observed sulfate concentrations are greater than the calculated standard, then that wild rice water is a candidate for the propose Alternate Standard, which is designed for such situations. In the TSD, the MPCA identified four waterbodies that were likely candidates for the Alternate Standard, out of the 108 different sites sampled. But the idea that groundwater generally emerges in wild rice beds is largely contradicted by the fact that the conceptual model of downward diffusion was validated by the peer-reviewed structural equation modeling analysis of the field data by Pollman et al. (Response Exhibit N.4), and the fact that the error rate of the proposed equation is less than 20%, meaning that over 80% of the waterbodies conformed to the model. In his review of the role of ground water in generating streamflow, Winter (2007, Response Exhibit N.17) notes that groundwater emergence varies a great deal, depending on topography and local geology. In his modeling of groundwater flow into lakes, Winter (1978, Response Exhibit N.18) finds that groundwater flow into land out of lakes is just at the margin of lakes, and that usually there is no net flow across the bottoms of most lakes. Fetter (2001, cited in the TSD) notes that evapotranspiration by trees such as willows on the margins of a waterbody can seasonally reverse the flow of groundwater into the margin of a waterbody. See also the Attachment 1 response to topic area 3.7.
17	F	Meaghan Blair	3.9	Error rate of 20% is because MPCA has misinterpreted correlation between porewater sulfide and surface water sulfate.	I would just suggest that the 80 percent you're talking about or the fact that this equation works sometimes, in my opinion, I guess, is that it is based on a sort of illogical fallacy that interpretation of a correlation between porewater sulfide and surface water sulfate, if that exists, that they are both correlated to something else, and they are both correlated -- and what I'm thinking, anyway, is that they are both correlated to groundwater sulfate, groundwater quality. I would suspect that -- that the fact that the equation works sometimes is more of a coincidence than a function of mechanism. That's -- it is kind of a lurking third variable, and I think it really does need to be explored before this draft proposal is adopted a lot harder and some clarification around what a dominant condition out there looks like. (pg. 122, line 22)	The commenter is suggesting that the 80% accuracy of the equation is the result of a correlation, rather than cause-and-effect. Essentially, the suggestion is that the surface water and the sulfate in the surface water are both derived from groundwater, which is actually controlling the porewater sulfide, since only groundwater is the source of both for lakes and streams. The commenter does not acknowledge that groundwater models predict that flow will only be at the margins of most lakes (Winter, 1978, Response Exhibit N.18) or that streams do not gain groundwater at every point along their length, and in the pools and backwaters where wild rice might be more common. There is an assumption that anthropogenic additions of sulfate to the surface water through a discharge would have no effect on porewater sulfide because upwelling groundwater would prevent sulfate in surface water from penetrating the sediment. That assumption is contradicted by the few sulfate addition experiments (both purposeful and natural) that have been made, where it has been noted that sulfide increases in the underlying sediment (Little Rock Lake, Wisconsin (Response Exhibit N.42)), a lake in the Experimental Lakes Area, north of International Falls, Minnesota (Response Exhibit N.41), and two lakes and a wetland receiving sulfate drainage from the iron range in Minnesota (Response Exhibits N.43 and N.44). See also the Attachment 1 response to topic area 3.9 and the Cover Memorandum to this Response.
17		Meaghan Blair	3.7	Impact of sulfate and iron in groundwater	my question I guess to the MPCA panel -- or first question to the MPCA panel is given the identification of this as a key omission, why or when or how could sulfate and iron groundwater quality have been included in the analysis?	See previous responses to this commenter.

18		Jason Metsa	3.7	Question about whether the MPCA's research led the MPCA to believe that groundwater upwelling would be the second part of the equation.	pg. 124, line 13	See transcript page 125, line 10 for MPCA response that refers to page 89 of the SONAR. The MPCA is aware that there are sites where groundwater is upwelling; this is part of the basis of the development of the proposal for an alternate standard. The alternate standard is a way to deal with part of the error in the equation. See also the Attachment 1 response
19	A	Joe Mayasich (question)	3.7	What was the duration of the Ng study? When did it start, and when did it stop?	126, line 15	See MPCA response on transcript pg 127 and exhibit L2.
19	B	Joe Mayasich (question)	3.7	Why wasn't the advisory committee informed of the study?	if its starting point overlapped with when the committee was meeting, why was the committee never informed of this study?	MPCA response 127, line 7
20		Kyle Vanderflute (question)	3.7	If this was a quick summer study that wasn't done by the MPCA and had no MPCA coauthors, why are you confident that it addresses the concerns that this hydrologist has just raised?	pg.128, line 16	MPCA response at 128, line 21 and 129, line 18
21		Joe Mayasich (question)	4	Why is the MPCA picking and choosing what studies to consider? (MPCA ignored the Fort Study)	I do see some duplicity here. I don't understand how a short-term study that just, you know, came out of nowhere -- and there is several of them that are in press or late arriving, late information. The Pollman paper, the advisory committee wasn't aware of that one. Myrbo's study, yes, her first one. But I guess it baffles me as to how the agency can pick and choose which ones they are going to include and which they are not. And I'm going to bring up two of them in particular, two high-class studies published in a highly-regarded journal, Fort -- D. Fort, et al. Ignored. Ignored. None of those findings have any relevance to this. So I don't understand how peer review in Society of Environmental Toxicology, two papers from Fort, et al, ignored. You can't cherrypick in the peer review world. Everything, everything has to be considered. (pg. 130, line 16)	The MPCA reviewed the Fort study and information about it is included throughout the TSD and this Response.
22		Jason Metsa (question)	4	How did MPCA choose which studyies to include and share?	wondering if the MPCA could provide you as they are making this -- disseminating what is going on at all of these hearings, if they could provide you with the process that they had in place to -- and, you know, the public as well -- to disseminate that information, whether it be to our task force members like Mr. Mayasich, and/or members of the legislature, their own colleagues, how they got the information, what they -- basically how they got the -- picked and choose, so to speak. It sounds like stuff was left out. Was there a reason for it? Is there a process in place? Or was it just pure conjecture every single time?	MPCA response 132, line 13
23	A	Thomas Rukavina	14.2	Existing standard has never been enforced except at Boswell	First heard of this standard in 2010. "The only time that this wild rice rule was ever applied was when Clay Boswell was given a number of 45 milligrams per liter, if I'm not mistaken, give or take a few. So things have been all over the board on this issue. It has been in place since 1973, but it wasn't enforced until recently." (page 135, line 1)	There are a variety of reasons why a sulfate limit has not been included in historical NPDES permits for the current sulfate standard of 10 mg/L. MPCA recognizes and takes the responsibility seriously to uphold the Clean Water Act and fully intends to implement water quality based effluent limits where a wastewater treatment facility demonstrates the ability to cause or contribute to a downstream impairment.
23	B	Thomas Rukavina		Elected officials/lawmakers have not been involved in the sulfate standard	There has never been an elected official involved in this. There has never been a law passed on the state level. There has never been a law passed on the federal level that deals with this issue. It has just been a submission in 1972 or three, whenever it was, and the Clean Water Act by someone in the Pollution Control Agency that submitted this and it has	The existing sulfate standard was adopted through rulemaking in 1973. The current rulemaking effort to revise that standard was directed by the 2011 Legislature (SONAR Attachment 1).

23	C	Thomas Rukavina	1.5	Why are only wild rice beds around since 1973 protected?	another thing that really puzzles me, Your Honor, is how the EPA determined that -- in 1973, that wild rice beds that would be identified after that would only be required to meet this standard, because if I remember the rule that was submitted, it mentioned historical wild rice beds, if I'm not mistaken...is this just directed at us? Because I get the feeling that everybody is talking about this rule all over the state for mining, and I think that's how it first came about in order to -- and this is my observation only -- to stop copper nickel mining, and now it has morphed into sewer plants, other industries that have huge milligrams per liter, whether it is the beet -- sugar beet industry, or the beer industry, or the ethanol industry, agricultural industries, milk producers, they are all way up there,...but it doesn't seem that new permits being applied.. (pg. 136, line 11)	The MPCA is not entirely clear on the meaning of this comment. The Clean Water Act requires protection of existing uses - those that were obtained in a water body on or after November 28, 1975.
23	D	Thomas Rukavina	33.1	The existing standard is wrong	And I want to say one last thing about Professor Moyle...Professor Moyle testified in 19 -- early fifties in Two Harbors, Minnesota, after he had done field studies like he did for this wild rice rule. He testified that due to his field studies he did with taconite tailings, that you could put taconite tailings in Lake Superior and nothing would ever happen. So if he was wrong on that, perhaps he is wrong on this, because that's the only science we have and it is hard to disprove it.	The MPCA's proposal is based on strong peer reviewed science. See the Cover memorandum to this response.
23	E	Thomas Rukavina	38	Wild rice has not declined	Since 1973, I don't think the wild rice crop has deteriorated to the point where we need to move so fast with this whole process, because to me it seems to be a, you know, problem looking for a solution.	The need for the proposed revisions is discussed in the SONAR (pg. 19). See also the cover memo to this response.
24	A	Andrew Starks	3.9	Error rate is too high	The equation has a 20 percent error rate. If my car failed to start 20 percent of the time, I would get a new car. So we need a new equation, because, you know, the estimated one billion dollars that it could cost to deal with the clean-up of sulfide and things like that is, like somebody mentioned earlier, a third of the total costs -- or a third of the total economic income that the mines receive. That's a death spiral to the Iron Range, a complete death spiral...We need a proper study that is not flawed, that does not feature 15 to 20 percent error, that features three, four, five percent error.	See responses about error rate in the Cover Memorandum to this Response and in Attachment 1 response for topic area 3.9.
24	B	Andrew Starks	4.1	Science is flawed - MPCA wanted to impose something and worked to find it	it seems like to me and to a lot of other people here the science is flawed. They started with their conclusion and worked their way back. They found -- they found studies that were quickly pushed through in the summer of 2015, if I can quote Mr. Swain. They agreed with it, quickly pushed through. It wasn't really mentioned to anybody else, but it is put in there, and that's a big problem.	See the Cover Memorandum to this Response.
24	C	Andrew Starks	33.1	Existing standard is based on flawed science	The standards started in 1973 based off from science from 1930s and 1940s. This is flawed science. (pg. 141, line 13)	Statement - no response required
24	D	Andrew Starks	2.3	The MPCA did not take into account for water depth in this study.	pg. 140, line 6	The MPCA agrees that factors other than sulfide may also have an effect on wild rice; this does not negate the need to protect wild rice from the impacts of sulfide.
25	A	Nokomis		Concerns about pollution and sulfate being added to rice and to the human body	So pollution is not okay. No matter what you call it, pollution is not okay. No matter how you do it, pollution is not okay. Whether you have a permit or not, pollution is still not okay. What you put in it or what you take out of it, pollution is still not okay. So we are talking about adding sulfate to the manoomin, and how do you do that? How -- and we are talking about adding it to the water. And don't you understand that you guys drink this water, and your families and your children and your animals and your livestock and -- and that's what it all boils down to, right? So it doesn't matter how much sulfide, sulfate, pollution you put in, it is still going into your body.	Statement - no response required

25	B	Nokomis	21	Wild rice is sacred.	you don't understand -- you need to understand the sacredness that this water is. You need to understand the sacredness of the food of this manoomin.	See response to topic area 23.
25	C	Nokomis	21	have you asked the manoomin itself about this sulfide/sulfate levels?	have you asked the manoomin itself about this sulfide/sulfate levels?	MPCA response at 144, line 18
25	D	Nokomis	21	Rice has rights	Do you understand that the wild rice has its own rights?	MPCA response at 145, line 7
26	A	Keith Nelson	18	Variances are not the answer, they are expensive to get	One of the big concerns that I had in listening to comments from the MPCA was that, "Oh, don't worry about the standard. We will grant you a variance."...Granting variances is not the answer. While we as a government entity, St. Louis County, can be reasonably assured that at some point the MPCA is, indeed, going to grant "the variance," imagine the industry and the businesses out there that are -- that are counting on a variance -- counting on a permit with the uncertainty that is the MPCA if you need to wait four-and-a-half years to get a permit and you're spending, again, thousands of dollars on consultants and permit fees and all of those things.	The MPCA is committed to implementing variances where appropriate, for both municipal and industrial facilities, when compliance with a limit to ensure the standard is met would cause widespread social and economic impacts.
26	B	Keith Nelson		Only the MPCA and the consulting industry will benefit from the standard	The hugest benefactor of this proposal is going to be the bureaucracy that is created within the MPCA. They will need another building. They will need hundreds of people. Hopefully they could build it up here to possibly supplant the job loss that we are absolutely going to see if this goes through. But the consultant industry, they will make hundreds of thousands of dollars off of every small community in my district and in all of St. Louis County, because we all know that septic discharge, sewer discharge, cannot meet this standard, so we will be applying for that variance for five years, which we are likely to get again, from track record, at about four, four-and-a-half years.	Statement - no response required
27	A	Matt Tichel	Alum	Some treatment processes add sulfur chemicals.	Has the MPCA considered that our treatment processes include some sulfur-bearing chemicals; namely, aluminum sulfate -- or wait -- sulfur dioxide and aluminum sulfate? (Page 150, line 18)	Yes, some wastewater treatment plants add alum (aluminium sulfate) as part of their treatment process and this will have to be considered during implementation of any needed effluent limits. MPCA response at 150, line 22
27	B	Matt Tichel	15	MPCA is short staffed, we have an expired permit	Right now we are working under an expired permit....that tells me that the MPCA is somewhat short-staffed (pg 151, line 16)	The MPCA does have a permit backlog and is committed to reducing that backlog so there are fewer expired permits. See also MPCA response on page 157, line 21.
27	C	Matt Tichel	15	MPCA is short staffed, is there are priority list for implementing standards?	Is there a priority list that the MPCA has that says, okay, you know, we are going to put mercury number one, we are going to do nitrate number two, we are going to do sulfate, and then, you know, X, Y and Z? Because, you know, there is all these standards coming down the line, and I know that there has been talk within the MPCA about, okay, we know that the nitrate is coming, we know that -- how can we tie all this together? (Page 151, line 20)	While this is a larger comment outside of the scope of just this rulemaking, the MPCA understands that it is frustrating for permittees to feel like they are constantly having to adjust their planning or redesign to deal with new standards. We know that municipal WWTPs in particular are concerned about good use of public funds. The MPCA is committed to working with our permittees to ensure efficient planning and effective use of public funds.
27	D	Matt Tichel	15	Have there been studies about costs? (Costs of permitting/sediment analysis.)	Has there been any studies done as far as costs? I mean, you talk about 1300 impaired water -- or possibly wild rice bearing waters, 250 of which are potentially impacted by permitted 130 facilities. That's 130 permits for sure that you're going to have to go through this whole process, so what does that cost to do that sediment and to -- and then once you do come up with that standard, then Tower-Soudan says, "Well, we don't agree with that. We are going to do our own study." Now we have got that cost, and you guys have to come back and say, "No, that's not right." (pg 152, Line 13)	The costs are described in the SONAR beginning on page 165, and includes the costs of analyzing sediment for iron and carbon.

27	E	Matt Tichel	18	Variations do not just remove the limit, there are other things that need to be done.	We have to show the MPCA that we are doing our due diligence to meet that standard that they put on us. It is not just, "Oh, you get a variance," and walk away. It's -- it's on us that we are supposed to be meeting that. So a variance is not the pie in the sky that is just -- it is not there anymore. We are still out of compliance. We still are not doing what we are supposed to be doing for the environment. (pg 153, line 7)	MPCA response on 153, line 20
27	F	Matt Tichel	19	Costs of sediment sampling	has there been a dollar amount associated with the cost of actually sampling and testing for those 250 bodies of water? (156, line 21)	A discussion of the cost of sampling wild rice waters is provided at SONAR page 153.
28		Greg Dosert		General concern about time it takes to reissue permits.	Why are we two years from getting a permit? Why -- why is Virginia's four years from getting a permit? Why isn't this done on a -- on a -- on a time now, a now basis? (pg. 157, line 16)	While this issue is not specific to wild rice, MPCA response is provided on page 157, line 21. "We don't have the details about permits and where they are in the renewal cycle to be able to specifically answer your question. I can tell you that we are -- are concerned about how long it is taking permits to get out the door. We think we have some ideas as to why. We used to be much more up to speed than in the last few years. Things have slowed down; we are taking actions within the agency to try to speed that up."
29		Kelsey Johnson	2.2	Could you please tell us why Fort Lab wasn't included in your final -- your final analysis and the final formula that you created?	Could you please tell us why Fort Lab wasn't included in your final -- your final analysis and the final formula that you created? (Page 158, line 22) I would think that the Fort Lab study would go out of its way to address a number of the concerns that were raised, especially by the peer review panel, so I just -- I'm just a little bit dismayed that it wasn't one of the major factors in addressing some of the issues and concerns related to the formula.	As noted in the transcript on page 159, line 5, MPCA did consider the Fort Labs study. That consideration is documented in the SONAR and TSD.
30	A	Tim Satrang	25	Take time to get science right	think there is time to take this back to the table, consider this again. (pg. 170, line 6)	The MPCA's proposal is based on sound peer reviewed science as described in the cover memo.
30	B	Tim Satrang	2	Drinking water standard is higher than MPCA proposing for sulfate standard.	believe the drinking water standard is extremely higher than what the standards that are being proposed. (Page 170, line 11)	MPCA response at 170, line 14. Also, SONAR pg. 65 provides a discussion of the toxic effect of sulfate on wild rice in relation to the effect of sulfate on humans.
31		Dan Snidarich	19	Concerns about economic and community impacts.	The impacts of this stuff are way, way farther than just the mining itself. There is the grocery stores, and there is the small communities, and the teachers, and the kids that are growing up. And, like I say, I thought maybe somebody would have brought it up already, but like I say, we chase this stuff around from city to city to city, and we defend our way of life and what we stand for, and to be honest with you, we are all good people, and, really, we just want that opportunity to raise our families and have good benefits for our families, and -- and, unfortunately, there is a lot of roadblocks in the way. This is another one....guess I just wanted to stand up here on behalf of what I do and the people that I represent, and at the end of the day, we are all one -- whether we are miners, or whether it is our members that go to work in the mines and help them do the support work that they do up there, or it is the people in the municipalities that I represent, or the shops or whatever it may be.	Statement - no response required
32	A	Jason Metsa	15	Are we looking at septic system users?	Are we looking at all at septic users on the sulfate standard, of which I believe St. Louis County has the most septic in the state, per capita,	MPCA response on 172, line 1
32	B	Jason Metsa	15	How would MPCA look at dischargers or other contributors?	(regarding input from other dischargers) We are going to go knock on every single door of all the dischargers and monitor their sites individually," or would the city have to come say, "Hey, we are discharging here, and we believe there is other contributors"? (page 173, line 10)	MPCA response on 173, line 19
32	C	Jason Metsa	15	my point with that question is it could be discriminatorily being implemented on some users and not others who are equally	Page 174, line 10	MPCA response on 174, line 14

Hearing Exhibit 1001	David Tommasoni		Exhibit reflects testimony	No additional response.
Hearing Exhibit 1002	Bill Whiteside		Information about climate change	No additional response.
Hearing Exhibit 1003	Bill Whiteside		information about acid rain	No additional response.
Hearing Exhibit 1004	Larry Sutherland		Exhibit reflects testimony	No additional response.
Hearing Exhibit 1005	Lory Fedo		Exhibit reflects testimony	No additional response.
Hearing Exhibit 1006	Melissa Cox		Exhibit reflects testimony	No additional response.
Hearing Exhibit 1007	Jonathan Holmes		Exhibit reflects testimony	No additional response.
Hearing Exhibit 1008	O'Neill Tedrow		Information about cattail effects on wild rice	No additional response.
Hearing Exhibit 1009	Steve Giorgi		Resolutions of RAMS and Iron Range Cities	No additional response.
Hearing Exhibit 1010	Nokomis		Water	No additional response.
Hearing Exhibit 1011	Nokomis		Wild Rice	No additional response.
Hearing Exhibit 1012	Chrissy Bartovich		Exhibit reflects testimony	No additional response.
Hearing Exhibit 1013	MPCA		MPCA Handout- Frequently asked questions	
Hearing Exhibit 1014	MPCA		MPCA Handout- Protecting Wild Rice from excess sulfide	

Comment ID	Part ID	Commenter Name	Topic	Paraphrase / Summary of Comment	Excerpt and Location of Comment (transcript line number)	Response or Response Location
1	A	Greg Chester	23	Tribes have treaty rights that should not be infringed	With the Ojibwe people, we guaranteed that they can hunt, fish and gather, contiguous within their territory throughout the state of Minnesota. And if we infringe upon that, if we poison the water, poison the animals, the plants, the wild rice, kill off the wild rice, we break our side of the treaty and the treaty becomes null and void and we lose whatever rights they have granted to us. And it's a contract; it's a simple contract. So, we must, you know, maintain our side of it. (50, line 24)	See Attachment 1 response to topic area 23.
1	B	Greg Chester	24	Concerns relating to sulfide mining tailings basins and effect on Lake Superior	I hear that they're going to be building dams, proper dams to retain the toxic wastes that are going to be emanating from the mine. This is not iron ore mines; this is a very different system. And even if they are kept in that compound, with the amount of the change in our climate where we're getting five inches of rain at a clip, ten inches of rain, and sometimes 14 inches of rain, and down in Houston it was over 50 inches of rain, I don't believe they will be able to retain that kind of rainfall. We just don't know what's going to be happening in the future. And if these toxic chemicals get out into the general area, it's going to cause havoc.	Specifics about how water is managed at new types of mines are out of scope for this rulemaking.
2	A	Justin Eichorn	3.9	Error rate is too high.	I know we can have both clean water and viable resources in our areas. Unfortunately, this proposed standard puts that in jeopardy. It has an error rate of up to 20%. And we don't budget with a plus or minus 20% error rate, and we shouldn't use it as a water quality standard, either. (54, line 8)	See responses about error rate in the cover memo to this response and in Attachment 1 response for topic area 3.9.
2	B	Justin Eichorn	37	MPCA cannot show that the proposal will protect wild rice.	There's no proof that this standard will do anything to increase the amount of wild rice in Minnesota.	See Attachment 1 response to topic area 37 and discussion in cover memo about wild rice improvement.
2	C	Justin Eichorn	19	Associated costs are too high; especially wastewater treatment costs assessed to households.	We do know that there will be great associated costs and put the economic future of communities in Northern Minnesota in jeopardy. I'm here to say that my constituents, and the hard-working people of Northern Minnesota shouldn't have to pay, nor have the ability to pay an extra \$2,000 a year, so that Minneapolis environmentalists can feel good about themselves when they buy a bag of wild rice from Whole Foods.	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
2	D	Justin Eichorn		MPCA should reconsider the proposal and legislation might be needed to prevent the proposal.	I'm asking that the PCA reconsider its proposal and to say that I will do everything in my power as a legislator to make sure that the bad science never goes into effect.	Statement. However, response exhibit N.30 provides information on how EPA might view legislative changes to the MPCA's existing standard and the processes that would be needed to make those changes effective.
2	E	Justin Eichorn	18	How many variances has MPCA issued to municipalities?	One question for the PCA that didn't get answered in one of my committee hearings. We talked a little bit about variances, and you had mentioned them, as well. How many variances has the MPCA given out in total? And how many of those went to municipalities? (56, line 9)	The MPCA response is on pg 58, line 1 of the transcript. The statement made at the hearing was drawn from information that is provided in response exhibit N.27.
2	F	Justin Eichorn	37	MPCA cannot show that the proposal will benefit wild rice.	In a March meeting in Northeastern Minnesota, an MPCA official was asked if the new standard and the investments made to comply with the standard would result in more abundant wild rice. The MPCA official said that based on the research there may be no benefit to wild rice, whatsoever.	See Attachment 1 response to topic area 37. See also MPCA response in the transcript page 63, line 10.
2	G	Justin Eichorn	2	Sulfate standards for drinking water are higher.	For comparison, the city of Virginia drinking water, which actually comes from an abandoned mine pit, is 60 milligrams per liter. The EPA set the drinking water standard for taste and odor at 250 milligrams per liter. Sandhills, which is a drinking water you can buy at the store, 450 milligrams per liter.	Standards are set based on the specific beneficial use. The level that is safe for humans to ingest is not analogous to a level that is safe for animals that live in water, for example, or for plants. Also, SONAR pg. 65 provides a discussion of the toxic effect of sulfate on wild rice in relation to the effect of sulfate on humans.
2	H	Justin Eichorn	19.4	MPCA should wait for the cost study.	We really want the PCA to also finish an economic study before any rule is put in place, so that the legislature can also take a look at that and understand the full circle of what's going on here.	A discussion of the LCCMR Study is provided in the MPCA's cover memo to this response.
2	I	Justin Eichorn	2	Original testing showed that sulfate does not impact wild rice, so MPCA decided that sulfides do affect wild rice.	One of the key concerns of the research on sulfate, the initial hypothesis was that sulfate was to cause wild rice plants to decline. However, the original testing demonstrated that sulfate, in and of itself, does not impede wild rice growth below 2500 milligrams per liter. So, then the MPCA theorized that sulfides did, in fact, affect wild rice growth. (60, line 2)	The MPCA's research showed sulfide, a known plant toxicant, was harmful to wild rice. The studies showed that the formation of sulfide from sulfate (mediated by iron and carbon) is the mechanism of the sulfate impact on wild rice originally demonstrated by Moyle.

2	J	Justin Eichorn	4.2	Peer review panel concerns about lab studies	The University of Minnesota sulfide toxicity testing was greatly criticized by MPCA organized peer-review panels. One of the concerns is that the original study used a laboratory condition that would never occur in nature. The panel recommended seven improvements to make sure the research be repeated. (60, line 14)	Both Dr. Pastor and Dr. Fort had challenges designing hydroponic experiments of seedling growth that would mimic the exposure of the germinated seed to elevated sulfide concentrations. A desirable design would have exposed the seedling roots to various sulfide concentrations in anoxic water while allowing the stem to elongate in water that contained oxygen concentrations found in nature (up to 10 ppm oxygen). But neither scientist found a way to grow wild rice with the roots in anoxic water underneath a stem in oxygenated water without the two layers of water mixing, destroying the experiment. (In nature, the roots grow in anoxic sediment, and the growing seedling elongates into the overlying water, but the point of hydroponic experiments is to avoid the use of sediment, which has undefined chemistry.) Nevertheless faced with the task of performing a hydroponic experiment, Dr. Pastor compromised by exposing the entire seedling to various concentrations of sulfide, which conceivably mimicked the elongation of the seedling through several inches of anoxic sediment in natural wild rice waters, (But the seedlings released oxygen, which decreased sulfide concentrations between renewals.) Dr. Fort's compromise was to germinate seeds in various sulfide concentrations, and to allow the elongating stem to emerge out of the sulfide solution into the atmosphere over the 21 days since germination. (Use of a larger volume and daily renewals kept the sulfide concentrations relatively constant). It might be claimed that the Fort lab's design mimicks nature. But the TSD notes (page 13) that in nature it is unlikely that 21-day old wild rice plants have access to high oxygen concentrations. High oxygen availability allows plants to detoxify sulfide that would otherwise be toxic. Accordingly, the Fort lab EC10 was not weighed heavily when identifying a protective sulfide concentration. See also the Attachment 1 response to topic areas 4.1 and 4.2.
2	K	Justin Eichorn	2.2	Fort Lab studies show that sulfide does not impact wild rice.	In 2013 the Minnesota Chamber of Commerce conducted an independent research at the Fort environmental labs that are regularly used in the creation of new government-issued standards, to correct deficiencies identified in MPCA's research during the peer review. And this research focused not only on sulfates, but also, on sulfides. And the results demonstrated that sulfide does not impact the wild rice concentration until 12,800 micrograms per liter. The most sensitive end point was not affected by sulfide concentrations below 1,600 micrograms per liter.	The MPCA reviewed the Fort study and information about it is included throughout the TSD, and in some depth starting on page 37. The results of the Fort sulfide study were not heavily weighted in consideration of the multiple lines of evidence because under natural conditions wild rice plants less than 21 days old would not have access to the high concentrations of oxygen in the atmosphere (210,000 ppm). Rather, under natural conditions such young rice plants would be under water, which has a maximum oxygen concentration of about 10 ppm. Access to oxygen can allow wild rice to detoxify sulfide concentrations that would otherwise inhibit growth, as discussed in the TSD, starting on page 13. Access to oxygen allows detoxification of sulfide both internally in the plant, where the sulfide is oxidized to non-toxic forms of sulfur, and external to the plant, where the sulfide is oxidized to sulfate.
2	L	Justin Eichorn	3.9	Error rate is too high.	The error rate of almost 20% is very concerning. A reduction in that error rate would mean that the equation would more closely represent the field studies, in order to reduce the error rate to approximately 4%. [Others] were able to tweak the formula so that it could get down closer to that 4% error rate.	See responses about error rate in the cover memo to this response and in Attachment 1 response for topic area 3.9.
3	A	Abbie Plouff	23	Degradation of wild rice has a disproportionately negative impact on tribal communities.	If this grain is further degraded in Minnesota, it will have a disproportionately negative impact on tribal communities and low income families who depend on wild rice for food. (66, line 7)	See Attachment 1 response to topic area 23, and SONAR section 9 on environmental justice.
3	B	Abbie Plouff	28	Mercury methylation	Understand the focus of this hearing is on the impact of wild rice by elevated sulfate levels. However, we cannot in good conscience discuss allowable sulfate levels without also discussing how elevated sulfate levels can accelerate the release of toxic mercury into the food chain and pose a critical human health threat.	Discussion of mercury and the relationship of mercury and sulfate is addressed in Attachment 1 under Topic 28.

3	C	Abbie Plouff	28	Mercury methylation	Research by a University of Minnesota research team verified that excess sulfate in the water leads to increased amounts of mercury, meaning there will be a greater methylation of mercury in fish and throughout the food chain. There are bacteria in these waters that feed on sulfate; and in the process of feeding on sulfate, they methylate inorganic mercury converts it into methylmercury. So, it needs organic rich lakes and stream beds. If there's more sulfate available for bacteria, there will be a higher rate of conversion of inorganic mercury into methylmercury.	Discussion of mercury and the relationship of mercury and sulfate is addressed in Attachment 1 under Topic 28.
3	D	Abbie Plouff	28	Methylmercury is an environmental justice issue	Methylmercury disproportionately impacts low income families and in tribal communities, who fish and hunt to provide food for their families.	Discussion of mercury and the relationship of mercury and sulfate is addressed in Attachment 1 under Topic 28. The MPCA will take environmental justice into account when it addresses mercury.
3	E	Abbie Plouff	10.1	Not enough wild rice waters are listed.	The answer to this methylmercury problem is to reduce the sulfate levels in our water in Northeast Minnesota. However, the proposed standard significantly restricts the number of wild rice water bodies that would be protected. In a letter from May 25th of this year, the Minnesota Native American Council stated concerns about the MPCA's proposal, stating that its rule changes err on the side of exclusiveness in designating wild rice waters, leaving hundreds of waters with existing wild rice use unprotected. (67, line 18)	See Attachment 1 response to topic area 10.1. See also exhibit N.25, the MPCA's response to the letter described.
4	A	Florence Heeden		Who was behind initiating the study to change the standard for sulfide or sulfate?	69, line 11	MPCA response on pg 69, line 14 of the transcript.
4	B	Florence Heeden	2.3	Climate change impacts	What indications are there that, for instance, climate change, which affects very much the water temperatures, how does that impact this whole thing?	The MPCA agrees that climate change can be one of the factors that affect wild rice. See discussion on page 30 of the Technical Support Document. This does not negate the need for to protect wild rice from excess sulfide.
4	C	Florence Heeden	25	Were field studies done?	I also was wondering if actual field studies were done as you were determining levels of sulfate and sulfide as it's coming up	MPCA response on transcript pg 72, line 5.
4	D	Florence Heeden		Impacts on seventh generation	I stand here thinking to the seventh generation; thinking about the impact of what we do now and the impact on the seventh generation. This is a Native American concept that I truly believe. We can't be living just for today. I was very pleased to see that the economic impact was not as much in consideration as the impact on the issue of wild rice, itself. That's good. But we hear, even with our legislator who spoke to us, that that is a very big concern. And for me, it has to take a way back seat, because we don't know how what we are doing now will affect the seventh generation, the more we change the things that are happening. (73, line 21).	Statement - No response required.
5	A	William Paulson	38	Wild rice is in decline	What I'm seeing is an overall loss of our wild rice beds in the states of Minnesota, Wisconsin and Michigan. Any time that we attempt to play with the environment it causes distress. (74, line 22). Back in the 1970s, 1975 -- I'm just going to take a year out of there -- we had almost 12,500 wild rice permits in the state of Minnesota. And more recently, four years ago, we only had 1200. (76, line 1)	The goal of the MPCA's proposed rule is to protect wild rice from the adverse impacts of sulfide. See Cover Memorandum to this Response.
5	B	William Paulson	2.3	Climate change impacts	Climate change will increase drought and restrict water flow, which will make conditions more difficult for wild rice.	The goal of the standard is to protect wild rice from the impacts of sulfide, one of the stressors to wild rice.
5	C	William Paulson	3.1	Keep the existing standard, don't increase sulfate.	Firmly request that we don't increase levels as we go forward, but we look at new technology to find different ways to make this profitable with the mines and stuff at the levels that we have.	See Attachment 1 response to topic area 3.1.
6	A	Andrew Struss	24	Need technology to advance.	I think we should wait for technology to advance so that these clean-up efforts can be more economically feasible and that they can streamline the process. So, at this time, I think we should defer and at least err on the side of caution and we should wait for technology, or until we have a more financially reasonable method to take care of the contamination. (78, line 11)	The comment seems to state that we should wait for better mining technology before allowing mining, which is out of scope for this rulemaking.
6	B	Andrew Struss	24	Risk of mining and mercury	Discussion of the value of Minnesota environment and pristine waters, and the risk from mining and mercury	The comment seems to state that we should wait for better mining technology before allowing mining, which is out of scope for this rulemaking. See also Attachment 1 response to topic area 28 on mercury.

6	C	Andrew Struss	23	Jurisdiction/treaty issues	A jurisdictional challenge should also be raised that perhaps the Department of State, or as a foreign, sovereign nation, that perhaps there should be an outside agency also involved. (79, line 22)	See Attachment 1 response to topic area 23.
7		Garrett Lempson	24	Danger of sulfide mining near Lake Superior.	My question to you guys is the potential danger of having sulfide mining in proximity to Lake Superior and the potential damage it might cause to 10% of the world's fresh surface water. (84, line 18)	The comment is about mining, not the standard. MPCA response at pg 84, line 23 of the transcript.
8	A	Matt Bliss	38	Wild rice is not in decline	It's been wildly reported that this is a bumper crop this year of wild rice, and that's great news. What problem are we trying to fix, and at what cost? (86, line 1)	The goal of the standard is to protect wild rice from the impacts of sulfide. Wild rice is naturally variable from year to year. See Cover Memorandum to this Response.
8	B	Matt Bliss	19	Costs of treatment	The proposed new wild rice sulfate standard would likely lead to hundreds of municipalities and businesses being out of compliance; and therefore, required to upgrade treatment equipment, which is incredibly costly.	The MPCA is committed to implementing variances where appropriate, when compliance with a limit to ensure the standard is met would cause widespread social and economic impacts.
8	C	Matt Bliss	19.4	MPCA should wait for the cost study	To accommodate the receipt of that information, the legislature moved the deadline for the completion of the new wild rice standard to January of 2019, so the MPCA could utilize those results of that study to further inform the rulemaking decision. Instead, they went ahead without those results.	A discussion of the LCCMR Study is provided in the MPCA's cover memo to this response
9	A	Cliff Tobey	24	Issue is being driven as a way to stop PolyMet	Discussion of the PolyMet mining issue and how those issues are driving the development of the proposed standard. (89, line 17)	See response above to comment 4A about why the standard is being revised.
9	B	Cliff Tobey	33.1	The existing 10 mg/L standard is not valid	The MPCA has finally recognized after all these years that sulfate standard on the books was without merit based on their studies, but I think it's evident, based on the research by the different labs that have weighed in on the issue, the fact that no other state even has a wild rice standard; and frankly, by the MPCA's own report, that this science is too flawed. (91, line 7)	Statement. However, the MPCA notes that the decision to revise the existing standard is not a separate decision from the proposed equation-based sulfate standard.
9	B	Cliff Tobey	25	Concern that the science is not sufficient - especially to support a standard with such high costs.	I think it's clear that if we're going to be forced to spend huge amounts of money to bring it up to a standard, then at least the basic science behind that standard should be done right and that the majority of the scientific community should agree on it.	The MPCA proposal is based on sound peer-reviewed science. See the Cover Memorandum to this Response.
9	C	Cliff Tobey	25	The standard will require regulation of natural water to levels cleaner than drinking water.	But, they're not only trying to be regulating that water, but in many instances, the water that we're talking about here is water that may just have ran off of rainwater or whatever into pits, and we have to move that water in order to mine those areas. So, I want you to think about that for a second. We're taking naturally occurring water, we're going to be forced to spend hundreds of millions of dollars to filter that water into water that's way more pure than even bottled water, and then we're going to be releasing it back into a natural body. That's how really ridiculous this whole thing has gotten to be. (92, line 1)	The commenter seems to be stating that the proposal is unsound because it would require the regulation of natural water, such as rainwater. The SONAR explains, beginning on page 171, the mechanics of the development of sulfate in mining operations - include through rainwater. As noted, variances can be applied in cases where meeting the standard would cause widespread economic and social harm.
9	C	Cliff Tobey	33.1	MPCA should remove the existing standard; it is not reasonable to add the sulfide standard	I believe once the MPCA determined that this sulfate standard did not do as designed because it didn't protect the rice, the Agency should have moved to eliminate the rule and this issue should have been over. The fact that the MPCA went ahead looking for a way to protect wild rice, when, to my knowledge, there was never a need	Statement. However, the MPCA notes that the decision to revise the existing standard is not a separate decision from the proposed equation-based sulfate standard. Response exhibit N.30 provides information from EPA on the processes needed to change a standard.
9	D	Cliff Tobey	38	Mine discharges are not destroying wild rice	These mines that have been up there for 130 years, these water discharges off of these different municipalities and other businesses are somehow changed or somehow, something has evolved and somehow, now we're destroying the wild rice. That's not the case. It was never the case. This whole thing was political right from the beginning. (94, line 12)	The MPCA's proposal is not based on any supposed changes to discharges from mines or WWTPs. It is based on the level of sulfate/sulfide needed to protect rice.
10	A	Mary Owen	23	Wild rice is important to Native culture and health.	Native Americans in this state do suffer a life expectancy ten years less than that of the white people or the average population. In taking care of people, and the literature that I have reviewed it's clear that Native people do better when they're allowed to follow their culture. It helps improve many different facets of their health. Part of their culture is growing wild rice. It's incredibly important to people here. They have just been able to, like many Native Americans, regain part of their culture. More and more people are partaking. Any threat to this piece of culture is a threat, I believe, to the health of Native people. (100, line 23)	See Attachment 1 response to topic area 23.

10	B	Mary Owen	3.1	Companies should pay for the full cost of doing business. Maintain existing standards.	I believe, if anything, these laws are or these rules are not nearly stringent enough in the fact that companies come and say that they can't afford to do their business because of these laws, makes me crazy. Pardon me. I'm not speaking for any official agency, so I can be crazy. This is not okay. If you can't afford do your business, then maybe you need to think about doing another business. For the lives of the people that I care about, the reason that I work, please consider maintaining these rules.	See Attachment 1 response to topic area 3.1.
11	A	Rob Beranek	4.1	Overemphasis on flawed mesocosm study	Discussion of the TSD Figure 1-2 (pg 34) and the mesocosm study - the dialogue last night made me think that perhaps too much weight was placed on the mesocosm study in this figure, 1-2, and that in our written comments as we detail out through the alternative changepoint analysis that I mentioned on Monday for the establishment of the water at 120 micrograms per liter threshold on the field study, and Mike Bock also testified regarding the changepoint of 120, the Ng study of 2017, I think, lends some credence to our criticism of the experimental design mesocosm; and therefore, I think that experimental design should be in the results of the mesocosm study, or looked at as an ultra-conservative value, an isolated system without mitigating the effects of the outgoing nutrients. (105, line 3)	The commenter is discussing the mesocosm study and suggesting that the MPCA, in considering the multiple lines of evidence, put too much weight on the results of the mesocosm study, as expressed as EC10s in Figure 1-2 on page 34 of the TSD. Figure 1-2 identifies six reliable estimates of protective sulfide concentrations, of which the mesocosm experiment supplied two (three reliable estimates from the field study, plus one from the hydroponic experiments). The commenter is a bit vague as to the purported weaknesses of the mesocosm experiment, only noting that a mesocosm was "an isolated system without mitigating the effects of the outgoing nutrients." The primary criticism seems to be that during the experiment the mesocosms were not augmented with nutrients (probably nitrogen and phosphorus) that were presumably lost during the three growing seasons prior to the measurement of porewater sulfide in August 2013. The commenter is assuming that significant quantities of nutrients were lost, and that the loss of those nutrients increased the sensitivity of wild rice to sulfide, making the EC10 estimates "ultraconservative". There is no scientific information to support either of those two assumptions. In conducting the experiments, Dr. Pastor went to great lengths to make sure that all plant biomass, including stems, leaves, roots, and seeds, were retained within each mesocosm to be allowed to decay and return all nutrients to that small ecosystem. Loss of nutrients through overflow due to high precipitation events was rare and constituted a minimal loss of nutrients, most of which were in in the the sediment, and therefore accessible to the roots of growing plants. In addition, the field study by Myrbo et al. (Response Exhibit N. 2) did not find any evidence that low nitrogen or low phosphorus tended to reduce the probability of wild rice occurrence in waterbodies. See also Attachment 1 response to topic areas 4.1 and 4.2.
11	B	Rob Beranek	3.5	There are alternate sulfide values from EC10 analyses	I've come to appreciate that EC10s are actually a curve-fitting exercise. And through the curve-fitting the statistician can use their professional judgment on which curve to pick. And it's from that curve, the EC10 value is established. On the environmental lab study we saw values ranging from 946 micrograms per liter sulfide all the way up to 4,050 micrograms per liter of sulfide. That's a four times range value. Exhibit 1016 to the Agency in May of 2017, we chose the most conservative EC10 that we felt represented the data. And that's, I believe, the 963 micrograms per liter. So, we took the lowest of that value to be basically, ultra-conservative. In that exhibit, Ramboll also did EC10 tests on that Pastor study, and then we also looked at some additional analysis. As you're looking back on this I'm sure you know better than I, but my note said there was a meta-analysis performed post-study for the PCA by Pastor. And the value that is in the exhibit of 300 micrograms per liter is an alternative toxic sulfide threshold to evaluate. It was an alternative to the EC10 value that Pastor had developed. (107, line 14)	MPCA staff do not understand the connections that are being made in this comment, and therefore need more specificity before a response can be prepared. We are not familiar with any "meta-analysis performed post-study for the PCA by Pastor," so perhaps there is a communication problem associated with this comment. In addition, MPCA staff are not familiar with any EC10 developed by Dr. Pastor.

11	C	Rob Beranek	4.1, 3.10	Comments on experimental design for hydroponic study - parts of plants exposed to sulfide and maintaining level of sulfide	<p>The peer-review panel had, I think, seven very pivotal recommendations on how the last studies could be improved. One of them, in particular, was that we should directly measure sulfide in the regions of the wild rice plant in the hydroponic study. What that would do is redistinguish the Fort study, the Pastor study. And you'll see that on that support document, that 1-2, the technical support document, that the sulfide thresholds for the Pastor study walked through either the initial sulfide concentration, the nominal sulfide concentration, but also, the average. One of the problems with that experimental design - or the two main problems with the experimental design, one is that the entire plant was exposed to the sulfide, the green parts of the plant, but also, due to the design, the sulfide level in the hydronponics could not be maintained throughout the duration of the study. (108, line 21) The advantage of the Fort study is that we were able to keep the sulfide value constant. So, in my professional opinion, that means that the results of the Fort study had a more reliable determination of what the toxic sulfide threshold was, because we were able to hold that sulfide value constant. (109, line 17)</p>	<p>Both Dr. Pastor and Dr. Fort had challenges designing hydroponic experiments of seedling growth that would mimic the exposure of the germinated seed to elevated sulfide concentrations. A desirable design would have exposed the seedling roots to various sulfide concentrations in anoxic water while allowing the stem to elongate in water that contained oxygen concentrations found in nature (up to 10 ppm oxygen). But neither scientist found a way to grow wild rice with the roots in anoxic water underneath a stem in oxygenated water without the two layers of water mixing, destroying the experiment. (In nature, the roots grow in anoxic sediment, and the growing seedling elongates into the overlying water, but the point of hydroponic experiments is to avoid the use of sediment, which has undefined chemistry.) Nevertheless faced with the task of performing a hydroponic experiment, Dr. Pastor compromised by exposing the entire seedling to various concentrations of sulfide, which conceivably mimicked the elongation of the seedling through several inches of anoxic sediment in natural wild rice waters, (But the seedlings released oxygen, which decreased sulfide concentrations between renewals.) Dr. Fort's compromise was to germinate seeds in various sulfide concentrations, and to allow the elongating stem to emerge out of the sulfide solution into the atmosphere over the 21 days since germination. (Use of a larger volume and daily renewals kept the sulfide concentrations relatively constant). It might be claimed that the Fort lab's design mimicks nature. But the TSD notes (page 13) that in nature it is unlikely that 21-day old wild rice plants have access to high oxygen concentrations. High oxygen availability allows plants to detoxify sulfide that would otherwise be toxic. Accordingly, the Fort lab EC10 was not weighed heavily when identifying a protective sulfide concentration. See also Attachment 1 response to topic areas 4.1 and 4.2.</p>
11	D	Rob Beranek	4.1	Information about lab studies and variation in amount of iron that plants were exposed to.	<p>The other thing that we did, based on recommendations of the peer review panel, was that we buried the iron in the solution that plants were exposed to. And we did an ultra low iron value, an average iron value that we felt would represent the majority of the systems in Minnesota, and the higher iron values you see in lakes that had, you know, high concentrations of iron. I'll give you some of what we saw as results. These are IC25s, so they're a little different than EC10s, but take it for whatever they're worth. At the low iron value we saw on IC25 of 3,900 micrograms per liter of sulfide, at the IC25, or the average iron, we saw a toxic sulfide threshold of 7,800, and the IC25 iron we saw a toxic sulfide threshold of 9,800 micrograms.</p>	<p>These results confirm the geochemical knowledge that iron can precipitate sulfide, reducing the toxicity of sulfide.</p>
11	E	Rob Beranek	4.1	Fort lab hydroponic studies did not show that exposing the green parts of the plant to oxygen resulted in sulfide detoxification.	<p>My read of the TSD on why the Fort results at 963 were discounted or given a low weight was the - or is the hypothesis that the green part of the plant was exposed to air. That was actually based on one of the peer-review panel recommendations. And so, therefore, we've incorporated it into our design and the green portions of the plant were not exposed to the sulfide...So, the hypothesis that the green parts of the plant have extra oxygen and the oxygen comes down to the root zone and may be the toxic effects of the sulfide. I'm not persuaded because we didn't have the measurement of the sulfide. And we in the study have that sulfide value throughout the entire duration of the study of the root zone. I think that they gave a fact guide anywhere beyond the nanometer range of the root zone actually was impacting the overall concentration of the root zone in that sulfide monitoring that we had put in place at the root zone. (110, line 19)</p>	<p>The commenter seems to be stating that if the wild rice plants were detoxifying sulfide, monitoring of sulfide in the porewater in the rooting zone of the plant would have shown a decrease. However, as mentioned on page 12 of the TSD, access to oxygen may also allow detoxification of sulfide within the root of the plant. Sulfide monitoring of the water in which the roots were growing would not have detected this effect.</p>

11	F	Rob Beranek	2.4	The 120 microgram/L sulfide value is not reasonable.	In summary, based on Exhibit 1016 and your patience of listening to me rattle off toxic sulfide thresholds, we find that the 7050.0224, Subpart 5, Item 5, what the PCA is proposing of a toxic sulfide threshold of 120 micrograms per liter is found to be not reasonable. (112, line 9)	The MPCA does not agree that the protective sulfide threshold of 120 micrgrams per liter is unreasonable. See discussions found throughout the SONAR and Technical Support Document.
12	A	Melinda Neville	33	Supports the proposal	I want to commend the Agency and scientists who have worked towards this proposed standard. It is my educated and professional opinion that using a wild rice water body specific equation is Number 1, and an improvement upon the current standard for protecting wild rice. Number 2, result in designating waters that may not suitable for any discharge. And Number 3, it's not overly protective of wild rice waters that do not have geochemical conditions for wild rice that have been damaged by sulfide. In fact, MPCA has more or less threaded the needle with this proposed change. (113, line 15)	Supportive comment - thank you for the comment.
12	B	Melinda Neville	33	Scientific studies have been thorough	I've heard politicians who misrepresent the statistics. I have heard industry representatives who have sued the MPCA over their ruling, offer a Minnesota Chamber of Commerce funded study that begs the question of peer review, and of impartiality. So, while I did not intend to speak this evening, and instead, I was planning on listening, I felt that it was important to acknowledge the work that has been done, the thoroughness of the studies that have just recently been published and the long-term, six-year record that I have just started to digest, myself.	Statement - No response required.
12	C	Melinda Neville	13	Wild rice waters prior to 1975	I haven't yet found a good answer as to whether the traditional ecological knowledge of our local tribal communities would be valid in identifying the previous extent of wild rice waters prior to 1975. If you know that wild rice was there 100 years ago, as opposed to 30 or 40, would that be sufficient to protect further waters that may not be in the original 1300? (114, line 18)	The MPCA does plan to accept traditional ecological knowledge to support adding waters to the list of wild rice waters. The Clean Water Act requires that states protect existing uses. An existing use is a use obtained in the waterbody as of November 28, 1975 or any time thereafter. Therefore, to protect the existing use the MPCA needs information about wild rice as of or after that 1975 date. (See also transcript response on 115, line 4, noting that the transcript should be corrected to state "that fact alone would NOT be sufficient")
12	D	Melinda Neville	1	Would the beneficial use be a Class 2 use?	Then, perhaps the historical harvesting area for our local tribes then, would not follow that standard, what standard would they follow? Would it be a Class 2?	MPCA response at pg. 115, line 20. Note that the 1975 date also applies to Class 2 uses.
13	A	William Paulson	21	Cultural importance of wild rice; tribal members no longer need state permit to harvest.	I'd like to reiterate on the record how important wild rice is culturally. When he looked at the area up here, it was suggested that he'd been on the roads up there for a long time while he was mining and stuff, and he could see wild rice growing, and stuff, and the fact that there is nobody on our team out there that's sitting out there and going to seed wild rice and stuff. We already know that growing wild rice requires self-seeding or promulgating. What I realized afterwards is that, I don't know if the Court is aware of it, that recently, within the last two years it has just now been established in the state of Minnesota that members of the tribal nations that are around Minnesota do not require a State permit to harvest wild rice anymore. That's a recent development. Prior to that, it would be a hindrance to the people of the reservations to harvest wild rice in their homeland, as established on the reservation and have to go outside to get a permit to harvest wild rice off the reservation. (118, line 14)	The MPCA understands the importance of wild rice to the tribal communities. The SONAR discusses this importance, including in the section on environmental justice (page 133) and in the regulatory analysis. Further see response to topic area 23.1.
13	B	William Paulson	23	Native peoples need to be part of the process and protect rice for their future generations	it is a concern of the Native Americans here in Minnesota that we are part of this process; that we're not only protecting the heritage and the future of our generations to come. That is one concern that I wanted to bring in.	See Attachment 1 response to topic area 23.
13	C	William Paulson		Iron content is important.	It really is about the iron in the ground. When the iron content is higher, it definitely changes the toxicity of the sulfide and the sulfates in the mineral system. And I don't know of any way to regulate it or to test it or to control it, except by each individual watershed.	Statement - No response required.

14	A	Susan Kedzie	23	Native American persons in this part of the country are facing a lot of unusual stressors.	121, line 20	See Attachment 1 response to topic area 23.
14	B	Susan Kedzie	29	Concerns about climate change and increased nutrients (eutrophication) and impacts on wild rice.	I'm concerned that we don't really know enough about the impact to nutrients in the environment under climate change. When you combine these two stressors together, what is the effect on the healthy wild rice population, as well as other aquatic plants and the interactions between plants and micro organisms and aquatic organisms. So, I feel this is something that we need to be considering; not just as in terms of whether we should throw out the old standard and look at a new one, but really assess the long-term health of our ecosystem.	The intent of this rulemaking is to protect wild rice from the impacts of sulfide. The MPCA has other water quality standards to protect aquatic life from the impacts of nutrients. The larger look at environmental issues is beyond the scope of this rulemaking.
14	C	Susan Kedzie		Multiple environmental concerns - look at them holistically	One of the other things that came to mind that I'm passionate about is the invasive species that will be impacting the ability of ours to attenuate floods and control damage through the floods. Losing those species will definitely trigger a cascade of ecological changes within the aquatic system. And I think it's important to be looking at multiple factors. You cannot isolate this question down to will sulfide have an impact on rice under perfect lab conditions. We need to be looking at this holistically. And I think that looking at that, we continue to tend to isolate this problem and we look at it in the lab and you think we can juxtapose those conditions into the real world, and lo and behold, we're not really matching it with the environment at all. (122, line 11).	Water quality standards are generally done on a pollutant by pollutant basis, based on looking at the adverse effect of the pollutant on the beneficial use at issue. The larger look at environmental issues is beyond the scope of this rulemaking.
14	D	Susan Kedzie		Be precautionary.	I would encourage the people that are making these decisions to err on the side of caution, to err on the side of humanity, to err on the side of sovereign rights of the traditional tribes who are using these resources for traditional purposes; and also, I would like for people that are involved with this decisionmaking process to evaluate whether increasing sulfide would, in fact, make conditions preferable to a whole other host of invasive species.	statement- no response required
14	E	Susan Kedzie	23	US constitutional system is focused on people and does not protect resources.	I think it's an honor to have my freedom of speech, but I am often wondering how much good it does when corporate entities seem to be making use of the -- using the judicial system that's more and more in favor of their gains, other than the people. And we don't have a constitution that protects our resources. Other countries have been bold enough to do that. We haven't done that, and probably won't, because our vision is bioptic, and I fear we're not leaving a very good legacy for our children.	See Attachment 1 response to topic area 23.
15		Lisa Boulay	23	Listen to the tribes and protect rice.	All I would like to say is the people who need to be listened to here are the tribes. They have the expertise in the wild rice; and listen to them. We need to protect it. (127, line 3)	See Attachment 1 response to topic area 23.
Hearing Exhibit 1015		Matt Bliss			Exhibit reflects testimony	No additional response.
Hearing Exhibit 1016		Rob Beranek	2	Alternatives to MPCA's proposed sulfide levels.	Ramboll ENVIRON - Draft Sulfate Standard Equation, Options and Basis for Improvements	This information was provided to the MPCA in the spring of 2017. The TSD considered the Ramboll Environ recommendations (pages 63-66) and concluded that the proposed changes would not be protective of wild rice. See also Attachment 1 response to topic area 3.9.

Comment ID	Part ID	Commenter Name	Topic Area	Paraphrase/Summary of Comment	Excerpt and Location of Comment (transcript line number)	Response or Response Location
1	A	Emily Onello	28	Mercury methylation	We are concerned about a process wherein more sulfate entering an ecosystem can yield higher rates of methylation of mercury, higher levels of methylmercury, which is a biologic form, enter the food chain and enter our fish and enter our human bodies... I think there are complexities of the potentially increase sulfate levels that may impact mercury exposures in humans that haven't been elucidated.	See Attachment 1 response to topic area 28.
1	B	Emily Onello	21	Concern about impact to the nutritional value of wild rice	I have not yet seen research that really looks at the nutritional value of rice grown under different sulfide conditions....Because we know wild rice is a... I'm quoting a colleague, "a super food". It's very healthy for you. So, as a physician, I also have that concern and I would like to see more evidence or consideration of the nutritional value of rice grown, not just one season, but several seasons under these potentially new sulfate conditions.	The commenter noted that this might not be the charge of the MPCA. The MPCA has heard from the tribes in particular that wild rice is a very important food because of its nutritional value (see page 3 of hearing exhibit 1020, for example) but is not aware of any scientific analysis that would enable evaluation of this question in a way that is relevant to the proposed water quality standard.
2	A	Dennis Scymialis	31.1	Objection based on due process of law - "you need a notice to everyone as to how it was going to be...implemented."	pg 70, line 20	The MPCA has met all notice requirements of Minn. Stat. ch. 14 for rulemaking, plus has made significant effort to provide additional notice of the proposed rules and opportunities to comment. See SONAR page 154 and page 3 of the Wild Rice Frequently Asked Questions (Hearing Exhibit 1013) handed out at the hearing about the MPCA's plan for implementation.
2	B	Dennis Scymialis	19	Cost should not dictate decisions.	Page 70, line 25	The MPCA will consider costs as allowed under the Clean Water Act, during the implementation process.
2	C	Dennis Scymialis	Alum	Aluminium sulfate added to water to clarify turbidity.	Page 71, line 6	Yes, some wastewater treatment plants add alum (aluminium sulfate) as part of their treatment process and this will have to be considered during implementation of any needed effluent limits.
2	D	Dennis Scymialis	Other Pollutants/21	Other pollution comes with sulfate pollution - namely heavy metals and arsenic - which have adverse health impacts and could get into the rice.	"With those sulfides and sulfates come other heavy metals, like arsenic. And arsenic is of particular concerns to wild rice...we're going to be putting more arsenic into our drinking water, which has more and more...adverse health effects...we are also going to be introducing arsenic into the wild rice... cause problems for those people eating" the rice. (page 71, line 21)	The MPCA has other water quality standards, including water quality standards for arsenic and heavy metals, to ensure that water is protected from the impact of those pollutants. The MPCA is not aware of relevant research concerning the uptake of arsenic or metals in to rice, as related to the level of sulfate in the surface water.
2	E	Dennis Scymialis	14	The current standard is not enforced, so how will MPCA enforce a new lower standard	The standard we have right now, those standards are not being enforced. (page 73, line 7)	There are a variety of reasons why a sulfate limit has not been included in historical NPDES permits for the current sulfate standard of 10 mg/L. MPCA recognizes and takes the responsibility seriously to uphold the Clean Water Act and fully intends to implement water quality based effluent limits where a wastewater treatment facility demonstrates the ability to cause or contribute to a downstream impairment.
2	F	Dennis Scymialis	4	The study has not been completed. I would argue for the continuation of the sulfate-sulfide study and the completion of the study.	Page 73, line 15	The MPCA and its collaborators completed several studies that serve as the basis of the proposed rule. It is unclear which particularly study the commenter is referring to as being not completed.
3	A	Tom Thompson	5	Support indigenous population concerns that the proposed regulation changes are a problem and do not have the protection of wild rice as the main concern.		The MPCA's goal in the rulemaking is to protect wild rice from adverse impacts due to sulfide.
3	B	Tom Thompson	23	The tribes have treaties protecting their ability to forage for wild rice.		The goal of the MPCA's rulemaking is to protect wild rice from the impacts of sulfide. See Attachment 1 response to topic area 23.
3	C	Tom Thompson	3.1	Support maintaining the ten part per million sulfate standard		The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1

3	D	Tom Thompson	14	Support more effective enforcement of the standard.		MPCA recognizes and takes the responsibility seriously to uphold the Clean Water Act, and intends to fully enforce the revised sulfate standard.
3	E	Tom Thompson	15	I think the proposed standards are unclear and uncertain... could lead to disputes, lawsuits and even noncompliance.		One of the goals of the rulemaking was to add clarity so that the sulfate standard could be more effectively used and enforced. The MPCA believes the proposal does that. The MPCA intends to have a user-friendly website that will clearly document wild rice waters and the applicable sulfate standard.
4	A	John Arbogast	33.1	We cannot fall back on 1940s research and a standard of 10 based on a gentleman paddling around in a canoe.	77, line 17	Statement- no response required
4	B	John Arbogast	28	Mercury methylation	"We are concerned about a process wherein more sulfate entering an ecosystem can yield higher rates of methylation of mercury, higher levels of methylmercury, which is a biologic form, enter the food chain and enter our fish and enter our human bodies..."	See Attachment 1 response to topic area 28.
4	C	John Arbogast	3.3	We also can not adopt this newly proposed standard because the PCA has refused to look at all the science, some of which say a number of 1600 to 2500 milligrams per liter will not affect wild rice growth.		The MPCA's proposal is based on strong peer reviewed science. It is true that sulfate concentrations of 1600 to 2500 milligrams per liter do not greatly affect wild rice growth, but the peer-reviewed science shows that the proximate problem is elevated porewater sulfide, which is derived from sulfate, not the sulfate itself.
4	D	John Arbogast	20	Politics is driving the PCA into rushing to adopt this standard so they can check a box and move on to something else.	Page 77, line 25	The MPCA's proposal is based on strong peer reviewed science.
4	E	John Arbogast	2.3		Let's look at water levels, landscape, invasive species and beavers. No one talks about beavers and how...these destructive little rodents can affect the wild rice crop by raising water levels with their dams.	See discussion in Technical Support Document, pg 23. That other factors affect wild rice does not negate the need to protect wild rice from excess sulfate.
4	F	John Arbogast	12	Let's bring in wild rice growers, people who grow rice for a living, and let's get their opinions.	Page 79, line 1	The proposed rule addresses natural stands of wild rice. Rice in cultivated waters is managed so that it responds differently to sulfate. (See TSD, page 14.) Wild rice waters do not include cultivated wild rice waters. See 7050.0130 Subp. 6C. Furthermore, the Minnesota Cultivated Wild Rice Council was represented on the MPCA's Wild Rice Advisory Committee.
4	G	John Arbogast	18, 39	Variances don't solve the economic problem. Need a better approach.	Variances are just kicking the can down the alley and won't do anything like getting us all together and solving this problem in a common sense approach.	The standard must be set based on what is needed to protect rice. The economics cannot dictate the approach. (See Cover Memo to this Response)
5	A	Bob Tammen	25	Concern about science that leads to allowing more pollution from mining companies; science is incomplete.	"Lake Superior and mining tailings...They didn't get the science right. And so, part of what I'm saying today is that we should be very skeptical of people coming, saying that they have got science that proves the point that would promote their mining industries when, in fact, the science is incomplete." (Page 83, line 3)	The MPCA's proposal is based on sound peer reviewed science as described in the cover memo.
5	B	Bob Tammen	3	Question whether iron is protective when rice disappears when you are downstream of an iron mine.	"I went out in the St. Louis River and you get southwest of Aurora, the rice disappears and there is iron in that water because it's downstream of the iron mines... I think we can legitimately ask how on earth are we going to make this formula work if iron is protective, but when you get downstream of an iron mine, the rice disappears."	Iron in the sediment of wild rice waters is protective by binding to sulfide and preventing it from impacting wild rice. There is no relationship to the presence of iron ore (or iron mines) and the levels of iron in sediment. Iron levels are not higher in the iron range.
5	C	Bob Tammen	39	Should also have a goal of restoring wild rice (page 84, line 23)	"You said the goal was to protect wild rice. ...I'd like to ask us also to have a goal of restoring wild rice."	The goal of the rulemaking is to protect wild rice from the impacts of sulfide. Fully restoring wild rice from all impacts is outside the scope of this rulemaking.

6	A	Margaret Watkins	21	Mahnomen played a central role in the Ojibwe migration stories and is considered a relative, not simply a resource.	Page 86, line 15.	The MPCA understands the importance of wild rice to the tribal communities. The SONAR discusses this importance, including in the section on environmental justice (page 133) and in the regulatory analysis.
6	B	Margaret Watkins	23	The Band's effort to preserve Mahnomen by opposing MPCA's proposed rules is a continuation of the Band's ongoing efforts to preserve our cultural identity.		See Attachment 1 response to topic area 23.
6	C	Margaret Watkins	27	Iron leads to iron plaques.	"This rule will not protect wild rice. Iron does not mitigate sulfide toxicity. Instead, as MPCA scientists know, iron sulfide forms a plaque on wild rice roots and gets taken up by the plant, forming blockages that prevent nutrient uptake." (87, line 3)	The only information the MPCA has on this issue is a 4-page non-peer reviewed progress report (Pastor, 2017, N.34) that indicates that exposing sediment from Rice Portage Lake, which would have a sulfate standard about 34 mg/L (TSD, page 92). The only evidence presented by Pastor (2017) that iron plaque can inhibit nutrient uptake was performed at a treatment concentration of 300 mg/L, over 8 times greater than the average sulfate concentration that would be allowed under the proposed standard. Thus, it may be true that deleterious forms of iron sulfide can form when sulfate concentrations occur that are much higher than would be allowed.
6	D	Margaret Watkins	10	More water bodies should be protected for wild rice.	The rule excludes, without justification, water bodies that need wild rice protection. The wild rice rule, as it is being proposed, will only apply to 58 percent of the known wild rice waters in the state, leaving the other 42 percent for rulemaking at a later date.	See Attachment 1 response to topic area 10.1 and SONAR pp. 41-57 for a detailed discussion of how the MPCA evaluated sources to determine proposed wild rice waters.
6	E	Margaret Watkins	13	Concern that the MPCA will never add additional wild rice waters.	"Tribes of the Lake Superior Basin know from experience with the 7052 rule, when 24 wild rice waters were added in 1998 and MPCA promised, but failed, to add more waters in the future, that in all likelihood, no more waters will be added to the list, ever." (87, line 17)	The MPCA has developed a specific process for future identification of wild rice waters in the proposed rule and is committed to implementing it. This process includes a pre-rulemaking process to obtain and review information on wild rice waters every three years. See pp. 58-64 of SONAR and 7050.0471 Subp. 2 in proposed rules.
6	F	Margaret Watkins	1.6, 11	MPCA rejected 1854 waters; rejecting some waters should require a Use Attainability Analysis.	"MPCA will only accept an out-of-date March 2016 list identifying 393 waters, instead of a list of 503 waters updated in March of 2017, without providing any rationale and in spite of requests from the 1854 Treaty authority. In short, MPCA has contravened the purpose of the Clean water Act by excluding existing wild rice waters listed by both the Minnesota Department of Natural Resources and the 1854 Treaty authority without providing the required use attainability analysis for excluding these waters." (88, line 4)	See detailed response on 1854 March 2016 and March 2017 lists in the Attachment 1 response to topic area 11. See also detailed response for Attachment 1, topic area 1.6, on use attainability analysis.
6	G	Margaret Watkins	11.1	Remove Grand Portage waters, Grand Portage will enforce their own standard.	Contrary to the specific request the band made during consultations, MPCA has automatically applied its standards to water situated entirely within the Band's reservation.	The MPCA apparently misunderstood the feedback we received from Grand Portage during consultation. Waters wholly within the reservation boundaries will be removed. See response to topic 11.1.
6	H	Margaret Watkins	5, 10	The rule is not protective because not enough waters are used.	The proposed wild rice rule will not protect wild rice and contravenes the Clean Water Act by excluding more than 900 waters from the rule.	The MPCA does not agree that every water in the inventory found in Appendix B of MDNR's 2008 Natural Wild Rice in Minnesota report meets the beneficial use of the grain as a food source for wildlife and humans. See pp. 42-57 for a detailed discussion fo how the report was evaluated. Also see response to topic area 1.6.
7	A	Nancy Schuldt	1.2	Wild rice should be protected as a Class 2 use.	There is a structural flaw in MPCA's conceptual approach to the revised wild rice rule. It starts with their insistence in maintaining the wild rice designated use in Class 4 agricultural and wildlife, rather than Class 2, which is four aquatic life use. By definition, they're choosing to narrowly define wild rice's value as restricted to simply food for humans and other wildlife, rather than its role as a key ecologically significant species that has its own essential associations with other aquatic plants and animals. And actually, serves as one of the best indicators of high quality functioning aquatic ecosystem.	The MPCA is not proposing to change the wild rice beneficial use; therefore the beneficial use is appropriately retained in the Class 4 agricultural and wild rice use classification. See discussion on p. 33-35 in SONAR, and hearing Exhibit N.26. All of the proposed Class 4D wild rice waters are also protected as Class 2 waters.

7	B	Nancy Schuldt	3	The equation is based on the probability of wild rice not looking at a healthy and sustainable population of rice.	"There is a disconnect between this narrow definition of a wild rice water and their calculated protected sulfate criterium. This equation- derived criterium is linked to the probability of wild rice being present. Not a healthy and sustainable population of wild rice that provides harvest and use of grains as a food source. This is an important distinction."	The sulfide level was derived based on looking at the presence of absence of wild rice within the sites of the field study. As part of the weight of evidence, the MPCA did consider density (see page 77 of the SONAR and Appendix 8 of the technical support document) because density is an important component of ensuring a healthy and self-sustaining rice population.
7	C	Nancy Schuldt	1.1	Wild rice water definition should be broad and based on the presence of wild rice.	"Tribes have consistently and wholeheartedly agreed that the definition of a wild rice water should be as broad as possible, simply the presence of wild rice, just like the presentation of trout in a stream defines it as a trout stream."	The MPCA is proposing to clarify, not change, the wild rice beneficial use ( see pp. 33-35 of the SONAR). The presence of one wild rice plant – or a handful of plants – is not sufficient to establish that the wild rice water would draw human harvesting or provide sufficient food for wildlife, thereby showing that the beneficial use is an existing use. With that said, MPCA is not proposing an absolute threshold for the amount of wild rice that must be present. Instead, MPCA proposes to evaluate if the beneficial use is an existing use individually for each waterbody as part of this (for the ~1300 Class 4D wild rice waters being proposed) and subsequent rulemakings.
7	D	Nancy Schuldt	15.6	MPCA should assess wild rice waters based on the health of wild rice.	"There needs to be an ecologically relevant endpoint or a response variable to is linked to that criteria, that calculated protected sulfate concentration. The PCA is proposing to only use the mean annual sulfate concentration in a wild rice water body as its sole means of assessing compliance. They are not proposing to actually measure the health or conditions or trends in wild rice waters, as they do for other parameters as part of the State's water quality standards." (94, line 14)	To be efficient with resources, MPCA will assess waters as part of our regular 10 year schedule. See SONAR page 154 and page 3 of the Wild Rice Frequently Asked Questions (Exhibit 1013) handed out at the hearing. Because wild rice varies from year to year for reasons other than sulfate/sulfide levels, the wild rice health the year we are in the watershed may not be indicative. The MPCA's goal is to protect wild rice from sulfate, so assessment will be based on sulfate levels. Many standards are assessed solely on pollutant levels compared to the standard.
7	E	Nancy Schuldt	13	Concern that the MPCA will never add additional wild rice waters.	Minnesota tribes have a different perspective of that 1998 rule making that identified 24 wild rice waters. And established these broad narrative standards to protect the water quality and habitat necessary to maintain them. At that time we agreed to provide MPCA with that limited list of wild rice waters with the understanding that it was only a beginning, a token gesture on the part of the State to redress their failure to adequately inventory and monitor wild rice waters in the state for decades. And then, nearly 20 years later, we find ourselves seeing that the agency's continued failure to adequately monitor, inventory and assess wild rice waters... we continue to advocate for a prime broad narrative standard for all wild rice waters... □	The MPCA has developed a specific process for future identification of wild rice waters in the proposed rule and is committed to implementing it. This process includes a pre-rulemaking process to obtain and review information on wild rice waters every three years. See pp. 58-64 of SONAR and 7050.0471 Subp. 2 in proposed rules.
7	F	Nancy Schuldt	11.1	Do not include Fond du Lac waters	Fond du Lac does not want the state to include our reservation wild rice waters in their published lists of Class 4D waters in the rule...we do not believe that the MPCA's proposed wild rice water quality standards are protective and we do not want there to be any misperception...that we in any way support or condone the rule revisions.	The MPCA in this Response is proposing to remove all waters within the Band's reservation from the list of identified wild rice waters in part 7050.0471. See Attachment 1 response to topic area 11.1.
7	G	Nancy Schuldt	2.1	Higher sulfate numbers (1500 mg/L and up) are not justified.	The number of 1600 to 2500 ppm sulfate advocated by Mr. Arbogast is roughly the concentration you drink before you have a colonoscopy... there is a reason why we have a 250 ppm drinking water standard. That science that is being promoted by certain parties is not defensible. (97, line 14)	Statement-no response required
8	A	Linda Herron	14	History of the standard is troubling, particularly lack of enforcement of existing standard.	99, line 25	MPCA recognizes and takes the responsibility seriously to uphold the Clean Water Act, and intends to fully enforce the revised sulfate standard.
8	B	Linda Herron	15.4	Concern about duration and frequency.	The new proposed standard...would also...preclude the enforcement of sulfate limits unless the levels of sulfate contamination violations occurred at least two times in ten years. That is, if it occurred only one time, there would be no violation investigation.	The MPCA's discussion of the reasonableness of the one in ten year frequency is provided on page 82 of the SONAR. The duration and frequency are based on what is needed to protect rice. Note that permit limits are set to ensure that the standard is met and are then enforced. Any violation of an effluent limit may lead to an enforcement action.

8	C	Linda Herron	15	Concern about how long it will take to implement the standard.	The MPCA has admitted that it would take at least ten years to set new sulfate limits for each individual Minnesota wild rice water. This borders on ridiculous.	It is not uncommon for many years of data gathering to be necessary before a standard can be fully implemented in permits. Even if the MPCA set a single number as the sulfate standard, it would take time to gather data about sulfate levels in surface water and effluent. see also Cover memo to this response.
8	D	Linda Herron	15.4	Political influence on process. Too many loopholes and allows for too many violations without enforcement.	The extremely laborious and unscientific process of changing the sulfate rule seems highly politically charged. How could this new standard, with its time-consuming process and so many loopholes, allowing for multiple violations without adequate enforcement, possibly protect Minnesota's wild rice waters. It cannot and would not.	The MPCA's discussion of the reasonableness of the one in ten year frequency is provided on page 82 of the SONAR. The duration and frequency are based on what is needed to protect rice.
8	E	Linda Herron	3.1	Maintain 10 mg/L and enforce year round.	102, line 7	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
9	A	Dorie Reisenweber	3.1	Maintain 10 mg/L and enforce year round.	I urge the MPCA to keep and to strictly enforce the ten milligram per liter sulfate standard.	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
9	B	Dorie Reisenweber	24	Sulfide mining always pollutes waters, would lead to heavier loads of sulfates in the water. Scientific studies have shown that high sulfate levels reduce wild rice beds.	103, line 12	MPCA agrees that higher sulfate reduces wild rice when it results in higher levels of sulfide. The MPCA's proposed standard will apply to waterbodies regardless of the type of the discharger that will impact them. This process is not about allowing (or not allowing) copper-nickel mining.
9	C	Dorie Reisenweber	28	Mercury methylation	Additionally, however, higher sulfate levels increase the methylmercury contamination in the water. When fish ingest it, eating those fish is harmful to other animals. Bears, raccoons, human beings... when an expectant mother eats fish laden with methylmercury, it affects the developing fetus...	See Attachment 1 response to topic area 28.
9	D	Dorie Reisenweber	3.1	Support 10 mg/L standard.	Why the change in sulfate limits? In 2014, the MPCA found the ten milligram per liter sulfate standard scientifically valid. From 1973 to 2017, the ten milligram per liter standard was applied. UND biology professor Dr. John Pastor's studies, which began in 2011 and were expected to be completed in 2019, were suddenly halted and moved. The Trump administration's science averse programs, in which the corporate world seems to dictate policy. In the case of the wild rice study, the chamber of commerce, mining representative and other businesses are science averse.	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1 and the Cover Memorandum to this Response. It is a misunderstanding or misrepresentation of the events to say that MPCA originally decided to maintain the existing 10 mg/L standard. In early March 2014 MPCA was preparing to issue a preliminary analysis of the results of the wild rice sulfate study. While the draft report was undergoing internal review and editing, MPCA recognized that the summary of the preliminary analysis was written in such a way that interested parties could interpret it to mean that the MPCA had concluded its work on the data analysis and evaluation of the existing standard. This was not the case; for example, the analysis had not yet had any form of independent peer review. To clarify this point the release of the report was delayed to allow time to revise the summary section to avoid suggesting that a decision had been made when in fact it had not. The preliminary analysis report (SONAR Exhibit 5) was released in March 2014. Through a Data Practices Act request an interested party obtained a copy of an earlier draft of the preliminary analysis, and some commenters have drawn erroneous conclusions about the MPCA's intent based on that earlier draft.
9	E	Dorie Reisenweber	15	It will be costly (time/money) to have a standard for each wild rice water.	Imagine the cost in time and money to employ different standards for each wild rice water in this time of agency budget constraints. Even and agency flushed with funding would find monitoring and enforcing a Herculean task. (106, line 3)	It is not uncommon for data gathering to be necessary before a standard can be fully implemented in permits. Even if the MPCA set a single number as the sulfate standard, it would take time to gather data about sulfate levels in surface water and effluent. The MPCA intends to use our existing monitoring program to be as efficient as possible.
10	A	Debby Allert	28	Mercury methylation	A major concern that we as medical professionals have is the impact the sulfide discharge will have on the level of mercury and methylmercury in our waters. We know the devastating toxic effect of mercury, and in particular methylmercury, in the developing brains of fetuses and young children. (108, line 13)	See Attachment 1 response to topic area 28.
10	B	Debby Allert	Other pollutants	Concern about other heavy metals.	Evidence suggests eliminating Minnesota's ten parts per million sulfate limit in wild rice waters would increase the threat of metal toxicity to our children. Changing the rule is unreasonable and dangerous.	The MPCA has other water quality standards, including water quality standards for heavy metals, to ensure that water is protected from the impact of those pollutants.

11	A	Dave Zentner	3.1	The existing standard is sound.	The standard now in place promulgated in the 1970s has been confirmed to be based on generally sound science, in spite of the attacks by the Minnesota Chamber of Commerce and the iron mining industry that the present standard is not based on reasonably sound science. (114, line 5)	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
11	B	Dave Zentner		Protect and restore rice.	History, in general, confirms strong environmental protections and an overall healthy economy do complement one another. Our goals, the goals of the League: Number one, protect what we have now, restore all that we can that remains or was wild rice	No response required.
11	C	Dave Zentner	20.1	MPCA will not have sufficient budget or personnel support to implement the rule.	In a more perfect world, the proposed model makes some sense. The proposed standard and rule, however, will require robust financial and personnel support, public dollars by our Legislature to do the evaluations, discrete decisions, the illustration about lakes next to each other, the examination and those differences. I do not believe that I or any of us guys can safely conclude that we're living in a time period where that level of support from our Legislature is realistic, given the short life of many Legislative memories and our national gridlock and ourstate and national history over four decades of my life of continuously reducing the investments in our natural resources. (115, line 14)	The MPCA is proposing to use our existing intensive watershed monitoring cycle to gather the data needed to set a numeric sulfate standard for each water. See SONAR page 154 and page 3 of the Wild Rice Frequently Asked Questions handed out at the hearing.
11	D	Dave Zentner	28	Mercury methylation	The impact of the revised standard on mercury contamination of fish does not appear to be adequately referenced or covered.	See Attachment 1 response to topic area 28.
11	E	Dave Zentner	1.2	Wild rice should be protected as a Class 2 use.	We agree with the commentator that clarifying it as native aquatic vegetation under the Class Number 2 is the prerogative that the State needs to have.	The MPCA is not proposing to change the beneficial use. The MPCA believes the beneficial use is appropriately retained in the Class 4 agricultural and wild rice use classification. See discussion on p. 33-35 in SONAR. All of the proposed waters are also listed as Class 2 waters.
11	F	Dave Zentner	10.1	More water bodies should be protected for wild rice.	The list of wild rice waters in northern Minnesota, as I commented earlier, should include all water bodies that currently or in the past supported natural stands of wild rice for a number of reasons. The list is not proposed to do that. (117, line 13)	See Attachment 1 response to topic area 10.1 and SONAR pp. 41-57 for a detailed discussion of how the MPCA evaluated sources to determine proposed wild rice waters.
11	G	Dave Zentner	28	Mercury methylation	We must not overlook the connection between sulfate, sulfide and methylmercury. This is toxic form of mercury is bioaccumulating and likely causing long-term health consequences to humans.	See Attachment 1 response to topic area 28.
12	A	Carl Sack	28	Mercury methylation	I wonder if it's safe to feed him local lake trout and salmon, knowing that the rates of methylmercury contamination in the Lake Superior. I wonder, you know, will he have wild rice to eat when he's older?	See Attachment 1 response to topic area 28.
12	B	Carl Sack	21	Wild rice is an important part of the culture.	it's an indelible part of our cultural fabric here in the north woods. And with the vast amount of sulfide ore body exploration,...I can imagine a northern Minnesota without wild rice in the future.	The MPCA understands the importance of wild rice to the tribal communities. The SONAR discusses this importance, including in the section on environmental justice (page 133) and in the regulatory analysis.
12	C	Carl Sack	20	Revision to the rules is a result of political pressure.	I would like to ask, urge you to include the back history that has been left out, including the 2009 enforcement order by the EPA, the role of the mining industry lobby in pursuing to stop this enforcement of the rule of land and pushing for the 2011 bill that, you know, is resulting in this process. (122, line 11)	The MPCA's reasons for undertaking the rule revisions are described in the SONAR on page 12 and in the section on general need starting on page 19.
13	A	Lyz Jaakola	23	Wild rice is a staple food and necessary for survival.	Wild rice is our staple. Without it life is very difficult, if not impossible. I can't eat flour or much of what the standard American diet is. My system can not digest what most Americans consider food now...We eat traditional food, we can survive and that requires clean water, rice and healthy ecosystem.	The MPCA understands the importance of wild rice to the tribal communities. The SONAR discusses this importance, including in the section on environmental justice (page 133) and in the regulatory analysis. Further see response to topic area 23.
13	B	Lyz Jaakola	3.1	Maintain 10 mg/L and enforce.	We need to keep the current standard at ten milligrams per liter. We need to more thoroughly and stringently enforce it.	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1

14	A	Allen Richardson	3.1	Enforce the existing standard; changing it is because of political/mining pressure.	I want to say that the political fingerprints of the mining industry can be seen all over this process and I want to encourage the MPCA to find the political will to enforce the existing standards. (127, line 21)	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
14	B	Allen Richardson	24	Protecting wild rice is the price of doing business	protecting wild rice is the price of doing business. Mining companies who denounce the wild rice standard as being bad for jobs, what they have is an economy problem.	Statement- no response required.
14	C	Allen Richardson	15	MPCA's history shows that they will not allocate staff hours to measure individual sulfide levels.	Given the MPCA's history of lackadaisical enforcement, it is simply not believable that MPCA would allocate the staff hours to measure individual sulfide levels on a lake by lake basis. (129, line 16)	The MPCA is proposing to use our existing intensive watershed monitoring cycle to gather the data needed to set a numeric sulfate standard for each water. See SONAR page 154 and page 3 of the Wild Rice Frequently Asked Questions handed out at the hearing.
15		Dave McMillan	3	Science is not sufficient to move forward with the rulemaking.	I don't believe the science is adequate or sufficiently mature to go forward and implement a rule of this scope, this magnitude or this consequence. The hydroponic research at the test tube level, work in the lab, is just conflicted, I believe. There is evidence on either side of that. (132, line 18). The mesocosm level research is very limited and of limited and questionable academic quality. And the field data, which does exist, correlates in some cases with the lab work and, in other cases, not so much. So, I'm not standing up here to criticize the science, just simply to say that I don't believe that it's adequate to go forward and do what we all want to do, which is protect wild rice.	The MPCA's proposal is based on sound peer reviewed science as described in the Cover Memorandum to this Response. A discussion of how costs can be considered in relation to the proposed sulfate standard is also provided in the MPCA's cover memo to this response.
16	A	Anna Marie Yliniemi	14	Concern about lack of enforcement.	I don't have a lot of confidence in the regulation enforcement. We've seen far too much evidence that the funding is continually being cut and their track record is not particularly good on...dealing with violations. (134, line 21)	There are a variety of reasons why a sulfate limit has not been included in historical NPDES permits for the current sulfate standard of 10 mg/L. MPCA recognizes and takes the responsibility seriously to uphold the Clean Water Act and fully intends to implement water quality based effluent limits where a wastewater treatment facility demonstrates the ability to cause or contribute to a downstream impairment.
16	B	Anna Marie Yliniemi	13	There is no opportunity for adding waters.	A lot of the decisions and waterbodies have already been defined and that is kind of a closed list. (135, line 7)	The MPCA has developed a specific process for future identification of wild rice waters in the proposed rule and is committed to implementing it. This process includes a pre-rulemaking process to obtain and review information on wild rice waters every three years. See pp. 58-64 of SONAR and 7050.0471 Subp. 2 in proposed rules. The MPCA is reviewing information submitted to add waters during this rulemaking. (Topic area 11.) See MPCA response on 136, line 12 of the transcript.
17	A	Jeremy	33	General comments about not basing the standard on generalizations and averages but to provide specific information for each water body.	pg. 137	Statement - no response required
17	B	Jeremy	39	Work together	We should be fighting together to figure out how we can make this land better, how we can make this ecosystem, which our families will live in, we should be trying our best to keep that to grow and be better.	See Cover Memorandum to this Response.
18	A	Matt Tyler	23	Tribes have treaty rights to harvest wild rice.	Treaty rights are a constitutional obligation. And the 1854 Treaty says that the bands that it covers have the right to harvest wild rice. And what that means is, because of the Constitution says treaties are the highest law of the land and this Treaty says that they have the right to do wild rice, we really can't afford to screw this up. (141, line 5)	See Attachment 1 response to topic area 23.
19	B	Matt Tyler	30	Genetic diversity	Minnesota and Wisconsin are the epicenter of genetic diversity for wild rice.	The proposed rule is about protecting wild rice from the impacts of sulfide; genetic diversity is out of scope.
19	C	Matt Tyler	25	Important to get this standard right.	We have to remember to zoom out past our own narrow political concerns and short-term concerns and realize that there are some very big things at stake. we have to get this right. (142, line 15)	Statement - no response required

19	D	Matt Tyler	20	The Chamber of Commerce and Legislature have been working to weaken the standard.	One of the things that I find very upsetting about it is that, early on in this process, people at the chamber of commerce and so forth and so on will raise an argument that, well, the existing ten parts per million standard isn't good enough. It's just that - and there's not enough experimental evidence. Okay. Maybe there's some merit to that. Sure. But then, the Legislature, you know, there's all of this stuff in the Legislature trying to weaken the standard by Legislative fiat. You know, not supposed to be legal under the Clean Water Act.	Statement - No response needed.
19	E	Matt Tyler	3.1	Science seems to support keeping the existing standard.	And here, we have reputable scientists with many publications doing good research. Maybe not complete research. There's still many questions- I'll concede that. But, we have experimental evidence that comes out and I have reviewed it. Looking at it, I go "Hmmm. This looks like it does confirm the ten part per million standard and its experimental evidence." That's better evidence than we had before.	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
19	F	Matt Tyler	20	144, line 15	There is an Iron Range delegation has a hissy fit, threatens the MPCA. And then, there's this new equation that comes up.	Statement - No response needed.
19	G	Matt Tyler	3.1	Maintain 10 mg/L.	given the moral severity and the constitutional obligations involved, we have to take the most protective standard that we have and that's supported by experimental evidence, which is ten parts per million.	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
20	A	Gerry Lambertson	3.1	Maintain 10 mg/L.	I am opposed to any change to the State's sulfate standard as the integrity of wild rice waters and their products are far too valuable to endanger in pursuit of short-term financial gain. (147, line 12)	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
20	B	Gerry Lambertson	23	The state needs to honor its treaty obligations	it's critical that the State of Minnesota honor its treaty obligations within the communities which ensure their continued access to wild rice and other resources within the territory. (149, line 7)	See Attachment 1 response to topic area 23.
21	A	Danka Aubid	2	Sulfate standard has gone up over the years, go back to the original standard.	Back in the day when the mining era first started, they wanted the sulfate standards to be at 2.3. Back then, we even thought then that was too high of a number because it would decimate the wild rice. Further on, and I think it was like in 1943. Well, keep in mind that in 1924 we were finally recognized as U.S. citizens. In 1943, they raised that sulfite standard up to 2.7. And just like what we heard in 1970, it was raised up to ten. And then, it's been continuously going on from there and now they want to raise that standard up even higher.	MPCA does not have information regarding these numbers cited as previous standards. Only the 10 mg/L standard has been adopted into the state water quality standards.
21	B	Danka Aubid	21	Wild rice quality has gone down in recent years.	150, line 1	Statement- no response required
21	C	Danka Aubid		General environmental comments	I'm also giving voice to those animals that are the marine life in these waters. If we take a look at them, you can see some of the abnormalities that have become normal. The three-legged frogs, two-headed frogs, the fish with one fin and, you know, we can gather as much data and support that we can show you what...What it's like for these waters.	Statement - no response required
21	D	Danka Aubid	2	Sulfate standard has gone up over the years, go back to the original standard.	What I would like to see is that these companies, these mining companies, bring that standard back to 2.3, where it was considered a healthy stand of wild rice no matter which lake we were in. (152, line 12)	MPCA does not have information regarding these numbers cited as previous standards. Only the 10 mg/L standard has been adopted into the state water quality standards.
22		Algin Goodsky	21	Discussion of general problems and historic response to problems, pollution and social priorities.	153, line 14	Statement--no response required.
23		Korii Northrup	21	Discussion of historic wild rice camps, Native American culture, and value of rice.		The MPCA understands the importance of wild rice to the tribal communities. The SONAR discusses this importance, including in the section on environmental justice (page 133) and in the regulatory analysis.

24		Lisa Fitzpatrick	23	Supports tribal knowledge about rice.	I believe we need to support all our tribes and the scientists can keep the existing standard to keep wild rice growing and healthy for future generations and according to the Treaty rights. (Page 160, line 9)	See Attachment 1 response to topic area 23.
25	A	Deanna Erickson	20	This policy is based on politics and not science.	I also see conflicting political energies in the state, particularly strong at this time. And those energies are directed towards enabling sulfide mining to occur in our state. And I see this effort really as being directed at modifying regulations for the benefit of the mining industry. And I have a great deal of respect for folks who do the research to produce policy, but I do believe that this is a political policy and not a policy based on decades of research regarding sulfate and wild rice. (162, line 13)	Statement - No response needed.
25	B	Deanna Erickson		General environmental comments	We are lucky. we are so blessed to have this resource here. And to have it compromised in the area, where we are already looking at increasing compromises from...In the nation, increased storm events, increased flooding, increased pests, increased mold, increased diseases that are impacting rice and a potential loss of traditional life ways all happening at the same time, seems unacceptable.	Statement - no response required
25	C	Deanna Erickson	28	Mercury methylation	It also compromises or, perhaps, does not properly take into account the role of mercury in our system and the presence of mercury in response to the presence of sulfate and sulfide.	See Attachment 1 response to topic area 28.
26	A	Winona LaDuke		Comments about the conflicts with the MPCA's hearings and the Dept of Commerce hearings about pipelines.	166, line 12	The MPCA made an effort to minimize conflicts with the hearings, we do want to ensure that everyone is able to participate.
26	B	Winona LaDuke		Wild rice is already declining and this will not improve it.	you have a proposal that will attack the same wild rice territory that has not yet been contaminated by (inaudible). Noting, of course, that 70 percent of the wild rice in the state of Minnesota has already been destroyed by poor management practices, by the State of Minnesota...and now we are looking at the last 30 percent. (169, line 2)	See Attachment 1 response to topic area 23.
27	C	Winona LaDuke		General environmental comments	And what I'm telling you is that that is absolutely wrong...To destroy your mother. To destroy your mother earth for the benefit of some short-term mining corporation. My personal suggestion to the State of Minnesota is... We would ask the state of Minnesota to think a little bit more long-term. We would ask the State of Minnesota and your agency, of which I am related to, to think about if we're going to be able to live here a hundred years from now or let's just say a thousand.	Statement - no response required
28		Paula Maccabee	5	The standard is not protective because it will allow large increases in sulfate.	None of the research, whether it was John Moyle's research, which actually began in 1930s and extended all the way into the 1970s, none of his research found wild rice growing in conditions were that high a level of sulfate and none of the studies that were done by the University of Minnesota did either...it is important that people realize that in significant parts of the state, in particular some of those that have mining, the levels of sulfate that would be allowed are far higher than anything we've ever seen allowed before in Minnesota.	The MPCA notes that actual calculated sulfate standards are not yet available. Also, as noted in the SONAR on page 28, Minnesota's antidegradation requirements also provide water quality protection. Antidegradation is a state's decision-making framework regarding evaluation of impacts to water quality resulting from proposed new or expanded discharges. The antidegradation framework ensures, as applicable, that existing beneficial uses are maintained and protected, that degradation is minimized to the extent prudent and feasible, and that high water quality is lowered only where necessary for important economic or social benefits. When a new or expanded discharge is proposed that would cause or contribute to a net increase in loading of pollutants (or other causes of degradation), the project must be reviewed. MPCA may issue a permit only when existing uses and the water quality necessary to preserve those uses are maintained. A key part of an antidegradation assessment is an analysis of alternatives that prevent or minimize pollutants; another is a review of existing water quality and a comparison to expected water quality if the new or expanded discharge is implemented. The antidegradation procedures will provide reasonable level of protection from sulfate degradation of wild rice waters.

28	Paula Maccabee	5	The standard is not protective because it will allow large increases in sulfate.	There's one point that Lake Superior estuary, where the current level of sulfate is about an average of eight milligrams per liter. Under the formula that is being proposed today, the level of sulfate that would be permissible there is over 90. Here is another part of the st. Louis estuary where the current sulfate is 9.7. If that - - this formula that we're talking about today would allow 122 milligrams per liter of sulfate. There is another third part of the estuary where there's a little bit of a concern because the level of sulfate is around 16 parts per million. This proposal would allow 245 milligrams per liter... Under this proposal, the Embarrass River would have a sulfate limit of 1,248 parts per million. (173, line 5)	The MPCA did do some sampling in the estuary as part of method development; it is not clear which exact locations the commenter is referring to. It is also not clear if the data is being used that would meet the MPCA's proposed sampling and analytical methods. See response above about antidegradation.
Hearing Exhibit 1017	John Arbogast		Exhibit reflects testimony		No additional response
Hearing Exhibit 1018	Tom Thompson		Exhibit reflects testimony		No additional response
Hearing Exhibit 1019	Bob Tammen		Exhibit with information about Verna Mize		No additional response
Hearing Exhibit 1020	A	Grand Portage Band (Morrison/Watkins)	23	The Grand Portage, Fond du Lac and Bois Forte Bands retain hunting, fishing, and other usufructory right that extend throughout the entire northeast portion of the state of Minnesota under the 1854 Treaty of LaPointe. State Agencies have a legal responsibility to maintain those treaty resources.	See Attachment 1 response to topic area 23.
Hearing Exhibit 1020	B	Grand Portage Band (Morrison/Watkins)	21	Wild rice is considered sacred by Minnesota's tribes. It is a non-human being, not just an inanimate resource. It is both difficult and of utmost importance to adequately translate and appreciate this worldview in the language of mainstream culture.	The MPCA understands the importance of wild rice to the tribal communities.
Hearing Exhibit 1020	C	Grand Portage Band (Morrison/Watkins)	3.1	Maintain 10 mg/L and enforce year round.	The existing federally approved 10 mg/L sulfate criterion is well-supported by multiple lines of evidence; thus, it should be maintained and enforced year-round. The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
Hearing Exhibit 1020	D	Grand Portage Band (Morrison/Watkins)	1.2	It is inherently offensive to Minnesota tribes to classify manoomin as a crop under the state's agricultural use class. Natural wild rice standards should be classified under Minnesota's Class 2 waters.	The MPCA is not proposing to change the wild rice beneficial use; therefore the beneficial use is appropriately retained in the Class 4 agricultural and wild rice use classification. See discussion on p. 33-35 in SONAR, and hearing Exhibit N.26. All of the proposed Class 4D wild rice waters are also protected as Class 2 waters.
Hearing Exhibit 1020	E	Grand Portage Band (Morrison/Watkins)	1.2	It is incorrect to infer that the natural hydrology required to grow manoomin is irrigation.	The MPCA does not infer that the hydrology that supports wild rice is equivalent to irrigation. The existing Class 4A standard refers not just to irrigation but to "vegetation grown in the waters". The clarified Class 4D wild rice beneficial use does not refer to irrigation.
Hearing Exhibit 1020	F	Grand Portage Band (Morrison/Watkins)	10.3/10.4	Using a minimum stem density or acreage threshold will not sustain manoomin. The stem-density and acreage threshold that MPCA proposes is inconsistent with how MPCA protects aquatic life, such as trout.	While the MPCA considered wild rice density and acreage, we are not proposing a strict stem density or acreage threshold to define wild rice waters. It was clear throughout consultation that the tribes were against such a threshold and therefore the MPCA removed a draft threshold from the proposed rule in favor of a more flexible approach as described in the SONAR, pg 41 - 51. The commenter notes that the MPCA protects trout streams based on habitat suitability, that the MPCA has designated trout streams based on the historical presence of trout, and that MPCA then may assess streams as impaired. The MPCA is proposing a similar regime for wild rice. Wild rice waters have shown the use since 1975, even if they do not show the use today. Ultimately, assessment of a wild rice water as impaired will depend on the sulfate levels compared to the standard, not the presence of rice.

Hearing Exhibit 1020	G	Grand Portage Band (Morrison/Watkins)	Data	MPCA claims there is not sufficient data to assess whether sparse stands of manoomin are indicative of natural seasonal variability or population decline, and further claims that there is a lack of sufficient data to assess any wild rice waters as impaired.		At this point the MPCA has not developed a clear assessment methodology for determining if wild rice waters are impaired for sulfate. The MPCA will do so, and expects that assessment of a wild rice water as impaired will depend on the sulfate levels compared to the standard, not the presence or variability of wild rice.
Hearing Exhibit 1020	H	Grand Portage Band (Morrison/Watkins)	13	Many water bodies that should be afforded protection will never get it.	Unless MPCA invests staff time to annually evaluate every waterbody on the DNR list that has been excluded, it is highly probable that the list of wild rice waters will never include many water bodies that should be afforded protection.	As noted, the MPCA has developed a process for future identification of wild rice waters. We will accept information from others about wild rice waters that need to be added.
Hearing Exhibit 1020	I	Grand Portage Band (Morrison/Watkins)	1.6	Any lowering of water quality below a full level of protection is not allowed without a use attainability analysis. The MPCA does not rely on a use attainability analysis or equivalent study to identify the waterbodies that need protection. MPCA in effect delisted wild rice waters with an existing use.		See response to Topic Area 1.6 in Attachment 1.
Hearing Exhibit 1020	J	Grand Portage Band (Morrison/Watkins)	10.1	The DNR 2008 list is regulatory and should be used.		See Attachment 1 response to topic area 10.1
Hearing Exhibit 1020	K	Grand Portage Band (Morrison/Watkins)	8.1	MPCA's efforts to delist waterbodies based on an existing use are inconsistent with the current narrative WQS that require that the quality of listed and unlisted wild rice waters not be materially degraded.		The MPCA's proposal does not delist waterbodies. The narrative standard has only ever applied in the listed waterbodies (designated [WR]) as clearly demonstrated in the rule record for the 1998 rulemaking. See the SONAR for this rulemaking at p 28 - 30, especially SONAR exhibit 16, pg 15.
Hearing Exhibit 1020	L	Grand Portage Band (Morrison/Watkins)	3.4/15.1	Based on MPCA's efforts to implement other site-specific criteria, we do not believe that the MPCA has enough staff, time, and resources to implement the criteria.		The MPCA is proposing to use our existing intensive watershed monitoring cycle to gather the data needed to set a numeric sulfate standard for each water. See SONAR page 154 and page 3 of the Wild Rice Frequently Asked Questions handed out at the hearing.
Hearing Exhibit 1020	M	Grand Portage Band (Morrison/Watkins)	31.6	Consultation was inadequate - it was notification. You can see this in the definition of wild rice waters and the number of waterbodies excluded.		The MPCA has a tribal consultation process, which was used extensively in preparing the wild rice rule. See attachment 1 response to topic area 31.6. See also exhibit N.26, which summarizes how the MPCA considered Tribal comments.
Hearing Exhibit 1020	N	Grand Portage Band (Morrison/Watkins)	11.1	Remove Grand Portage waters, Grand Portage will enforce their own standard.		The MPCA apparently misunderstood the feedback we received from Grand Portage during consultation. Waters wholly within the reservation boundaries will be removed. See response to topic 11.1.
Hearing Exhibit 1020	O	Grand Portage Band (Morrison/Watkins)	11.1	Listing 1318 waters instead of 2329 due to lack of data is indefensible. Also MPCA has refused to list 1854 waters. MPCA and Grand Portage have a Cooperative Agreement for shared waters that MPCA is ignoring.		See Attachment 1 response to topic areas 10.1 and 11.1
Hearing Exhibit 1020	P	Grand Portage Band (Morrison/Watkins)		December 18, 2015 Letter from Grand Portage and Fond du Lac Bands.		These comments were submitted at a prior point in the process and MPCA has reviewed them. They were not specifically referenced at the hearing or in the letter from the Grand Portage Tribal Council.
Hearing Exhibit 1020	Q	Grand Portage Band (Morrison/Watkins)	23, 31.7	May 25, 2017 Letter from Minnesota Indian Affairs Council.		See response exhibits N25 and N26.
Hearing Exhibit 1021		Linda Herron		Exhibit reflects testimony		
Hearing Exhibit 1022		Anna Marie Yliniemi		Exhibit reflects testimony		
Hearing Exhibit 1023				wild rice		

---

Hearing Exhibit 1024	Debbie Allert	Exhibit reflects testimony, map of Lake Superior, and a series of articles, letters and petitions regarding mercury health effectsMap of Lake Superior
-------------------------	---------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------

---

Comment ID	Part ID	Commenter Name	Topic	Paraphrase/Summary of Comment	Excerpt and Location of Comment (transcript line number)	Response or Response Location
1	A	Dennis Good	18	Flexible standard will be no standard; variances will be given to everyone.	This flexible standard is going to turn out to be no standard at all. Because variances will be routinely given and everybody will plead poverty and nobody will do anything. (65, line 20)	The MPCA will likely use variances in the permitting process, at least in the near future, due to the high cost of sulfate treatment. But facilities with variances still must identify and implement affordable options for minimizing sulfate discharges, which will benefit wild rice. In addition, technological advances may lead to better treatment options in the future, which has been the case with other pollutants. Variances have to be reviewed periodically, so they can be adjusted as economic conditions change or more cost-effective treatment technologies emerge. Variances can be renewed if the conditions that led to the variance persist.
1	B	Dennis Good	3.1	Keep the 10 mg/L standard.	That 2011 study validated the ten milligram standard. I didn't get the peer review because that study was yanked off the PCA's website. (66, line 1)	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1. It is a misunderstanding or misrepresentation of the events to say that MPCA originally decided to maintain the existing 10 mg/L standard. In early March 2014 MPCA was preparing to issue a preliminary analysis of the results of the wild rice sulfate study. While the draft report was undergoing internal review and editing, MPCA recognized that the summary of the preliminary analysis was written in such a way that interested parties could interpret it to mean that the MPCA had concluded its work on the data analysis and evaluation of the existing standard. This was not the case; for example, the analysis had not yet had any form of independent peer review. To clarify this point the release of the report was delayed to allow time to revise the summary section to avoid suggesting that a decision had been made when in fact it had not. The preliminary analysis report (SONAR Exhibit 5) was released in March 2014. Through a Data Practices Act request an interested party obtained a copy of an earlier draft of the preliminary analysis, and some commenters have drawn erroneous conclusions about the MPCA's intent based on that earlier draft.
1	C	Dennis Good	28	Mercury methlation	Sulfates play a crucial, indispensable role in converting elemental mercury to methylmercury. And Dark Lake on the Dark River has some of the highest levels of methylmercury in the state. I'd like to ask, if methylmercury was considered as part of this standard, what would the standard have to be, then, to control them.	See Attachment 1 response to topic area 28.
1	D	Dennis Good	24	The standard is being changed so Minntac does not have to clean up their tailing basin.	We're here because this is happening because Minntac U.S. Steel does not want to clean up the tailings basin. Ever.	Statement - no response required. Issues related to any specific facility are out of scope for this rulemaking.
1	E	Dennis Good	11	Dark River and Dark Lake should be wild rice waters.	They don't want the Dark River and Dark Lake to be part of that wild rice waters list. It's not on there now. And that's because sulfate levels, the 2014 numbers I have, runs between 900 and 1100 milligrams per liter...so, you can see why we'll never wind up on a wild rice waters list with numbers like that. Even though there is --oh, I can think of half a dozen places on that river, and the lake, where wild rice would grow. (p. 67, line 22)	Discussion of the MPCA's evaluation of Dark Lake and Dark River is addressed in Attachment 1 under Topic 11.
2	A	Rob Ecklund	25	The MPCA's standard is not based on sound science.	The Legislature has enacted laws providing the MPCA time and resources to carry scientific and economic analysis to modernize the rule, with the the goal of understanding the standards to be science based and ecologically and economically justified. As a result, we are deeply concerned that the MPCA still released a draft rule based on science that had significant research flaws and did not take into consideration all of the information available, particularly from communities, municipalities and industry that represent a wide swath of northern Minnesota. (69, line 13)	The MPCA's proposal is based on sound peer reviewed science as described in the cover memo. A discussion of how costs can be considered in relation to the proposed sulfate standard is also provided in the MPCA's cover memo to this response.
2	B	Rob Ecklund	37	MPCA cannot show the proposal will result in healthier wild rice	The MPCA staff is well aware of these cost concerns attributed to this proposed rule. To make matters worse, the MPCA has publicly acknowledged that, even with these huge expenditures, that they do not know if the treated discharges will result in healthier wild rice.	The MPCA's response is provided in Attachment 1 under Topic 37.
2	C	Rob Ecklund	31.5	MPCA needs to provide cost information	Minnesota law requires that the MPCA complete an analysis of costs complying with its proposed rule before proceeding.	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
2	D	Rob Ecklund	19.4	MPCA should wait for the cost study.	It appears that the MPCA Commissioner has chosen to ignore our Legislative action and the cities' requests and is proceeded... And is proceeding to rule making before completing the analysis that the Legislature funded.	A discussion of the LCCMR Study is provided in the MPCA's cover memo to this response

2	E	Rob Ecklund	4.2	Peer review panel input shows supporting science is inaccurate.	According to the MPCAs own peer review group, led by scientists and experts in their field of study, whose sole charge is to review the science before the MPCA, this standard and supporting science is inaccurate and not reputable. (71, line 19)	Information on peer review is provided in the cover memo.
2	F	Rob Ecklund	3.9	The error rate is too high; industry should not have to spend money to comply with a standard that is so likely to be wrong.	The error rate of the proposed MPCA equation is approximately 15 to 20 percent. We are concerned that the major employers on the Iron Range would take millions of dollars to comply, when the error rate is so high. (71, line 25)	See responses about error rate in the Cover Memorandum to this Response and in Attachment 1 response for topic area 3.9.
2	G	Rob Ecklund	2.3	Rice is impacted by many factors.	If you talk to the local ricers that I represent, they will tell you that rice growth and healthy stands depend on many things, from water depth to cattail growth to heat and amount of rainfall. (72, line 10)	The MPCA agrees that factors other than sulfide may also have an effect on wild rice; this does not negate the need to protect wild rice from the impacts of sulfide. See also discussion in the TSD, Chapter 1B, beginning on page 23.
3	A	Pete Stauber	19	The flawed standard will result in devastating costs.	Failure to adjust the proposed standard to be reasonable and science-based will result in devastating financial impacts to cities and businesses throughout Minnesota, especially on St. Louis County's economically distressed Iron Range. (74, line 1)	Statement - no response required
3	B	Pete Stauber	33.1	The 10 mg/L standard is flawed.	Recently, and only after a few parochial interest groups started pressing the MPCA to enforce it, did people fully understand and realize the old standard was obsolete and fundamentally flawed.	A discussion of the need for the revisions is provided in part 2 (page 19) of the SONAR
3	C	Pete Stauber	4.2	Peer review panels raised concerns	The MPCA's rule making process should always be science-based and inclusive of all available research. Unfortunately, this wasn't the case here. In fact, significant concerns were voiced about the process used to set the new standard; your own MPCA-organized peer review panel criticized much of the toxicity testing and research, the very basis by which most of the proposed new standard was determined. Despite the peer review concerns, however, the testing and research was already done.	Information on peer review is provided in the cover memo.
3	D	Pete Stauber	2.3	Rice is impacted by many factors.	There were other important factors which were also completely missed or ignored, which shouldn't have, including several known wild rice stressors, such as water depth, water clarity, fluctuations in hydrology, invasive species and shoreland development. Without their full inclusion and a thorough analysis of these other important factors, Minnesotans have no choice but to conclude the proposed new standard is simply fundamentally flawed. (75, line 8)	The MPCA agrees that factors other than sulfide may also have an effect on wild rice; this does not negate the need to protect wild rice from the impacts of sulfide. See also discussion in the TSD, Chapter 1B, beginning on page 23.
4	A	Douglas Hawkins	4.3	No relationship between sulfate, TOC and iron and the presence or absence of wild rice.	My first key point is the proposed sulfate standard... does not differentiate between water bodies that do and do not contain wild rice...Now it's not because the MPCA did a bad job with their modeling. The fact of the matter is that there is no relationship between sulfate, TOC and iron and the presence or absence of wild rice. (77, line 18)	See Attachment 1 response to topic area 4.3.
4	B	Douglas Hawkins	4.3	Sulfide explains only 10% of the variability in the presence or absence of wild rice.	If we turn to sulfide, sulfide is somewhat predictive of the presence or absence of wild rice. Statistically significant, not really strong. It explains ten percent of the variability in the presence or absence of wild rice. Now, it may be the most powerful of the three factors looked at at MPCA, but it is still a small player. Ninety percent of the variability is still there. Now, the MPCA assessment found quite (inaudible) behavior for the sulfate standard. But the reason for that is that they're not predicting wild rice. They're predicting sulfide. We're not here to look after sulfide. We are here to look after wild rice. When you take the sulfide, the monkey in the middle, out of the picture, the association just goes away. (78, line 21)	See Attachment 1 response to topic area 4.3.
4	C	Douglas Hawkins	4.3	Sulfide, sulfate, TOC, iron - all vary within a waterbody.	All of these analyzed items, the sulfides, sulfate, sulfide, the TOC and the iron vary substantially from time to time within a water body. The variability within a water body is comparable to that between water bodies. So, these chemistries are rapidly moving forward. Sulfate, TOC and iron are statistically significant predictors of sulfide, but they're not very accurate. Most of the variability in sulfide is still there even after you do the prediction. So, I think these are fundamental difficulties with the analyzes that are being carried out, with the conclusions. (79, line 8)	See Attachment 1 response to topic area 4.3.

4	D	Douglas Hawkins	4.3	120 microgram/L sulfide is not supported by the data.	The proposed standard of 120 is not well supported by the data. There is a wide range of cutoffs on sulfide, which will just trade off with specificity, more or less on a one-for-one basis. So, this number is no line in the sand. I am concerned that the sulfate standard is going to lead to a lot of time spent on wild goose chases, looking for problems where there aren't any and ignoring problems where there are. The effort spent on enforcing the standard might better be spent on looking into the more fundamental issues of why wild rice is or is not there. Not on a water-body-by-water-body basis. (80, line 14)	See Attachment 1 response to topic area 4.3.
5	A	Dale Lueck	3	MPCA is on the right track but science is not complete.	I think we're probably on the right track, general track, with how we're looking at this, but I don't think we've accepted and found all the science available yet to be able to effectively promulgate this standard. (84, line 22)	The MPCA interprets this as meaning it is the right track to remove the existing standard. The MPCA notes that the decision to remove the 10 mg/L standard is not a separate decision from the proposed equation.
5	B	Dale Lueck		intent to protect wild rice	We want to do it right. Unlike the old rule, which basically has never been enforced, you know, we do intend to fully protect wild rice. But, we've got to make sure we do it right.	Statement- no response required
5	C	Barbara Courneya	3.1	Keep the 10 mg/L standard.	the existing standard limits sulfate discharges to a flat limit of ten milligrams per liter, which seems to have been working since we have lots of wild rice in our rivers and streams and our lakes. (87, line 10)	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1.
6	A	Barbara Courneya	10	Many wild rice lakes and streams might not be regulated.	1300 lakes and streams have been identified as containing wild rice beds. The actual number is likely far greater as it is generally accepted that not all wild rice lakes and streams have been identified to date. That means that custom standards would only be applied to those bodies of water already identified. This could result in many wild rice lakes and streams not being regulated at all. (87, line 22)	The MPCA acknowledges that not all wild rice waters have been identified and is proposing a specific process for future identification of wild rice waters (proposed 7050.0471, subp. 2) A discussion of the proposed process is in SONAR pp. 58-64.
6	B	Barbara Courneya	15.1	It's very hard to believe that 1300 bodies of water can receive an analysis in a timely manner.	Given that current reductions in fines for environmental protection, it's very hard for me to believe that 1300 bodies of water could even receive an analysis of the existing sulfide level in a timely manner. And even if they were successful in determining the existing sulfide level, it would then be necessary to individually calculate how much sulfate that body of water could handle in discharge water to maintain the proper sulfide level. How much often that testing have to happen to confirm that the right formula had been applied and that sulfide levels were still acceptable? Wouldnt' this be a moving target? Is it really workable. How much often that testing have to happen to confirm that the right formula had been applied and that sulfide levels were still acceptable? Wouldn't this be a moving target? Is it really workable? Further complicating matters appears to be the fact that the impacts of carbon and iron in the sediments are not agreed upon. There's disputes in that area. Overall, this sure sounds like a chemistry experiment destined to fail in the protection of wild rice. Minnesota's wild rice crop is far too important to get this wrong. (88, line 12)	See discussion of the implementation process in the Cover Memorandum to this Response as well as in the TSD (pgs. 84-98) and SONAR (pgs. 83-87 and 96-105) and in Hearing Exhibit 1013.
7	A	Gerard Bettendorf	19	costs are prohibitive	The potential costs to the municipalities of this proposed rule should not be understated. We have seen preliminary cost estimates, showing cities could be forced to spend tens of millions of dollars to meet this standard. Such costs would place an undue hardship on our community and many other communities.	See cost discussion in the cover memo.
7	B	Gerard Bettendorf	18	the granting of variances is not guaranteed	We appreciate that proposed rule would waive the variance fee for municipalities. But, the need for variances is evidence that the standard is unreasonable. Further, the granting of a variance is not guaranteed, must be approved by the EPA and merely delays costs. (91, line 14)	The MPCA disagrees that the need for variances indicates a fundamental unreasonableness of the standard. Variances are a reasonable response to economic or technological limitations that preclude the immediate implementation of the standard.
7	C	Gerard Bettendorf	2.3	What other sources contribute to this problem?	We are also curious what other sources the PCA has looked at as a contributing factor to this problem. Have they been identified? And what are you doing about their potential contribution? (91, line 24)	Unclear what problem and contributing source are being referred to. The MPCA agrees that factors other than sulfide may also have an effect on wild rice; this does not negate the need to protect wild rice from the impacts of sulfide. See also discussion in the TSD, Chapter 1B, beginning on page 23.
8	A	Peder Larson	31	APA-related issue	My comments relate to your standard of review in 1400.2100 and whether the PCA is adopting this rule in compliance with the procedural requirements	Comments relating to the MPCA's compliance with the state Administrative Procedures Act are addressed in Attachment 1 under Topic 31.

8	B	Peder Larson	31.5	APA-related issue	My comments relate to Minnesota Statute 14.131, Sonar Requirements. Specifically, Number 3, related to the determination of whether there are less costly methods or less intrusive methods for achieving the purpose of the proposed rule. Number 4, whether there are alternative methods for achievement of purpose of the proposed rule that were seriously considered and why they were rejected and, of course, the probable costs of the complying with the proposed rule.	Comments relating to the MPCA's compliance with the state Administrative Procedures Act are addressed in Attachment 1 under Topic 31.
8	C	Peder Larson	31	Relationship of state rules to Clean Water Act Requirements	The Agency could have, in their proposal, have deleted the ten milligram per liter standard under the Clean Water Act and been left with their language in 7050.0224, subdivision 1, which is the narrative standard that you're probably familiar with. It's the wild rice is an aquatic plant and resource and it relates to the WR waters. That's perfectly acceptable under the Clean Water Act. The Clean Water Act doesn't require the Agency to do anything else...The Agency here is talking about a subcategory of the use. the agency has discretion in deciding whether to establish that in how they act. Because they have that discretion, its a state law issue and they have to comply with the Administrative Procedures Act. (96, line 6)	In Response Exhibit N.30 the MPCA provides a letter from U.S. EPA explaining the relationship between state and federal standards.
8	D	Peder Larson	31.5	APA-related issue	Chapter 14 requires an analysis of the probable costs of complying with the proposed rule. You've heard from the Agency and this is a quote, I believe, I haven't looked at the transcript, "In water quality standards setting, we are not allowed to consider costs." In the Sonar, at Page 165, the Agency says, "It's important to note that providing additional detail regarding cost estimates would not change the proposed rule revisions." They also state later that there will be ample opportunity later, on Page 165, to consider costs. Your Honor, they are required to consider costs now under the APA. They're required to comply with the APA in doing their work here. And there is no provision in the Clean Water Act that allows them to violate the APA.	Comments relating to the MPCA's compliance with the state Administrative Procedures Act are addressed in Attachment 1 under Topic 31.
8	E	Peder Larson	19.4	MPCA should wait for the cost study.	this is the Legislative language for the appropriation: "It is to be used to inform the development and implementation of wild rice, sulfate and other water quality standards." That's what that language was appropriated for. It was appropriated to help them in implementation, but it, specifically, also appropriated to inform the development of water quality standards. (98, line 13)	A discussion of the LCCMR Study is provided in the MPCA's cover memo to this response.
8	F	Peder Larson	31.5	inadequate evaluation of costs	The Agency is suggesting, by not considering costs, that they don't have to take those into account here.	Comments relating to the MPCA's compliance with the state Administrative Procedures Act are addressed in Attachment 1 under Topic 31.
8	G	Peder Larson	31	APA-related issue	I am talking about the policy decision to go beyond eliminating the ten, to go beyond the current narrative standard and adopt this new language. ..I am here to say that they have to comply with that requirement in the APA.	Comments relating to the MPCA's compliance with the state Administrative Procedures Act are addressed in Attachment 1 under Topic 31.
8	H	Peder Larson	31	APA-related issue	There are other provisions ...that are required in the APA...They have to look at alternatives to meet the State's purpose... They should have in their Sonar a description of other options to protect wild rice, outside of simply a water quality standard for sulfate. They have chosen not to include those alternatives in their sonar or analyze them.	Comments relating to the MPCA's compliance with the state Administrative Procedures Act are addressed in Attachment 1 under Topic 31.
8	I	Peder Larson	31	APA-related issue	..page 145 of the Sonar...referred to the second class of people affected by the rule revision are those who want to enjoy the beneficial use of the water quality standards to protect fishing, swimming, boating. On Page 43 of the Sonar, the PCA states, "The wild rice sulfate standard, generally, and in these rule provisions specifically, only have an impact on wild rice where it grows in water bodies that are impacted by sulfate discharges." The APA requires that, when the agency provides a sonar, they have to state how the evidence rationally relates to the choice of actions taken. Their benefits description describe a whole lot of benefits about wild rice. What they don't do is describe how regulation of discharges will affect that enjoyment. ...they don't have information on particularly how many acres they're looking at that are at risk here. How many acres will be better protected if they adopt the standard? .. I suggest that the benefits described will be enjoyed regardless of this rule. (102, line 1)	Comments relating to the MPCA's compliance with the state Administrative Procedures Act are addressed in Attachment 1 under Topic 31.
8	J	Peder Larson	31	APA-related issue	I expect the Agency's information, and I'd like to know the answer to that, would show that a small percentage of wild rice in Minnesota would actually be affected by a discharge.	Comments relating to the MPCA's compliance with the state Administrative Procedures Act are addressed in Attachment 1 under Topic 31.

8	K	Peder Larson	31	APA-related issue	...based on current discharges subject to an MPDS permit, what's the acreage of wild rice... Enlisted wild waters, where it grows in water bodies that are impacted by sulfate discharges? And I understand you might have to estimate that. And then, how does that acreage compare to the acreage of wild rice growing in other wild rice waters, that are proposed for listing but aren't impacted by a discharge?	Comments relating to the MPCA's compliance with the state Administrative Procedures Act are addressed in Attachment 1 under Topic 31.
9		Josh Heintzeman	20	political influences	point out a very relevant concern that I have and many others have, as well. And that would be that the process proposed to give a variance, so speak, to some cities. That's probably not the right word, but an exception in regard to their water treatment facilities, that that process could become political. (106, line 22)	The MPCA's response to comments relating to the public process for the granting of variances are addressed in Attachment 1 under Topic 20.1
10	A	Larry Wannebo		Did the MPCA investigate what controls the nutritional value of wild rice grain?	wondered, though, if that analysis went on to any of the nutritional value and the chemical value of the grain itself? (108, line 16)	The MPCA study did not collect wild rice grain, and so are not able to relate analyses of grain to any environmental variables. There have been studies by others of the nutritional quality of wild rice grain and comparisons made to other grains, but to date the MPCA has not had the resources to investigate this topic.
10	B	Larry Wannebo		mining related issue	Are there some specific industry entities that have pushed for this standard change and for this investigation? Specific industries and by name, company name, and what is their product?	MPCA response in hearing transcript on page 109, line 17,
10	C	Larry Wannebo		question about proprietary information	are there other chemicals that are mixed in with that, that may end up in those local water resources then as part of that discharge?And how would you identify the other chemicals that an industry may say are proprietary (sic) or, you know, that are secret, how would you identify other contaminants that may be linked or bonded to that sulfate?	MPCA response in hearing transcript on page 111, line 9.
10	D	Larry Wannebo		question about proprietary information	I'm curious if that also would happen in the mining industry to say it's a proprietary chemical. It's a trade secret and we're not going to tell you.	MPCA response in hearing transcript on page 113, line 1. Note that confidential business information may still need to be submitted to the MPCA but the MPCA is bound to not make such information public.
10	E	Larry Wannebo	20.1	political influences	They have restricted funding. They have affected budgets....the PCA or other entities will have good intentions of staffing enough and adequately trained people to enforce it. And then, in the next biennium or whatever, the Legislature will come along and they will tighten down the funding that was necessary for the enforcement that they approved in the previous session...And as a citizen here and as a rice eater, that... That really bothers me that they will.	statement- no response required
10	F	Larry Wannebo		intent to protect wild rice	our waters and our wild rice resources are our most valuable assets here and everything that the PCA can do to protect them going into the next hundred years would be appreciated.	statement- no response required
11	A	Joe Mayasich	4.1	The MPCA wild rice study produced a paradigm shift in the understanding of how sulfate affects wild rice.	Now, MPCA staff are to be positively recognized and commended for mobilizing resources, managing the logistics to complete multiple studies in approximately two years. They did an excellent job. Now, all of that effort yielded typical scientific findings. One, it is sulfide, not sulfate, that is the substance of concern to wild rice. Two, it is the sediment, not the water column, that is the environmental media of concern. Three, iron inhibits and total organic carbon stimulates sulfide toxicity.these breakthrough findings benchmark the clear scientific paradigm shift. The paradigm shift represents a red flag, time out moment. That should have been appreciated and leveraged by the MPCA commssioner.(116, line 2)	statement-no response required

11	B	Joe Mayasich	4.1	The phases of the project were not thoroughly planned or systematically completed in a sequential fashion, as the EPA's DQO guidance recommends. Instead, they were essentially started simultaneously. The absolutely critical initial first step of stating the problem was not taken.	Theme 2. ...identifying the data needed to make a sound regulatory decision on a substance of concern is a core tenant of the United States Environmental Protection Agency, which I'll refer to as EPA..."I will now read from the forward of the associated guidance document. "The U.S. Environmental Protection Agency has developed the data quality objectives, DQO, process and specify tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity of data needed to support decisions." The point here is that that guidance was and still is ... available from the Federal agency that the MPCA must interact with and must answer to....how, with the backdrop of the right way and the benefit, I admit, of some 20:20 hindsight, here are the shortcomings of what has unfortunately occurred with regard to the recent efforts to inform the sulfate standard... the absolutely critical initial first step: State the problem. It was never taken...every phase of the wild rice project life cycle is jeopardized with respect to meeting data quality objectives. (117, line 11)	See Hearing Exhibit Response to Exhibit 1030 below
11	C	Joe Mayasich	33.1	The existing standard of 10 mg/L is clearly scientifically untenable.	The previously covered two themes underpin two egregious outcomes. The promulgation of the ten milligram per liter sulfate standard. Dr. Moyle's fieldwork did not assess sulfide, nor did it characterize sediment for iron or TOC. Therefore, the initial sulfate standard is now clearly scientifically untenable. This is fully correctable by sunseting the ten milligram per liter sulfate standard. 120, line 25	See Hearing Exhibit Response to Exhibit 1030 below
11	D	Joe Mayasich	4.1	The MPCA wild rice study was devoid of a Data Quality Objective process.	The proposed rule's reasonableness, now this is the second outcome, is equivocal. The genesis and conduct of the studies underpinning the all important Technical Support Document, the TSD, were devoid of a DQO.. Data Quality Objective process, similar to the EPA's. (121, line 12)	See Hearing Exhibit Response to Exhibit 1030 below
11	E	Joe Mayasich	2.1	It has not been demonstrated that discharged sulfate adversely affects wild rice.	Is there a substantiated need for a sulfate standard, given the conspicuous absence of objective, scientifically sound evidence that discharged...sulfate adversely affects wild rice. (122, line 5)	MPCA-sponsored research readily found a highly significant statistical relationship between wild rice occurrence and sulfide in an analysis of 108 different Minnesota water bodies, as published in a peer-reviewed science journal by Myrbo et al. (2017, Response Exhibit N.2).
11	F	Joe Mayasich	2.1	Every living thing requires sulfur.	we need to remember that everything living requires the ubiquitous sulfur-based ions and their sulfur essence. And I have included for you a sulfur cycle, natural cycle. (122, line 15)	It is true that all living thing requires sulfur. The most common sulfur ion in the environment is sulfate. Human activities can increase sulfate over natural concentrations. There also is a basic principle of toxicology that "the dose makes the poison"--in other words, the toxicity of any substance depends on its concentration. There can be too much of any substance, depending on the sensitivity of the system into which it is introduced.
12	A	Marianne Bohren	4.1	The need for a revised standard has not been established.	The need for and reasonableness of the rule have not been properly considered or established. (125, line 14)	These questions are extensively addressed in the SONAR, sections 2 and 6.
12	B	Marianne Bohren	36	Concerns about membrane treatment	identification of objections to membrane treatment. 1. no facility has installed this technology to reduce sulfate levels, 2. for WLSSD a 600% increase in electrical use, 3. use of chemicals to prevent fouling, 4 salt management issues,5 toxic discharge, 6 cost of installation and maintenance.	A discussion of the problems associated with reverse osmosis is provided in Part 10 D. of the SONAR (pg.178) and in the cover memo to this Response.
12	C	Marianne Bohren	19	costs are prohibitive	For WLSSD, the capital required to construct membrane filtration is estimated at 500 million dollars. You've heard a lot of numbers that say it's going to cost the State a billion dollars. I will tell you, for a facility our size, it is 500 million dollars.	The MPCA understands and has documented that membrane filtration is expensive. However, since sulfate standards are not yet developed it is not yet determined what level of treatment (if any) would be required at WLSSD (or any other facility). Therefore, it is premature to state that facilities will be required to undertake costs of this magnitude. In addition, variances are available where meeting an effluent limit would result in widespread social and economic impacts. See also the Cover Memorandum to this Response.
12	D	Marianne Bohren	19	costs are prohibitive	Annual operating cost to run this system would more than double our current operating costs	The MPCA understands and has documented that membrane filtration is expensive. However, since it is not yet determined what level of treatment (if any) would be required at WLSSD (or any other facility), it is premature to state that facilities will be required to undertake costs of this magnitude. In addition, variances are available where meeting an effluent limit would result in widespread social and economic impacts.
12	E	Marianne Bohren		discussion of costs to users		Variances are available where meeting an effluent limit would result in widespread social and economic impacts.

12	F	Marianne Bohren	18	the granting of variances is not guaranteed	The granting of a variance is a long, complicated process. We know. We have a variance. The time and effort required to obtain a variance is unpredictable and can take several years. And an application for a variance is not a guarantee. The variance process does not address situations where several variances may be needed due to significant and long-term technological challenges, as in the case in treating wastewater for sulfate	MPCA's variance process does allow for multiple variances, and for the reissuance of variances if the conditions that justified granting the variance persist. The MPCA is committed to working with municipal dischargers to streamline the process of getting a variance for the wild rice sulfate rule; that was part of the impetus for the LCCMR study.
12	G	Marianne Bohren	18	the granting of variances is not guaranteed	A five-year MPDS permit with an associated variance can expire far in advance of the new variance being approved. When a variance expires, the permittee is considered out of compliance, even if the new variance is eventually granted. Variances are not considered retroactive. The review and granting of a variance is not under the sole control of the MPCA. And state variances must be approved by the U.S. EPA Region 5, adding more time and uncertainty.	The MPCA is committed to working with municipal dischargers to streamline the process of getting a variance for the wild rice sulfate rule and to ensure that the variance procedure runs smoothly, preventing unnecessary legal exposure for permittees.
12	H	Marianne Bohren	18	the need for variances indicates a fundamental unreasonableness	The MPCA should not be proceeding with rule making for which they anticipate granting variances as a standard implementation practice....The fact that implementation of this rule depends so heavily on the use of variances raises serious doubts about the fundamental reasonableness of the MPCA's approach.(131, line 1)	The MPCA disagrees that the need for variances indicates a fundamental unreasonableness of the standard. Variances are a reasonable response to economic or technological limitations that preclude the immediate implementation of the standard.
13	A	Kurt Anderson	33.1	statement of information available to support elimination of existing standard	Here are the things I would like to see before we move towards removing any protections for wild rice. 1. evidence in a controlled environment showing sulfate is not toxic to wild rice until levels are far above ten parts per million sulfate. We have that. 2. field research that shows that wild rice can thrive in waters that contain excess of ten parts per million sulfate. I'd like to see it in multiple water bodies and I'd like to see it over the course of several years. We also have that information. The information we have on sulfate in wild rice is rigorous, provides a high degree of certainty and its along multiple lines of evidence. (134, line 25)	The MPCA disagrees with the commenter's characterization of the available evidence.
13	B	Kurt Anderson	33.1	eliminate the existing standard	I'm satisfied, as both a scientist and a resident of northern Minnesota, that it is safe to move away from the existing ten parts per million standard and I fully support the decision by the MPCA to remove that part of the standard. (136, line 14)	Statement. However, the MPCA notes that the decision to "remove" with the existing 10 part per million standard is not a separate decision from the proposed equation-based sulfate standard.
13	C	Kurt Anderson	3.7	Because of upwelling groundwater, assuming that sulfate reaches sediment and creates sulfide is unreasonable.	before we take the leap to a new standard I would like to see: 1. do we have a clear indication that sulfate from a wastewater discharge actually reaches a sediment and creates sulfide? ..what we have seen, Your Honor, is that there is no guarantee that sulfate from a discharge actually goes into the sediment. groundwater upwelling- sulfate could move in the opposite direction-assuming it is a simple one-way street is unreasonable. (137, line 3)	See extensive reponses on this topic documented in the Virginia hearing spreadsheet.
13	D	Kurt Anderson	2	We don't know the most basic of toxicology questions	We don't know the most basic of toxicology questions, which is how is sulfide affecting wild rice. Is it the young rice seedlings? Is there tissue damage? Is there nutrient deficiencies? We don't know any of this. (138, line 6)	It is not necessary to understand the specific mechanism(s) by which a chemical is toxic to animals or plants when developing a water quality standard.
13	E	Kurt Anderson	2	why wild rice does not respond to sulfide in the laboratory until levels are approximately 30 times higher than their protective limit.	even if we were to proceed as the MPCA is proposing with the assumption that setting a sulfide level at 120 parts per billion is protective, we still don't know why wild rice does not respond to sulfide in the laboratory until levels are approximately 30 times higher than their protective limit. (138, line 11)	The 30 times factor probably refers to the Fort Labs study, where seedlings were afforded access to oxygen in the air when they elongated more than 1 cm long, which would not occur in nature (TSD, p. 14). In contrast, Pastor et al. (Response Exhibit N.5) found that sulfide reduced growth by 50% at a concentration of 227 parts per billion, less than a factor of 2 higher than the protective limit of 120 parts per billion (same as micrograms per liter).
14	A	Nicolette Slagle	15.1	How are wild rice waters going be individually protected?	as far as my information goes, is that most of these rice stands haven't even been adequately mapped by the MPCA, according to tribal governments and tribal members. So, I'm just wondering how, if we don't even have a good assessment of where these stands are, how are we going to go through and individually protect each one individually? (143, line 18)	See discussion of the implementation process in the Cover Letter as well as in the TSD (pgs. 84-98) and SONAR (pgs. 83-87 and 96-105) and in Hearing Exhibit 1013.
14	B	Nicolette Slagle		request for systems-based analysis	wonder why we are looking at science based on breaking down these Mahnomen stands into their individual parts and not looking at this as a systemwide approach. Because the only way that we're going to protect our environment and not completely destroy this vital resource is by looking at everything at a systems level. (144, line 3)	The MPCA is revising an existing sulfate standard and therefore is focusing on the impacts of sulfate/sulfide to wild rice.
14	C	Nicolette Slagle	23	pipeline issues	that includes looking at the potential impact of the Line 3 project on these rice stands and looking at the potential impact of these tribal communities to be able to have access to their treaty-protected resource.	Treaty issues are discussed in the attachment 1 response to topic area 23.

14	D	Nicolette Slagle		information about the estimated yield of wild rice and acreage necessary to provide wild rice per person	144, line 22	statement- no response required
14	E	Nicolette Slagle	14	How are you going to be able to enforce the new standard with the existing staff?	would also like to ask a question on your ability to enforce these standards. My understanding is that the across-the-board standard that you have now is not... not enforced. And as far as I know, your staff numbers are not actually to the point that, if you're making a more complicated process for enforcing the standard, how are you going to be able to then enforce that standard with the existing amount of staff you have now? Are you going to hire additional staff to enforce a standard that's even more complicated than the existing standard that you have that you're not enforcing? (146, line 2)	There are a variety of reasons why a sulfate limit has not been included in historical NPDES permits for the current sulfate standard of 10 mg/L. MPCA recognizes and takes the responsibility seriously to uphold the Clean Water Act and fully intends to implement water quality based effluent limits where a wastewater treatment facility demonstrates the ability to cause or contribute to a downstream impairment. MPCA is working with internal staff to collect and analyze data and is committed to implementation; however, it will take time to fully implement around the state. Please refer to the SONAR (pgs. 83-87 and 96-105) for a discussion on implementation.
14	F	Nicolette Slagle	18	variances may lead to eventual abandonment of wastes	One more question I have is regarding the variances and how they can be reviewed periodically so they can be adjusted as economic conditions change. And I am wondering whose economic conditions may change? Are we talking about if the companies that are applying for these wastewater permits economic standards change, that they no longer have to pay for their variances, so then there is going to be these wastewater ponds that are sitting and potentially and leaking contaminants into the environment and who is going to be paying for the cleanup of these areas?	Variances are required to be reviewed regularly, including as part of the triennial standards review. In terms of economic conditions, the MPCA generally anticipates that treatment would become less expensive over time, so that there would no longer be widespread social and economic impacts from paying for the treatment. Variances can be renewed. The comment seems to imply that permitted discharges that are granted a variance can be abandoned without penalty. The granting of a variance does not change the legal responsibility of the discharger. Variances also include interim limits and requirements for the discharger, even if the final limit cannot be reached.
14	G	Nicolette Slagle		effect on future generations	We already have so many tailing ponds in this state. Are we just going to continue to add to that and wait for our children and our grandchildren to figure out how to clean up this mess that we're making for everyone? (148, line 9)	The specifics of any individual mining facility are out of scope for this rulemaking.
14	H	Nicolette Slagle		request for systems-based analysis	How does your science that you've used to come up with these metrics mesh with tribal and indigenous science and looking at things from a systems perspective?	See the Attachment 1 response to topic area 23. The MPCA intends to use tribal knowledge to inform the addition of Class 4D wild rice waters in future rulemakings.
15	A	John Wayne		priorities	But, you know, why are you going to put a resource, a culturally resource, at risk just to benefit you guys own pocket? (149, line 22)	statement- no response required
15	B	John Wayne		discussion of value of wild rice, money, and risks to wild rice		statement- no response required
16	A	Lisa Morgan Ronnquist	21	sacredness of wild rice	The wild rice is a big part of our food and I would like to share with you (sic) that, you know, that wild rice is going to save you people one day...You know why? Because the creator sent our people here to where the food floats on the water... Or grows on the water, that is. And that's wild rice. That's the Mahnomen. that's what's going to save people. (153, line 6)	The SONAR includes a discussion of the cultural importance of wild rice.
16	B	Lisa Morgan Ronnquist	21	importance of clean water	We're trying to help ourselves, our grandchildren, our great grandchildren, everybody coming up behind us. Because you kill the water, you kill us all.	statement- no response required
16	C	Lisa Morgan Ronnquist		intent to protect wild rice	All I have to say is please don't kill the wild rice or anything	statement- no response required
17	A	Tania Aubid		increases in acceptable levels of sulfate	Back in the day when us all first started registering, I believe it was a 2.3, back in the day, from one when my elders were talking about it. And I think that was back in, I believe, 1930... Late 1930s, early 1940s when they started taking the measurements. It went from a 2.3 to a 2.7, up to a 4.3, to the 7.2 and then up to a ten, to what it is today. And I'm going to demand that we go back to that water quality standard of 2.3. As an Anishinaabe woman of this land, I am also the first daughter of the... Of a war chief for the southern Ojibwe. :(158, line 3)	The MPCA does not have any information about the historic standards cited.
17	B	Tania Aubid		value of clean water	this water quality standard is a genocidal act when it goes up even further. No longer do I want to see these babies born without brains or any other anomalies that happens to them when they are born.	statement- no response required
17	C	Tania Aubid	28	value of clean water	When I was pregnant myself, I couldn't even eat two fish a month because of the contamination of the mercury at that time and other things that are floating through the fish. And that got me to thinking, okay, why do we have to do this? Why do we have to accept it? And as an Anishinaabe from this land, telling you visitors you've got to quit. (159, line 25)	See Attachment 1 response to topic area 28.

17	D	Tania Aubid		increases in acceptable levels of sulfate	declare an act of war is being done when you raise the standards of the water quality. I demand that they go back down to a 2.3 when they first started... When they first started registering them.	The MPCA does not have any information about the historic standards cited.	
17	E	Tania Aubid		value of clean water	it would only make sense that, if it's poisoned, it would become an endangered species; correct?Or can you guys fix it? So, if you're poisoning our waters at whatever standards you're looking at, can you fix that?	MPCA response at 162, line 7 and at 162, line 22 of the hearing transcript.	
18	A	Raina Krkaraya	21	importance of clean water	I am here today because water is life and I am the water and the water is me. As a woman, we are an extension of (inaudible) or mother earth. We carry that same water.And whatever attack that she is under, we are, as well. I feel that, as a woman, deeply in my heart and my soul, that she is being raped every single day by these corporations for profit. They dig her up. And they... They poison our waters in the process.	statement-no response required	
18	B	Raina Krkaraya	21	Discussion of Native American culture and effect of popular culture and pipeline issues.		statement-no response required	
18	C	Raina Krkaraya		value of clean water	177,line 1 ..suggest not establishing any standard for mining and just say "no" to their proposals based on past offenses. ..."Have every company, corporation who's trying to extract from this earth not live by any standard and just live with --and stay the hell away from our land and our water."	statement-no response required	
Hearing Exhibit 1026	A	Douglas Hawkins	4.3	The waterbody-specific sulfate standard proposed by MPCA does not differentiate waterbodies hosting wild rice from water bodies that do not.	Comment A (Hawkins p. 2): The waterbody-specific sulfate standard proposed by MPCA does not differentiate waterbodies hosting wild rice from water bodies that do not. This refers to Chapter 1 E Development of an equation to calculate a numeric sulfate standard for each wild rice water. Both P values far from statistical significance. In other words, the predicted protective sulfate thresholds do not associate with the presence or absence of wild rice.	See Attachment 1 response to topic area 4.3.	
Hearing Exhibit 1026	B	Douglas Hawkins	4.3	I have been unable to find any function of surface water sulfate, iron and total organic carbon that differentiates water bodies hosting wild rice from water bodies that do not.	Comment B (Hawkins p. 3): I have been unable to find any function of surface water sulfate, porewater iron and porewater total organic carbon that differentiates water bodies hosting wild rice from water bodies that do not. This refers to Chapter 1 E Development of an equation to calculate a numeric sulfate standard for each wild rice water. This also finds no evidence of any difference in surface water sulfate, porewater TOC or porewater iron between bodies with and without wild rice. In other words, the core components of the proposed equation do not associate with wild rice presence or absence.	See Attachment 1 response to topic area 4.3.	
Hearing Exhibit 1026	C	Douglas Hawkins	4.3	Porewater sulfide is a weak predictor of wild rice presence.	Comment #C (Hawkins p. 4): Porewater sulfide is a weak predictor of wild rice presence. Although statistically significant, it is not much better than blind guessing. This refers to Chapter 1C. Identification of 120 µg/L as the protective sulfide concentration. Receiver operating characteristic is a standard tool for assessing a diagnostic. The ROC of a good diagnostic initially rises sharply then flattens. Random guessing gives a straight line from bottom left to top right corner of graph. Area under the curve (AUC) measures quality of diagnostic: 1 for a perfect predictor, 0.5 for random guessing. There is a formal test of whether AUC is better than 0.5. AUC of 0.653 shows that porewater sulfide is statistically significantly better than random guessing (AUC=0.5), but not by much. Quantifying another way, sulfide is highly significant in logistic regression for wild rice presence (P=0.0031). But it explains less than 10% of the variability, leaving better than 90% due to other causes.	See Attachment 1 response to topic area 4.3.	

Hearing Exhibit 1026	D	Douglas Hawkins	4.3	The MPCA assessment of performance is questionable.	Comment D (Hawkins p. 5): The MPCA assessment of performance is questionable. This refers to Chapter 1 F Comparison of an equation-based standard to fixed standards: Error rates and concerns. MPCA document claims that proposed sulfate standard does fairly well in predicting porewater sulfide. Porewater sulfide is a surrogate endpoint for rice presence/absence. Our real concern is predicting wild rice, not porewater sulfide. Surrogate endpoints are valuable in some circumstances: • when they are easier to get than the real endpoint, and • when they are strongly associated with the real endpoint. Neither of these conditions holds here. A visual assessment of the wild rice is surely easier, cheaper and quicker than sampling and assaying to determine water chemistry; and porewater sulfide is not strongly associated with wild rice presence or absence. The more appropriate question is whether the proposed sulfate standard can predict presence or absence of wild rice, the answer to which appears to be "No."	See Attachment 1 response to topic area 4.3.
Hearing Exhibit 1026	E	Douglas Hawkins	4.3	All four analytes vary substantially from time to time within the same water body.	Comment E (Hawkins p. 6): All four analytes vary substantially from time to time within the same water body. This relates to Chapter 1D Assumption that sulfate, TOC, iron and sulfide are in a steady state at field sites. Data sets include 53 water bodies sampled on two or more occasions. The variation in sulfide level from time to time within the same water body, shown in this logarithmic-scale box and whisker plot, is large – it is comparable to that from one water body to another. Sulfate, iron and TOC show similar large variations within a water body from one time to another. Water body chemistry is a moving target. This may help explain its low association with wild rice.	See Attachment 1 response to topic area 4.3.
Hearing Exhibit 1026	F	Douglas Hawkins	4.3	504, TOC and Fe are imprecise predictors of sulfide, albeit statistically significant.	Comment F (Hawkins p. 7): 504, TOC and Fe are imprecise predictors of sulfide, albeit statistically significant. This refers to Chapter 1 C. Relationship between surface water sulfate and porewater sulfide. Regression of porewater sulfide on surface water sulfate, porewater TOC and porewater iron gives High statistical significance, but explains only 49% of sulfide variability. Graph of actual vs predicted sulfide. Dotted lines are where prediction is off by a factor of 2. Many predictions are this bad or worse.	See Attachment 1 response to topic area 4.3.
Hearing Exhibit 1026	G	Douglas Hawkins	4.3	A toxic sulfide threshold of 120 µg/L is unreasonable and would lead to many false alarms.	Comment G (Hawkins p. 8): A toxic sulfide threshold of 120 µg/L is unreasonable and would lead to many false alarms. Since sulfate seems ineffective in predicting presence/absence, could sulfide be used? ROC curve indicates possibility. A wide range of cutoffs - from 100 µg/L to 300 µg/L gives similar overall performance. PPV is proportion of bodies above cutoff that do not have wild rice. This is below 50%; most of the effort in following up alarms is wasted. NPV is proportion of bodies below cutoff that have wild rice. Higher cutoffs give better PPV and worse NPV. For example 274 µg/L gives fewer, and better-focused alarms. PPV goes from 46% to 57% with modest drop in NPV from 76% to 73%. This tighter focus on where trouble is more likely may represent more effective use of resources.	See Attachment 1 response to topic area 4.3.
Hearing Exhibit 1027		Dale Lueck		Exhibit supports testimony		No additional response.
Hearing Exhibit 1028		Barbara Courneya		Exhibit supports testimony		No additional response.
Hearing Exhibit 1029		Gerard Bettendorf		Exhibit supports testimony		No additional response.

Hearing Exhibit 1030	A	Joe Mayasich	4.1	MPCA did not follow EPA DQO guidance, and therefore every phase of the study is jeopardized.	The U.S. Environmental Protection Agency (EPA) has developed the Data Quality Objectives (DQO) Process as the Agency's recommended planning process when environmental data are used to select between two alternatives or derive an estimate of contamination...and specify tolerable levels of potential decision errors that will be used as the basis for for establishing the quality and quantity of data needed to support decisions. ...The absolutely critical initial step of "State the Problem" was never taken. Therefore, every phase of the sulfate / wild rice Project Life Cycle is jeopardized with respect to meeting Data Quality Objectives. ...Therefore, the data generated by the sulfate / wild rice Project Life Cycle are insufficiently integrated and cohesive to quantitatively support the SONAR.	The MPCA wild rice study is not the type of activity for which the DQO guidance was developed. MPCA was performing research to revise a standard, not performing either of the two DQO activities described in the DQO EPA guidance document (assessing compliance with an existing standard or ascertaining the mean environmental concentration level of a contaminant). Rather, MPCA followed the EPA's guidance for developing water quality standards (EPA, (1985; Response Exhibit N.31) e.g., TSD page 31). Despite the difference in activities (research vs. environmental data collection), there are two process steps that both types of activities should achieve: an initial step of defining the problem ("State the Problem" in DQO terminology) and a subsequent step of achieving consensus on the type, quality, and quantity of data needed. As part of the research effort, MPCA did conduct the two process steps, which parallel the steps described in the DQO guidance: (1) In May, 2011, before any data were collected MPCA convened a team of experts (as suggested on p. 15 of the DQO guidance) that defined the problem by discussing a draft research protocol and the research that could address the problem (described on pages 3-4 of the TSD; the wild rice study protocol was finalized in November, 2011 (Response Exhibit N.32), and (2) MPCA worked with the research team to develop extensive documentation regarding the quality of data needed, parallel to the DQO guidance, producing Quality Assurance Project Plans, QAPPs for each research area (Response Exhibits N.14, N15, and N16). Much of the data had been collected before the "effective date" on each QAPP (the date of last approval signature) because of the compressed time frame available to conduct the research. Nevertheless, data quality goals were defined and met, and subsequently the data proved entirely adequate for addressing the research questions regarding the effect of sulfate on wild rice, and the data were further validated by publication in four peer-reviewed journal articles (Response Exhibits N2, N3, N4, and N5).	
Hearing Exhibit 1031		Marianne Bohren		Exhibit supports testimony and provides information about cost of treatment plant operation			
Hearing Exhibit 1032		Marianne Bohren		Information about WLSSD			
Hearing Exhibit 1033		Kurt Anderson		Exhibit includes research papers and excerpts of research papers.			

Comment ID	Part ID	Commenter Name	Topic	Paraphrase/Summary of Comment	Excerpt and Location of Comment (transcript line number)	Response or Response Location
1	A	Michelle Shaw	3.1	Increased sulfate would not help the environment and public health, so keep the existing standard and enforce it.	As one of the core values on the PCA's website, it states that you, "measure success by the environmental and public health outcomes achieved." How would allowing higher percentages of sulfate into wild rice waters achieve an environmental outcome? And how would allowing higher percentages of sulfate achieve a public health outcome? I have to believe that these outcomes are supposed to help the environment and have positive effects on our public health. Are these the questions that guide your decisions? If so, then we must keep the sulfate standard and enforce it. (54, line 13)	The MPCA takes its mission to protect and improve the environment and human health very seriously, and strives to put the Agency core values into practice every day. The MPCA has developed an extensive rulemaking proposal including a TSD and SONAR that demonstrate that the data and research support the proposed standard as a better, more precise standard. See also the Cover Memorandum to this response and the Attachment 1 response to topic area 3.1.
1	B	Michelle Shaw	15	Concerns about enforcement	If our wild rice wasn't being protected with one simple standard, then how is that the MPCA is suddenly going to be able to monitor an equation where every single wild rice stand is going to have a different acceptable amount of pollution? (55, line 23)	The MPCA is proposing to use our existing intensive watershed monitoring cycle to gather the data needed to set a numeric sulfate standard for each water and then to measure sulfate levels in wild rice waters. See SONAR page 154 and page 3 of the Wild Rice Frequently Asked Questions handed out at the hearing.
1	C	Michelle Shaw		Concerns about all pollution and allowing corporations to pollute waters.	Instead of allowing more pollution in Minnesota waters, let's choose to enforce the protection this taxpayer-funded agency put in place over 50 years ago. In fact, why aren't we debating the merits of eliminating the pollution altogether? I don't understand why we are allowing large corporations to determine how much they can pollute our waters and surrounding food sources. I don't understand why we aren't making them clean up their mess, and I don't understand why we are putting these companies' profits above the values we hold dear as Minnesotans. (56, line 7) Why is it bad to charge customers higher prices for products that created the pollution to begin with. Someone has to take responsibility for cleaning up, right? We need to get in the mindset that there are consequences to the production of anything, and companies have the responsibility to fix the negative impacts, or they shouldn't cause them in the first place. (56, line 22)	Statement - no response required.
1	D	Michelle Shaw		General pollution concerns and corporate responsibility.	Do you stand idly by and allow their livelihoods to be destroyed? Or do you stand up and demand that something be done to protect them, the land, and the water? Do you really want a business like that in your town if they aren't willing to take responsibility for the problems they have caused their fellow community members. (57, line 20)	Statement - no response required.
1	E	Michelle Shaw	3.1	Keep the existing standard or have a lower standard.	Protect our state grain and the farmers who spend their lives harvesting it. Choose our land, air, and water, and cultural heritage over the profits of big business. Keep the standard you have now or eliminate the allowance of sulfate altogether. (58, line 24)	The data and research support the proposed standard as a better, more precise standard. See the Cover Memorandum to this response and the Attachment 1 response to topic area 3.1.
2	A	Vernell Roberts	19.4	Variances can be difficult to get. Just because variances are available does not mean the standard should be conservative.	Recent negotiations regarding other recently imposed regulations shows that getting a variance is easy in theory, but in all reality, it may not be a suitable solution to other parties invested in seeing these regulations come to fruition. Further, the granting of a variance is not guaranteed. It must be approved by the EPA and merely delays the cost. Therefore, the potential availability of a variance does not make the use of overly conservative assumptions any more reasonable.	The availability of variances does not have an impact on the level of the standard. As explained throughout, including the cover memo, the standard is set to protect the beneficial use.
2	B	Vernell Roberts	19.4	MPCA should wait for the cost study.	We are disappointed that the agency is pushing forward with this rule when there is currently a study underway to look at those costs in more detail. (63, line 5)	The MPCA's discussion of the LCCMR Study is provided in the cover memo to this Response.
2	C	Vernell Roberts		Dealing with ever-evolving standards is difficult and costly.	We must keep in mind the extreme costs some of us are experiencing in meeting these ever-evolving standards, standards that have evolved and may be imposed upon us after taking great lengths and diligent study and design to meet the requirements placed upon us in a compliance schedule. (61, line 17) We are investing literally millions of dollars to meet targets, goals, and requirements that are constantly changing. This makes it impossible to plan, design, and build facilities that have any hope of meeting standards that live through a normal five-year permitting cycle. We're seeing our facilities face changes so rapidly that even before we start construction, we are faced with a new set of limits that these facilities can no longer meet, while spending millions of dollars to chase unattainable certainty in standards. (61, line 24)	While this is a larger comment outside of the scope of just this rulemaking, the MPCA understands that it is frustrating for permittees to feel like they are constantly having to adjust their planning or redesign to deal with new standards. We know that municipal WWTPs in particular are concerned about good use of public funds. The MPCA is committed to working with our permittees to ensure efficient planning and effective use of public funds.

2	D	Vernell Roberts	4	Standard is overly conservative, uses too many conservative assumptions.	We're concerned that the new sulfate rule proposed by the MPCA is built on a series of overly conservative assumptions, incomplete analysis, resulting in a standard that is more restrictive than necessary to protect wild rice. (62, line 12)	The MPCA disagrees with the assertion that the standard is overly conservative because it uses too many conservative assumptions. In developing the standard, the MPCA has balanced conservative and less conservative assumptions. MPCA will respond to this comment more fully if additional details are received during the comment period.
2	E	Vernell Roberts	18	We appreciate that the proposed rule will waive the variance fee for municipalities.	63, line 21	Comment in support of variance fee waivers for municipalities. No response required.
3	A	Chris Swedzinski	19.4	MPCA should wait for the cost study.	The legislature, this last year, put an extension so that MPCA could go through the process of really finding out what is the true economic impact of this potential rule. Instead of waiting for that, instead of really finding what's the real cost to taxpayers, what's the cost of that to private business, we're not going to see that, and that's exceptionally concerning. (66, line 18)	The MPCA's discussion of the LCCMR Study is provided in the cover memo to this Response.
3	B	Chris Swedzinski	37	MPCA cannot say that the rule will make a difference on the production of wild rice.	There was an MPCA official saying, "If this rule was enforced and this would move forward, would it make any real difference on the production of wild rice?" From what that person said, it really didn't sound like it was going to make much of a difference. In talking with the folks in the field, when it comes to the production and the harvest, it doesn't. And that's exceptionally concerning to me. (67, line 16)	See Attachment 1, response to topic area 37.
3	C	Chris Swedzinski	19	The standard could adversely impact jobs and hurt the economy.	The potential impact on jobs, especially in the northeast, could just be devastating for the opportunities that those people need to be able to enjoy. (69, line 1)	Statement - no response required.
4	A	Elizabeth Wefel	33.1	Agree with the removal of the existing standard.	we do agree that the rule needs updating, and that the current 10-milligram per liter standard should be removed and replaced because it is not well supported by what we know now. (72, line 3)	Statement. However, the MPCA notes that the decision to remove existing 10 part per million standard is not a separate decision from the proposed equation-based sulfate standard.
4	B	Elizabeth Wefel	4	Standard is overly conservative, uses too many conservative assumptions.	There is not a rational relationship between the overly conservative assumptions in the rule and the underlying evidence. The Minnesota Supreme Court has recognized that examining the rule requires a searching and careful inquiry of the record that includes looking at how the evidence rationally connects with the rule. Our written comments will delve more deeply into specific instances where this has not happened, but we're concerned about problems particularly with the magnitude, frequency, duration criteria. (72, line 8)	The MPCA disagrees with the assertion that the standard is overly conservative because it uses too many conservative assumptions. In developing the standard, the MPCA has balanced conservative and less conservative assumptions. MPCA will respond to this comment more fully if additional details are received during the comment period.
4	C	Elizabeth Wefel	15	Duration is too short - should be multi-year	I'm going to use the duration as an example today. The proposed standard uses an annual average for the sulfate criterion. The duration for the criterion depends upon how long it takes for sulfide to adversely affect wild rice waters. In the one-year exposure test discussed in the SONAR, there were no adverse effects on plant biomass in any test concentration, even with sulfate concentrations ranging up to eight times higher than the proposed criterion. Without evidence of adverse effects within one year, there is no rational basis for this criterion, and it should be rejected as arbitrary. The evidence, instead, dictates a multiyear duration. (73, line 4)	The SONAR (p. 79 -81) discusses the importance of protecting the wild rice plant on an annual basis. MPCA considered a number of biological endpoints in the mesocosm experiment, including percent filled seeds and number of plants germinated, which decreased as surface water sulfate and porewater sulfide increased. Exhibit N.5 (figure 3a) reports the association between annual sulfate concentration and increased porewater sulfide concentration.
4	D	Elizabeth Wefel	19.4	MPCA has not done a sufficient cost analysis and should wait for the LCCMR study.	Our second concern is the cost analysis. The Minnesota Administrative procedures Act requires that the MPCA put forth a reasonable effort to comply with Chapter 14 requirements. Those requirements include an analysis of the cost to proposed regulation to municipalities. We do not believe this has happened. A cost and feasibility analysis regarding municipal treatment is going to be done in May 2018. (73, line 22)	See response cover memo.
4	E	Elizabeth Wefel	18	Appreciate waiving variance fee for municipalities.	We are very appreciative of a willingness to waive the fees for the municipal variances. I think that's very important. (74, line 18)	Comment in support of variance fee waivers for municipalities. No response required.
4	F	Elizabeth Wefel	18.4	Do not incorporate Interim Economic Guidance for WQS by reference.	We are very concerned about the incorporation, by reference, of the Interim Economic Guidance for Water Quality Standards workbook. This this guidance document is several decades old; it's outdated. It fails to consider some critical factors, in that it hasn't gone through a lot of vetting in this rulemaking process. We ask that it not be incorporated, by reference, into the rule, and instead, that a stakeholder group looks at this issue separately. (74, line 20)	In this Response, the MPCA is proposing to remove the incorporation by reference of the Interim Economic Guidance for Water Quality Standards workbook. This document will remain as a component of MPCA's review of variances, as it is a well-established tool for reviewing variances by both MPCA and EPA. However, the MPCA (and EPA) are able to use other tools to demonstrate that a variance is needed because of economic impacts. The MPCA looks forward to discussing additional available tools and demonstrations.

4	G	Elizabeth Wefel	18	Variances can be difficult to get. Just because variances are available does not mean the standard should be conservative.	want to caution against looking at the availability of variances as a justification for overly conservative assumptions in the rules. I think it's been made clear that variances are not guaranteed, they're subject to challenge, and they're only a temporary solution. (75, line 12)	The availability of variances does not have an impact on the level of the standard. As explained throughout, including the cover memo, the standard is set to protect the beneficial use.
5	A	Bradley Peterson	15.4	MPCA should wait for the cost study.	we're very concerned that this is going forward before a legislatively directed study on cost has been completed, because, as has been noted, that is a very important component of this discussion. (78, line 1)	A discussion of the LCCMR Study is provided in the MPCA's cover memo to this response
5	B	Bradley Peterson	15	An additional concern about treatment technology is the need for highly trained treatment operators; Minnesota has a lack of qualified wastewater operators.	The MPCA notes, in the SONAR, the challenge related to the personnel to run these facilities. To quote from the SONAR, "The highest classification of wastewater operator would be required for these technologies. Minnesota currently suffers from a lack of qualified wastewater operators. Attracting, retaining, and funding qualified wastewater operators would be a significant hurdle for Minnesota wastewater plants." This is a challenge that we should not, cannot underestimate when making this decision. (79, line 4)	The availability or feasibility of treatment is not a consideration in setting the water quality standard. The MPCA is aware of the wastewater treatment community's concern about limited numbers of qualified operators. The MPCA would like to work with the commenter and others in the wastewater operator community to consider how we can work together to ensure there are qualified operators for the technology to meet all water quality standards, and how operator availability could be considered as part of planning for implementation of the standard.
5	C	Bradley Peterson	18	Variances can be difficult to get, and are not permanent.	Appreciate the rule provision that would waive the fee for variances, as this process can be very expensive just to get in the door for communities, but as has also been noted, applying for a variance is by no means a slam dunk in terms of getting a variance. There are other actors at play beyond the MPCA, including the Environmental Protection Agency, at the federal level, as well as outside third parties that also may challenge the variance. Also, these variances are not permanent. (79, line 19)	Comment in support of variance fee waivers for municipalities.
5	D	Bradley Peterson	18.4	Do not incorporate Interim Economic Guidance for WQS by reference.	U.S. EPA's Interim Economic Guidance for Water Quality Standards, we agree that this two-decade-old document is highly technical, very complicated, and may not account for all of the critical economic factors that come into play when communities are going through this process...we would echo those calls that have already been made to remove that from the rule and create a stakeholder process to get the documented process that would be responsive to Minnesota's needs. (80, line 5)	In this Response, the MPCA is proposing to remove the incorporation by reference of the Interim Economic Guidance for Water Quality Standards workbook. This document will remain as a component of MPCA's review of variances, as it is a well-established tool for reviewing variances by both MPCA and EPA. However, the MPCA (and EPA) are able to use other tools to demonstrate that a variance is needed because of economic impacts. The MPCA looks forward to discussing additional available tools and demonstrations.
5	E	Bradley Peterson	4	Standard is overly conservative, uses too many conservative assumptions.	The rule is based on overly conservative assumptions that lead to greater restrictions than necessary. (80, line 22)	The MPCA disagrees with the assertion that the standard is overly conservative because it uses too many conservative assumptions. In developing the standard, the MPCA has balanced conservative and less conservative assumptions. MPCA will respond to this comment more fully if additional details are received during the comment period.
6	A	Grant Merritt	3.1	The 10 mg/L standard is a good standard	Dr. Moyle did a good job. He had the background, as I recall, of having studied sulfate in plants for some time, as an aquatic biologist. I mention that simply because the Moyle standard has been used here now for all these years, since 1950 -- '73, and I think it's a good standard. (82, line 14)	The data and research support the proposed standard as a better, more precise standard. See the Cover Memorandum to this response and the Attachment 1 response to topic area 3.1.
6	B	Grant Merritt	20	Politics is driving the revision of the standard.	The handout that I looked at back here talks about protecting wild rice from excess sulfide. It says, "The only way to modify an existing standard is through a rulemaking process that demonstrates a scientific basis for the proposed changes." The other irony is that we're here today because of political science. The tough Iron Rangers came down, descended on the governor, saying, "We can't have this 10-part-per-million sulfide standard," and then, of course, that got over here to the PCA. And then the legislature appropriated the 1.5 million that we've heard about here today, and so, added to more traditional sciences, the political science. (83, line 6)	Statement - no response required.
6	C	Grant Merritt	33	Support the MPCA's revised standard.	So that gives further basis for adopting the amended standard. I am impressed that the scientists that -- some of them, I've met, the last couple years -- that have studied how we can determine what waters should be protected and how to protect them. I think that the standard that's being proposed by the PCA ought to be adopted. (83, line 19)	Statement of support - no response required.
7	A	Paula Maccabee	10	How did MPCA get to the list of waters?	You solicited requests for information in 2013 to identify wild rice waters - and that's how you got the list of the 1300, or so, waters that are proposed to be listed in the rule? (88, line 1)	MPCA's response is on pg 88 line 12 of the hearing transcript. Also SONAR pp. 41-57 contains a detailed discussion of how the MPCA evaluated sources to determine the list of proposed wild rice waters.

7	B	Paula Maccabee	10	Question about the number of "insufficient information waters".	Looking at that spreadsheet I got from the PCA, there were about 960 wild rice waters that were determined not to be put on the list, or that were -- or at that point you thought were -- had insufficient information to be on the list, including about 950 water bodies that the DNR had provided information that they were water bodies with wild rice. Is that approximately the right number? At the time, you were recommending these 960-or-so waters, that the DNR had come forward with, not be on the list? And then to follow that up, how many of them have you put on the list since January of 2017? You're going to give us information of -- comparing the list of waters that were released to the advisory committee in January 2017, how many more have you put on that were on that DNR list?	In response to Ms. Maccabee's question, MPCA made a quick waterbody line entry comparison of a January 24, 2017 draft of the list of Minn. R. 7050 WR waters, the proposed wild rice waters (PWRW) and the insufficient information (II) waters against the most current wild rice database list (October 20, 2017) in order to get an estimate as to the number of waterbody status changes that have occurred since Jan. 24, 2017. (Note: This comparison does not factor in the removal of the waters wholly within the Leech Lake Reservation nor does it factor in the pending removal of the wild rice waters wholly within the Fond du Lac and Grand Portage Reservations.) The Jan. 24, 2017 Version Draft had 1,315 [PWRW] line entries, 988 [II] line entries, and 24 [7050] line entries. The October 20, 2017 version of the MPCA_WR_DEV database has 1,324 [PWRW] line entries, 998 [II] line entries, and 24 [7050] line entries. The MPCA will continue to try to develop an exact answer to this question as time allows.
7	C	Paula Maccabee	13	Questions about the status of waters not on the wild rice waters list and whether a sulfate limit will apply.	Am I correct that under the MPCA proposal, that any water that isn't listed in the rule would have no sulfate limit at all to protect wild rice? (92, line 4) So if somebody would -- a discharger was up for a permit and somebody come in front of the PCA and said, "I know this wild rice -- this water body...even if that evidence was presented, the Pollution Control Agency wouldn't be allowed to consider it in setting the limits on sulfate? (92, line 14) Reading the rule, that there would be no way, unless there was another rulemaking process, to protect that body of water... Does the rule mean what it says, which is: Until another rulemaking happened, there wouldn't be any protection? (93, line 14)	The proposal is that the <u>standard</u> is applicable to the wild rice bodies that are specifically identified in rule. Sulfate limits would be applies to facilities have a reasonable potential to cause or contribute to an exceedance of the standard. See also Attachment 1 response to topic area 13.
7	D	Paula Maccabee	13	Questions about providing evidence in the permitting process	Is there anything in your Statement of Reasonableness? ... Is there anything that suggests that there would be an option to provide evidence in a rulemaking process and -- not at a rulemaking -- in the permitting process? Is there anything there? If you could just, you know, let us know where it is in the SONAR. (94, line 7)	See Attachment 1, response to topic area 13.
7	E	Paula Maccabee	13	Questions about the status of waters not on the wild rice waters list and whether a sulfate limit will apply.	is it correct that the only way that an additional wild rice water could be given that protection is if it were added in formal rulemaking, - like this proceeding here? (95, line 15)	Yes.
7	F	Paula Maccabee	10	Criteria for sufficient/insufficient information to list waters.	I didn't see any specific criteria of which the PCA used to identify -- to decide that certain lakes and streams didn't have sufficient information, such as the ones listed by the DNR. Is there a place where it says a list of specific criteria that were used in making that decision? (95, line 24)	No. The MPCA used a weight-of-evidence approach to determine which waters had sufficient information to support the beneficial use. These waters were proposed as wild rice waters. This process is described in the SONAR on pp. 41-58.
7	G	Paula Maccabee	10	Is the same evidence that is listed in the rule for new waters, is that the -- is that the criteria that you used in listing these first 1300?	97, line 3	See MPCA response pg 97, line 7 of the hearing transcript. Also, the MPCA's goal is to ensure that the process of identifying wild rice waters is as consistent as possible between the this rulemaking and future rulemakings.
7	H	Paula Maccabee	10	For wildlife, was there some kind of sense about how big or dense or lush the area had to be in order to be used by wildlife?	97, line 17	The beneficial use is harvest and use of the grain by humans and wildlife in waters that are being proposed for Class 4D use designation. The presence of one wild rice plant -- or a handful of plants -- is not sufficient to establish that the wild rice water would draw human harvesting or provide sufficient food for wildlife, thereby showing that the beneficial use is an existing use. With that said, MPCA is not proposing an absolute threshold for the amount of wild rice that must be present. Instead, MPCA proposes to identify waters as wild rice waters via the rulemaking process in order to allow all interested parties the opportunity to participate in the identification process as well as to examine and comment on the available information for the specific waterbody. See also Appendix 2 of the TSD and MPCA response pg 97, line 21 of the hearing transcript.
7	I	Paula Maccabee	10	Would MPCA identify waters as wild rice waters if the wild rice has declined?	And how did you look at a situation where the wild rice was sparse now, but there was evidence that there had been deterioration of that water body? (98, line 19) But you would agree that if there was sparse rice but an evidence of decline, that that would be an appropriate water body to list. (99, line 7)	MPCA responses on pg. 98, line 23 and pg 99, line 11 of the hearing transcript. The goal of proposed rule is to identify waters where the wild rice beneficial use is an existing use (since November 28, 1975) as wild rice waters. The MPCA would identify waters as wild rice waters if there is evidence to support that the beneficial use exists, even if wild rice in that water body has declined today.

7	K	Paula Maccabee	Exhibit Number 2, the article that was published in the peer review journal this year. Am I correct that the PCA reviewed drafts and made suggestions before the article was published?	99, line 18	Exhibit L2 is the scientific article "Modeling hydrologic controls on sulfur processes in sulfate-impacted wetland and stream sediments" by Ng, Yourd, Johnson, and Myrbo (all at the University of Minnesota). No MPCA staff member reviewed drafts and made suggestions before the article was published. The article is largely based on Yourd's Master's thesis. The MPCA was not directly involved in this research, except to encourage that it be carried out, and by helping to get some monitoring wells installed at the research site. The Acknowledgments section of the published paper include "...Groundwater monitoring wells were installed with help from Andrew Streitz (Minnesota Pollution Control Agency) with funds from Minnesota's Clean Water, Land & Legacy Amendment. ... Edward Swain (Minnesota Pollution Control Agency) contributed key insights throughout the project." Edward Swain does not recall contributing "key insights" at any stage of the project, but perhaps is being thanked for providing data on the site that was acquired during the MPCA wild rice study, and for being on one of the co-author's (Amanda Yourd) Master's committee. As an un-compensated adjunct professor at the University of Minnesota, Edward Swain helps advise graduate students during the research phase of their schooling. As a member of Amanda Yourd's committee, Swain met with Yourd and her advisor Ng several times over the course of the research.
8		Alex Spitzer	Did MPCA look at other factors that impact rice or others factors that impacts the sulfate-sulfide relationship?	You said you'll look closely at the iron and carbon and see its relationship. So I was wondering: What, if any, there are, other chemicals or conditions -- like precipitation or temperature -- that might also affect the sulfate-sulfide relationship or just the relationship with wild rice? (102, line 6)	See MPCA response on page 103, line 1 of the hearing transcript. Also Chapter 1, Part A of the TSD and exhibits L3 and L4.
Hearing Exhibit 1034		Michelle Shaw	Exhibit reflects testimony		No additional response.
Hearing Exhibit 1035		Vernell Roberts	Exhibit reflects testimony		No additional response.
Hearing Exhibit 1036		Elizabeth Wefel	Exhibit reflects testimony		No additional response.

Comment ID	Part ID	Commenter Name	Topic	Paraphrase/Summary of comment	Excerpt of comment	Response or Response Location
1	A	Stephen Wiley	2.8	Measure point-of-discharge sulfate, not sulfide	Measuring point-of-discharge sulfates will be far simpler and cheaper than measuring resulting downstream sulfide levels. And assuming that downstream sulfide concentrations can be reliably measured is risky and will certainly be costly and cumbersome, by contrast. Stick to the current method.	The difficulty of measuring sulfide concentrations is a key benefit of using the equation to translate from a protective sulfide concentration to a sulfate standard. Sulfate is easier to measure. The MPCA has proposed directly measuring sulfide for the alternate standard.
1	B	Stephen Wiley	21	value of clean water	the Arrowhead has for centuries also been home to sensitive ecosystems that support tourism and hunting and, as you point out, David, Anishinaabe homelands and cultural traditions and economic lifeways that go back centuries, maybe millennia	Statement - no response required
2	A	David Manuel	3.1	keep the 10 mg/L standard	Enforcing the current regulations would suffice.	The data and research support the proposed standard as a better, more precise standard. See the Cover Memorandum to this response and the Attachment 1 response to topic area 3.1.
2	B	David Manuel	20.2	political influences	The newly proposed regulations are the result of pressure by mining interests	The MPCA's reasons for undertaking the rule revisions are described in the SONAR on page 12 and in the section on general need starting on page 19.
2	C	David Manuel	23	environmental justice	This is an environmental justice issue that threatens cultural and subsistence activities of all Anishinaabe in northern Minnesota	The MPCA understands the importance of wild rice to the tribal communities. The SONAR discusses this importance, including in the section on environmental justice (page 133) and in the regulatory analysis. Further see response to topic area 23.
3	A	Helgaleena healingling	10.1	issues with the list of wild rice waters	The list of water resources is not complete. There need to be more wild rice areas added by the different bands.	See Attachment 1 response to topic area 10.1 and SONAR pp. 41-57 for a detailed discussion of how the MPCA evaluated sources to determine proposed wild rice waters.
3	B	Helgaleena healingling	20.2	political influences	entire thing is a result of mining companies putting on pressure	Statement - no response required
3	C	Helgaleena healingling	20.2	political influences	Sulfide levels are not the real issue	Statement - no response required
4	A	Josh Anderson	19.3	cost	These companies support our communities here on the Range...Please consider all angles before implementing something that could be so very detrimental to our economy!	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
4	B	Josh Anderson	2	relationship to drinking water standard	...to impose a standard that is more strict than that of what we consume on a daily basis, is absurd.	SONAR pg. 65 provides a discussion of the toxic effect of sulfate on wild rice in relation to the effect of sulfate on humans.
5	A	Craig Wainio (city of Mt. Iron Resolution)	19.3	cost	...proposed rule has the potential to devastate our cities, our communities, our important industries and our way of life..	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
5	B	Craig Wainio (city of Mt. Iron Resolution)	19.4	LCCMR report	the MPCA should immediately suspend its rulemaking process until after May 2018 until it completes its analysis of wastewater treatment alternatives to inform the development and implementation of the wild rice sulfate standard....	A discussion of the LCCMR Study is provided in the MPCA's cover memo to this response
6	A	Greg Ranta	2	relationship to drinking water standard	I do not agree that it should be held to a standard that is greater than that of bottled water or tap water	SONAR pg. 65 provides a discussion of the toxic effect of sulfate on wild rice in relation to the effect of sulfate on humans.
6	B	Greg Ranta	19.3	cost	we need to find a solution that does not destroy our community, both economically or culturally	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response. Information about a large solution about wild rice can also be found Attachment 1 resposne to topic area 39.
7	A	Jeff Love	2.3	other factors	the annual differences in the wild rice crop has more to do with river level, storms, and temperature than any other cause, including sulfate or sulfide levels...Other factors, most beyond our control, are far more significant threats to wild rice than sulfate or sulfide levels.	The MPCA agrees that factors other than sulfide may also have an effect on wild rice; this does not negate the need to protect wild rice from the impacts of sulfide.
7	B	Jeff Love	2.1	wild rice does fine in higher sulfate waters, including near Boswell	I am confident the effect of the current sulfate or sulfide levels, due to the operation of industry or city wastewater discharges, is not a factor of the productivity of the wild rice crop. I monitor the wild rice plants all summer, and have noted no degradation of the crop on either side of Boswell's discharge.	There is insufficient information available to respond to this comment, since we do not yet know what the equation-based sulfate standard would be or the actual measured sulfate in the surface water where wild rice grows near the Boswell facility.
8	A	Constance Slaten	15.1	implementation	Due to the difficulty of measuring the degree of sulfate and sulfide released into these sensitive waters, I think that it is inappropriate to change the requirements at this time.	The MPCA does not agree that it is difficult to measure sulfate in effluent or in surface water. Measurement of effluent and surface water sulfate would be needed regardless of whether the proposed revised standard or the existing standard is implemented. See also response to 1A on this spreadsheet.

8	B	Constance Slaten	3.1	keep the 10 mg/L standard because it is not clear what damage higher sulfate might do.	When we have a more precise method to measure the damage the increase in levels might indeed cause, the present requirements should remain unchanged.	The data and research support the proposed standard as a better, more precise standard. See the Cover Memorandum to this response and the Attachment 1 response to topic area 3.1.
9	C	Constance Slaten	23	Native American issues	When so many treaties have been broken and such damage already done, should we not take the path of patience and reason?	See Attachment 1 response to topic area 23.
9	A	John Malek	2	lack of certainty about the standard	No one yet can say conclusively that wild rice is effected below a certain level of sulfate concentration, and this is using 21st century research (1600) parts per whatever.	The MPCA's proposal is based on strong peer reviewed science. It is true that sulfate concentrations of 1600 to 2500 milligrams per liter do not directly affect wild rice growth, but the peer-reviewed science shows that the problem is elevated porewater sulfide, which is derived from sulfate, not the sulfate itself. See also the Cover Memorandum to this Response.
9	B	John Malek	2.3	other factors	How can anyone put a standard in that does not take in to consideration everything that can influence how wild rice grows.	The MPCA agrees that factors other than sulfide may also have an effect on wild rice; this does not negate the need to protect wild rice from the impacts of sulfide.
9	C	John Malek	25	sound science	BASE THE STANDARD ON FACTS NOT FICTION !	The MPCA's goal in the rulemaking is to protect wild rice from adverse impacts due to sulfate.
10	A	Greg Shaw	19.3	cost	if these new standards go into effect it would cripple the mining industry on the iron range and the local towns that would have to upgrade there water filtration systems who's going to pay for it people with no jobs?	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
10	B	Greg Shaw	3	lack of certainty about the standard	no one knows if the rice will grow with these new lower standards.	The data and research support the proposed standard as a better, more precise standard. See the Cover Memorandum to this response and the Attachment 1 response to topic area 3.1.
11	A	Kyle Lantz	2	Standard should be closer to the drinking water standard	...I am for proposing a standard on sulfate water quality. However, this proposed level is a drastic one. Many bottled water and beer makers have not been able to achieve this low of a level.	SONAR pg. 65 provides a discussion of the toxic effect of sulfate on wild rice in relation to the effect of sulfate on humans.
11	B	Kyle Lantz	25	lack of certainty about the standard	While there has been studies, there are not enough facts to put such a low number out yet.	The MPCA believes the data and research support the proposed standard as a better, more precise standard. See Attachment 1 response to topic area 3.1.
11	C	Kyle Lantz	2	relationship to drinking water standard	Many bottled water and beer makers have not been able to achieve this low of a level.	SONAR pg. 65 provides a discussion of the toxic effect of sulfate on wild rice in relation to the effect of sulfate on humans.
11	D	Kyle Lantz	24	mining	what the mines and manufacturing facilities are doing up here must be working. For the last 40+ years the mines and manufactures have had very little negative impact on the water and woods.	Statement - no response required
12	A	Lea Foushee	16	sampling procedures	At the recent University of Minnesota Nibi Manoomin Symposium in White Earth the MPCA representative stated that the mining companies would collect the samples from the rice lakes that they may impact. This was not the understanding that I had after attending years of Wild Rice Rule "Stakeholder" Meetings. Whatever happened to neutral 3 party?	In its presentation to the wild rice advisory committee on July 6, 2017, the MPCA shared a slide that discussed how water quality standards become permit limits. The slide stated "Gather ambient water quality and sediment data: MPCA for existing facilities, permittee for new or expanding facilities." A key reason for incorporating the sediment sampling procedures into the rule is to ensure that sampling is done correctly and to ensure that permittees follow the procedures.
12	B	Lea Foushee	24	provided map of wild rice lakes overlaid with mining activities		statement- no response required
13	A	Daniel Broten	25, 2.2	sound science	The MPCA's rulemaking should be science-based and inclusive of all available research	The MPCA's proposal is based on sound science. The MPCA reviewed the Fort study and information about it is included throughout the TSD.
13	B	Daniel Broten	19.2	cost	Failure to adjust the current standard to be reasonable and science-based will result in devastating financial impacts to cities and businesses throughout the state, and would result in major job losses on the Iron Range.	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
13	C	Daniel Broten	37	Rule will not benefit rice	the proposed rule is not proven to be effective in protecting wild rice	See Attachment 1 response to topic area 37.
13	D	Daniel Broten	2.3	other factors	An effective standard should use sound science that considers all of the environmental impacts to wild rice, such as water depth, water clarity, fluctuations in hydrology, invasive species, and shoreline development to determine appropriate sulfate levels.	The MPCA has based the rule on sound science, as discussed throughout the SONAR, TSD, and the cover memo to this response. The MPCA agrees that factors other than sulfide may also have an effect on wild rice; this does not negate the need to protect wild rice from the impacts of sulfide.

14	A	Dennis Schubbe	2.5	research design	MPCA did NOT test sulfide in the root zone to come up with their proposed standard of 120 ppb. Instead they exposed (in the laboratory) wild rice stems/leaves above the root zone to sulfide. This situation does NOT exist in nature since oxygen present in water very quickly removes sulfide. This is a fundamental flaw in MPCA's research from which they have developed the proposed rule. MPCA's own wild rice peer review pointed out this flaw. As an example, sulfide concentrations in the root zone has been studied with concentrations (Fort Lab) being shown to be 10x greater than what MPCA research predicted.	Both Dr. Pastor and Dr. Fort had challenges designing hydroponic experiments of seedling growth that would mimic the exposure of the germinated seed to elevated sulfide concentrations. A desirable design would have exposed the seedling roots to various sulfide concentrations in anoxic water while allowing the stem to elongate in water that contained oxygen concentrations found in nature (up to 10 ppm oxygen). But neither scientist found a way to grow wild rice with the roots in anoxic water underneath a stem in oxygenated water without the two layers of water mixing, destroying the experiment. (In nature, the roots grow in anoxic sediment, and the growing seedling elongates into the overlying water, but the point of hydroponic experiments is to avoid the use of sediment, which has undefined chemistry.) Nevertheless faced with the task of performing a hydroponic experiment, Dr. Pastor compromised by exposing the entire seedling to various concentrations of sulfide, which conceivably mimicked the elongation of the seedling through several inches of anoxic sediment in natural wild rice waters, (But the seedlings released oxygen, which decreased sulfide concentrations between renewals.) Dr. Fort's compromise was to germinate seeds in various sulfide concentrations, and to allow the elongating stem to emerge out of the sulfide solution into the atmosphere over the 21 days since germination. (Use of a larger volume and daily renewals kept the sulfide concentrations relatively constant). It might be claimed that the Fort lab's design mimics nature. But the TSD notes (page 13) that in nature it is unlikely that 21-day old wild rice plants have access to high oxygen concentrations. High oxygen availability allows plants to detoxify sulfide that would otherwise be toxic. Accordingly, the Fort lab EC10 was not weighed heavily when identifying a protective sulfide concentration. See also the Cover Memorandum to this Response and the Attachment 1 response to topic areas 4.1 and 4.2.
14	B	Dennis Schubbe	12	cultivated rice	MPCA ignored information/data from wild rice growers (paddy rice). This is a major concern since wild rice growers add sulfate to increase wild rice growth and production. Paddy rice is the SAME as wild rice, just managed as a crop. Both sulfate and sulfide concentrations are much greater in the paddy rice ponds. How can this be? MPCA's proposed rule is flawed, not having considered the body of knowledge.	The proposed rule addresses natural stands of wild rice. Rice in cultivated waters is managed so that it responds differently to sulfate. (See TSD, page 14.) Wild rice waters do not include cultivated wild rice waters. See 7050.0130 Subp. 6C.
14	C	Dennis Schubbe	4	research design	MPCA concluded that wild rice "should be" present where lily pads are present and based their field studies on this assumption when in fact, based on MPCA's data, in 263 wild rice water bodies this assumption FAILS 115 time! Another indication of flawed research and studies to create a FUNDAMENTALLY flawed propose rule.	Wild rice and water lilies often grow in similar habitat. The MPCA is proposing that sediment in wild rice waters (which are designated based on other information) should be gathered in areas where lilies grow only if wild rice stands cannot be located.
15	A	Bryan Hansel	3.1	support for 10 mg/L	WHEREAS, Minnesota currently has a water quality standard (Minnesota Rule 7050.0224, Subp. 2) limiting sulfide pollution in wild rice waters to 10 milligrams per liter (mg/L), a limit the Minnesota Pollution Control Agency (MPCA) agreed in February 2014 was "needed" and "reasonable" to protect wild rice in lakes and streams, based on Minnesota's recent taxpayer-funded scientific research	The data and research support the proposed standard as a better, more precise standard. See the Cover Memorandum to this response and the Attachment 1 response to topic area 3.1.
15	B	Bryan Hansel	10	identify wild rice waters without acreage/density criteria	WHEREAS, this state-funded scientific research also supported applying Minnesota's wild rice sulfate standard year-round and provided no basis for the MPCA to set arbitrary thresholds on acreage and density to limit the scope protection of natural stands of wild rice;	While the MPCA considered wild rice density and acreage, we are not proposing a strict stem density or acreage threshold to define wild rice waters. See Attachment 1 response to topic area 10.1 and SONAR pp. 41-57 for a detailed discussion of how the MPCA evaluated sources to determine proposed wild rice waters.
15	C	Bryan Hansel	3.1	support for 10 mg/L	THEREFORE, I request that in any proposed MPCA rulemaking Minnesota preserve and enforce year-round the State's existing water quality standard limiting sulfate pollution in wild rice waters to 10 mg/L in all wild rice waters, without imposing thresholds for acreage or density of natural wild rice	The data and research support the proposed standard as a better, more precise standard. See the Cover Memorandum to this response and the Attachment 1 response to topic area 3.1.
16	A	Alena Stewart	3.1	support for 10 mg/L	Minnesota's existing limit on sulfate pollution should be preserved and enforced year-round in all wild rice waters	The data and research support the proposed standard as a better, more precise standard. See the Cover Memorandum to this response and the Attachment 1 response to topic area 3.1.

16	B	Alena Stewart	10	identify wild rice waters without acreage/density criteria	without imposing thresholds for acreage or density of natural wild rice	While the MPCA considered wild rice density and acreage, we are not proposing a strict stem density or acreage threshold to define wild rice waters. See Attachment 1 response to topic area 10.1 and SONAR pp. 41-57 for a detailed discussion of how the MPCA evaluated sources to determine proposed wild rice waters.
16	C	Alena Stewart		value of clean water	better protect clean water, wild rice and state resources, and reduce toxic accumulation of methylmercury in fish, algae blooms and other health issues.	The proposed rule is about protecting wild rice from the impacts of sulfate; in a formal sense the effects of sulfate on the methylation of mercury are out of scope for this rulemaking. However, the MPCA is very concerned about actions that might increase the mercury content of fish, and the MPCA is conducting an ongoing separate study concerning the factors that control mercury in fish. MPCA has water quality standards for both mercury in water and in fish. MPCA has reviewed what is known about the effect of elevated sulfate on mercury methylation, and finds that the relationship between sulfate and mercury methylation significantly more complicated than the relationship between sulfate and sulfide on which the the proposed wild rice rule is based. Therefore, it would be even more challenging to develop specific limits on sulfate discharge based on the potential for production of methylmercury.
17	A	Robert Slimak	33	support for the proposed standard	I agree with the proposed changes. There is nothing more important than our environment. Mining has always threatened to shut down if they don't get to keep polluting. One example of that was when they were told they had to stop dumping their tailings into Lake Superior. Do not let threats take precedence over protection of our waters.	Support for proposed revisions- no response required
18		Todd Pontinen		Unknown	Unknown	The MPCA was unable to retrieve and review the uploaded comment.
19	A	Kraig Raiber	19	cost	What happened to using science and reason when coming up with environmental regulations??? There is absolutely no science behind this proposed wild rice standard and observations from the 1930's and 40's was the only thing used to come up with the existing standard. I think science has evolved a little over the past 70 years. But still we have people that for no other reason than shutting down industry in Minnesota will completely disregard the science and convince the MPCA to propose regulations that will bankrupt not only the mines but also all the cities on the iron range!	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
19	B	Kraig Raiber	20	political influences	The fact is this proposed regulation was pushed thru quickly without any science to back it up for the sole purpose of getting it to Governor Dayton to sign before he leaves office. The MPCA themselves admitted that to us.	The MPCA has been in the process of developing the proposed rules for more than 7 years. The discussion of Need in the SONAR (pg.19) states "Following an initial evaluation of the scientific literature in 2010, the MPCA determined that it needed additional studies to better understand the effects of sulfate and other substances on the growth of wild rice and determine the appropriateness of the standard and its implementation."
19	C	Kraig Raiber	38	wild rice is not in decline	we have been mining iron ore for over 100 years up here and we still have large stands of wild rice all over the range in waters that have higher sulfate levels than the proposed or old standard. How is that possible if what the MPCA and these extreme environmentalists are saying is true?	The MPCA's research documented a clear impact of sulfide on wild rice. The calculated sulfate standard has not yet been determined for the wild rice waters, so it is impossible to say if rice is thriving in waters that have sulfate higher than the standard. If that turns out to be the case, those situations can be handled using the alternate or a site-specific standard.
19	D	Kraig Raiber	2	relationship to drinking water standard	By the way, the drinking water standard for sulfates is 250 ppm and if the MPCA and environmentalists get their way the mines and municipalities on the range would need to reduce sulfate levels down to 10 ppm for any water that is discharged. We might as well just bottle all the water we discharge if they are going to force us to install these very expensive reverse osmosis systems on all our discharges.	SONAR pg. 65 provides a discussion of the toxic effect of sulfate on wild rice in relation to the effect of sulfate on humans.
20		David Siebert	20	political influences	It is so blatantly obvious why the MPCA is doing this at this particular time. Instead of allowing a business, Polymet, to go through the certification process with the current laws and rules the MPCA is trying to change the standards in the middle of the process. What the MPCA is doing is slimy but typical of a liberal agency that wants to control and destroy any hope a normal person has of making a decent living.	Comments about specific mining projects are out of scope for this rulemaking.

21		Diana Cumming	3.1	support for 10 mg/L standard	To protect wild rice, reduce mercury contamination of fish and prevent additional eutrophication of lakes, the MPCA should keep and enforce Minnesota's existing (10 mg/L) wild rice sulfate limit in all wild rice waters.	The data and research support the proposed standard as a better, more precise standard. See the Cover Memorandum to this response and the Attachment 1 response to topic area 3.1. Discussion of mercury and the relationship of mercury and sulfate is the Attachment 1 response to topic area 28 and elsewhere in Attachment 2.
22		Charles Belich	38	wild rice is not in decline	I came to the conclusion that sulfate is in the water and the mining industry is not making it any worse.	The SONAR documents area of sulfate discharge from mines beginning on page 171. The MPCA's research documented a clear impact of sulfide on wild rice. The calculated sulfate standard has not yet been determined for the wild rice waters, so it is impossible to say if rice is thriving in waters that have sulfate higher than the standard.
23	A	Kathleen Quinn	3.1	support for 10 mg/L standard	The current standard should be enforced	The MPCA believes the data and research support the proposed standard as a better, more precise standard. See Attachment 1 response to topic area 3.1.
23	B	Kathleen Quinn	16	sampling procedures	The proposed methods of sampling appear overly complex, and possibly subject to varying interpretations.	The MPCA's goal of incorporating the sampling methodology into the rule is to ensure that it is clear and can be followed without the need for significant interpretation.
23	C	Kathleen Quinn	10	incomplete list of wild rice waters	the bodies of water identified for 'protection' do not include many areas currently used for wild rice growing.	See Attachment 1 response to topic area 10.1 and SONAR pp. 41-57 for a detailed discussion of how the MPCA evaluated sources to determine proposed wild rice waters.
24	A	Tracy Kugler	3.1	support for 10 mg/L standard	I urge the MPCA to maintain the existing 10 mg/L sulfate standard, and to enforce it consistently year-round in all wild rice waters.	The data and research support the proposed standard as a better, more precise standard. See the Cover Memorandum to this response and the Attachment 1 response to topic area 3.1.
24	B	Tracy Kugler	3.3	the proposed model does not consider organic carbon	The proposed shift to an equation incorporating iron concentrations seems to be an attempt to justify allowing additional sulfate pollution. The interactions between sulfate, other water chemistry factors, and wild rice are an active area of scientific research and are not fully understood. For example, a recent article found that organic carbon plays an important role in regulating the interaction between sulfate and iron (Pollman et al. 2017). Organic carbon is not considered in the proposed model.	The data and research support the proposed standard as a better, more precise standard. See the Cover Memorandum to this response and the Attachment 1 response to topic area 3.1. The model does take into account organic carbon and iron.
24	C	Tracy Kugler		precautionary principle	While it may be possible for wild rice to survive in waters with higher levels of sulfate under certain conditions, it is reasonable for regulations to be based on more cautious levels. Indeed, such caution should be the function of environmental regulation....Environmental regulations should not be construed as aiming to allow for the maximum pollution possible without causing critical harm to life. According to the precautionary principle, a widely accepted principle for establishing environmental regulations, "When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically" (Science and Environmental Health Network 1998). The case of wild rice and sulfate is a classic instance in which the precautionary principle should apply. The cause and effect relationships are not fully understood, and we should therefore err on the side of caution to protect the water, wild rice, and the livelihood and culture of Native Americans who depend on it.	Statement - no response required
25	A	Mary Theresa Downing	3.1	The current standard is needed and reasonable	The current Minnesota water quality standard limits sulfide pollution in wild rice waters to 10 milligrams per liter (mg/L), a limit the Minnesota Pollution Control Agency (MPCA) agreed in February 2014 was "needed" and "reasonable" to protect wild rice in lakes and streams, based on Minnesota's recent taxpayer-funded scientific research. The proposed changed is not based on sound science.	The data and research support the proposed standard as a better, more precise standard. See the Cover Memorandum to this response and the Attachment 1 response to topic area 3.1.
25	B	Mary Theresa Downing	15	proposal will make measurement and enforcement more complex	A uniform standard is much more easily enforced, an important consideration when so many state and federal budgets are being slashed. Making measurement and enforcement more complex by introducing more variables is an attempt to obfuscate the process, allowing mining companies to pollute until they are proven to have exceeded the allowable level for a particular lake. The current standard should not be changed.	The data and research support the proposed standard as a better, more precise standard. See Attachment 1 response to topic area 3.1. See also cover memo to this response on implementation. The MPCA is proposing to use our existing intensive watershed monitoring cycle to gather the data needed to set a numeric sulfate standard for each water and then to measure sulfate levels in wild rice waters. See SONAR page 154 and page 3 of the Wild Rice Frequently Asked Questions handed out at the hearing. Once a sulfate limit is set, that single number will be enforced for that water body.

26	A	Sydney Evans	15.1	complexity of implementing the standard	What justification can there be for enacting new sulfate standards that vary from one body of water to the next? If the MPCA has limited enough resources that it has difficulty monitoring sulfate standards under current single standard regulation, how can the Agency possibly effectively monitor every rice bearing body of water under individual standards?	The MPCA is proposing to use our existing intensive watershed monitoring cycle to gather the data needed to set a numeric sulfate standard for each water. See SONAR page 154, page 3 of the MPCA's Wild Rice Frequently Asked Questions (Hearing exhibit 1013) and the cover memorandum to this response.
26	B	Sydney Evans	24	political influences	...this proposed change in measuring standards smacks of Industry favoring standards not environmental. What is the correlation between the current permitting battle over PolyMet's proposal for sulfide/sulfate mining in the Arrowhead?	Comments about specific mining projects are out of scope for this rulemaking.
27	A	Robin Vora	33	support for the proposed standard	Wild rice is very important to people and wildlife in Minnesota and so I support more protective rules to limit sulfate pollution. A lake-specific standard makes sense biologically given levels of iron and organic carbon differ among lakes, although I am not an expert on this science.	Statement of support--no response required.
27	B	Robin Vora	33	support for the proposed standard	It is also good this proposed standard would clarify which lakes are protected. The present standards include too few lakes and this change is needed to include the many more than contain wild rice.	Statement of support--no response required.
28		Chris Lamke	37, 19	No proof it will help rice; cost concerns	Since there is no real proof that these new standards would help the wild rice crop it is reckless to impose these standards because of the financial stress it would put on the towns here in northeastern Minnesota and destroy the mining industry that is our life blood	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response. See also Attachment 1 response to topic area 37.
29	A	David Smith	2.1	sulfate does not affect rice	I live directly down stream from one of Minnesota's largest Iron ore operations. I can look out my window every day and see the wild rice that is thriving in our bay.	The calculated sulfate standard has not yet been determined for the wild rice waters, so it is impossible to say if rice is thriving in waters that have sulfate higher than the standard.
29	B	David Smith	2.3	other factors	I can also see that fluctuations in water level have the greatest effect on wild rice production in the bay. For this reason I oppose the proposed sulfate standard. I believe that it would be more beneficial for mining operations to stay in production and emitting a steady discharge and helping to avoid fluctuations in water level downstream.	The MPCA agrees that factors other than sulfide may also have an effect on wild rice; this does not negate the need to protect wild rice from the impacts of sulfide. The rule would not necessarily impact the amount of water discharged from mining facilities.
29	C	David Smith	27	Iron negates effects of sulfate	believe that more research should be done on the effect of sulfate on rice in iron rich waters. Some of the articles I have read seem to imply that high levels of iron present in our water negates the effect of sulfates on wild rice.	The MPCA's proposed equation recognizes that sulfate turns to sulfide less efficiently in water bodies with higher amounts of iron in the sediment.
29	D	David Smith	19	cost	I also think that the economic burdens of this proposed standard out weigh the proposed benefits	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
30	A	Jennifer Stanzell	3.9	sound science	the obvious reaction should be to suspend this rulemaking action until there is actual science that has a much lower threshold of error than 20% and can decisively sustain and increase wild rice production.	See responses about error rate in the cover memo to this response and in Attachment 1 response for Topic area 3.9.
30	B	Jennifer Stanzell	19	cost	I strongly urge the MPCA to wait until there is an outcome that not only actually benefits the wild rice waters, but doesn't financially devastate the small town that I call home	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
31	A	Chris Vreeland	2.3	other factors	I have met with the DNR employees responsible for working wild rice waters in NE Minnesota and they said the best way to get more wild rice is to control water levels in more wild rice waters, they blow as many beaver dams as money permits and the wild rice comes back, sulfate has nothing to do with the amount of wild rice we have.	The MPCA agrees that factors other than sulfide may also have an effect on wild rice; this does not negate the need to protect wild rice from the impacts of sulfide.
31	B	Chris Vreeland		only state to have a wild rice standard	Why are we the only state in the country with a sulfate standard. We need to get ride of unnecessary rules.	The Clean Water Act allows states to set standards to protect beneficial uses that are unique in their state. Minnesota has an existing sulfate standard and the subject of the proposal is the revision of that existing standard, not whether it should have been adopted in the first place.

32		David Hamalainen	38	wild rice is not in decline	I attended the hearing in Virginia and the vast majority of time was spent on the validity of the proposed MPCA sulfate standard and the potential costs of implementation. What I found glaringly missing was the evidence of wild rice being adversely affected by industry and municipality water discharges in the first place. Both have been around for decades and certainly much longer than the duration of the MPCA study. Where was even one proven example of industry or municipality water discharge being directly responsible for the detriment of wild rice? There wasn't. How then can the very livelihood of these entities be jeopardized by a proposed sulfate standard when it has not even been proven to be necessary?	There is insufficient information available to respond to this comment, since we do not yet know what the equation-based sulfate standard would be or the actual measured sulfate in the surface water of wild rice waters. See also Attachment 1 response to topic area 37.
33	A	Richard Crum	2	standard is too low	The MPCA was unable to demonstrate a direct effect of sulfate on wild rice until levels reached well over 1,000 mg/L. Based on this contradiction between the data and the existing rule, they next identified sulfide, a reduced form of sulfur, as the potential pollutant impacting wild rice.	MPCA-sponsored research readily found a highly significant statistical relationship between wild rice occurrence and sulfide in an analysis of 108 different Minnesota water bodies, as published in a peer-reviewed science journal by Myrbo et al. (2017, Response Exhibit N.2).
33	B	Richard Crum	4	flaws in research	We have concluded that the Technical Support Document (TSD) contains significant uncertainty regarding the role of sulfate in wild rice distribution and abundance. The proposed rule with the sampling and analysis methodology would increase that uncertainty in assigning site-specific sulfate limits.	MPCA-sponsored research readily found a highly significant statistical relationship between wild rice occurrence and sulfide in an analysis of 108 different Minnesota water bodies, as published in a peer-reviewed science journal by Myrbo et al. (2017, Response Exhibit N.2).
33	C	Richard Crum	2	standard is too low	The sulfide limit of 120 ug/L is set far lower than sulfide levels in which wild rice survives in the laboratory (Fort, et al) and in the field (MPCA field data ftp://files.pca.state.mn.us/pub/wild_rice/)	The MPCA is setting a protective level of sulfide, above which there is evidence that wild rice grows and reproduces less well (Pastor hydroponic and mesocosm experiments) and has lower probability of occurrence and stem density in the field (field study). the protective sulfide level is not an absolute threshold above which wild rice is never present -- such an approach would not be protective. See pp. 31-39 of the TSD and the response to Topic Area 37.
33	D	Richard Crum	2.3	other factors	The understanding of how multiple stressors affect wild rice has remained unexamined in this rulemaking.	The MPCA agrees that factors other than sulfide may also have an effect on wild rice; this does not negate the need to protect wild rice from the impacts of sulfide.
33	E	Richard Crum	3.9	error rate	The equation has a high degree of error, meaning that it over predicts or under predicts sulfate values nearly 20% of the time. In addition, the rule requires the lowest resulting sulfate value to be the standard.	See responses about error rate in the cover memo to this response and in Attachment 1 response for Topic area 3.9.
33	F	Richard Crum	16	sampling procedures	The sampling and analysis method does not provide representation of the spatial and temporal variability in a wild rice water. Preliminary analysis shows extremely wide variations in what a protective sulfate value might be within wild rice stands, which do not display corresponding variations in wild rice density	The proposed equation requires data on TOC and extractable iron for implementation, neither of which exhibits strong temporal variability in a wild rice water (Myrbo et al., 2017, Response Exhibit N.2). The MPCA acknowledges spatial variability of these variables in a wild rice water, which is why the proposed rule would require the sampling of five transects.
33	G	Richard Crum	4.2	peer review	Recommendations from the Peer Review Panel to improve the test design to obtain more relevant information were not heeded by the MPCA; rather, they continued to rely on flawed study designs to draw their conclusions.	A discussion of the MPCA's peer review of the research and analysis on which the proposed standard is based is provided in Part 10. G of the SONAR (pg. 216) and in the cover memo to this response. The cover memo also includes a general description of peer review.
33	H	Richard Crum	4	peer review	Minnesota Chamber of Commerce funded studies by an accredited lab using Good Laboratory Procedures which incorporated the Peer Review Panel recommendations. The results of these studies are being inappropriately discounted by the MPCA due to assertions that sulfide was "detoxified". Empirical data clearly shows sulfide levels were maintained at a consistent rate throughout the exposure.	As mentioned on page 12 of the TSD, access to oxygen may also allow detoxification of sulfide within the root of the plant. Sulfide monitoring of the water in which the roots were growing would not have detected this effect. See also Attachment 1 Response to topic areas 4.1 and 4.2.

33	I	Richard Crum	19	cost	The rule is being published despite significant negative economic consequences....To justify this, the MPCA has stated that the Clean Water Act requires them to determine the standard without considering treatment costs. This statement confuses the distinction between setting a standard and promulgating the rule to enforce the standard.The Environmental Policy of the United States as originally described in the National Environmental Policy Act is to protect the environment WHILE interfering as little as possible with the efficiency of commerce or the liberty of people. In addition the Administrative Procedures Act of Minnesota fully supports evaluation of the costs associated with a new or revised rule.	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response. A discussion of how the MPCA properly considered costs under the APA is provided in Attachment 1 response to topic area 31.
33	J	Richard Crum			Because any new regulation has upsides and downsides (winners and losers), a reasonable evaluation of ethics related to environmental regulation would dictate that new regulations are only appropriate when the risk to be mitigated is clear and consequences of the regulation are understood, or if the risk is extreme and immediate.	This is not an existing legal standard to evaluate rules and regulations.
33	K	Richard Crum	18	variances	Variances are not guaranteed, must be approved by the EPA and can be challenged by activist groups that may demand compliance with the rule through the courts. Furthermore, the data needed to provide justification for a variance is expensive, time consuming, and comes with a schedule of compliance which ultimately would require compliance with the rules.	The MPCA is committed to implementing variances where appropriate, when compliance with a limit to ensure the standard is met would cause widespread social and economic impacts. This includes providing information to support the determination of widespread social and economic impacts; this was described as part of the need for the LCCMR study.
34		Laura Gruchow	24	Mining is a temporary economy	Wild rice is a renewable resource. Harvesting wild rice can provide people with income indefinitely. Mining provides a finite number of jobs for a limited amount of time. Mining cannot provide income indefinitely. Protecting wild rice farming is better for Minnesota's economy in the long run.	statement- no response required
35	A	Kevin Hakala	25	sound science	The proposed standard is not based on sound science	The MPCA has based the rule on sound science, as discussed throughout the SONAR, TSD, and the cover memo to this response.
35	B	Kevin Hakala	33.1	the existing standard is too stringent	The current 10 mg/L standard is also much more restrictive than it needs to be.	The MPCA believes the data and research support the proposed standard as a better, more precise standard. However, the MPCA notes that the decision to remove existing 10 part per million standard is not a separate decision from the proposed equation-based sulfate standard.
36	C	Kevin Hakala	2	the standard is too low	MPCA and Fort Environmental Labs studies proved that wild rice is not affected until sulfate levels reach 1600mg/L or greater, and it is proven that wild rice is growing well in waters of Northern Minnesota currently having 800mg/L of sulfates.	Sulfate is not directly toxic to wild rice. Rather, sulfate exerts negative effects on wild rice when it is converted to hydrogen sulfide in sediment. See discussion in SONAR pp. 65-66. We do not yet know what the equation-based sulfate standard would be or the actual measured sulfate in the surface water of wild rice waters, some sulfate levels may be relatively high without the protective sulfide level being exceeded.
36	D	Kevin Hakala	19	cost	proposed standard could lead to sulfate limits under 10 mg/ L, which would cost city waste water treatment centers millions of dollars to treat to the ridiculously low standards.	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
36	E	Kevin Hakala	19	cost	I do believe there should be standard, but it should set at a reasonable level that both protects wild rice and does not waste significant tax dollars on over-treatment.	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
36	F	Kevin Hakala	2	relationship to drinking water standard	The drinking water standard is 250mg/L. Wild rice is growing in waters with 800mg/L in this area every year. How does the MPCA come up with a standard that will limit sulfate levels to well under the levels in drinking water?	SONAR pg. 65 provides a discussion of the toxic effect of sulfate on wild rice in relation to the effect of sulfate on humans.
37	A	Jeff Williams	3.2	support for a single standard, not an equation	Not having and enforcing one uniform level of sulfate across all the wild rice waters/areas will result in many of them not being able to sustain the growth of wild rice.	The data and research support the proposed standard as a better, more precise standard. See the Cover Memorandum to this response and the Attachment 1 response to topic area 3.1 and 3.2. Some waters may support rice with levels of sulfate higher than the existing 10 mg/L standard, while others might need levels of sulfate lower than the existing 10 mg/L
37	B	Jeff Williams	23	environmental justice	This would especially result in economic and cultural harm to Minnesota's tribal communities.	The MPCA understands the importance of wild rice to the tribal communities. The SONAR discusses this importance, including in the section on environmental justice (page 133) and in the regulatory analysis.

37	C	Jeff Williams	15.1	implementation	The proposed sulfate rule which allows an individual sulfate standard for each wild rice water/area (there are at least 1,300 waters/areas if not many more) will be very difficult to implement and enforce.	The MPCA is proposing to use our existing intensive watershed monitoring cycle to gather the data needed to set a numeric sulfate standard for each water. See SONAR page 154 and page 3 of the Wild Rice Frequently Asked Questions handed out at the hearing.
37	D	Jeff Williams	15.1	waters will not be monitored	...is likely that many wild rice waters/areas will either be skipped or not tested/monitored in any sort of timely fashion. That means many of them will diminish in their capacity to grow wild rice.	It is not uncommon for many years of data gathering to be necessary before a standard can be fully implemented in permits. Even if the MPCA set a single number as the sulfate standard, it would take time to gather data about sulfate levels in surface water and effluent. The MPCA is proposing to use our existing intensive watershed monitoring cycle to gather the data needed to set a numeric sulfate standard for each water. See SONAR page 154 and page 3 of the Wild Rice Frequently Asked Questions handed out at the hearing.
37	E	Jeff Williams	3.1	support for the 10 mg/L standard	Our waters would be much better served if the current standard were adequately enforced and expanded across all wild rice waters.	The MPCA believes the data and research support the proposed standard as a better, more precise standard.
38	A	Nancy Mccready	3.9	error rate	My primary concern is that the MPCA has moved forward with a draft wild rice sulfate standard based on an inaccurate equation to derive a sulfate water quality standard. The proposed equation predicts the wrong outcome up to one in five times, and I am deeply concerned that the MPCA expects regulated entities and private industry to invest hundreds of millions of dollars in treatment facilities based on such a high error rate.	See responses about error rate in the cover memo to this response and in Attachment 1 response for Topic area 3.9.
38	B	Nancy Mccready	37	MPCA cannot even say the rule will help wild rice	It is uncertain if wild rice will be more abundant if the proposed rule is implemented. When asked if the new standard and investments made to comply with the standard would result in more abundant rice, the MPCA official said that based on the research there may be no benefit to the wild rice species.	See discussion in cover memo to this response discussing comments about improvement to wild rice. See also Attachment 1 response to topic area 37.
38	C	Nancy Mccready	36	reverse osmosis	The only treatment option to comply with the proposed rule is Reverse Osmosis. This is very costly and would bankrupt cities and businesses.	A discussion of the problems associated with reverse osmosis is provided in Part 10 D. of the SONAR (pg.178) and in the cover memo to this Response.
38	D	Nancy Mccready	19	cost	This is very costly and would bankrupt cities and businesses. A cost analysis of the treatment to the benefit needs to be done.	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
38	E	Nancy Mccready	38	wild rice is not in decline	According to the Minnesota Cultivated Wild Rice Council, the crop is currently plentiful and our state is one of the world's largest producers of cultivated wild rice, producing 5-10 million pounds annually.	Out of scope. The proposed rule addresses natural stands of wild rice. Wild rice waters do not include cultivated wild rice waters. See 7050.0130 Subp. 6C.
38	F	Nancy Mccready	38	wild rice is not in decline	Yet the MPCA is moving forward with providing a solution for a non-problem.	The need for the proposed revisions is provided in SONAR pg. 19. See also the cover memo to this response.
38	G	Nancy Mccready	3.9	error rate	The MPCA must adopt the recommendations by the highly-respected scientific firm, Ramboll ENVIRON, to reduce the error rate of the sulfate equation to 4% and to address scientific shortcomings identified by Fort Environmental Labs (FEL) and MPCA's peer review panel.	See responses about error rate in the cover memo to this response and in Attachment 1 response for Topic area 3.9. The MPCA reviewed the Fort study and information about it is included throughout the TSD. A discussion of the MPCA's peer review of the research and analysis on which the proposed standard is based is provided in Part 10. G of the SONAR (pg. 216) and in the cover memo to this response. The cover memo also includes a general description of peer review.
38	H	Nancy Mccready	2.7	the dataset used to develop the equation should include only those waters with wild rice	adjust the waterbodies included in the dataset used to develop the equation to only include those that are recommended as draft wild rice waters.	See the TSD discussion on "Dataset used to perform the MBLR" beginning on page 63.
39	A	Kathleen Quinn		precautionary principle	I am urging the judge and the MPCA to apply The Precautionary Principle: When an activity raises threats of harm to human health or the environment, precautionary measures should be taken, even if some cause and effect relationships are not fully established scientifically.	statement- no response required
39	B	Kathleen Quinn	other pollutants	sulfate and relationship to mercury and lead	The history of the discoveries of the impact on human health and the environment of lead and mercury cannot be ignored! We do not yet know enough about the effects of sulfur compounds on health and environment to make a determination of what is 'safe'.	The MPCA has other water quality standards, including water quality standards for metals, to ensure that water is protected from the impact of those pollutants.
40	A	Ryan Heule	37, 19	No improved in rice, cost	My concern is this proposed sulfate rule will make no improvement to the wild rice in the state yet will have a large economic cost.	See discussion in cover memo to this response discussing comments about improvement to wild rice. A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response. See also Attachment 1 response to topic area 37.

40	B	Ryan Heule	2.3	other factors	There are too many factors that have a greater effect wild rice to make an economically burden sum rule.	See TSD discussion p.23-30 B. That other factors affect wild rice does not negate the need to protect wild rice from excess sulfide.
41		David Ross	19	cost	(Chamber of Commerce) leadership is concerned regarding the potentially onerous and questionable barriers the proposed standard will place on our region's iron mining operations. Additionally, we are concerned that the apparent treatment options to meet the proposed sulfate standard will prove to be prohibitively expensive.	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response. Variances are a tool that can be used during permitting until treatment costs will not cause widespread social or economic impacts.
42		Lea Foushee	other pollutants	radioactivity	Section 7.11 refers to Radioactivity in wild rice waters. We do have a wild rice bed just below the Prairie Island Nuclear Reactors discharging into the Mississippi for decades. Eating alpha and beta particles in waterfowl that eat the rice or directly eating the rice would be very ill advised. I was commended for noticing the clause but nothing was done by the MPCA to address this problem. There is no such thing as a safe dose of nuclear radiation.	This rulemaking is about protecting wild rice from the impacts of sulfate/sulfide.
43	A	Mary Meyer	33	support for the proposed standard	The current rule is over 40 years old and all evidence points toward sulfates contributing to wild rice decline and death. The new rule reflects new understanding including organic carbon and iron influences on sulfate and is an improvement in setting new standards to protect wild rice and Minnesota water quality.	support for proposed revisions- no response required
43	B	Mary Meyer	34	Pilot test	A number of critical waters should be used to pilot the new rule including cost analysis for reducing the sulfate levels, this report should be submitted after 5 years to determine the impact of the new sulfate levels and their realistic adoption in the future.	Minnesota has an existing 10 mg/L sulfate standard on the books that would have to be implemented if this proposed revision does not move forward. The MPCA believes the data and research support the proposed standard as a better, more precise standard. It is not clear what exactly the commenter has in mind as a pilot study, but the MPCA is not sure this is a realistic approach when there is an existing standard.
44		Dan Fabian	4.2	peer review	While there is general agreement that the existing standard of 10 mg/Liter standard needs updating, the research done thus far to establish a new standard was criticized by a peer review panel...	A discussion of the MPCA's peer review of the research and analysis on which the proposed standard is based is provided in Part 10. G of the SONAR (pg. 216) and in the cover memo to this response. The cover memo also includes a general description of peer review.

44		Dan Fabian	4	research design	.. A main concern is that laboratory conditions to conduct research were not similar to conditions that would exist in nature	Both Dr. Pastor and Dr. Fort had challenges designing hydroponic experiments of seedling growth that would mimic the exposure of the germinated seed to elevated sulfide concentrations. A desirable design would have exposed the seedling roots to various sulfide concentrations in anoxic water while allowing the stem to elongate in water that contained oxygen concentrations found in nature (up to 10 ppm oxygen). But neither scientist found a way to grow wild rice with the roots in anoxic water underneath a stem in oxygenated water without the two layers of water mixing, destroying the experiment. (In nature, the roots grow in anoxic sediment, and the growing seedling elongates into the overlying water, but the point of hydroponic experiments is to avoid the use of sediment, which has undefined chemistry.) Nevertheless faced with the task of performing a hydroponic experiment, Dr. Pastor compromised by exposing the entire seedling to various concentrations of sulfide, which conceivably mimicked the elongation of the seedling through several inches of anoxic sediment in natural wild rice waters, (But the seedlings released oxygen, which decreased sulfide concentrations between renewals.) Dr. Fort's compromise was to germinate seeds in various sulfide concentrations, and to allow the elongating stem to emerge out of the sulfide solution into the atmosphere over the 21 days since germination. (Use of a larger volume and daily renewals kept the sulfide concentrations relatively constant). It might be claimed that the Fort lab's design mimics nature. But the TSD notes (page 13) that in nature it is unlikely that 21-day old wild rice plants have access to high oxygen concentrations. High oxygen availability allows plants to detoxify sulfide that would otherwise be toxic. Accordingly, the Fort lab EC10 was not weighed heavily when identifying a protective sulfide concentration. See also Attachment 1 response to topic areas 4.1 and 4.2.
44		Dan Fabian	2.3	other factors	additionally, the current proposal does not take into consideration other critical factors that can affect the growth of wild rice from year to year, such a fluctuations in water depth, water clarity, invasive species...	See TSD discussion p.23-30 B. That other factors affect wild rice does not negate the need to protect wild rice from excess sulfide.
44		Dan Fabian	19	reverse osmosis	... the only treatment option known to work at this time is reverse osmosis which is incredibly expensive.	A discussion of the problems associated with reverse osmosis is provided in Part 10 D. of the SONAR (pg.178) and in the cover memo to this Response.
44		Dan Fabian	37	wild rice is not in decline	..in this case, we don't know if the new standard will result in more wild rice beds or even maintain the ones we have. Forcing cities and industrial permit holders to spend million and millions for an uncertain outcome makes absolutely no sense.	See discussion in cover memo to this response discussing comments about improvement to wild rice. A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
44		Dan Fabian	19.4	LCCMR report	.. A more complete picture of wastewater treatment alternatives is forthcoming... that would help them make better informed decision....that study should be completed and analyzed before the completion of any new regulation	A discussion of the LCCMR Study is provided in the MPCA's cover memo to this response
44		Dan Fabian	19	cost	.. Could have far-reaching and potentially devastating impact on Greater Minnesota. The cost of compliance alone could consume small community budgets, increase utility bills for residents and bankrupt state programs providing state funds for municipal wastewater treatment....	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
45		Bruce Brummitt	3.1	retain the 10 mg/L		The data and research support the proposed standard as a better, more precise standard. See the Cover Memorandum to this response and the Attachment 1 response to topic area 3.1.
45		Bruce Brummitt	15.3	enforce the standard year-round		The discussion of the annual average is at page 79 of the SONAR
45		Bruce Brummitt	10	identify wild rice waters without acreage/density criteria		While the MPCA considered wild rice density and acreage, we are not proposing a strict stem density or acreage threshold to define wild rice. See Attachment 1 response to topic area 10.1 and SONAR pp. 41-57 for a detailed discussion of how the MPCA evaluated sources to determine proposed wild rice waters.

Comment ID	Part ID	Commenter Name	Topic	Relevant Excerpts/summary of comment	Full Comment or Location	Response or Response Location
1	A	Ronald Fureo	3.1	oppose repealing 10 mg/L standard		The MPCA believes the data and research support the proposed standard as a better, more precise standard. See Attachment 1 response to topic area 3.1.
1	B	Ronald Fureo	5	proposed standard is unenforceable and unprotective		The MPCA has demonstrated that the data and research support the proposed standard as protective of wild rice. The MPCA is proposing to use our existing intensive watershed monitoring cycle to gather the data needed to set a numeric sulfate standard for each water and then to measure sulfate levels in wild rice waters. See SONAR page 154 and page 3 of the Wild Rice Frequently Asked Questions handed out at the hearing. Once a standard is set for a water body, enforcement will be similar as for a single standard.
2	A	Frank Pezzutto	3.3	Sulfate in the Sandy River is not preventing rice from growing.	Spent the morning on the Sandy River which is partially sourced from the Minntac Tailings basin. The rice crop was good and so think that we had a difficult time finding the river channel. From doing some research, know that the sulphate levels in this body of water is higher than what the MPCA is proposing.	The MPCA does not have information about the calculated sulfate standard for Sandy River downstream of Minntac that would result from implementation of the proposed revision, so we cannot say whether or not the current sulfate level is higher or lower.
2	B	Frank Pezzutto	19.3	Sulfate standard will cripple range economy	The proposed MPCA sulphate standard will cripple mining here on the The Range and bankrupt local municipalities	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's Cover Memorandum to this response. Because sulfate standards have yet to be calculated, it is too early to say what kind of sulfate treatment (if any) will be needed and therefore the costs of such treatment. The kinds of widespread economic and social impacts that the commenter raises concerns about are what is considered in determining if a variance from the standard is appropriate for a municipal or industrial permittee.
3	A	Dennis Good	20	The 1/18/14 Wild Rice sulfate study was "covered up" by political interests		It is a misunderstanding or misrepresentation of the events to say that MPCA originally decided to maintain the existing 10 mg/L standard or that something was covered up. In early March 2014 MPCA was preparing to issue a preliminary analysis of the results of the wild rice sulfate study. While the draft report was undergoing internal review and editing, MPCA recognized that the summary of the preliminary analysis was written in such a way that interested parties could interpret it to mean that the MPCA had concluded its work on the data analysis and evaluation of the existing standard. This was not the case; for example, the analysis had not yet had any form of independent peer review. To clarify this point the release of the report was delayed to allow time to revise the summary section to avoid suggesting that a decision had been made when in fact it had not. The preliminary analysis report (SONAR Exhibit 5) was released in March 2014. Through a Data Practices Act request an interested party obtained a copy of an earlier draft of the preliminary analysis, and some commenters have drawn erroneous conclusions about the MPCA's intent based on that earlier draft.
3	B	Dennis Good	35	Intent behind 2011 study.	The 2011 wild rice study was intended to grease the skids for mining...The motive for the 2011 study was to 1) discredit the 10 mg/L standard and 2) delay enforcement of the 10 mg/L standard	This is out of scope; the MPCA is constrained to follow enacted laws regardless of legislative intent.
3	C	Dennis Good	35	Discussion of 2001 Minntac Water Diversion, enforcement and history of seepage		The specifics of any single facility, such as Minntac are out of scope for this rulemaking
3	D	Dennis Good	3.1	Keep the 10 mg/L standard	The Wild Rice Sulfate Study of 2011 completely validated the 10 mg/L standard. John Pastor, the lead scientist of this study said publicly that "we always knew the 10 mg/L standard was valid but we didn't know why. Now we know."	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
3	E	Dennis Good	2.3	Sulfate is what has to be regulated.	The peer reviewers of this study said that, just as one must limit mercury to prevent the formation of toxic methylmercury, "sulfide is harmful, but sulfate is what has to be regulated."	The MPCA agrees with this comment, which is why the equation set a specific sulfate standard for each wild rice water.

3	F	Dennis Good	10	Dark River and Dark Lake should be wild rice waters.	It should be obvious to anyone why the Dark River System (including Dark Lake) is not on the State Wild rice waters list and why U.S. Steel doesn't want it on the list.	Dark Lake (WID 69-0790-00) was one of the sampling sites included in the MPCA's wild rice field study. When field crews sampled the site, only a few stems of wild rice were found. None of the other sources provided additional information about the extent of rice on Dark Lake. For this reason, Dark Lake was added to the list of waters with insufficient information rather than being proposed as a wild rice water. Discussion of the MPCA's evaluation of Dark Lake and Dark River is addressed in Attachment 1 under Topic 11.
3	G	Dennis Good	28	Mercury methylation	There is a much larger public health issue concerning sulfates and that is the essential role that sulfates play in the conversion of mercury to methylmercury.....	See Attachment 1 response to topic area 28.
3	H	Dennis Good	3.1	The 10 mg/L standard is valid	The 10 mg/L standard is scientifically valid, was recently peer reviewed and found to be valid and necessary...	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
4		Carl Gibson	39	DNR management has decreased wild rice	in addition to Recurring Letter B, added the following comment: Maybe look into the DNRs "management" of bodies of water and take note of how their involvement has decreased wild rice rich lakes in this area.	This is out of scope for the proposed rulemaking.
5	A	Jed Olmstead	19	Concerns about costs and economic impacts	in addition to Recurring Letter B, added the following comment: If this becomes a standard, there is a potential that I along with thousand + others could end up losing our job and our communities. A lot of the small communities on the range are older generation (retirement age communities) and these hard working folks live on there retirement - fixed income - Even if these towns can afford to meet these "new standards" and install reverse osmosis systems how are we going to pay our utility bills if none of us have jobs because the mines shut down and the others have to decide whether they're going to have needed medications, groceries etc. or pay their utility bill.	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response. Because sulfate standards have yet to be calculated, it is too early to say what kind of sulfate treatment (if any) will be needed and therefore the costs of such treatment. The kinds of widespread economic and social impacts that the commenter raises concerns about are what is considered in determining if a variance from the standard is appropriate for a municipal or industrial permittee.
5	B	Jed Olmstead	37	MPCA cannot even say the rule will help wild rice	The MPCA doesn't even know if this is going to have a positive effect on the rice so before they start making new rules and laws, I would like to see some sound concrete scientific proof that this is going to be effective.	See Attachment 1 response to topic area 37.
6	A	Brian Zarn	19	standard could affect every mine and entity that discharges water into the environment	Public comments received 10/25/17, page 4.	The standard could affect any discharger of sulfate into or upstream of a wild rice water. Permittees will eventually receive permit limits to ensure they do not cause or contribute to an exceedance of the standard.
6	B	Brian Zarn	4	standard should be based on proven scientific method and should include all available research	Public comments received 10/25/17, page 4.	The MPCA's SONAR and TSD show that the proposal is based on sound science. See also discussion of sound science and peer review in the cover memo.
6	C	Brian Zarn	19	unsustainable costs to mining companies on the Iron Range		The kinds of widespread economic and social impacts that the commenter raises concerns about are what is considered in determining if a variance from the standard is appropriate for a municipal or industrial permittee.
6	D	Brian Zarn	37	may not even have an effect on wild rice		See Attachment 1 response to topic area 37.
7	A	Jon A. Sarkela	19	MPCA wants to impose a new set of regulations upon the cities, towns and taconite mines on Northern Minnesota and would cost a billion plus dollars	Public comments received 10/26/17, page 11	The proposed rule is a revision to an existing water quality standard, not a new water quality standard. See also the cover memo to this response about costs.
7	B	Jon A. Sarkela	37	the standard is not protective	The ones who did the study on sulfates aren't sure that this water treatment will work. It could do more harm to the environment and wild rice.	See Attachment 1 response to topic area 37. A discussion of the problems associated with reverse osmosis is provided in Part 10 D. of the SONAR (pg.178) and in the cover memo to this Response.
7	C	Jon A. Sarkela	2.1	Sulfate does not harm wild rice; MPCA should consider another (Fort Lab) study.	There is another study that has to be considered, it proves that sulfate causes no harm to wild rice when mixed with carbon and iron. This study is not being considered.	The MPCA's proposed equation considers carbon and iron. The MPCA's study is based on sound science and the MPCA considered the Fort Lab study as noted in the Virginia hearing transcript on page 159, line 5, MPCA did consider the Fort Labs study. That consideration is documented in the SONAR and TSD.
8	A	Roslyn Hjermsstad		Advocate for a clean environment. The 350 lakes that are downstream of industries that discharge sulfate need protection.	Public comments received 10/26/17, page 12	Facilities will receive a permit limit if they cause or contribute to an exceedance of the standard downstream.

8	B	Roslyn Hjernstad	3.1	Wild rice is a precious resource that is very vulnerable to that type of pollution. Please keep or increase protections for our waters.	Public comments received 10/26/17, page 12	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
9	A	City of Plainview	19	WWTP is close to a wild rice water and rule could cause financial hardship to our community.	Our wastewater facility is located within 50 miles of a wild rice water, and we are concerned that the rule is unreasonable and could cause significant financial hardship to our community. (Public comments received 10/26/17, page 14)	If the WWTP needs a sulfate effluent limit to comply with the revised standard and meeting that effluent limit will cause widespread social and economic harm, the city would likely receive a variance.
9	B	City of Plainview	33	We support the goal of protecting wild rice, a resource that is culturally and economically important to our state		Statement - no response required.
9	C	City of Plainview	25	Use our taxpayers' dollars wisely by ensuring reasonable regulations based on sound science		The MPCA understands the need to ensure that public resources are spent wisely, and wants to work with municipalities to ensure this happens. The MPCA believes the rule is based on sound science.
9	D	City of Plainview	4	Concerned new sulfate rule proposed is built on a series of overly conservative assumptions and incomplete analyses, resulting in a standard that is more restrictive than necessary.		The MPCA disagrees with the assertion that the standard is overly conservative because it uses too many conservative assumptions. In developing the standard, the MPCA has balanced conservative and less conservative assumptions. These questions are extensively addressed in the SONAR, sections 2 and 6.
9	E	City of Plainview	15	Concern about magnitude, duration, frequency.	We are concerned that the proposed criteria magnitude (EC10), duration (annual average) and exceedance frequency (once in 10 years) are overly conservative and that the scientific data supports less restrictive criteria. Given the significant financial costs of complying with these rules, it is unreasonable to adopt a rule that goes beyond what is necessary to protect wild rice.	Wild rice is an annual plant and, as such, it needs to germinate every year for production. MPCA considered a number of biological endpoints, including percent filled seeds and number of plants germinated. It is important to protect the wild rice plant on an annual basis to ensure the propagation of the plant every year. The annual average and 1 in 10 year frequency are consistent with the data and empirical statistical relationships upon which the equation is based. Please refer to SONAR (pages 79-81 and 82-83) for more discussion on this.
9	E	City of Plainview	19.4	The MPCA should wait for the cost analysis.	The potential costs to municipalities of this proposed rule should not be understated. We are disappointed that the MPCA is pushing forward with this rule when there is a study underway to look at those costs in more detail. It is unreasonable to push forward when that study is not yet complete, especially since the Legislature has given the MPCA more time to complete this rulemaking.	The MPCA's discussion of the LCCMR Study is provided in the cover memo to this Response.
9	F	City of Plainview	18	Variances are difficult to get and merely delay costs	There is no guarantee, however, that a variance will be granted or that the U.S. EPA will approve it. Even if granted, a variance merely delays enforcement and the associated costs. The potential availability of a variance does not make the use of overly conservative assumptions in the rule reasonable	The availability of variances does not have an impact on the level of the standard. As explained throughout, including the cover memo, the standard is set to protect the beneficial use. Variances may delay the need to treat for a pollutant until economically feasible treatment is available, but interim limits may need to be met.
9	G	City of Plainview	18.4	concern the EPA's Interim Economic Guidance for Water Quality Standards Workbook is being incorporated into the rule		In this Response, the MPCA is proposing to remove the incorporation by reference of the Interim Economic Guidance for Water Quality Standards workbook. This document will remain as a component of MPCA's review of variances, as it is a well-established tool for reviewing variances by both MPCA and EPA. However, the MPCA (and EPA) are able to use other tools to demonstrate that a variance is needed because of economic impacts.
9	H	City of Plainview	18.4	MPCA should convene a stakeholder group to discuss the development of its own economic guidance for variances		The MPCA looks forward to discussing additional available tools and demonstrations.
10	A	Robert Russo	24	Wild rice standard is directed at mines	Everything I've read or studied about the wild rice study seems like it's been directed to impact mining operations in north eastern MN Iron Range. Even after looking at a map of where wild rice waterways and lakes are, it seems that only a small percent of these lakes are located on the Iron Range. The concentration of lakes, seem to be in central MN, yet there was a larger study, (percent of lakes studied), on the Iron Range than there was in central MN. (Public Comments Received 10/27/17, page 77.)	The standard is designed to protect wild rice from the adverse impacts of sulfide/sulfate no matter where those occur.

10	B	Robert Russo		Study claimed there were more problems in lakes with low iron content.	The other concern I have is the study claimed there were more problems in lakes with low iron content. Common sense would tell me in iron rich ground there would be a higher concentration of iron in our water. I currently live in western St. Louis county close to Koochiching county and I have a lot of iron in my well. The closest mine to me is 40 miles away.	Iron in the sediment of wild rice waters is protective by binding to sulfide and preventing it from impacting wild rice. There is no relationship to the presence of iron ore (or iron mines) and the levels of iron in sediment. Iron levels are not higher in the iron range.
10	C	Robert Russo	19	Economic costs of unattainable regulations	I don't want to see the mining industry shut down because of what I believe to be unattainable regulations. The cost of putting a filtration system to bring down sulfate levels to 0.12 parts per million would financially collapse an industry that has been beat up for years by steel dumping	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response. The proposed rules are tailored to environmental conditions, and effluent limits and needed treatment will be set on a facility by facility basis. Because sulfate standards have yet to be calculated, it is too early to say what kind of sulfate treatment (if any) will be needed and therefore the costs of such treatment. The kinds of widespread economic and social impacts that the commenter raises concerns about are what is considered in determining if a variance from the standard is appropriate for a municipal or industrial permittee.
11	A	Doretta Reisenweber	3.1	Keep the 10 mg/L standard	I urge MPCA to keep and strictly enforce the 10 mg/L sulfate standard. (Public comments received 10/30/17, page 143).	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
11	B	Doretta Reisenweber	24	Sulfide mining always pollutes waters	Sulfide turns to sulfate when exposed to air or water, which happens when it is mined. Iron /taconite ore bodies do contain sulfides, but sulfide ore bodies, like the Duluth Complex, where copper/nickel and other heavy metals are found, have a much higher a sulfide content than iron ore bodies. Sulfide ore mines such as the proposed PolyMet and Twin Metals are only the first among numerous others now waiting to act on their leases. If any sulfide mines are permitted in northeastern MN, we need to bear in mind that sulfide mining always pollutes the waters.	The specifics of any single facility, or type of facility, are outside the scope of this rulemaking.
11	C	Doretta Reisenweber	33	Studies have shown that high sulfate levels reduce wild rice stands		The MPCA agrees with this statement
11	D	Doretta Reisenweber	28	Concerns about methyl mercury	Higher sulfate levels increase the methylmercury contamination in the water. When fish ingest it, eating those fish is harmful to other animals: bears, raccoons...human beings. Seriously harmful.	See Attachment 1 response to topic area 28.
11	E	Doretta Reisenweber	20	In 2014 MPCA found 10mg/L valid; certain interests have pushed for this revised standard	Why the changing sulfate limits? In 2014 the MPCA found the 10mg/L sulfate standard scientifically valid---needed in fact...In the case of the wild rice study, it looks like the Chamber of Commerce, mining representatives and other businesses are science-averse and pushing their agenda. I submit that the MPCA's proposed "different stakes for different lakes" approach results from pressure from the sulfate polluting entities: municipal sewage treatment facilities, industries, and mining, especially sulfide mining	The MPCA's SONAR and TSD show that the proposal is based on sound science. The standard is appropriately tailored to environmental conditions. It is a misunderstanding or misrepresentation of the events to say that MPCA originally decided to maintain the existing 10 mg/L standard or that something was covered up. In early March 2014 MPCA was preparing to issue a preliminary analysis of the results of the wild rice sulfate study. While the draft report was undergoing internal review and editing, MPCA recognized that the summary of the preliminary analysis was written in such a way that interested parties could interpret it to mean that the MPCA had concluded its work on the data analysis and evaluation of the existing standard. This was not the case; for example, the analysis had not yet had any form of independent peer review. To clarify this point the release of the report was delayed to allow time to revise the summary section to avoid suggesting that a decision had been made when in fact it had not. The preliminary analysis report (SONAR Exhibit 5) was released in March 2014. Through a Data Practices Act request an interested party obtained a copy of an earlier draft of the preliminary analysis, and some commenters have drawn erroneous conclusions about the MPCA's intent based on that earlier draft.
11	F	Doretta Reisenweber	15	Will be costly to implement and is not workable or protective	Imagine the cost in time and money to employ different standards for each wild rice water in this time of agency budget constraint. Because determining an individually different sulfate limit per wild rice water body is expected to take ten years, the proposal is not workable, not acceptable, and not protective of the waters.	The MPCA is proposing to use our existing intensive watershed monitoring cycle to gather the data needed to set a numeric sulfate standard for each water and then to measure sulfate levels in wild rice waters. See SONAR page 154 and page 3 of the Wild Rice Frequently Asked Questions handed out at the hearing. Once a sulfate limit is set, that single number will be enforced for that water body. Implementing the 10 mg/L standard would also require extensive data collection over time. See cover memo to this response.

11	G	Doretta Reisenweber	15	Time necessary for implementation will allow for pollution	By the time separate standards were determined-in ten years-- sulfide mining could very well have polluted certain wild rice waters without a baseline determination having been made from which to measure deviation from whatever would have been the norm. (Public comments received 10/30/17, page 145)	New facilities applying for permits will be required to gather and analyze sediment as part of their permitting process, so that the sulfate standards can be set and effluent limits developed for any wild rice waters they may impact. A baseline is not needed - waters will be assessed based on their sulfate levels compared to the calculated standard.
11	H	Doretta Reisenweber	3.1	Variable standard is not in the people's best interests	Whose interest would this new & variable sulfate proposal server? Not the people's. It is an abrogation of responsibilities for the public interest.	The tailored standard will allow resources to be focused on areas of actual problems. See the cover memo to this response.
11	I	Doretta Reisenweber	15	Monitoring and enforcement is a big task and concerned MPCA could not completed it	Even an agency flush with funding and staff would find monitoring and enforcement of the many wild rice waters a Herculean task....How indeed could the MPCA be expected to complete the onerous task its own proposal on variable sulfate standards sets? (Public comments received 10/30/17, page 145)	The tailored standard will allow resources to be focused on areas of actual problems. See the cover memo to this response.
11	J	Doretta Reisenweber	19	Variances can be requested	There has been much concern expressed that the MPCA proposal would create a financial hardship on various entities. As the MPCA official explained yesterday at the hearing in Cloquet, a variance could be requested based on financial hardship, but the general public and municipal leaders seem unaware of that. Commenter cites Timberjay editorial. (Public comments received 10/30/17, page 146)	Statement - no response required.
11	K	Doretta Reisenweber	3.1	Follow the science and keep 10 mg/L	Heed science, not politics. Not pressure from those who would profit from devastating our waters. Prudence demands that we keep the sulfate level of 10mg/L and enforce it.	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
12	A	City of Cambridge	Multiple	The comments are the same as those submitted by the City of Plainview.	Public comments received 10/31/17, pg. 1	See response to City of Plainview, above
13	A	Karl Collier	20	The issue is largely politically motivated and being propelled without a thoughtful and full review of the scientific issues	Public comments received (10/3/17, pg. 3)	The MPCA disagrees with this statement. The MPCA proposal is based on sound science.
13	B	Karl Collier	4.2	lack of peer reviewed research supporting the agency's conclusions		The underlying science supporting the MPCA's proposal has been through extensive peer review. See the cover memo to this response.
13	C	Karl Collier	2.1	Fort Lab study	The research conducted by Fort used the highest standards of the scientific method and contradicted with many of the conclusions drawn by the MPCA.	As noted in the Virginia hearing transcript on page 159, line 5, MPCA did consider the Fort Labs study. That consideration is documented in the SONAR and TSD.
13	D	Karl Collier	19	impact this rule would have on local communities would be financially devastating		A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response. The proposed rules are tailored to <u>environmental conditions, and effluent limits and needed treatment will be set on a facility</u>
14	A	Iron Range Legislative Delegation	33.1	Support agency's conclusion that the existing standard of 10 mg/L is not supported by current science	Public comments received 11/2/17, page 57)	The MPCA notes that the decision to move away from the 10 mg/L existing standard is not separate from the proposed revision.
14	B	Iron Range Legislative Delegation	2.4		We find that the new 120 ug/L sulfide standard to be premature, without sufficient scientific research and economically unfeasible	MPCA-sponsored research readily found a highly significant statistical relationship between wild rice occurrence and sulfide. A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
14	C	Iron Range Legislative Delegation	19.4	The MPCA should wait for the cost analysis.	During the 2017 legislative session, a law (Minnesota Laws 2017, ch. 93, art. 2, sec. 150) was passed providing the MPCA an additional year (until January 15, 2019) to adopt a new wild rice water quality standard. The legislature did this, in part, to provide time for the MPCA to complete an analysis of treatment options and their costs in order to better inform the rulemaking process. The proposed rules are premature as the analysis is not complete and is not scheduled to be completed until June 30, 2018.	See the cover memo to this response.
14	C	Iron Range Legislative Delegation	3.2		The formula approach, while providing flexibility, also provides less certainty for the regulated community	The MPCA understands that dischargers want immediate clarity about how the standard will affect them, but these issues need to be addressed in the an individualized permitting process. Effluent limits are not the same as water quality standards. Effluent limit setting requires evaluating multiple factors as described beginning on page 96 of the SONAR. The MPCA believes that getting the standard right is more important than immediate certainty.

14	D	Iron Range Legislative Delegation	37	The MPCA cannot even say that the standard will protect wild rice; also no other state has a wild rice standard.	The standard has not been proven to protect wild rice, no wild rice water quality standard exists in other states or is required generally under the federal Clean Water Act.	The cooperative federalism approach of the Clean Water Act gives states the authority and responsibility to set standards that are appropriate to each state. Wild rice does not exist in all states, therefore there is no specific national standard for it. See also Attachment 1 response to topic area 37.
14	E	Iron Range Legislative Delegation	33.1	Eliminate any sulfate standard	Further study is warranted and it is best to eliminate the standard at this time rather than revise it	See response exhibit N.30.
14	F	Iron Range Legislative Delegation	18	Variance application fee should also be waived for industrial applicants	commend MPCA for recognizing the need for more variances and variance fee exemptions for municipal facilities, we disagree with the MPCA's decision to only allow municipal facilities the variance fee exemption.	The MPCA believes the Commissioner has the authority to waive any fee if payment of the fee would be a hardship. Industrial entities could ask for a fee waiver and MPCA will be happy to discuss it with them.
15	A	Hibbing Area Chamber of Commerce		Resolution that objects to the MPCA's proposed wild rice sulfate rule and urges the Governor of the State of Minnesota and the Minnesota Legislature to consider the severe implications of the proposed rule on the Iron mining industry which employs thousands on the iron range	Public comments received (11/2/17, pg. 60)	See response exhibit N.30.
16		Wayne Dupuis	21	I appreciate your efforts to protect this gift	wild rice is considered a gift from the creator and identified in Anishinabe prophecies as growing in abundance in the place destined for the Anishinabe that will be called home. I appreciate your efforts to protect this gift. Public comments received 11/3/17 (3rd uploaded comment folder), pg. 10	Thank you.
17	A	WaterLegacy		Attaches petitions and postcards signed by citizens to MPCA proposal to change the sulfate water quality standard applicable to wild rice and to limit the applicability of the standard to a specified set of wild rice waters	4th uploaded batch of public comments received 11/3/17, pg.1	See individual parts
17	B	WaterLegacy	3.1		Minnesota currently has a water quality standard (Minnesota Rule 7050.0224, subp. 2) limiting sulfide pollution in wild rice waters to 10 milligrams per liter (mg/L), a limit the Minnesota Pollution Control Agency (MPCA) agreed in February 2014 was "needed" and "reasonable" to protect wild rice in lakes and streams, based on Minnesota's recent taxpayer funded scientific research.	The MPCA provides evidence that the proposed standard is a better, more precise standard. See the Cover memorandum to this Response and Attachment 1 response to topic area 3.1. It is a misunderstanding or misrepresentation of the events to say that MPCA originally decided to maintain the existing 10 mg/L standard or that something was covered up. In early March 2014 MPCA was preparing to issue a preliminary analysis of the results of the wild rice sulfate study. While the draft report was undergoing internal review and editing, MPCA recognized that the summary of the preliminary analysis was written in such a way that interested parties could interpret it to mean that the MPCA had concluded its work on the data analysis and evaluation of the existing standard. This was not the case; for example, the analysis had not yet had any form of independent peer review. To clarify this point the release of the report was delayed to allow time to revise the summary section to avoid suggesting that a decision had been made when in fact it had not. The preliminary analysis report (SONAR Exhibit 5) was released in March 2014. Through a Data Practices Act request an interested party obtained a copy of an earlier draft of the preliminary analysis, and some commenters have drawn erroneous conclusions about the MPCA's intent based on that earlier draft.
17	B	WaterLegacy	3.1		we request any proposed MPCA rulemaking Minnesota preserve and enforce year-round the State's existing water quality standards limited sulfate pollution in wild rice waters to 10 mg/L in all wild rice waters, without imposing thresholds for acreage or density of natural wild rice	While the MPCA considered wild rice density and acreage, we are not proposing a strict stem density or acreage threshold to define wild rice waters. The MPCA provides evidence that the proposed standard is a better, more precise standard. See the Cover memorandum to this Response and the Attachment 1 response to topic area 3.1.

17	C	WaterLegacy	3.1		any proposed MPCA rulemaking Minnesota preserve and enforce year-round the State's existing water quality standards limited sulfate pollution in wild rice waters to 10 mg/L in all wild rice waters, without imposing thresholds for acreage or density of natural wild rice	The MPCA provides evidence that the proposed standard is a better, more precise standard. See the Cover memorandum to this Response and the Attachment 1 response to topic area 3.1
17	D	WaterLegacy	10.4		any proposed MPCA rulemaking Minnesota preserve and enforce year-round the State's existing water quality standards limited sulfate pollution in wild rice waters to 10 mg/L in all wild rice waters, without imposing thresholds for acreage or density of natural wild rice	While the MPCA considered wild rice density and acreage, we are not proposing a strict stem density or acreage threshold to define wild rice waters. The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
17	E	WaterLegacy	10		1) list additional lakes, creeks, rivers and wetlands on which natural wild rice grows and has grown within the Lake Superior Basin and in all other Minnesota watersheds	The MPCA acknowledges that it is likely that not all wild rice waters have been identified and is proposing a specific process for future identification of wild rice waters (proposed 7050.0471, subp. 2) A discussion of the proposed process is in SONAR pp. 58-64.
17	F	WaterLegacy	10.1		2) protect natural wild rice for wildlife uses and preservation of genetic diversity as well as protecting larger and more accessible stands used for human harvest	The beneficial use being protected is use of the grain as a food source by humans and wildlife. See Attachment 1 response to topic area 10.1 and SONAR pp. 41-57 for a detailed discussion of how the MPCA evaluated sources to determine proposed wild rice waters.
17	G	WaterLegacy	1		3) protect waters where wild rice has grown since the November 28, 1975 Clean Water Act "existing use" date and protect waters where wild rice was harvested by tribes, whose right to harvest is protected by treaties	The MPCA is proposing to identify waters where the beneficial use is an existing use, based on the Clean Water Act 1975 date. See also response to Topic Area 23 in Attachment 1.
18	A	River Market Natural Foods Co-op	3.1	Keep existing std.	...request that the Minnesota Pollution Control Agency retain the State's existing wild rice standard limiting sulfate to 10 parts per million (mg/l) in wild rice waters Public comments received 11/6 -11/7 pg 271	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
18	B	River Market Natural Foods Co-op	3.1	Keep the existing standard	preserve and enforce year-round the Minnesota's existing water quality standard	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
19	A	Allete (MN Power)	33.1	Supports moving away from the 10 mg/L standard.	have reviewed the scientific information the MPCA has used to support removal of the existing 10 parts per million sulfate standard, and fully support this MPCA decision Public comments received pp 1-2 (11/6, 7, 8, 9/17)	Statement. However, the MPCA notes that the decision to move away from the existing 10 part per million standard is not a separate decision from the proposed equation-based sulfate standard.
19	B	Allete (MN Power)	4	The standard should be based on a clearly defined dose response or toxic threshold.	I feel the MPCA is proposing a sulfide-based standard which is not based on the same level of scientific vigor the Agency used when examining the 10 ppm sulfate standard. The proposed rulemaking contains numerous inconsistencies regarding the proposed level of sulfide needed to protect wild rice, including results showing wild rice thriving in levels far higher than their proposed protective value.	The Technical Support Document Chapter 1C discusses in depth how the MPCA considered the technical information gathered from the wild rice study and used it to determine a sulfide concentration that is protective of the beneficial use described in the SONAR p. 13. We do not anticipate extirpation of wild rice in waters with sulfide concentration above 120 micrograms per liter, however, our data show that above this threshold, wild rice population density declines significantly. Further discussion on the reasonableness of this decision can be found in the SONAR p. 66 and in the Attachment 1 responses to topic area 4.
19	C	Allete (MN Power)	2.1	No established need	do not feel the Agency has established a clear need for the proposed sulfide based regulation in its current structure, because they have provided no assurances it is actually needed to protect wild rice.	The need and reasonableness of the proposed protective level of 120 micrograms per liter in porewater is demonstrated in both the SONAR (pages 66-72) and TSD (pages 31-39).
19	D	Allete (MN Power)	4	Complying with the standard is expensive and there is no guarantee that the standard will protect wild rice.	I am concerned that the proposed rulemaking will impact the cities, towns, and business in our region in fundamental ways for many years to come.	The cost to treat sulfate does not negate the need to set a standard to protect wild rice from the impacts of sulfate. See Attachment 1, response to topic area 3.3. Also, see Attachment 1 response to topic area 5 concerning whether the standard will protect wild rice, and the Cover Memorandum to this Response.
19	E	Allete (MN Power)	25	Science is incomplete/rushed	Wild rice certainly needs to be protected; its cultural and ecological importance cannot be understated. Yet the Agency should not seek to install regulatory controls based off incomplete or rushed science, or in a manner that is unclear and often contradictory	See Cover Memorandum to this Response.

20	A	Iron Range Mayors		Object to the newly proposed standard	we want to official object to the newly proposed Wild Rice/Sulfate standard as proposed by the Minnesota Pollution Control Agency (MPCA). Public comments received (11/6-9, line 169)	This is a standard revision, not an entirely new regulation. The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
20	B	Iron Range Mayors	33.1	The existing standard is wrong	The standard which is currently on the books (10 mg/t) was based on limited research conducted in the late 1930's and early '40's by Dr. Moyle in southeastern Minnesota. In 1973, that standard became part of the pollution control standards recorded with the Federal Environmental Pollution Control Agency under the Clean Water Act. Since that date, the standard has virtually gone unenforced by the MPCA.	The removal or revision of any federally approved standard requires documentation of the methods and scientific analyses to support the revision and a demonstration that the revised standard is sufficient to protect the use. (See response exhibit N.30.) The MPCA does not believe the research supports the complete removal of a standard to protect wild rice from the impacts of sulfate.
20	C	Iron Range Mayors	12	MPCA did not look at cultivated rice, made an unreasonable jump to look at sulfide.	the research conducted under the oversight of the MPCA was limited to determining if in fact sulfate was harmful to wild life growth and sustainability in natural settings like streams, lakes, or rivers, and did not include research on the more prevalent domestic wild rice farming. The MPCA studies did conclude, that "SULFATE IS NOT TOXIC TO WILD RICE", however there may be an issue with sulfide in sediments of lakes, streams, ponds, or rivers	Unlike natural stands of wild rice, cultivate wild rice is extensively managed, which makes it inappropriate to extrapolate from one scenario to another. The proposed rule addresses natural stands of wild rice. Wild rice waters do not include cultivated wild rice waters. See 7050.0130 Subp. 6C.
20	D	Iron Range Mayors	2.3	Should focus on biological stressors, not chemical ones	No other factors into wild rice growth or lack of growth were examined, including water column depth, natural competing vegetation other chemical or mineral impacts on wild rice.	The MPCA agrees that factors other than sulfide may also have an effect on wild rice. In the TSD (Chapter 1, part A) and the SONAR (Section E, parts 1-3) the MPCA has established the adverse effect of sulfide in the sediment where wild rice grows and therefore, the need for the proposed standard. The existence of other stressors does not negate the need to protect wild rice from the impacts of sulfide.
20	E	Iron Range Mayors	3.9	error rate	For these and other reasons, including the evidence that the new MPCA "formula" for determining a site specific sulfate standard being incorrect 20% of the time, have convinced us as the elected leader of our community that we must stand united in our objection to the new proposal.	See responses about error rate in the cover memo to this response and in Attachment 1 response for topic area 3.9.
20	F	Iron Range Mayors	19.4	The MPCA should wait for the cost analysis.	concerned that the MPCA chose to move forward with formal rule making hearings on this matter prior to the completion of a fiscal analysis of viable treatment options, and implementation in our municipal wastewater treatment plants. This invaluable information would have afforded not only us mayors, but our communities to be able to speak on this matter at one of the hearing from a position of being more fully informed on the real impact of the standard.	The MPCA's discussion of the LCCMR Study is provided in the cover memo to this Response.
21	A	Michael Goettel		Balance resources between competing interests	Allocating critical resources and risk between competing interests is one of the most difficult tasks to undertake - it must be based on sound judgment, wisdom, familiarity with people's needs and circumstances, and a degree of empathy (Public comments received 11/13-11/17 line 47)	Statement - no response required.
21	B	Michael Goettel	25	Proposal must be based on sound science	any Sulfate or sulfide standard must be independent of public policy or economics and only based on wild rice science, with a standard's limits and strengths recognized and documented	The MPCA agrees that the standard must be based on what is needed to protect wild rice
21	C	Michael Goettel	24	Can have both mining and a clean environment	Mining, wild rice and unspoiled Boundary Waters are all critical to northern Minnesota, and it is possible to have and protect everything - innovative technical solutions are within reach if maximizing profits is not the only criterion used.	Statement - no response required.
21	D	Michael Goettel			any activity can have far reaching effects and negative impacts; other's rights cannot be discounted because they are not proximal or members of the benefiting group	Statement - no response required.
21	E	Michael Goettel	33	Base rules on sulfate/sulfide, include variances	Rules should be based on the sulfate-sulfite standard, with variance mechanisms available to provide economic relief where reasonable and to create a proper benefit/burden balancing process. Sophisticated and transparent economic analyses will thus be required to compare wild rice risks (a great cultural assets, and to some a life source) and the financial benefits to the mining industry (critically needed jobs).	Statement of support - no response required.
21	F	Michael Goettel	18	Variances should look at treatment options and wealth	Variances will have to account for existing and prospective treatment options (of which many exist), true local and global profit margins, the amount of wealth that would actually stay in the community and the potential long term project recovery costs.	Statement - no response required.

21	G	Michael Goettel		suggest court review the two decisions Clean Wisconsin v. Wisconsin DNR, and Natural Resources Defense Council et al. v. EPA		
22	A	Jobs for Minnesotans	33.1	Supports moving away from the 10 mg/L standard.	our state is long overdue to remove the existing 10 mg/L sulfate standard based on questionable research conducted in the 1930s and 1940s. (Public comments received 11/13/17 through 11/17/17, beginning on page 133)	Statement. However, the MPCA notes that the decision to move away from the existing 10 part per million standard is not a separate decision from the proposed equation-based sulfate standard.
22	B	Jobs for Minnesotans	25, 37	Standard is not based on sound science and MPCA cannot say it will benefit wild rice.	Opposes the Minnesota Pollution Control Agency's (MPCA) remaining proposed amendments to the sulfate water quality standard as currently written. Given our concerns, we strongly urge you to direct the agency to revisit the logic and research behind the proposed sulfide-based standard. A standard based on flawed science will cause lasting and potentially disastrous impacts to Minnesota's society and economy, all for a proposed standard that even the MPCA is uncertain will actually benefit wild rice.	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1 The MPCA has based the rule on sound science, as discussed throughout the SONAR, TSD, and the cover memo to this response. See also "Reasonableness of the specific equation" starting on page 75 in the SONAR. See also Attachment 1 response to topic area 37.
22	C	Jobs for Minnesotans	3.3	Sulfide standard is not based on sound science	The agency's approach toward establishing a specific sulfide value is not based on sound science or on logical interpretations of field and lab data...The MPCA's peer reviewers noted that the original test designs were flawed, but the agency did not pursue additional testing with the recommended design changes.	See the cover memo to this response for a discussion of peer review
22	D	Jobs for Minnesotans	19	economic costs to install and maintain systems	The only way for industry and communities to comply with the proposed new rules involves systems that are extremely costly to install and maintain...If mines and municipalities across the state have to comply with the amendments, billions of dollars of up front capital and ongoing operational costs will need to be spent on wastewater treatment investments that have no proven efficacy	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response. Because sulfate standards have yet to be calculated, it is too early to say what kind of sulfate treatment (if any) will be needed and therefore the costs of such treatment. The kinds of widespread economic and social impacts that the commenter raises concerns about are what is considered in determining if a variance from the standard is appropriate for a municipal or industrial permittee.
22	E	Jobs for Minnesotans	18	Variances are not designed to be a standard practice	complying with the proposed rule amendments would include wide use of site-specific variances. Variances are not designed to be a standard practice because wide-spread use of variances is costly and time-consuming for MPCA staff to implement	The MPCA disagrees that variances are not intended to be a standard practice. Although variances have not been extensively used in Minnesota, they have been an important tool over time. (See response exhibit N.27 on variances issued in Minnesota.) Several states in the region, including Wisconsin and Michigan, have categorical or multi-discharger variances for certain standards. As the scientific understanding of pollutants impacts improves, we are able to measure and document effects of pollutants at levels lower than treatment has been designed for. The MPCA expects that variances will be an important tool to bridge the time period between the understanding of impacts and the availability of economically feasible treatment.
22	F	Jobs for Minnesotans		Technologies to enforce the rule do not add environmental protection	Jobs for Minnesotans supports the use of state-of-the-art technologies that are economically viable and environmentally responsible. Unfortunately, the technologies needed to enforce the proposed sulfate rule have not been shown to add any new environmental protections.	The MPCA is unclear on the meaning of this comment. No specific technology has been identified. Reverse osmosis is a technology to meet low levels of sulfate, and MPCA has discussed that technology in the SONAR. The MPCA has demonstrated that a sulfate standard is needed to protect wild rice.
23	A	Cook County Whole Foods Co-op	3.1	Keep existing standard	request that the Agency retain the State's existing wild rice standard limiting sulfate to 10 parts per million (mg/L) in wild rice waters	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1
23	B	Cook County Whole Foods Co-op		General importance of rice	natural wild rice is a vital plant for fish, waterfowl and wildlife, and a critical food and Treaty resource for many Minnesotans. Wild rice is vulnerable to sulfate pollution	The beneficial use being protected is use of the grain as a food source by humans and wildlife. The MPCA agrees that wild rice is vulnerable to sulfate pollution in certain areas. See response to topic area 23 on treaty rights.
23	C	Cook County Whole Foods Co-op		Benefit of standard	preservation of wild rice sulfate standard will benefit our customers, as well as consumers of natural wild throughout the state	See the cover memo to this response.
24	A	River Market Community Coop	3.1	Keep existing standard	...request that the Minnesota Pollution Control Agency retain the State's existing wild rice standard limiting sulfate to 10 parts per million (mg/L) in wild rice waters. Public comments received 11/6-9/17 pg. 273	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1

24	B	River Market Community Coop		General importance of rice	Natural wild rice is Minnesota's state grain. It is also a popular choice of our owners, as well as customers from the community at large. natural wild rice is a vital plant for fish, waterfowl and wildlife, and a critical food and Treaty resource for many Minnesotans. Wild rice is vulnerable to sulfate pollution.	The beneficial use being protected is use of the grain as a food source by humans and wildlife. The MPCA agrees that wild rice is vulnerable to sulfate pollution in certain areas. See response to topic area 23 on treaty rights.
24	C	River Market Community Coop	3.1		In February 2014, the MPCA agreed that Minnesota's wild rice sulfate standard of 10 mg/L was "needed" and "reasonable" to protect wild rice in lakes and streams, based on Minnesota's recent taxpayer-funded scientific research.	The MPCA provides evidence that the proposed standard is a better, more precise standard. See Attachment 1 response to topic area 3.1. It is a misunderstanding or misrepresentation of the events to say that MPCA originally decided to maintain the existing 10 mg/L standard or that something was covered up. In early March 2014 MPCA was preparing to issue a preliminary analysis of the results of the wild rice sulfate study. While the draft report was undergoing internal review and editing, MPCA recognized that the summary of the preliminary analysis was written in such a way that interested parties could interpret it to mean that the MPCA had concluded its work on the data analysis and evaluation of the existing standard. This was not the case; for example, the analysis had not yet had any form of independent peer review. To clarify this point the release of the report was delayed to allow time to revise the summary section to avoid suggesting that a decision had been made when in fact it had not. The preliminary analysis report (SONAR Exhibit 5) was released in March 2014. Through a Data Practices Act request an interested party obtained a copy of an earlier draft of the preliminary analysis, and some commenters have drawn erroneous conclusions about the MPCA's intent based on that earlier draft.

Comment ID	Part ID	Number of identical comments received as of 11/17	Sponsor/Identifier	Topic Number	Paraphrase/summary of comment	Excerpt of Comment	Response or Response Location
A	1	38	Letter A beginning with "I am writing today to urge you to carefully review all the facts and the consequences before making any decision on a sulfate water quality standard."	25	sound science	...should be science-based and inclusive of all available research.	The MPCA's research has undergone peer review; the MPCA included all research including the Fort Labs research.
A	2	38	Letter A beginning with "I am writing today to urge you to carefully review all the facts and the consequences before making any decision on a sulfate water quality standard."	19	cost	Failure to adjust the current standard to be reasonable and science-based will result in devastating financial impacts....	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
A	3	38	Letter A beginning with "I am writing today to urge you to carefully review all the facts and the consequences before making any decision on a sulfate water quality standard."	5	not protective	proposed rule is not proven to be effective in protecting wild rice	The MPCA's goal in the rulemaking is to protect wild rice from adverse impacts due to sulfate.
A	4	38	Letter A beginning with "I am writing today to urge you to carefully review all the facts and the consequences before making any decision on a sulfate water quality standard."	2.3	other factors	an effective standard ...considers all of the environmental impacts to wild rice, such as water depth, water clarity, fluctuations in hydrology, invasive species, and shoreline development to determine appropriate sulfate levels	The MPCA agrees that factors other than sulfide may also have an effect on wild rice. In the TSD (Chapter 1, part A) and the SONAR (Section E, parts 1-3) the MPCA has established the adverse effect of sulfide in the sediment where wild rice grows and therefore, the need for the proposed standard. The existence of other stressors does not negate the need to protect
A	5	38	Letter A beginning with "I am writing today to urge you to carefully review all the facts and the consequences before making any decision on a sulfate water quality standard."	19	cost	...seriously reconsider its proposal to require hundreds of millions of dollars on wastewater treatment that might not have any significant impact on wild rice in northeastern Minnesota	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
B	1	604	Letter B beginning with "I am a dedicated employee of Cleveland Cliffs..."	2	sulfate is not a problem	new research that applied modern experimental and analytical techniques has shown that sulfate in and of itself is not harmful to wild rice. Instead, the MPCA suggests that sulfide may have an effect on wild rice.	MPCA-sponsored research readily found a highly significant statistical relationship between wild rice occurrence and sulfide in an analysis of 108 different Minnesota water bodies, as published in a peer-reviewed science journal by Myrbo et al. (2017, Response Exhibit N.2). The need for the proposed revisions is discussed in the SONAR (pg. 19). Also see the cover memo to this Response.
B	2	604	Letter B beginning with "I am a dedicated employee of Cleveland Cliffs..."	25	sound science	instead of using this knowledge to conduct further research to understand how and to what extent sulfide may impact wild rice growth, the MPCA has moved forward with a draft wild rice sulfate standard based on an inaccurate equation to derive a sulfate water quality standard.	The MPCA's proposal is based on sound science. See attachment 1 response to topic area 25.
B	3	604	Letter B beginning with "I am a dedicated employee of Cleveland Cliffs..."	19	cost	This rule could financially devastate my community and has not been proven to protect wild rice.	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
B	4	604	Letter B beginning with "I am a dedicated employee of Cleveland Cliffs..."		importance of wild rice	I believe wild rice is an important crop and I want to maintain its vitality. However, this proposed standard does not appear to accomplish that goal.	Statement - no response required
B	5	604	Letter B beginning with "I am a dedicated employee of Cleveland Cliffs..."	37	not protective	At a March 2017 meeting .. an MPCA official was asked if the new standard and the investments made to comply with the standard would result in more abundant rice. The MPCA official said that based on the research there may be no benefit to the wild rice species.	See Attachment 1 response to topic area 37.
B	6	604	Letter B beginning with "I am a dedicated employee of Cleveland Cliffs..."	12	wild rice is not in decline	...according to the Minnesota Cultivated Wild Rice Council, the crop is currently plentiful and our state is one of the world's largest producers of cultivated wild rice..	Unlike natural stands of wild rice, cultivated wild rice is extensively managed, which makes it inappropriate to extrapolate from one scenario to another. The proposed rule addresses natural stands of wild rice. Wild rice waters do not include cultivated wild rice waters. See 7050.0130 Subp. 6C.
B	7	604	Letter B beginning with "I am a dedicated employee of Cleveland Cliffs..."	36	cost/problems with reverse osmosis	the only viable treatment option to meet the proposed standard is reverse osmosis. Reverse osmosis is costly to install and maintain. If the standard is implemented, many businesses, communities, and families will have to cover the cost....This cost is burdensome and unacceptable given that the proposed standard has not been scientifically proven to protect wild rice.	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response. A discussion of the problems associated with reverse osmosis is provided in Part 10 D. of the SONAR (pg.178) and in the cover memo to this Response.

B	8	604	Letter B beginning with "I am a dedicated employee of Cleveland Cliffs..."	19.4	LCCMR study	...Legislature is aware of these costs and granted the MPCA an extension on publishing the standard in order to complete an economic impact analysis. Instead, the agency chose to publish the rule before completing the study that would inform regulated entities the true cost of implementing the rule.	A discussion of the LCCMR Study is provided in the MPCA's cover memo to this response
B	9	604	Letter B beginning with "I am a dedicated employee of Cleveland Cliffs..."	3.9	error rate	...adopt the recommendations by the highly-respected scientific research firm, Ramboll ENVIRON. MPCA's adoption of their findings will reduce the error rate of the sulfate equation to 4% and address scientific shortcomings identified by ..FEL and the MPCA's peer review panel.	See responses about error rate in the cover memo to this response and in Attachment 1 response for topic area 3.9.
B	10	604	Letter B beginning with "I am a dedicated employee of Cleveland Cliffs..."	3	error rate	The two Ramboll ENVIRON recommendations are: To increase the toxic sulfide threshold based on evidence from the MPCA and FEL research,	See responses about error rate in the cover memo to this response and in Attachment 1 response for topic area 3.9.
B	11	604	Letter B beginning with "I am a dedicated employee of Cleveland Cliffs..."	3.9	error rate	To adjust the waterbodies included in the dataset used to develop the equation to only include those that are recommended as draft wild rice waters.	See the TSD discussion on "Dataset used to perform the MBLR" beginning on page 63 and Attachment 1 response to topic area 3.9.
C	1	554	Letter C (U.S. Steel and United Steel Workers)	2.1	sulfate is not a problem	MPCA's initial position was that sulfate was the cause of wild rice decline. However, further testing and analysis conducted by researchers for MPCA demonstrated that sulfate, in and of itself, does not impact wild rice. Therefore, a sulfate standard is unnecessary.	MPCA-sponsored research readily found a highly significant statistical relationship between wild rice occurrence and sulfide in an analysis of 108 different Minnesota water bodies, as published in a peer-reviewed science journal by Myrbo et al. (2017, Response Exhibit N.2). The need for the proposed revisions is discussed in the SONAR (pg. 19). Also see the cover memo to this Response.
C	2	554	Letter C (U.S. Steel and United Steel Workers)	3.1	affected plant parts	MPCA now suggests that sulfate may impede wild rice growth by converting to sulfide in low-oxygen conditions in the sediment. However, the laboratory conditions researchers simulated do not occur in nature. The part of the plant affected by sulfide in the lab was not in the sediment, but in the surface water. In nature, that surface water has enough oxygen that sulfide does not exist.	Both Dr. Pastor and Dr. Fort had challenges designing hydroponic experiments of seedling growth that would mimic the exposure of the germinated seed to elevated sulfide concentrations. A desirable design would have exposed the seedling roots to various sulfide concentrations in anoxic water while allowing the stem to elongate in water that contained oxygen concentrations found in nature (up to 10 ppm oxygen). But neither scientist found a way to grow wild rice with the roots in anoxic water underneath a stem in oxygenated water without the two layers of water mixing, destroying the experiment. (In nature, the roots grow in anoxic sediment, and the growing seedling elongates into the overlying water, but the point of hydroponic experiments is to avoid the use of sediment, which has un-defined chemistry.) Nevertheless faced with the task of performing a hydroponic experiment, Dr. Pastor compromised by exposing the entire seedling to various concentrations of sulfide, which conceivably mimicked the elongation of the seedling through several inches of anoxic sediment in natural wild rice waters, (But the seedlings released oxygen, which decreased sulfide concentrations between renewals.) Dr. Fort's compromise was to germinate seeds in various sulfide concentrations, and to allow the elongating stem to emerge out of the sulfide solution into the atmosphere over the 21 days since germination. (Use of a larger volume and daily renewals kept the sulfide concentrations relatively constant). It might be claimed that the Fort lab's design mimicks nature. But the TSD notes (page 13) that in nature it is unlikely that 21-day old wild rice plants have access to high oxygen concentrations. High oxygen availability allows plants to detoxify sulfide that would otherwise be toxic. Accordingly, the Fort lab EC10 was not weighed heavily when identifying a protective sulfide concentration.
C	3	554	Letter C (U.S. Steel and United Steel Workers)	2.2	support for Fort report conclusions	When the research was repeated by Fort Environmental Labs using the MPCA's Peer Review Panel recommendations the sulfide level of concern was in fact much higher than MPCA's proposal of 120 ug/L, with no effect below 1,600 ug/L, and minimal effect up to 12,800 ug/L.	The MPCA reviewed the Fort study and information about it is included throughout the TSD.
C	4	554	Letter C (U.S. Steel and United Steel Workers)	2.2	support for Fort report conclusions	This additional study, which was Peer Reviewed and rigorously evaluated before being published, is not being given proper weight in the proposed rule.	The MPCA reviewed the Fort study and information about it is included throughout the TSD.
C	5	554	Letter C (U.S. Steel and United Steel Workers)	2.3	other factors	the current proposal does not account for impacts from other known wild rice stressors - such as water depth, water clarity, fluctuations in hydrology, invasive species, shoreland development, etc.	The MPCA agrees that factors other than sulfide may also have an effect on wild rice. In the TSD (Chapter 1, part A) and the SONAR (Section E, parts 1-3) the MPCA has established the adverse effect of sulfide in the sediment where wild rice grows and therefore, the need for the proposed standard. The existence of other stressors does not negate the need to protect wild rice from the impacts of sulfide.
C	6	554	Letter C (U.S. Steel and United Steel Workers)			It is irresponsible to propose a regulation where the agency selectively determines what to include in the analysis.	Statement- no response required
C	7	554	Letter C (U.S. Steel and United Steel Workers)	2.1	cost	Based on the research a sulfate standard is not necessary and compliance costs would be staggering.	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
C	8	554	Letter C (U.S. Steel and United Steel Workers)	2.2	support for Fort report conclusions	if a standard is promulgated, at a minimum it needs to be based on the sulfide work by Fort Environmental Labs.	The MPCA reviewed the Fort study and information about it is included throughout the TSD.
D	1	375	Letter D (Taconite)	37	not protective	the proposed wild rice sulfate rule will not protect or enhance wild rice	See Attachment 1 response to topic area 37.
D	2	375	Letter D (Taconite)	19	cost	The proposed standard could financially devastate my community and the industries we rely on to make a living	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.

D	3	375	Letter D (Taconite)	25	sound science	the proposal was not put forth using sound science... New research.. shows that sulfate in and of itself is not harmful to wild rice. Instead, the MPCA suggests that sulfide may have an effect on wild rice. Despite this change, the MPCA has moved forward with a draft wild rice sulfate standard based on an inaccurate equation.	Sound science is discussed through the documents, including in the cover memo.
D	4	375	Letter D (Taconite)	19	cost	The proposed rule could cost Northern Minnesota's municipal wastewater facilities AND Minnesota's iron mining facilities billions of dollars to comply.	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
D	5	375	Letter D (Taconite)	19.4	LCCMR study	...MPCA chose to publish their draft rule BEFORE completing an economic impact analysis to determine the true cost of compliance...	A discussion of the LCCMR Study is provided in the MPCA's cover memo to this response
D	6	375	Letter D (Taconite)	3.9	error rate	the proposed standard predicts the wrong outcome up to one in five times...	See Attachment 1 response to topic area 3.9.
D	7	375	Letter D (Taconite)	39	need better wild rice conservation efforts	reject the MPCA's proposed wild rice standard so Minnesotans can work together to find better wild rice conservation efforts.	See cover memo to this response.
E	1	3	Letter E (USW letter to members)	37	will not improve wild rice	It is uncertain that wild rice will be more abundant	See Attachment 1 response to topic area 37.
E	2	3	Letter E (USW letter to members)	36	reverse osmosis	there is only one real treatment option... costly to install and operate.	A discussion of the problems associated with reverse osmosis is provided in Part 10 D. of the SONAR (pg.178) and in the cover memo to this Response.
E	3	3	Letter E (USW letter to members)	19	cost	dramatic costs to local communities, household, and businesses.	A discussion of how costs can be considered in relation to the proposed sulfate standard is provided in the MPCA's cover memo to this response.
E	4	3	Letter E (USW letter to members)	3.9	error rate	MPCA must adopt the recommendations by the highly-respected scientific firm,Ramboll ENVIRON, to reduce the error rate of the sulfate equation to 4% and to address scientific shortcomings identified the Fort Environmental Labs (FEL) and MPCA's peer review panel.	See Attachment 1 response to topic area 3.9.
E	5	3	Letter E (USW letter to members)	2.2	support for Fort report conclusions	The two Ramboll ENVIRON recommendations are: To increase the toxic sulfide threshold based on evidence from the MPCA and FEL research,	The MPCA reviewed the Fort study and information about it is included throughout the TSD and addresssed eslewhere in depth in this Attachment 2.
E	6	3	Letter E (USW letter to members)	3.9	adjustment of the dataset relates to comments about the error rate	To adjust the waterbodies included in the dataset used to develop the equation to only include those that are recommended as draft wild rice waters.	See the TSD discussion on "Dataset used to perform the MBLR" beginning on page 63 and Attachment 1 response to topic area 3.9.
F	1	322	Letter F (beginning with "in 1973, the MPCA enacted a wild rice sulfate standard")		same comments as Letter B		
G	1	75	Letter G (headed "Requests to Define "wild rice waters" broadly in rulemaking")	10.1	future listing of wild rice waters	I would strongly request that the MPCA, when considering this rule change: 1) list additional lakes, streams, creeks,rivers and wetlands on which natural wild rice grows and has grown within the Lake Superior Basin and in all other Minnesota watersheds;	The proposed rule puts into place a process to solicit evidence that supports identifying additional waters in rule as part of each triennial review of water-quality standards. See SONAR pp. 58-59 and rule part 7050.0471 Subp. 2.
G	2	75	Letter G (headed "Requests to Define "wild rice waters" broadly in rulemaking")	5	not protective	2) protect natural wild rice for wildlife uses and preservation of genetic diversity as well as for protecting larger and more accessable stands use for human harvest	The MPCA's goal in the rulemaking is to protect wild rice from adverse impacts due to sulfate.
G	3	75	Letter G (headed "Requests to Define "wild rice waters" broadly in rulemaking")	1	Existing use	3) protect waters where wild rice has grown since the November 28, 1975 Clean Water Act "existing use" date and protect waters where wild rice was harvested by tribes, whose right to harvest is protected by treaties.	The MPCA's intent is to protect waters where the wild rice beneficial use is an existing use based on the November 28, 1975 date. A history of human harvest is part of the beneficial use. See also Attachment 1 response to topic area 23.