Notes on the use of the spreadsheets

In this workbook the MPCA has identified each comment submitted to the Office of Administrative Hearings (OAH) from November 17, 2017 to November 22, 2017 and to the extent possible has summarized the content of the submittal. Although the MPCA has not been able to itemize individual comments in this worksheet for some submittals containing extensive comments, the MPCA has addressed all issues raised by commenters in the detailed rebuttal response.

On November 22, 2017 the MPCA provided extensive responses to comments in documents submitted to OAH. In this Rebuttal Response, the MPCA will not be repeating the responses already provided in the MPCA's November 22, 2017 Response but will indicate where those responses are appropriate to the comments in this worksheet.

Index of Comments: (note: In order to correlate the MPCA's response to comments with how the comments are presented on the OAH website, the worksheet identifies commenters by the name of the person who submitted the comment to OAH, not necessarily the person who signed the comment letter or the organization they represent. Where possible, the submitter, the organization, and the signator are also shown.)

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Comment ID	Commenter Name	Topic	Comment (Summary or Excerpt and Location)	Response or Response Location
1	Tom Scott	25	apparently the plan is to push legislation through that will be based on science that no one can say is actually accurate	Comments about the political basis for the proposed rules were addressed in MPCA's 11/22/17 Response to Comments (Part 20 of Attachment 1 (pg. 19)
2	Tom Scott	19.3	Cities and businesses face potentially devastating financial impacts based on non-factual evidence	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)
3	Tom Scott	2.1	also know people who harvest wild rice, and I've heard their accounts of how well wild rice grows in waters that have sulfate discharged into them.	Comments about the effect of sulfide on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.B pg. 6)
4	Norman Miranda (Central Iron Range Sanitary Sewer District)	16.1	The dilemma I see for utility managers regardless of whatever protective limit is adopted is to convince their respective City Council and rate payers that a very limited number of samples and sample locations yielded adequate and conclusive data to justify a significant capital investment. All permitted facilities could make this realistic argument that sound science and undisputable data over a period of time is critical prior to making huge capital investments.	statement- no response required
5	Norman Miranda (Central Iron Range Sanitary Sewer District)	16.1	believe MPCA is on the right track offering a consistent sampling regiment of a fixed number of samples at a prescribed location array. The challenge is the analytical results represent conditions at a snapshot in time. With so much at stake financially for the regulated parties and the State needing to provide more Grants and Loans through the Public Facilities Authority, I believe at least two sampling events conducted in appropriate but separate locations need to be conducted by the MPCA. I realize the MPCA has limited financial resources to conduct extensive sampling and analysis in multiple locations for every discharger. However, to offer some flexibility, I think the Rule should include a provision that municipalities/permitted facilities be given the opportunity to conduct additional sampling/testing beyond two events that would be required under the Rule.	This comment is addressed in MPCA’s detailed rebuttal response.
6	Norman Miranda (Central Iron Range Sanitary Sewer District)	16.1	I believe there should be language where the MPCA will give the Regulated Party's data set the same weight if all conditions are followed.	This comment is addressed in MPCA’s detailed rebuttal response.
7	U.S. Forest Service (Constance Cummins/Darla Lenz)	2.4, 3.4,4, 10	"have concern with specific aspects.. Such as wild rice population trends, estimated protective values of sulfide in sediment, possible reduction of identified wild rice waters, the accuracy of the equation used to predict sulfide concentation, and the application of the standard and its adequacy to protect wild rice. "	Population study is out of scope for this rulemaking
8	U.S. Forest Service-attachment A	2.3	cites DNR 2008 report -"sulfur is not identified by the DNR as a specific threat."....Sound science would suggest that the interaction of these factors should be understood before the MPCA can focus in on one factor (sulfur) that isn’t even listed as a main threat to wild rice by the DNR.It is presently not understood if these factors are independent or additive. ...In other words, it would be valuable to understand if one factor is so dominant that the control of sulfate is irrelevant or if sulfate control is sufficient to protect or restore a population. If the later situation exists, then it is important to know what amount of incremental loss of rice by sulfate, if any, is reasonable.	This topic was addressed in the Cover Memorandum to the MPCA's 11/22/17 Response to Comments
9	U.S. Forest Service-attachment A		Discussion of the levels of sulfate currently present in northern MN	Informational- no response needed
10	U.S. Forest Service-attachment A	8.2	The MPCA does not have a goal to protect species viability except for the small number of specifically listed lakes in M.R. Chapter 7052 where the narrative standard still applies. The narrative standard protects the water quality and the habitat necessary for the survival of the species.	Statement- no response required; however, statement is somewhat related to the scope and beneficial use comments that are addressed in the MPCA's detailed rebuttal response.
11	U.S. Forest Service-attachment A	8.1	The approach proposed is not the only way to clarify the existing rule. An alternative would be to keep the existing numeric and narrative standard and apply them to all waters Statewide, year-round. Also allow a case by case demonstration of why individual waterbodies are not wild rice waters.	Comments related to alternatives were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. E. (pg. 11)
12	U.S. Forest Service-attachment A	8.2	although promises were made to expand the scope of the narrative standard by adding wild rice waters, the MPCA arbitrarily chose to not do so in this rulemaking,	MPCA's decisions regarding the scope of this rulemaking are addressed in depth in the detailed rebuttal response and 11/22/17 Response to Comments. Furthermore, the scope of this this rulemaking has not changed from that identified in the initial request for Comments.

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13	U.S. Forest Service-attachment A	2.4	The level of porewater sulfide proposed, 120 micrograms (ug) S/L, is not “protective” and is in fact harmful as will be outlined later.	Comments about the protectiveness of the proposed standard were addressed in MPCA's 11/22/17 Response to Comments.
14	U.S. Forest Service-attachment A	2.4	An analysis of the protectiveness of the current standard versus wild rice presence, not the chosen “protective” porewater sulfide value of 120 micrograms ug S/L, is needed.	Comments about the protectiveness of the proposed standard were addressed in MPCA's 11/22/17 Response to Comments.
15	U.S. Forest Service-attachment A	2.5	The proposed equation to relate porewater sulfide to sulfate in the overlying water suffers from too much data variability to be useful. The MPCA over-focuses on accuracy as an issue, primarily so that the equation is not over-protective and facilities are not spending money needlessly. The MPCA’s analysis of over/under protective is based on the assumption that 120 ug S/L is actually protective and uses that value as the yardstick.	MPCA agrees that the analysis of error rates is based on the proposed protective sulfide concentration of 120 ug/L, the scientific basis for which the MPCA had presented in the SONAr and TSD and also addressed in its 11/22/17 response to Comments and the detailed rebuttal response. MPCA disagrees that there is too much variability for the equation to be useful; the scientific defensability of the equation is also addressed in the SONAR, TSD, Response to Comments and Rebuttal Response. MPCA's analysis of the accuracy of the proposed approach is a useful and reasonable approach to *inform* the proposed standard revision, but MPCA wishes to assert that the ultimate focus is protecting the wild rice beneficial use from sulfate impacts, as MPCA has repeatedly stated in the TSD, SUNAR and responses.
16	U.S. Forest Service-attachment A	2.5	There are no data to show the protectiveness of the equation because a level of sulfide that is actually protective was not selected.	Comments about the protectiveness of the proposed standard were addressed in MPCA's 11/22/17 Response to Comments.
17	U.S. Forest Service-attachment A	10	Identifying wild rice waters by habitat is arbitrarily dismissed as being too complex. The MPCA’s idea of complexity changes though when they implement their equation, which is so complex that its validity can’t be shown.	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)
18	U.S. Forest Service-attachment A	10	MPCA sets an arbitrarily high standard as a prerequisite to look into the issue: “to broadly characterize the physical conditions necessary for wild rice requires a complete understanding of all the variables affecting wild rice presence and growth and the complex relationships between them.” This same high standard of understanding is not required of the equation used to predict sulfate from sulfide.	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)
19	U.S. Forest Service-attachment A	10.1	The bottom line is that the list is not inclusive of all wild rice waters in Minnesota.If even more clarity is desired, the rule could apply to all waters of the State as a default and individual waterbodies can be examined for suitable habitat on a case by case basis as they come up. That would lead to only a small number that would need to be examined versus the MPCA’s plan which involves setting a site-specific standard for all listed lakes, which they said would take over 10 years.	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)
20	U.S. Forest Service-attachment A	10	Since there is so much variability in rice in a particular waterbody over time, setting a minimum density and acreage for classification as a wild rice water is arbitrary. It also ignores the status of the species overall. Setting such a threshold sets a “de-minimus” level of rice and relegates rice beds less than this amount as unimportant and not protected.	MPCA has not set a minimum density and acreage for wild rice; rather, MPCA considers these factors in evaluating whether the wild rice beneficial use is an existing use in a water body. See detailed rebuttal response regarding the beneficial use and future listing of Class 4D wild rice waters via rulemaking.
21	U.S. Forest Service-attachment A	1.1	Throughout the document the MPCA differentiates between “the wild rice beneficial use” and the survival of the species. It would appear that these concepts are not mutually exclusive, and we question how there could be beneficial use without a viable, sustainable population of wild rice.	This comment is addressed in MPCA’s detailed rebuttal response.
22	U.S. Forest Service-attachment A	10	Disagree with the MPCA's characterization of wild rice waters. "This approach leaves smaller, thinner stands unprotected."	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12) and are further addressed in MPCA's detailed rebuttal response.
23	U.S. Forest Service-attachment A	8.2	They state that changing the phrasing (of the narrative standard) does not alter the scope or effect of the existing beneficial use. We disagree. For example, limiting applicability to certain listed lakes does.	This comment is addressed in MPCA’s detailed rebuttal response.
24	U.S. Forest Service-attachment A	11	In one case, a lake was removed for having a sparse amount of wild rice yet this lake is immediately downstream of a taconite plant tailings basin and has sulfate concentrations around 200 mg SO4/L. What amount of wild rice would be there if it didn’t receive the tailings basin discharge?	This is not a question that MPCA has data to answer. With that said, if there is evidence that suggests that the wild rice beneficial use was present since November 28, 1975 MPCA would welcome receiving that evidence so it could be considered in a future rulemaking to add Class 4D wild rice waters to MN Rule 7050.0471. Sandy Lake and Little Sandy Lake are examples of such waterbodies.

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25	U.S. Forest Service-attachment A	15.3, 15.4	MPCA will average all the measured sulfate values over a year which allows short term spikes in sulfate. They will also allow a violation of the standard once every ten years. The effect of these exceedances on wild rice viability are not clearly explained and are especially hard to put into context without the population study.	This comment is addressed in MPCA's detailed rebuttal response. Furthermore, MPCA disagrees that a population study is needed to establish the scientific basis for the proposed duration and frequency of the standard; the scientific basis for MPCA's proposal is demonstrated in the TSD, SONAR and responses to comments.
26	U.S. Forest Service-attachment A	17, 18	allow facilities to avoid applying the limits including: a mechanism for the commissioner to exempt facilities that will not affect the "beneficial use" and the issuance of variances. In fact the MPCA says it expects the majority of facilities to apply for a variance which will likely allow them to do nothing to reduce the discharge of sulfate. Since little to nothing will be done to reduce sulfate in the near term, it is all the more important to take the time now to implement the measures necessary to protect the species.	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.
27	U.S. Forest Service-attachment A	2.3	The goal of the Study was not to look at all the factors that control wild rice populations, it was "to enhance understanding of the effects of sulfate on wild rice and to inform a decision as to whether a revision of the wild rice sulfate standard is warranted." The primary hypothesis was sulfide controlled wild rice presence. This is clearly not true. The study only looked at adverse effects related to sulfate and attempt to determine protective levels that are protective only of sulfate impacts. MPCA clearly shows the Study is limited to sulfur and ignores the other important factors,	This comment was addressed in MPCA's 11/22/17 Response to Comments (Cover memo).
28	U.S. Forest Service-attachment A	2.4	The MPCA selects 120 ug S/L in the porewater as protective of sulfate impacts from multiple studies. We strongly disagree with this conclusion…	Comments about the protective sulfate level were addressed in MPCA's 11/22/17 Response to Comments (Cover memo)
29	U.S. Forest Service-attachment A	3.5	The MPCA arbitrarily only cites two recommendations from the science advisory panel. The balance of the recommendations include: The MPCA should select a more conservative value, as low as EC05. The MPCA didn't state why they ignored the panel.	Comments about peer review were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A(pg. 4) and 4.1 of Attachment 1 (pg. 5)), and the detailed rebuttal response.
30	U.S. Forest Service-attachment A	4	Additional recommendations about the design of the studies	Comments about the design of the studies are addressed in MPCA's 11/22/17 Response to Comments and its detailed rebuttal response. Comments about the MPCA's consideration of the recommendations of the peer review panel are also addressed in the Response to Comments and detailed rebuttal responses.
31	U.S. Forest Service-attachment A	3.4	calculations of actual sites using field data set results in unrealistic protective sulfate values. Pg. 13 "the strength of the equation is poor for the reasons stated above. We believe the equation is not useable and the effort at developing one should be abandoned because there is so much scatter in the data due to wild rice presence being influenced by factors unrelated to sulfur."	The fact that the equation may lead to numeric sulfate standards than are higher than the ambient sulfate concentration in a specific waterbody does not mean that the proposed equation results in a standard that is not protective of the beneficial use. See also MPCA's 11/22/17 Response to Comments and the detailed rebuttal responses to additional comments about the proposed equation.
32	U.S. Forest Service-attachment A	10	A clearer approach would be to apply the rule Statewide (or ecoregion by ecoregion) and allow for case by case applications to remove a waterbody through the rulemaking process.	MPCA disagrees that is would be appropriate to apply the standard statewide, since the wild rice beneficial use that is the subject of the standard does not exist (and has not existing since 11/28/75) in all waters of the state.
33	U.S. Forest Service-attachment A	3.1, 8	One supposed benefit of the new rule is having a stable regulatory environment. The MPCA's approach is not the only way to get there. Statewide application of the current numeric and narrative standard as proposed above is simple, efficient, effective and most importantly more protective than the proposed standard.	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)
34	U.S. Forest Service-attachment A	5	Making the determination of what constitutes "protection" required the MPCA to make a number of policy decisions. The MPCA based the proposed revisions on two fundamental decisions. The first decision determined what portion of the wild rice population the standard would protect. Would the standard protect 100% or 1% of wild rice or some level in-between?	The MPCA's proposal is not premised on protecting a proportion of the wild rice, though to some extent the decision of EC10 has been characterized that way. The MPCA's rule is grounded in protecting the Class 4D beneficial use. This concept is further addressed in the MPCA's 11/22/17 Response to Comments and the detailed rebuttal response.
35	U.S. Forest Service-attachment A	10	The second decision determined what constituted a wild rice water. How much wild rice must be present in a river, lake, or stream, or how must that wild rice have been used, before the water body is considered a wild rice water protected by the standard?	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)

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36	U.S. Forest Service-attachment A	6	In adding a process to establish an alternate standard the MPCA raises the bar in that the decision must be based on “reliable and representative data characterizing the health and viability of the wild rice.” The MPCA says the health of wild rice “is the beneficial use.” This is a different interpretation than was used for the balance of the rule – i.e. the beneficial use is the use of the grain as food which is equivalent to at least 2 acres of rice. pg.15	MPCA is not and has not stated that the beneficial use is the health of wild rice. MPCA is stating that one of the factors that must be considered in establishing the numeric sulfate standard via use of the alternative standard approach is the health and viability of the wild rice in a Class 4D wild rice water (i.e. a water where the wild rice beneficial use has been demonstrated and that water has been included in MN Rules 7050.0471). In this portion of the SONAR, the MPCA was trying to convey that there is a relationship to the health of wild rice and the maintenance of the beneficial use.
37	U.S. Forest Service-attachment A	8, 34	In moving the narrative standard the MPCA removed the word “species” from “the quality of these waters and the aquatic habitat necessary to support the propagation and maintenance of wild rice plant species must not be materially impaired or degraded.” This removal is not discussed in the SONAR and we feel it is significant because it implies a more holistic look at the species versus groups of plants on specific lakes. We request the word “species” be put back in.	The proposed definition of "wild rice' is "plants of the species Zizania palustris or Zizania aquatica." the MPCA believes that a specific definition of what is meant by the term "wild rice" is clearer and more comprehensive than a reference to "wild rice plant species" only within the narrative standard.
38	U.S. Forest Service-attachment A	2.3	Under the Environmental Justice Policy and Strategy section the MPCA feels the proposed rule will not have any negative consequences on the sustainability of wild rice. We disagree and find no evidence to support this statement. Here they stress that the rule is narrow in scope relative to all the factors that may impact wild rice. They state they do not have the information or resources to address this issue (we see this not as a lack of resources but a reflection of agency priorities).	Statement- no response required. However, MPCA wishes to stress that the purpose of this rulemaking is to *protect* the wild rice beneficial use, which bolsters the MPCA's statement that the proposed rulemaking will not negatively impact wild rice sustainabiluity.
39	John Harrington	14	The proposed standard is likely to be well beyond the staff and technical resources of MPCA to effectively enforce. For that reason alone, the existing standard should be maintained, with the proviso that it is actually enforced in permit issuance	Comments about implementation issues were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. D (pg. 10) and Attachment 2)
40	Rich Staffon (Izaak Walton League-Duluth)	3	we believe there is insufficient understanding of the complex relationship between wild rice, water chemistry, microbial interactions and river/lake seasonal water fluctuations, to move forward with the proposed new sulfate standard for wild rice.	statement- no response required
41	Rich Staffon (Izaak Walton League-Duluth)	28	The impact of the revised standard upon mercury contamination of fish has not been fully considered.	Comments about methyl mercury were addressed in MPCA's 11/22/17 Response to Comments (28 of Attachment 1 (pg. 21))
42	Rich Staffon (Izaak Walton League-Duluth)	1.2	Natural wild rice stands should be classified under the aquatic life use (Class 2), not the agriculture/wildlife use (Class 4).	This comment is addressed in MPCA’s detailed rebuttal response.
43	Rich Staffon (Izaak Walton League-Duluth)	10	The list of wild rice waters in northern Minnesota should include all waterbodies that currently or in the past supported natural stands of wild rice.	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)
44	Rich Staffon (Izaak Walton League-Duluth)	15.3	The use of the yearly average of sulfates in modeling may not be appropriate due to the multiple sources of sulfates and their different seasonal and annual cycles.	This comment is addressed in MPCA’s detailed rebuttal response.
45	Rich Staffon (Izaak Walton League-Duluth)	27	Support for Pastor research showing threat of iron precipitate on roots.	This comment is addressed in MPCA’s detailed rebuttal response.
46	Rich Staffon (Izaak Walton League-Duluth)	15	An additional concern we have is whether or not the Legislature will provide MPCA with the necessary funding and staffing to move from using the present general standard of 10 mg/L, to the more complex and time consuming site-specific analysis being proposed.	Comments about implementation issues were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. D (pg. 10) and Attachment 2)
47	Rich Staffon (Izaak Walton League-Duluth)	14.2	We also question whether the revised standard will meet with EPA approval or resolve MPCA’s exposure to litigation over their failure to enforce the wild rice sulfate standard.	MPCA received comments from EPA as part of the comments and addresses its response to those comments in the detailed rebuttal response.

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48	Rich Staffon (Izaak Walton League-Duluth)	14	we recognize the challenge faced by the MPCA to enforce a sulfate standard in the face of the potential increased costs to industry and sewage treatment plants to meet standards. We see the taconite mining industry and municipalities claiming the new standard would cause draconian impacts on the one hand, while environmental organizations criticize that the standard is not strong enough to protect wild rice on the other hand. In the present politically charged environment, we have been at a stalemate for a long time, and no sulfate standard is being widely enforced to protect our wild rice waters.	statement- no response required
49	Rich Staffon (Izaak Walton League-Duluth)	3.2. 34	The Izaak Walton League is willing to work with MPCA and the broader community to find a path forward where the 10 mg/L standard might be reasonably waived or modified for a time, for both municipal and industrial discharge, so long as they are seriously working towards finding solutions to their sulfate discharges.	Comments related to alternatives were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. E. (pg. 11)
50	Rich Staffon (Izaak Walton League-Duluth)	34	we would like to engage MPCA, NRRI, Tribal experts, and others in private industry that are capable and interested in seeking a solution. For example, we envision the development of a mobile tailings basin treatment system as a possible mitigation tool. The treatment would need to achieve reduction in tailings pond sulfates down to a more acceptable level of discharge. Failure to make much progress to this point and the continued conflict cries out for a new “business model” to work together to solve this problem. A model for this cooperative approach is provided by the Western Lake Superior Sanitary District’s mercury pollution prevention project. They successfully reduced mercury levels to meet standards by engaging industry stakeholders in a collaborative process to identify and reduce mercury inputs. We believe the same could be done with sulfates if we work together	Comments related to alternatives were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. E. (pg. 11)
51	Darren Vogt (1854 Treaty)	1.1	The scope of the beneficial use is too narrow. Wild rice provides a variety of resource services including cultural and ecological	This comment is addressed in MPCA’s detailed rebuttal response.
52		10.4	agreement has not been reached on the definition of wild rice water..If a water supports or has supported wild rice, it is a wild rice water.	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12) and MPCA's detailed rebuttal response.
53	Darren Vogt (1854 Treaty)	10.3	Do not agree with a two-acre threshold.	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)
54	Darren Vogt (1854 Treaty)	10.1	The PCA has not accepted all the waters identified in the DNR 200 8 report- rejecting 998 identified waters as Insufficient Information	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)
55	Darren Vogt (1854 Treaty)	10.1	The MPCA does not recognize the latest updates to the 1854 list of wild rice waters	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)
56	Darren Vogt (1854 Treaty)	10.1	providing a list of 106 waters they consider to be wild rice waters that we have not identified.	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)
57	Darren Vogt (1854 Treaty)	11.1	The MPCA says it will not list waters that tribes request during the comment period- this is inappropriate and a formal consultation process is required. The MPCA must communicate directly with each band about listing waters within their boundaries.	MPCA believes it did communicate with tribes during the formal tribal consultations held during the wild rice sulfate study and development of the proposed rules, and regrets any misunderstanding or lack of clarity (See MPCA's 11/22/17 Response to Comments, Attachment 1). This response shows that the MPCA has adjusted the list of waters during this rulemaking. MPCA will continue to work with Tribes and EPA to address juridictional questions, as it does with other water quality standards and activities (impaired waters listing, etc.).
58	Darren Vogt (1854 Treaty)	10	identifying waters should be inclusive rather than exclusive- poor history of subsequent rulemaking to identify waters.	This comment is addressed in MPCA's detailed rebuttal response.
59	Darren Vogt (1854 Treaty)	10, 10.3, 11	concerned about the initial omission of waters, the process for adding waters, the existing acreage guidance and the potential future acreage criterion.	This comment is addressed in MPCA's detailed rebuttal response.

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60	Darren Vogt (1854 Treaty)	34	the list where the sulfate standard applies should not be called "wild rice waters." this is not a list of wild rice waters in the state, but instead a subset of the ful list and only places where the sulfate water quality standard would apply. We suggest calling these locations "waters where the wild rice sulfate standard applies."	MPCA has noted this comment and will strive to be as clear as possible when communicating about the waters identified as Class 4D wild rice waters in MN Rules 7050.0471.
61	Darren Vogt (1854 Treaty)	3.4	It is difficult to determine if the proposed equation is scientifically valid and to what level wild rice is protected.	statement- no response required
62	Darren Vogt (1854 Treaty)	3.6	issues about "steady-state." Has not been tested or validated over long term.	This comment is addressed in MPCA's detailed rebuttal response.
63	Darren Vogt (1854 Treaty)	5	The premise of what is "protective" should be re-examined to protect good stands of wild rice not just to protect against extinction.	Comments about the protectiveness of the proposed standard were addressed in MPCA's 11/22/17 Response to Comments.
64	Darren Vogt (1854 Treaty)	27	concerns about iron plaque	This comment is addressed in MPCA's detailed rebuttal response.
65	Darren Vogt (1854 Treaty)	2.4	…it appears that a noticeable decline in wild rice presence occurs at a lower level of sulfide. The determination of 120 seems to be subjective.	This comment is addressed in MPCA's detailed rebuttal response.
66	Darren Vogt (1854 Treaty)	3.5	to guarantee protection.. Perhaps a no observable effect level, or EC5 should be a consideration.	This comment is addressed in MPCA's detailed rebuttal response.
67	Darren Vogt (1854 Treaty)	14 , 15	implementation is key- the current standard has been poorly enforced. The proposed approach does not provide certainty.	Comments about implementation issues were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. D (pg. 10) and Attachment 2)
68	Darren Vogt (1854 Treaty)	16.1	The MPCA's sampling protocol has uncertainty and is a flawed approach.	This comment is addressed in MPCA's detailed rebuttal response.
69	Darren Vogt (1854 Treaty)	6	Alternate standard adds another layer of uncertainty	While this is a statement and no response is therefore necessary, comments about the alternate standard are addressed in the MPCA's detailed rebuttal response.
70	Darren Vogt (1854 Treaty)	14, 18	what good is a standard with poor enforcement and ongoing variances?	statement- no response required
71	Darren Vogt (1854 Treaty)	5	How can a protective standard be developed for a water that is already impaired?	This question seems to conflate standards development with the evaluation of a waterbody to see if the standard is being achieved. The stablishment of the numeric standard is based on the understanding of the way in which sulfate -- via sulfide -- affects the wild rice beneficial use. Once a water body is included in 7050.0471, the standard is applicable whether or not the beneficial use is impaired.
72	Darren Vogt (1854 Treaty)	15.1	a fixed standard will result in less staff time and resources to implement.	Comments about implementation issues were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. D (pg. 10) and Attachment 2)
73	Darren Vogt (1854 Treaty)	15.3	the annual average raises concerns.Dischargers could flush during certain times and attempt to reduce or stop discharges other times, which could essentially be a seasonal discharge.	This comment is addressed in MPCA's detailed rebuttal response.
74	Darren Vogt (1854 Treaty)	19	the economic analysis is deficient by only looking at the costs to the regulated community and not on the value of the clean water, healty rice, reduced mercury and health and cultural benefits.	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)
75	Darren Vogt (1854 Treaty)	23	The Environmental Justice part of the SONAR does not discuss treaty rights. Treaty rights are the supreme law of the land.. Maps of ceded territories .. Should be included for analysis of impacts…	Comments about tribal consultations and tribal authority were addressed in MPCA's 11/22/17 Response to Comments (31.6 of Attachment 1 pg.(23))
76	Rob Schilling (Sappi Cloquet)	11	St.louis River Estuary is not currently a wild rice water but there are no provisions to prevent its future listing.	statement- no response required
77	Rob Schilling (Sappi Cloquet)	2.4	120 is too low is unsupported by the adminstrative record	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
78	Rob Schilling (Sappi Cloquet)	19	treatment costs would be prohibitive	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)
79	Rob Schilling (Sappi Cloquet)	33.1	10 mg/L standard is not valid	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
80	Rob Schilling (Sappi Cloquet)	3	MPCA's proposal to regulate a sediment based parameter instead of a water based standard is unprecedented.	statement- no response required

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81	Rob Schilling (Sappi Cloquet)	3.9	the equation under or over predicts sulfide levels nearly 20% of the time.	Comments about the error rate were addressed in MPCA's 11/22/17 Response to Comments (3.9 of Attachment 1, pg. 5)
82	Rob Schilling (Sappi Cloquet)	4.2	the MPCA ignored peer review comments	Comments about peer review were addressed in MPCA's 11/22/17 Response to Comments (4.1 of Attachment 1 pg. 5)
83	Rob Schilling (Sappi Cloquet)	2	visual observations of wild rice in high sulfate waters	Comments about the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. B. pg. 6)
84	Rob Schilling (Sappi Cloquet)	19	did not adequately consider costs	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)
85	Emily Onello (physicians comments)	28	fails to consider two critical effects- increase in methyl mercury and potential decrease in food value of wild rice.	Comments about methyl mercury were addressed in MPCA's 11/22/17 Response to Comments (28 Attachment 1, pg. 21)
86	Mike Sundin	19, 5	should not be forced to comply with another costly regulation that does not even guarantee the protection of our precious state grain.	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)
87	Mike Sundin	25, 33.1	recognizes the importance of moving away from its original 1973 standard based on outdated field observations from the 1940s, this new proposal is still based on bad science.	statement- no response required
88	Nancy Giguere (The Wedge Co-op)	3.1	Preservation of the wild rice sulfate standard will benefit our customers, as well as consumers of natural wild rice throughout the state who deserve a healthy and ecologically sound product.	statement- no response required
89	Nancy Giguere (The Wedge Co-op)		in any proposed rule-making, the MPCA preserve and enforce year-round Minnesota's existing water quality standard.	Comments about the maintaining the existing 10 mg/L sulfate standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A (pg. 4) and 3.1 of Attachment 1 (pg. 3))
90	Scott Gilbertson (Detroit Lakes)	19	Has completed a $31 million treatment system that will not remove sulfate- extreme costs of ever-evolving standards	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)
91	Scott Gilbertson (Detroit Lakes)	3	proposal is built on overly-conservative assumptions	This comment is addressed in MPCA's detailed rebuttal response.
92	Scott Gilbertson (Detroit Lakes)	15	Question how the MPCA will determine effluent limits in reality	Comments about implementation issues were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. D (pg. 10) and Attachment 2)
93	Scott Gilbertson (Detroit Lakes)		What other sources of sulfate/sulfide have been considered (other than point sources)	The sources of a particular pollutant that is the subject of the development or revision of a water quality standard are not material to the way in which that pollutant, when in the waterbody, affects the beneficial use being protected. Therefore, this type of data was not examined by MPCA, nor was it necessary for the MPCA to do so. MPCA does speak generally to sulfate sources in the SONAR and supporting documents.
94	Scott Gilbertson (Detroit Lakes)	34	request removal of the Interim Economic Guidance from the rule	The MPCA proposed to remove this incorporation by reference in the 11/22/17 Response to Comments.
95	Douglas McLaughlin (NCASI)	3.5	It is unclear from the TSD why MPCA first selected the EC 20 for the wild rice response effect level of interest, and later decided to use the EC10.	This comment is addressed in MPCA's detailed rebuttal response.
96	Douglas McLaughlin (NCASI)	3.9	MPCA's error rate analysis focuses on the relationship between pore water sulfide concentration and water column sulfate concentration, rather than the relationship between sulfate (the target of criteria and management) and the wild rice response. Therefore, the error rates presented are likely underestimates of the overall false positive and false negative error rates.	Comments about the error rate were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.A.b (pg. 6) and 3.9 of Attachment 1 (pg.5)

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97	Douglas McLaughlin (NCASI)		with respect to MPCA's reliance on the empirical sulfate model, we note that representation of the basic concepts of H2S formation (i.e. dependent upon available carbon and sulfide) in the model appears reasonable. Nonetheless, some widely used water quality computer simulation models (e.g., Water Quality Analysis Simulation Program, or WASP) predict H2S in porewaters using an approach that incorporates the underlying mechanisms that control sulfur chemistry, rather than relying on purely statistical relationships . Such a mechanistic approach could improve upon MPCA's empirical model, especally for predictions at locations not represented in the derivation of the empirical model.	While MPCA acknowledges that there may be other models or approaches that could be used to explore the sulfate-sulfide relationship , the existence of other potential approaches does not diminish the reasonableness of scientific defensibility of the approach the MPCA took in developing the rulemaking proposal.
98	Kurt Anderson (Mn Power)	2.3, 3	attachment includes detailed comments and the Fort Lab seed depth study report	The Fort Lab study is addressed in this Rebuttal Response.
99	Kurt Anderson (Mn Power)	33.1	… research and data available from this rulemaking effort clearly supports the MPCA's proposal to remove the existing.. Standard of 10 mg/L	statement-no response required
100	Kurt Anderson (Mn Power)	3.4	..unprecedented, unorthodox and unproven approach…rife with unaddressed contradictions	statement-no response required
101	Kurt Anderson (Mn Power)	5	unlikely to provide any benefit to wild rice	Comments about the benefit to wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. B. b (pg. 7))
102	Kurt Anderson (Mn Power)	6	"work-arounds" are evidence that the MPCA is regulating beyond its knowledge of the fate and transport of sulfate and beyond their ability to understand…sulfide impacting wild rice.	The potential need for variances or site-specific standards is not evidence that the MPCA's proposal is either scientifically flawed or unreasobale. See MPCA's 11/22/17 Response to Comments and the detailed rebuttal response for additional responses to similar comments.
103	Kurt Anderson (Mn Power)	3.7	The MPCA has not shown the conditions needed for sulfate from a discharge to enter into the sediment and create sulfide. The simplistic, "one-way street" hypothesis (sulfate from a discharge always enters the sediment, penetrates to rooting zone depth, and creates sulfide) is the basis of their current proposed rule. However, groundwater movement may mean that sulfate from a discharge does not affect or contribute to sulfide levels in the sediment. This is a core issue that must be resolved prior to rulemaking.	Comments related to ground water issues were addressed in MPCA's 11/22/17 Response to Comments (3.7 of Attachment 1 (pg. 4)
104	Kurt Anderson (Mn Power)	38, 4.3	After years of research, the MPCA has not provided a single documented example of a decline in natural wild rice stands from the impacts of elevated sulfide or sulfate. They have relied on a simplistic visual assessment of compressed (log scale) field data as one of the primary foundations of this proposed rulemaking, which is not a reasonable approach.	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
105	Kurt Anderson (Mn Power)	3,4	The MPCA has not provided any information regarding how sulfide, which they propose to be the toxic agent, might actually be impacting wild rice. More specifically, they have not provided a mechanism regarding how, or when, sulfide affects wild rice above their proposed "protective" level of 120 ppb sulfide.	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
106	Kurt Anderson (Mn Power)	2.4	One of the foundational aspects of the proposed standard – the MPCA's proposed protective level of sulfide for wild rice – contains numerous unresolved contradictions, based on the MPCA's own field research and peer-reviewed, published laboratory studies...	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
107	Kurt Anderson (Mn Power)	4	a. Fifty-seven percent of the waterbodies with sulfide levels above the MPCA's proposed "safe" level have wild rice present – including some of the densest stands in the entire state.	Comments related to presence and absence of wild rice above or below the proposed protective level of sulfide were addressed in MPCA's 11/22/17 response to Comments.
108	Kurt Anderson (Mn Power)	spreadsheet	b. The densest stand of wild rice in a natural lake, Lake Monongalia, had sulfide levels eleven times higher than what the MPCA is proposing as "protective".	Comments relating to Lake Monongalia were addressed in MPCA's 11/22/17 Response to Comments (Attachment 2, St. Paul hearing, response to testimony of Kurt Anderson.)
109	Kurt Anderson (Mn Power)	35	c. The densest stand of paddy rice – the densest stand of wild rice observed anywhere in the state-funded study– had sulfide levels over three times higher than what the MPCA is proposing as "safe". The MPCA has chosen to exclude this commercial paddy data for unsupported reasons.	Comments relating to Lake Monongalia were addressed in MPCA's 11/22/17 Response to Comments (Attachment 2, St. Paul hearing, response to testimony of Kurt Anderson.)

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110	Kurt Anderson (Mn Power)	4	The MPCA has chosen to exclude data from their own funded laboratory research showing no impact to wild rice in the rooting zone at levels nearly 30 times higher (no effect in the rooting zone at 3,060 ppb sulfide) than their proposed protective level of 120 ppb sulfide.	MPCA has not excluded this information; rather, it has given it less weight in identifying the protective sulfide concentration, as explained on pp. 33-34 and 38-39 of the TSD and in this rebuttal response.
111	Kurt Anderson (Mn Power)	2.2, 4.2	The MPCA has chosen to discount peer-reviewed, published research that studied the effects of sulfide on wild rice in the rooting zone – a study which was designed based on the MPCA's own hypothesis, and the MPCA's own peer reviewers' recommendations.	Comments about peer review were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)
112	Kurt Anderson (Mn Power)	19	Removing sulfate to reach this unsupported "safe" level of sulfide represent an incredible potential risk to the State's economy.	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.A (pg. 4)
113	Kurt Anderson (Mn Power)	36	The MPCA has not evaluated whether removing sulfate to these levels might actually result in detrimental impacts to the aquatic community, including ion imbalances and nutrient deficiencies due to removal of essential minerals and salts.	A discussion of the issues associated with sulfate treatment is provided in SONAR pg. 182
114	Kurt Anderson (Mn Power)	37, 34	There are numerous feasible options the State can take to actually benefit wild rice, and the State of Minnesota is uniquely positioned to protect and promote wild rice through various venues, such as the Department of Natural Resources' ("DNR") Shallow Lake Program. These options are far more likely to actually deliver actual environmental benefit for wild rice, and at a much lower cost to the residents of Minnesota.	Comments related to alternatives were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. E. (pg. 11)
115	Joe Mayasich	33.1, 4	there is no valid basis for the 10 mg/L standard….the basis for a sulfate standard has never been established…"an objective, hypothesis-based, well-documented, peer-reviewed and published field investigation of potentially adverse effects of point-source-discharged sulfate on wild rice does not exist."	The promulgation of a water quality standard does not require any finding that point sources are the cause of an environmentally adverse effect. A water quality standard must protect a designated use from a stressor, pollutant or toxicant; point sources analysis need not enter the analysis. The SONAR and TSD address the MPCA's findings that the existing sulfate standard is imprecise, which is why MPCA is proposing to replace it with a more precise approach to protecting the wild rice beneficial use from sulfate impacts.
116	Joe Mayasich	4	the MPCA did not use fate and transport protocols for the development of the proposed standard.	statement- no response required
117	Joe Mayasich	4	an astute Virginia City Council member asked MPCA staff a very basic and fundamental question pertaining to the environmental fate of Sulfate and Sulfide; specifically in regard to their half-lives. The MPCA staff replied that they did not know. That same person asked that same question at the hearing in Virginia on October 24, 2017; again, MPCA had no answer/information about the half-lives (i.e. the persistence) of sulfate or sulfide in the environment. It is UNREASONABLE to have developed and have plans to implement, a revised Sulfate standard across permitted, point-source dischargers when such an essential and fundamental environmental-fate property, like half-life, remains unknown.	Sulfate fate and transport is a complex environmental phenomenon and it is not possible to simplify sulfate fate in the environment using a singular half life decay rate statewide. The MPCA implementation approach for point source discharged sulfate will consider factors such as flow dilution, water body type, water flow path, site-specific sulfate decay rates, etc... when setting effluent limits as needed to ensure protection of the water quality standard and the designated use.
118	Joe Mayasich	3.7	A very insightful hydrogeologist testified at the October 24th hearing in Virginia; with a keen focus on the irrefutable and potent transport of Sulfate to lake and river sediments via groundwater. The MPCA admitted that this (groundwater) route/mechanism of Sulfate transport was not addressed in the field surveys, was not present in the container studies, and is not accounted for in the equation. The proposed Rules erroneously assume that 100% of the sulfate load/concentration discharged from permitted facilities' outfalls reach wild rice habitat via surface water transport, and then erroneously assert, with a simplistic equation, that the "protective" level of biogeochemically produced Sulfide (i.e. 120 µg/L) can be achieved by reducing just the load/concentration of just the point-source-discharged, surface-water-transported Sulfate. This assumption and this assertion are totally UNREASONABLE, because the environmental fate and transport details of this pathway are inadequately elucidated and because the significance of Sulfate contribution from groundwater is ignored. Sulfate and Sulfide are ubiquitous and cycle naturally in the environment. The following four (4) figures illustrate the underpinnings of this UNREASONABLENESS.	Comments related to ground water issues were addressed in MPCA's 11/22/17 Response to Comments (3.7 of Attachment 1 (pg. 4)

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119	Joe Mayasich		The information in a recently peer-reviewed and published paper (see pertinent details immediate below) underscores the UNREASONABLENESS of the above-discussed assumption and assertion. Although the focus if the paper is sulfate and mercury, the research focus and the findings are entirely applicable to sulfate and wild rice....The MPCA needs to respond to the question of why this recently peer-reviewed and published paper was not referenced, acknowledged or discussed as a component of the SONAR. It's important to note the affiliations of the highly credible authors. (paper is Berndt, Rutelonis, Regan)	See the Rebuttal response document.
120	Joe Mayasich	28	There is a troubling paucity of extremely important information regarding the mode and mechanism of action of sulfide's toxicity, which can only be obtained by testing with the greater sensitivity obtainable at the Organ through Molecular levels of biological organization. The following four excerpts from the Peer Review final report emphasize the importance of focusing on the roots, which are representative of the Organ and Tissue levels of biological organization.	MPCA disagrees that an explicit understanding of the mode of action is necessary to develop a proposal that is protective of the wild rice beneficial use.
121	Joe Mayasich		The proposed Rules erroneously assume that 100% of the sulfate load/concentration discharged from permitted facilities' outfalls reach wild rice habitat via surface water transport, and then erroneously assert, with a simplistic equation, that the "protective" level of biogeochemically produced Sulfide (i.e. 120 µg/L) can be achieved by reducing just the load/concentration of just the point-source-discharged, surface-water-transported Sulfate.	The rules do not make assumptions about the sulfate load/concentration from permitted facilities. The process of establishing effluent limits is conducted during the review of permit applications and after adoption of the standard. Analysis of Since the MPCA is lacking discharger specific data about the fate and transport of sulfate in the environment. The MPCA will refine its sulfate fate and transport assumptions during implementation of the standard.
122	Joe Mayasich		Peer-Reviewed study in journal of environmental management published by a MPCA author on sulfate fate and transport was recently published and the MPCA decided to not include it in the rulemaking document or to inform implementation.	The MPCA informally considered this work when developing the implementation strategy in the SONAR. This paper discovered information at a specific level of detail that was too narrowly specific as to include as a reference in the SONAR.
123	Joe Mayasich	2.2	The efforts by Fort et al. represent the only comprehensive, well-focused, peer-reviewed and published ecotoxicological research findings available, to fill the data/information gap that exists at the Individual level of biological organization.	The MPCA reviewed the Fort study and information about it is included throughout the TSD and in the MPCA's 11/22/17 response; the Fort study is also addressed in the MPCA's detailed rebuttal response.
124	Joe Mayasich	4.2	Additionally, the Peer Review report repeatedly criticized the use of nominal (i.e. not analytically verified) exposure concentrations. This criticism applied to both the hydroponic and the container studies completed by the U of M.	MPCA has addressed the topic of the peer review comments in its 11/22/17 response to comments and in the detailed rebuttal response. The fact that there are limitations to or concerns about specific study designs or results does not mean that the study or result is not at all useful; it does mean that caution must be excercised in the use of the results. MPCA has exercised that caution both in the use of specific results (see for example the discussion of uncertainoly on pp. 38-39 of the TSD) and it's reliance on a multiple lines of evidence approach.
125	Joe Mayasich	2.2	in contrast, and correctly so, the study conducted by Fort et al. did measure (i.e. analytically confirm) and rigorously maintain the targeted exposure concentrations of sulfide, and also used the measured concentration values in the analysis of the data and the interpretation of the results. This attention to detail and sound scientific technique is reflective of the fact that the study by Fort et al. was conducted as per the requirements of EPA Good Laboratory Practice Standards (GLP)5. None of the U of M's research was performed to meet the rigorous, yet logical requirements of GLP.	The MPCA reviewed the Fort study and information about it is included throughout the TSD, in the MPCA's 11/22/17 response and in the detailed rebuttal response.
126	Joe Mayasich	4.2	The peer review process was (therefore) defective because there never was a "back-check" with the members of the peer review panel, which assured that their comments were all adequately addressed during the transition from the draft to the final TSD.	The charge of the peer review panel was to help with interpreting the MPCA commisioned studies and not to review the final TSD document. Additionally, the peer review panel was not setup as a consensus panel where the peer reviewers comments must be formally considered.

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127	Joe Mayasich	4	use of surrogate plants for wild rice plants as a concern during a 2017 meeting of the Wild Rice Standards Study Advisory Committee. The MPCA staff responded to my concern by saying that the “data are in the Myrbo paper”, which at the time was not published or available for review. Although currently still not published, a version of the now-accepted-for-publication manuscript was recently made available for review by MPCA. I have compiled the key data from that manuscript into.....It’s very important to point out that this “identification” of wild rice habitat is penultimate to the subsequent sediment core sampling, which will yield the data that determines if a numeric sulfate limit is to be imposed or not and, if it is, what that numeric limit will actually be.	statement -- no response necessary, though MPCA does respond to questions aboput the use of the presence of waterlilies as an indicator of wild rice habitat in the detailed rebuttal response.
128	Joe Mayasich	18	The MPCA has repeatedly mentioned Variances as a form of relief,.. (Variances are complex, require outside assistance, must be approved by EPA)...is vitally important to consider the potential for “Regulatory Gridlock” to occur.	Although variances have not been extensively used in Minnesota, they have been an important tool over time. (See response exihibit 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.
129	Joe Mayasich	15.1	is vitally important to consider the potential for “Regulatory Gridlock” to occur.	statement-no response required
130	Joe Mayasich	15	The footprint of the proposed, revised Sulfate Standard is capriciously established to a 25-mile downstream distance; measured from point-source outfall to “wild rice habitat”...there has been no opportunity afforded to the permit holder by the MPCA to reconsider the reasonableness of this distance-based limit.	In the SONAR (pg. 147) the MPCA states that the 25 mile downstream estimate was only for purposes of the regulatory analysis and was not in any way a final determination. "*For purposes of this regulatory analysis, these facilities within 25 miles of a wild rice water were considered to be the most likely to be affected to the extent that they will need an effluent limit review, and may bear costs depending on the result of that review and the treatment that would be needed to meet a limit. Attachment 5 identifies the potentially affected dischargers.* ***It is important to note that this list of potentially affected dischargers is very preliminary and subject to change depending on a number of factors.*** *However, Attachment 5 provides an approximation of the dischargers that the proposed revisions may affect.*
131	George Crocker (North American Water Office)	31, 23,	comments regarding the fairness of the process	The MPCA met all administrative procedure requirements and provided extensive opportunity for public involvement in the rulemaking process.
132	George Crocker (North American Water Office)	21	comments about the differences between the culture of state government and the Native American community	statement- no response required
133	George Crocker (North American Water Office)	21	comments about western-style science versus the relatedness of linving things as observed in indigenous cultures.	statement- no response required
134	George Crocker (North American Water Office)	10	the lists of wild rice waters leave out waters that produced wild rice in the past.	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)
135	Margaret Leubner	15.1	the complexities of the rule make it difficult to make educated choices and comments	statement- no response required
136	Tom Leubner	3.1	leave the 10 mg/L standard	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)
137	Tom Leubner	24	concerns about Polymet and future compliance with a sulfate standard	Comments relating to mining were addressed in MPCA's 11/22/17 Response to Comments (24 of Attachment 1. (pg. 21)
138	Tom Leubner	10	the list of wild rice waters is incomplete	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)
139	Tom Leubner	14	more stringent enforcement is needed	Issues about implementation issues were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. D. pg. 10

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140	John Ipsen	3.1	research conclusions are largely based on laboratory studies that may not accurately predict what happens in the natural habitat where wild rice grows. This is in contrast to the current sulfate standard that was based on many years of observational studies in the field and peer reviewed research.	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)
141	John Ipsen	2.3	there is now evidence that more factors than the sulfate concentration affect the wild rice crop, the details of the interactions between sulfate levels, dissolved oxygen levels, water flows, pH, temperature, carbon content, sulfide concentrations, and iron levels are not adequately known in the natural environment and need further investigation - to be sure we are not making the wrong decision and promulgating a false standard	Comments about additional stressors to wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.B. c. pg. 7)
142	John Ipsen	21, 23	Wild rice has value as a food crop and indigenous food with high nutritional value and spiritual significance for the Ojibway people. Allowing sulfate/sulfide to rise to levels that damage the crop reduces its availability and is a subtle form of cultural warfare against the native people of Minnesota.	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.
143	John Ipsen	28	Excessive sulfate in the waters (though indirectly and probably influenced by multiple other factors) is associated with diminished growth of wild rice and in affected stands it may also increase the methylmercury content of the seeds that survive (this has been demonstrated in other rice). Increased sulfate discharges also result in increased sulfate loading downstream and similarly enhances methylation of mercury that winds up in fish we consume. There is concern this will contribute to neurological damage in children living along the shore of Lake Superior,	comments about methyl mercury were addressed in MPCA's 11/22/17 Response to Comments (28 of Attachment 1 (pg. 21))
144	John Ipsen	14	The simple rule we have now is not being enforced – what would there be about a more complex rule that would make enforcement more likely?	Comments about implementation issues were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. D (pg. 10) and Attachment 2)
145	Gerri Williams	3.1	Setting a standard for specific bodies of water throughout the state would be onerous, take decades to effectuate and would be prohibitively costly to the state – at the same time that funding to the MPCA for monitoring is being cut.	Comments about implementation issues were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. D (pg. 10) and Attachment 2)
146	Kris Wegerson	3.1	keep the 10 mg/L standard	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)
147	Kris Wegerson		support for Pastor study	statement -- no response needed
148	Kris Wegerson	28	iron plaque	This comment is addressed in MPCA's detailed rebuttal response.
149	Kris Wegerson	11	For the Sandy and Dark Rivers, the sulfide level of 120 ug/L would not be protective. The sulfide level is already lower at several measured locations and no wild rice has been observed.In effect, the field data do not support the new standard.	If sulfide levels lower than 120 are damaging the wild rice beneficial use within wild rice waters, a site-specific standard can be developed.
150	Kris Wegerson	3.1, 3.4	One static equation that will be effective for 10 years at a time can not accurately reflect this dynamic state.We know from John Moyle's research that sulfate levels greater that 10 mg/L decrease wild rice survival. Continuing this standard will be easier and more cost effective than implementing an unproven in vivo standard and one that would be unwieldy and time consuming to implement. If the new sulfide standard is implemented, in effect, there will be no standard protective of wild rice.	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)
151	Kris Wegerson	28	concern about methyl mercury	See November 22, 2017 Attachment 1 response to topic area 28.
152	Nicolette Slagle (Honor the Earth)	23	It is unclear to us what free, prior, and informed consent has been achieved from the sovereign nations that would also be impacted by this change.	Comments about tribal consultations and tribal authority were addressed in MPCA's 11/22/17 Response to Comments (31.6 of Attachment 1 pg.(23))
153	Nicolette Slagle (Honor the Earth)	14	we are shocked and disappointed by the audacity of a state agency trying to change a standard they never adequately enforced in the first place.	statement -no response required
154	Nicolette Slagle (Honor the Earth)	38	Stands and extent has decreased by an estimated 70% since the signing of the treaties between the Anishinaabeg Bands and the US Federal Government.	Comments about the health or decline of wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III, B. a (pg. 6)

Comment ID	Commenter Name	Topic	Comment (Summary or Excerpt and Location)	Response or Response Location
155	Nicolette Slagle (Honor the Earth)	21, 23	The Mesabi range is a sacred area to Anishinaabeg and Dakota people. The continued mining in this area, as in other sacred areas across Turtle Island and the world is an act of desecration, and ultimately, compliance in genocide.	Comments about tribal consultations and tribal authority were addressed in MPCA's 11/22/17 Response to Comments (31.6 of Attachment 1 pg.(23))
156	Nicolette Slagle (Honor the Earth)	23	In a true environmental justice framework, the aim of regulations would be to be restorative as well as just. As far as environmental policies go, this would take the form of both restorative environmental practices and land management decisions that focus on restorative justice for impacted communities. In trying to restore justice to environmental policies in Minnesota, state regulators and agencies need to enter into joint management plans with the Native Nations within its borders. These joint management plans need to utilize indigenous science, traditional ecological knowledge, indigenous risk assessment methodologies, and traditional governance practices.	Comments about alternate proposals were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. E. (pg. 11))
157	Nicolette Slagle (Honor the Earth)	23	risk assessments for indigenous communities need to focus on the impacts on the vulnerable not averages based on exposure scenarios for healthy individuals.Without recognizing that risk and impacts are different for indigenous peoples, western regulators can never be just partners in land management decisions.	statement - no response required
158	Nicolette Slagle (Honor the Earth)	35	discussion of the risk assessment process	statement - no response required
159	Nicolette Slagle (Honor the Earth)	21, 23	discussion of Anishinaabeg worldview	See November 22, 2017 Attachment 1 response to topic area 23.
160	Nicolette Slagle (Honor the Earth)	21	discussion of traditional knowledge	See November 22, 2017 Attachment 1 response to topic area 23.
161	Nicolette Slagle (Honor the Earth)	21	discussion of "ways of knowing"	See November 22, 2017 Attachment 1 response to topic area 23.
162	Nicolette Slagle (Honor the Earth)	21	discussion of manoomin in general	statement - no response required
163	Nicolette Slagle (Honor the Earth)	35	concern about the effect of sulfate on other aquatic plants	See this rebuttal response discussion of scope.
164	Nicolette Slagle (Honor the Earth)	23	The proposed change in the sulfide standards will violate the federally protected treaty rights of the Anishinaabeg by endangering primary areas of hunting, fishing, wild rice harvest, medicinal plant harvest, and organically certified wild rice crops as reserved in the Chippewa treaties from 1825 to 1867.	Comments about tribal consultations and tribal authority were addressed in MPCA's 11/22/17 Response to Comments (31.6 of Attachment 1 pg.(23))
165	Nicolette Slagle (Honor the Earth) 2nd submittal)	23	map of Anishinaabeg ceded lands in Minnesota	statement- no response required
166	Nicolette Slagle (Honor the Earth) 3rd submittal)	10	list of waters identified as having insufficient information for listing as wild rice waters	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)
167	Doug Beckwith	24, 11	discussion of Dunka Bay as an example of wild rice growing in high sulfide water	The sulfate concentration from two samples collected in Dunka Bay of Birch Lake (69-0003-00) in August 2011 averaged 22.3 mg/L. For comparison, an August 2011 Birch Lake water sample at a site about 2 miles northwest of Dunka Bay had a sulfate concentration of 3.6 mg/L.
168	Doug Beckwith	2,3, 4	have seen from personal experience over the last 10 years or so that Risk Assessment numbers are continually going lower and lower in determining what is an acceptable risk to human health and the environment. The MPCA's proposed number is basically if one can measure it then it's unacceptable. Real life Dunka Bay sulfides/sulfate are more compatible than what the MPCA's proposed number is.	MPCA disagrees with the commenters characterization of MPCA's proposed protective sulfide concentration. The MPCA's 11/22/17 Response to Comments and the detailed rebuttal response provides additional response to similar comments about the protectiveness (or lack of protectiveness) of the MPCA's prosed approach. The sulfate concentration from two samples collected in Dunka Bay of Birch
169	Nathan Johnson		encourage the MPCA to consider the domain of applicability for their proposed equation with respect to all variables used in the model: surface water sulfate, porewater sulfide, sediment iron, and sediment carbon.	This comment is addressed in MPCA's detailed rebuttal response.

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170	Nathan Johnson		equation was fit to real observations in natural systems, it is conceivable that an increase or decrease in sulfate at a particular location would shift the sediment conditions towards those conditions represented by another location included in the model calibration dataset. However, several constraints need to be considered to ensure that the model is not extrapolating beyond the set of conditions under which the model was trained....The MPCA should consider whether the model has the statistical power at the edges of the dataset in determining where the model's "domain of applicability" should rest.	This comment is addressed in MPCA's detailed rebuttal response.
171	Nathan Johnson		Using the proposed equation to extrapolate to very high surface water sulfate concentrations (higher than those observed commonly in the observational dataset) represents a potential instance of applying the model beyond an appropriate domain of applicability. The same could be said for sediment carbon and iron.	This comment is addressed in MPCA's detailed rebuttal response.
172	Rod Ustipak	33	There is no other sensible way to set sulfate limits for wild rice, so it is the best and most practical solution to this issue. The PCA proposal for limiting sulfate discharge is completely reasonable and founded in good science.	Supportive comment.
173	Miya Evans (Mesabi Nugget)	25	not based on robust science	This comment is addressed in MPCA's 11/22/17 response to Comments (Cover memo).
174	Miya Evans (Mesabi Nugget)	32	departs from the legislative directive	This comment is addressed in MPCA's detailed rebuttal response.
175	Miya Evans (Mesabi Nugget)	3.4	Second Creek study "demonstrates that wild rice can and does thrive in conditions where MPCA's equation would nevertheless require sulfate loading reductions."	Acknowleged. That is why MPCA also prosed the alternate standard approach, and noted that the ability to develop site-specific standards where warranted.
176	Miya Evans (Mesabi Nugget)	25	discussion of flawed science from technical experts	This comment is addressed in MPCA's 11/22/17 response to Comments (Cover memo).
177	Miya Evans (Mesabi Nugget)	15.3	In a significant departure from the existing sulfate rule, the Proposed Rule will apply equally year-round despite MPCA-gathered evidence demonstrating that the risk of sulfide formation in sediment is much lower in the colder months. MPCA erroneously assumes that a pound of sulfate discharged in January would pose the same threat to wild rice as a pound of sulfate discharged in June.	This comment is addressed in MPCA's detailed rebuttal response.
178	Miya Evans (Mesabi Nugget)	34	It appears MPCA may have committed a drafting error when preparing the rule language for public notice. The agency says that water quality-based effluent limitations (WQBELs) for sulfate will typically be expressed as a 12-month moving total mass. MPCA SONAR (July 2017), p. 105. However, the corresponding rule language does not appear to reflect this policy decision made by MPCA. The rule language should be updated to properly reflect the mass limit approach.	This comment is addressed in MPCA's detailed rebuttal response.
179	Miya Evans (Mesabi Nugget)	6, 3.7	Mesabi agrees that the rule should account for waterbodies with groundwater inflow, but the rule's proposed language inappropriately leaves such a decision to MPCA's future discretion. The Proposed Rule states that the MPCA "may establish an alternate sulfate standard" to be applied under certain circumstances....Even though MPCA is aware of this evidence, the agency failed to collect any information on groundwater movement at any of the field sites.	This comment is addressed in MPCA's detailed rebuttal response.
180	Miya Evans (Mesabi Nugget)	16.1	MPCA's approach does not consider complex samplings of sediments from moving waterbodies. In rivers and streams, it is likely that sediment parameters at issue will not be constant, either from place to place in the same waterbody or over time.	This comment is addressed in MPCA's detailed rebuttal response.
181	Miya Evans (Mesabi Nugget)	15	there is no scientific reason for forcing dischargers to use the lowest calculated sulfate level rather than an average. MPCA argues that averaging "is vulnerable to extreme values." MPCA TSD, 2017 at 87. In reality, averaging can more precisely describe the natural system and can avoid undue influence from an outlier. Forcing the regulated community to use the lowest calculated sulfate level would require a discharger to over-treat its discharge. Using the lowest calculated sulfate level is unreasonable, especially when applied to riverine systems generally and to Second Creek in particular.	This comment is addressed in MPCA's detailed rebuttal response.

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182	Miya Evans (Mesabi Nugget)	2.2	Mesabi supports the use of laboratory testing to evaluate a target toxicant, because a laboratory setting allows many potentially confounding influences to be isolated. Research by Fort Environmental Labs, a nationally-recognized environmental toxicology laboratory with experience working for numerous state and federal governmental agencies, demonstrated that sulfate itself is not toxic to wild rice at any concentration found in Minnesota's waters....Fort mimicked natural conditions by exposing only the rooting zone to sulfide, whereas Pastor's laboratory study was flawed because the entire seedling was exposed to sulfide, including the early primary leaf. MPCA TSD, 2017 at 14. Yet MPCA continues to discount the Fort studies without reasonable justification.	The MPCA reviewed the Fort study and information about it is included throughout the TSD, in the MPCA's 11/22/17 response and in the detailed rebuttal response.
183	Miya Evans (Mesabi Nugget)	4.1	The artificial mesocosms were not designed or operated in a way that yields useful data for developing a rule to be applied to real-world environments. These mesocosms were hydrologically isolated tanks that did not capture naturally-occurring variables such as groundwater inflow, temperature fluctuations, and iron and sulfur sources....Pastor and Myrbo's recent studies did not adequately describe the role of iron in the real world, where iron is being constantly introduced into the porewater interactions. In both these experiments, iron was added to the mesocosms only once, yet the scientists continued to draw conclusions about sulfide toxicity long after the iron was depleted from the system.	This comment is addressed in MPCA's 11/22/17 Response to Comments.
184	Miya Evans (Mesabi Nugget)		MPCA is using data collected from non-wild rice waters in order to make regulatory decisions for wild rice waters. MPCA says it included non-wild rice waters to describe a chemical relationship in the environment….An agency should not be using data from waters that do not have the use sought to be protected and will not have the standard applied to them. When the data from non-wild rice waters is removed, results show no correlation between porewater sulfide and wild rice presence.	This comment is addressed in MPCA's 11/22/17 Response to Comments.
185	Miya Evans (Mesabi Nugget)	4.1, 3	the agency's field data is vastly skewed toward still water (27 streams compared to 81 lakes), and the data has been molded into a mathematical expression that does not account for the differences between lakes and streams….MPCA did not collect any data on water movement, yet scientists agree wild rice grows best in habitat with moving water. MPCA TSD, 2017 at 25. The proposed equation has no way of accounting for the changes in sediment type or water chemistry in moving water. The repeated presence of healthy wild rice in Second Creek – a stream with concentrations already higher than MPCA's formula would typically allow – is proof that the equation is flawed.	This comment is addressed in MPCA's detailed rebuttal response.
186	Miya Evans (Mesabi Nugget)	4.3	MPCA set the assumed protective sulfide value of 120 µg/L using a visual interpretation of apparent data trends and resorted to presence/absence data instead to studying concentration levels. The agency's approach lacks statistical rigor and critical analysis.	This comment is addressed in MPCA's 11/22/17 Response to Comments and the detailed reuttal response.
187	Miya Evans (Mesabi Nugget)	3.3	the calculation assumes that underlying sediment is relatively stationary – an inaccurate assumption for riverine systems. DeRocher and Johnson encouraged the agency to consider more fully the hydrological processes which could result in mobilization of sulfide minerals in rivers and streams.	This comment is addressed in MPCA's detailed rebuttal response.
188	Miya Evans (Mesabi Nugget)	2.3	The studies did not sufficiently address other environmental factors that affect wild rice, such as fluctuating water levels and competition from other plant species. Without studying other factors that can influence the presence and vitality of wild rice, MPCA's assumed causal connection to sulfate is flawed.	Comments about the other factors that influence wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. B. c. (pg. 7))
189	Miya Evans (Mesabi Nugget)	35	MPCA erred by not gathering and considering the growing conditions inside wild rice paddies. Publicly-available information demonstrates that wild rice is commercially grown in waters with sulfate at levels higher than MPCA's formula would suggest is protective. Indeed, those rice growers sometimes intentionally add sulfate in their fertilizers.	A discussion of why the conditions for growing paddy rice are different than the natural conditions in wild rice waters is provided in SONAR pg. 35

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190	Miya Evans (Mesabi Nugget)	3.9	The proposed equation is unreasonable because actual site conditions do not match the agency's equation a high percentage of the time….These are proof that the equation as currently written does not work, especially as applied to Mesabi.	Comments related to the error rate were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. b (pg. 6) and 3.9 of Attachment 1 (pg. 5)
191	Miya Evans (Mesabi Nugget)	15.1	The complexity of the equation-based standard brings many questions about whether such a complicated approach can be implemented effectively. It is unclear how changes in equation inputs – and the resulting output – from one sampling event to the next will be addressed. A discharger's sulfate limit could drastically change based on new sampling, but treatment capacity cannot be so easily adjusted from one permit cycle to the next.	MPCA does not anticipate adjusting the numeric sulfate standard for a Class 4D wild rice water -- and therefore any permitted effluent limit based on the standard -- once it is established, absent a catastrophic event, such as an extreme flood, that would greatly alter the sediment characteristics. Antibacksliding requirements apply to established effluent limits.
192	Miya Evans (Mesabi Nugget)	15.4	The rule as currently proposed specifies a one in ten-year frequency for the wild rice sulfate standard. MPCA SONAR, 2017 at 82. This timeframe appears to be arbitrarily chosen and does not correspond to any of the data gathered for the Proposed Rule.	This comment is addressed in MPCA's detailed rebuttal response.
193	Miya Evans (Mesabi Nugget)	31	While MPCA argues that this rulemaking is federally mandated and thus does not need to follow these SONAR requirements, Mesabi notes that the existing sulfate standard is for agricultural protection, the Clean Water Act does not contain a provision requiring this wild rice rule, and Minnesota is enacting a rule that no other state has today. The Proposed Rule is a state-driven process and must follow the SONAR requirements. MPCA has failed to determine if there are less costly or less intrusive methods for achieving the rule's purpose, has failed to adequately describe alternative methods for achieving compliance, and has not fully assessed the probable costs.	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)
194	Miya Evans (Mesabi Nugget)	15.3	the equation fails to account for seasonal trends in porewater sulfide and thus still requires improvement to appropriately protect wild rice. ..Minnesota has never had a year-round sulfate limit for the protection of wild rice. ...in the SONAR the agency argues that the existing rule's seasonality language "is no longer scientifically supported."MPCA is claiming that wild rice is equally susceptible to sulfate at all times of the year. This brand new conclusion is based on a flawed interpretation of only the smallest amount of data and discounts the only MPCA-sponsored study on this issue, in contravention of the Minnesota Legislature's 2011 directive.	This comment is addressed in MPCA's detailed rebuttal response.
195	Miya Evans (Mesabi Nugget)	32	Legislature very specifically directed the agency to gather information about the effect of sulfate on the growth of wild rice and to research "the specific times of year during which the standard applies." Laws of Minnesota, 2011 First Special Session, Ch. 2, Art. 4, Sec. 32. The legislature also prohibited the agency from amending the existing rule without valid research supporting such changes. Id. Despite seasonality being one of the three express directives for research, we understand from MPCA staff that only a tiny percentage of the $1.5 million budget allocated by the Legislature was spent studying sulfate's effects on wild rice during specific times of the year.	This comment is addressed in MPCA's detailed rebuttal response.
196	Miya Evans (Mesabi Nugget)	15.3, 4	MPCA arbitrarily discounted the only research on this topic and proceeded as though its data supported nothing but a year-round standard, with the calculated effects of a summer discharge being treated just like a sulfate discharge in the dead of winter. In 2013 DeRocher and Johnson provided research to MPCA showing significant temperature-dependent differences in the rate of sulfide creation in sediment. Their sediment incubation study indicates that in cold water, additions of sulfate take several weeks to show any increased porewater sulfide, and then it takes only a few weeks to go back to previous sulfide levels once the sulfate additions have ended.	This comment is addressed in MPCA's detailed rebuttal response.
197	Miya Evans (Mesabi Nugget)		MPCA should acknowledge that the protections afforded by Minn. Stat. §14.127 (effect on small businesses) apply to Mesabi.	This comment is addressed in MPCA's detailed rebuttal response.

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198	Miya Evans (Mesabi Nugget)		Mesabi provides Exhibit A- Second Creek study,Exhibit B-sampling results, Exhibit C comments as of 12/17/15,Comments as of 9/19/15	Statement. No response required
199	John Paulson	34	suggest alternative approach of collaboratively drafting a state wild rice management plan with tribal interests, industry, natura resource agency, and municpalities. "reasonable alternatives" do exist to protec and enhance wild rice habitat better than the proposed regulation.	Comments related to alternatives were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. E. (pg. 11)
200	John Paulson	35	the nutritional value of sulfate is not clarified nor fully vetted through scientific support.	This topic is outside the scope of this rulemaking. 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.
201	John Paulson	2	wild rice is naturally adapted to grow in the sediment within the naturally occurring sulfide zone.	Statement. No response required
202	John Paulson	2.5	sulfide occurs naturally when there is no oxygen. Wild rice stems do not exist where there is no oxygen. The MPCA study forces the plant into unnatural conditions that don't exist in the real world.	MPCA disagrees with this statement, and has presented evidence throughout the SONAR, TSD and responses to comments that NMPCA's proposed approach is protective of the wild rice beneficial use.
203	John Paulson		citations to the SONAR where uncertainty is expressed. "if the MPCA's supoprting science is profoundly uncertain the regulation should be exercised with greater caution.	This comment seems to mix up the uncertainty in the scientific assessment of sulfate, sulfide and wild rice with the uncertainty in the economic analysis of the benefits of the proposed regulation. The comment quotes the portions of the SONAR (on pages 189 and 190) that indicate the defficiency of a fixed standard and why a standard that takes into account the conditions of each waterbody is more effective. The remainder of the references to "uncertainty" in the SONAR in this comment (pages 192-194) are about the uncertainty in ascribing an economic value to the benefits of the proposed regulation or to wild rice in general. These latter mentions of uncertainty are not about the science supporting the proposed regulation.
204	John Paulson	21	the "priceless" position is untenable and unreasonable.	The comment points out that the benefits of wild rice may be considered "infinity" or "priceless" (at least to some stakeholders), and then seems to conlude that "the costs of the regulation would also be valued as infinite." The SONAR does not take the position that the benefits of wild rice are "priceless" or "infinite." Rather, it points out that in a general sense, that some people see the value of nature as infinite or priceless, which is something that can make putting natural benefits into monetary values more challenging. The SONAR does project more defined and finite projections of the costs to implement the proposed regulation. It is not clear why the commenter contends that pointing out that the value of nature could be infinite to some people leads to the conclusion that the costs of this regulation would also have infinite value.
205	John Paulson		question about the use of Advisory Group input.	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments.
206	John Paulson	4	the MPCA puts too much weight on the current study compared to other research/literature	MPCA made extensive use of available literature, as demonstrated by the citations in the TSD, SONAR and MPCA Hearing Exhibits.
207	John Paulson	38	where in the SONAR does the MPCA actually justify its statement that there have been wild rice losses?	the sentence referred to on SONAR pg. 190 is "*there are also concerns… about the populations that have borne costs or received benfits up to this point- with limited implementation of the existing standard* ***and a sense by many that wild rice waters have been lost over the years.*** .. " This is a statement about the perceived consequences of the proposed standard. The sentence is not a statement by the MPCA that wild rice waters have been lost, but instead only identifies the fact that some people consider that wild rice waters have been lost.
208	John Paulson	38	similar statement as above about "loss of benefits" of not adopting the proposed standard. Commenter questions whether there is evidence of actual declines where the proposed sulfate standard has been exceeded.	Comments related to actual decline of wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. B.a. (pg. 6)

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209	John Paulson	19, 31	…If we are, for all practical purposes, maxed out in numbers of ricers, the MPCA can't increase human beneficial use to the valuation.	The comment suggests that if we are maxed out on the number of ricers, then there is no benefit to more wild rice, because it will not lead to more ricers. This is incorrect. There is a benefit of harvestable wild rice regardless of how many ricers there are. Whether protection of wild rice leads to more ricers, the same number of ricers harvesing more wild rice, or the same number of ricers harvesting the same amount of wild rice but with less effort, in either case there is a benefit to increased harvestable wild rice. Moreover, as the SONAR made clear, the provisioning benefit (i.e., harvest of wild rice) is just one of the numerous benefits that wild rice provides.
210	John Paulson	19, 31	additional comments about the value of ricing…request to define "potentially harvestable wild rice stands. (Comment #9)	This is outside the scope of this rulemaking. See also MPCA's responses to comments about the beneficial use in the 11/22/17 response to Comments and detailed rebuttal response.
211	John Paulson	19, 31	the value of wild ricing is greatly overshadowed by the projected costs. "This is a terrible imbalance in cost-to-benefit ratio….The MPCA estimated costs should disqualify this regulation on the grounds of being economically unreasonable compared to the benefit.	The SONAR did not show that the projected value of the benefits of the proposed regulation are exceeded by the projected costs. The SONAR did not attempt to tabulate all the benefits if the proposed regulation and compare the total to the projected costs of the regulation. If the commenter is solely referring to provisioning benefits (i.e., harvest of wild rice), whose value the MPCA did attempt to estimate, then he is right that this value is exceeded by the projected costs. However, as the SONAR makes clear, there are numerous other benefits of protecting wild rice besides the provisioning benefit.
212	Katherine Marko (U.S.EPA)	33	These proposed rules are a significant advance in the science of wild rice protection and EPA strongly supports MPCA's work.	MPCA appreciates EPA's acknowledgment and support.
213		32	suggest revision of the definition of wild rice water to remove reference to Minn. Laws 2011 on the basis that is it is unclear.	See proposed revisions to the rules (detailed rebuttal response)
214	Katherine Marko (U.S.EPA)	34	suggest revising the tables in 7050.0220 to include Class 4D	The MPCA will discuss the feasibility of this change with the Revisor of Statutes
215	Katherine Marko (U.S.EPA)	34	suggest removing the phrase "4D when applicable to a wild rice water listed in part 7050.0471." on the basis that it is superfluous.	See proposed revisions to the rules
216	Katherine Marko (U.S.EPA)	34	suggest removing the phrase "used as a guide."	This part of the rule is not under consideration in this rulemaking. The suggested change will be addressed in a future rulemaking.
217	Katherine Marko (U.S.EPA)	34	suggest clarification of the information that will be maintained on the website and that the MPCA identify the frequency of updates to the website.	MPCA agrees that the information should be provided on the website and will design the website accordingly. MPCA anticipates updating the website at least annually.
218	Katherine Marko (U.S.EPA)	34	suggest the addition of "surface water."	See proposed revisions to the rules (detailed rebuttal response)
219	Katherine Marko (U.S.EPA)	33	Based on the information provided by Minnesota as part of the public notice for these rules, the proposed criterion appears to be scientifically defensible and protective of the wild rice use.	MPCA appreciates EPA's acknowledgment and support.
220	Katherine Marko (U.S.EPA)		EPA recommends that potential input parameter values to the equation be constrained to reflect the range of concentrations observed in the studies upon which the equation is based.	See proposed revisions to the rules (detailed rebuttal response)
221	Katherine Marko (U.S.EPA)	34	suggest eliminating the reference to the sampling and analysis document incorporated by reference and instead require the determination of carbon in a manner consistent with the document identified in item E.	See proposed revisions to the rules (detailed rebuttal response)
222	Katherine Marko (U.S.EPA)	34	questions regarding how the alternate standard will be determined. Suggest the addition of detail "to ensure predictable, repeatable outcomes" and appropriate safeguards.	See proposed revisions to the rules (detailed rebuttal response)

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223	Katherine Marko (U.S.EPA)	34	for the alternate standard suggest addition of reference to the EPA approval process	See proposed revisions to the rules (detailed rebuttal response)
224	Katherine Marko (U.S.EPA)	34	suggest for the site specific standard addition of reference to the EPA approval process	MPCA agrees that a site-specific standard must be adopted following the requirements of the Clean water Act and submitted to EPA. However, MPCA feels it is redundant to include in this rule language that is already in effect elsewhere and applies regardless of a reference here.
225	Katherine Marko (U.S.EPA)	34	suggest clarification of the site- specific standard to address 365Q10 issues	MPCA agrees that clarification would be helpful but will address this in the future in a separate rulemaking addressing site-specific standards more comprehensively.
226	Katherine Marko (U.S.EPA)	34, 16	raises concerns about how to address "unforseen technical issues" within the limits of the sampling and analysis document incorporated by reference. Suggests language to address that concern.	See proposed revisions to the rules (detailed rebuttal response)
227	Katherine Marko (U.S.EPA)	11.1	Identifies limitations to EPA approval to waterbodies that are not within Indian Country.	Statement. No response necessary
228	Katherine Marko (U.S.EPA)		Comments regarding additional information that would facilitate future triennial reviews.	MPCA agrees that additional detail would facilitate triennial reviews, and will include additional context/detail in the triennial review notices. See also proposed rule revisions regarding this subp.
229	Katherine Marko (U.S.EPA)	9	Support for effort to clarify the use and identify specific waters; comments regarding splitting WIDs	MPCA appreciates EPA's support of our efforts to clarify the beneficial use and specifically identify waters where the use applies. MPCA acknowledges that a use and value demonstration and rulemaking will be needed if, in splitting a WID, MPCA does not carry the wild rice water identification forward to all of the new WID segments that comprised a WID previously identified as a wild rice water.
230	Katherine Marko (U.S.EPA)	17	suggest removal of the provision allowing the commissioner to make a determination that "no reasonable potential" exists to impair the beneficial use	removing this provision was proposed in the MPCA's in 11/22/17 Response to Comments.
231	Katherine Marko (U.S.EPA)	18	context regarding variances and recommend the addition of clarifying language.	MPCA acknowledges and appreciates the information EPA provides about variances and EPA's commitment work with MPCA to ensure any potential water quality standards variance from the sulfate standard would be consistent with federal rules. MPCA addressed the comment about clarifying language in the 11/22/17 Response to Comments.
232	Katherine Marko (U.S.EPA)	16	Appendix 1 to comment letter-Technical comments on Minnesota's Sampling and Analytical Methods for Wild Rice Waters	MPCA will consider these comments as it updates the methods document. MPCA anticipates developing a detailed Standard Operating Procedure for sampling that will address many of these suggestions. See also proposed revisions to the rule parts regarding the methods document incorporated by reference.
233	Katherine Marko (U.S.EPA)		Appendix 2 to comment letter-Recommendations regarding NPDES implementation considerations pertaining to the wild rice sulfate criterion	MPCA will comply with all federal requirements, including 40 CFR 122 provisions, when implementing the wild rice sulfate standard. MPCA appreciates EPA sharing considerations regarding NPDES implementation, and welcomes further dialogue with EPA about NPDES implementation.
234	Meghan Blair	3.7	extensive comments regarding the effect of groundwater.	Comments related to ground water issues were addressed in MPCA's 11/22/17 Response to Comments (3.7 of Attachment 1 (pg. 4)
235	Emily Haley (Friends of the Boundary Waters)	3.1	keep the 10 mg/L standard	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)
236	Emily Haley (Friends of the Boundary Waters)		support protection of wild rice	statement- no response required
237	Emily Haley (Friends of the Boundary Waters)	3.4, 15.1	equation is too complicated	Comments about implementation issues were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. D (pg. 10) and Attachment 2)
238	Emily Haley (Friends of the Boundary Waters)	4.2	equation ignores ongoing scientific studies and the opinions of the peer review panel.	This comment is addressed in MPCA's detailed rebuttal response and the MCPA's 11/22/17 Response to Comments (Cover memo III. A).
239	Emily Haley (Friends of the Boundary Waters)	4.2	peer review panel confirmed that the existing standard is scientifically valid.	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)

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240	Emily Haley (Friends of the Boundary Waters)	7, 14	a site-specific standard will be used primarily to continue the lack of enforcement	MPCA disagrees with this statement.
241	Emily Haley (Friends of the Boundary Waters)	10	object to limiting the standard to identified wild rice waters	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)
242	Emily Haley (Friends of the Boundary Waters)	10	List is not complete	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)
243	Emily Haley (Friends of the Boundary Waters)	28	mercury methylation	comments about methyl mercury were addressed in MPCA's 11/22/17 Response to Comments (28 of Attachment 1 (pg. 21))
244	John Coleman (GLIFWC)	14	primary concern is enforcement of the existing 10 mg/L standard.	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)
245	John Coleman (GLIFWC)	15.1	the proposed new standard is overly complicated, based on highly variable data and has unrealistic implementation requirements.	Comments about implementation issues were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. D (pg. 10) and Attachment 2)
246	John Coleman (GLIFWC)	4.3	EC10 based on logistic regression of pore water sulfide vs. rice presence.- While the general approach taken by the MPCA has merit, the analysis is hampered by the small data set and the large overlap in pore-water-sulfide concentration between waters with and waters without rice. The overlap of the data sets can be seen in Figure 1-4 and A7-2 a. and b of the Final Technical Support Document (FTSD). One can see that the waters with rice present (y-axis =1.00) have a very similar distribution along the sulfide concentration axis (x-axis) as waters with rice absent (y=0).These data sets (waters with rice present and waters with rice absent) have been plotted as overlapping histograms (Figure 1) to illustrate their similarity. While there are differences, the variability of the data obscures that difference. The main difference in the distributions is the heavier tail at high sulfide concentrations for those waters without rice, and a heaver tail at low sulfide concentrations for waters with wild rice. The extensive overlap of the distributions generates a lot of uncertainty as to the location of the EC10. That uncertainty is reflected in the 95% confidence interval around the MPCA's preferred EC10 estimate of 93 ug/L (95% CI = 14 to 239 ug/L).	This comment is addressed in MPCA’s detailed rebuttal response.
247	John Coleman (GLIFWC)	4.3	These data sets (waters with rice present and waters with rice absent) have been plotted as overlapping histograms (Figure 1) to illustrate their similarity. While there are differences, the variability of the data obscures that difference. The main difference in the distributions is the heavier tail at high sulfide concentrations for those waters without rice, and a heaver tail at low sulfide concentrations for waters with wild rice. The extensive overlap of the distributions generates a lot of uncertainty as to the location of the EC10. That uncertainty is reflected in the 95% confidence interval around the MPCA's preferred EC10 estimate of 93 ug/L (95% CI = 14 to 239 ug/L).	This comment is addressed in MPCA’s detailed rebuttal response.
248	John Coleman (GLIFWC)	4.3	Visual examination of proportion of waterbodies with wild rice present.- The graphical method used to identify 120 ug/L of pore water sulfide as the "protective concentration" is conceptually flawed and can not be used to identify a change in response of rice to sulfide concentration. The "dip" at 120 ug/L of sulfide, identified in Figure 1-5 of the FTSD and Figure A7-3 of Appendix 7 of the FTSD, is an artifact of the number of samples with a concentration near 120 ug/L. The dip does not represent a response of rice to sulfide. The problem with the graphical method used by the MPCA is that the height of the curve on the y-axis is dependent on the density of samples at a particular sulfide concentration. As one moves right on the x-axis (increasing sulfide), the sample size (n) for calculating the percentage (y) changes. In some regions of sulfide concentration, the sample size changes rapidly, causing a drop in proportio (percentage) on the y-axis.	This comment is addressed in MPCA’s detailed rebuttal response.

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249	John Coleman (GLIFWC)	4.3, 2.4	Changing either the numerator (number of lakes with rice) or the denominator changes the proportion of lakes with rice present. A "dip" in the plot of the proportion of waterbodies with rice vs. sulfide concentration can be created without any change in rice response to sulfide. In an artificial data set, Figure 2 below, the general negative slope of the curve is caused by the single "rice-absent" value at high sulfide concentration. The "dip" in the curve at 120 ug/L is caused by the multiple samples near a sulfide concentration of 120 ug/L. The "dip" is an artifact of the plotting method used in the FSTD....The visual graphical analysis presented in the FTSD does not support any particular pore water sulfide concentration as being "protective" but simply reflects that there is a high density of samples near 120 ug/L. The theoretical basis for this conclusion, that the shape of the curve is dependent on sample density and not necessarily on rice response to sulfide,is described in Appendix A.	This comment is addressed in MPCA's detailed rebuttal response.
250	John Coleman (GLIFWC)	4.3	Change-point analysis based on rice density.-There is little information in the FTSD on the MPCA methods used to conduct change-point analysis to identify a change in rice stem density in relation to pore-water sulfide concentrations. However, with the assistance of MPCA staff, we were able torecreate the analysis using the R statistical software and the MPCA Class B data set. Using both the ChangePoint and stepR packages of R on a subset of the Class B data that contained only those waterbodies where rice stem density was greater than zero, we were able to also identify 112 ug/L porewater sulfide as a concentration above which mean stem density dropped. However, with neither package were we able to recreate the 95% confidence interval of 25 to 368 ug/L sulfide around the change-point estimate. The MPCA method for generation of confidence intervals around the changepointestimate was unclear.	The MPCA has discussed changepoint analysis in both the initial and this rebuttal response to comments.
251	John Coleman (GLIFWC)	2.7	MPCA chose to present results for the change-point analysis on the data set that only included water bodies where stem density was greater than zero. However, there could be an argument made that water bodies with stem densities of zero should be included in the analysis.	The MPCA has discussed changepoint analysis in both the initial and this rebuttal response to comments.
252	John Coleman (GLIFWC)	4.3, 2.7	While change-point analysis appears to be a somewhat objective way of identifying the point at which the mean rice stem density changes in response to sulfide concentration, there is a lot of uncertainty around the estimate, as reflected in the wide confidence interval identified by MPCA in theFTSD (25 - 368 ug/L sulfide). The method is also sensitive to the data set used.	The MPCA has discussed changepoint analysis in both the initial and this rebuttal response to comments.
253	John Coleman (GLIFWC)	4.3, 2.7	Because the field survey data used by the MPCA was not collected in a systematic way, it is unclear how representative the data sets are. Furthermore, these field survey data sets, which were used to identify a "protective" level of sulfide for wild rice, generate results with a high degree of uncertainty, and do not clearly separate waters with and without wild rice based on sulfide concentration. The method using visual identification of a graphical "dip" to identify the "protective" level is conceptually flawed and the two other methods generate substantially different estimates depending on the data subset used. A stronger field survey data set, based on a statistically valid sampling plan, is needed to identify the level of sulfide that is protective of wild rice.	This comment is addressed in MPCA's detailed rebuttal response.
254	John Coleman (GLIFWC)	27	...there is evidence that after iron and sulfide bond in the sediment the chemical byproduct can attach to the roots of the rice plant with negative effects….How does the standard account for this possibility?	This comment is addressed in MPCA's detailed rebuttal response.

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255	John Coleman (GLIFWC)	16	Of particular note is that the proposed regulatory framework (sampling procedures) does not include collection of any additional data to strengthen or clarify the relationships hypothesized in the proposal. Rice stem density, water transparency and other data found to affect rice presence or density must be collected during rice water evaluation so that the currently weak predictive relationships can be improved. Although hard to discern, it appears that the proposed procedure would require 5 composite sediment samples and 10 pore-water samples per water body. Beyond habitat type and locational information, the parameters to be collected appear to be limited to sediment TOC, TEFe and pore-water sulfide. Measures of rice health should also be collected, such as rice stem density.	This comment is addressed in MPCA's detailed rebuttal response.
256	John Coleman (GLIFWC)	16	MPCA data from the Twin Lakes, a small to moderate sized waterbody, shows high spatial variability in iron and TOC in its sediments. Given this variability, how were 5 composites determined to be adequate? There is no rationale given to support the number of sample areas. If there is a reason for delineating 5 sample areas and transects, this reasoning should be provided.	This comment is addressed in MPCA's detailed rebuttal response.
257	John Coleman (GLIFWC)	16	The sampling plans appear to assume that sediment chemistry does not change over a period of years. Inter-annual changes in sediment iron, TOC and sulfide must be further investigated to determine how often re-sampling of a waterbody needs to be conducted.	This comment is addressed in MPCA's detailed rebuttal response.
258	John Coleman (GLIFWC)	16.2	Porewater sampling and analytical method for the determination of sulfide.- The procedures do not make it clear how the porewater sampling effort can occur in conjunction with the sediment core sampling. The document states that the sediment sampling must be done before the porewater sampling. It then states that the porewater sampling must be done no later than 4 hours after the sediment cores are taken. Given that the sediment sampling is done first, how will the MPCA determine what is an undisturbed sediment for the purpose of porewater sampling?	This comment is addressed in MPCA's detailed rebuttal response.
259	John Coleman (GLIFWC)	16	Quality assurance.- The sampling document does not include information on field quality assurance andquality control procedures for sediment or porewater sampling. For example, the sampling plan should include information on field duplicate or split sample collection to allow the detection of contaminatedsamples. In addition, are clean sampling techniques required for this type of data collection? A fullQuality Assurance Project Plan (QAPP) should be developed.	This comment is addressed in MPCA's detailed rebuttal response.
260	John Coleman (GLIFWC)		attachment of "Percentage Lakes with Rice"	No response necessary.
261	Jane Reyer (Friends of the Boundary Waters)	14	In light of the Minnesota Pollution Control Agency (MPCA)'s failure to enforce the current standard over a period of forty years, we believe that making the standard more complicated will result in more delay.	Comments about implementation issues were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. D (pg. 10) and Attachment 2)
262	Jane Reyer (Friends of the Boundary Waters)	10	The limitation of the standard to listed waters may leave some historic wild rice waters unprotected, in violation of the federal Clean Water Act.	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)
263	Jane Reyer (Friends of the Boundary Waters)	3.5	Perhaps for that reason, it appears from the evidence that the target sulfide level of 120 ug/L will not be protective of about ten percent of wild rice waters.	This comment is addressed in MPCA's detailed rebuttal response.
264	Jane Reyer (Friends of the Boundary Waters)	28	we find it unconscionable that MPCA is proposing a standard that may as a practical matter result in higher mercury levels in fish in some lakes and rivers.	Comments about methyl mercury were addressed in MPCA's 11/22/17 Response to Comments (28 of Attachment 1 (pg. 21))
265	Jane Reyer (Friends of the Boundary Waters)	3.1	While the current 10 mg/L sulfate standard may not be ideal, both MPCA and the 2014 Peer Review Panel looked at the evidence and affirmed that it provides a sufficient fit to the data to be defensible as a water quality standard. It is also the standard that is currently in place and that must be enforced unless and until another standard is promulgated by MPCA and approved by the U.S. Environmental Protection Agency.	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)

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266	Jane Reyer (Friends of the Boundary Waters)	14.1	the proposal to eliminate the 10 mg/L standard to be slowly replaced by case-by-case standards based on an equation runs afoul of the Clean Water Act because it will leave most if not all wild rice waters without a standard for some length of time. Our Friends of the Boundary Waters Wilderness is a 501(c)3 organization. Your donation is tax deductible to the fullest extent allowed by law. I understanding is that once this rule is finalized, no standard will apply at any water body until MPCA does the field work and applies the equation to its data.	Comments about implementation issues were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. D (pg. 10) and Attachment 2)
267	Jane Reyer (Friends of the Boundary Waters)		The Clean Water Act takes discretion away from state legislatures and agencies to simply do away with water quality standards if they find them inconvenient. While the State of Minnesota may not have been required to set a numeric standard to protect wild rice in the first place, now that it has done so it cannot go back to having no standard without a showing that no standard is needed to protect wild rice. This is precisely what MPCA's proposal will do, for at least an interim period for each water body.	See MPCA's 11/22/17 Response to Comments.
268	Jane Reyer (Friends of the Boundary Waters)	20, 32	The legislature controls MPCA's purse strings. MPCA is currently following the legislative directive not to enforce the sulfate standard, despite clear knowledge that to do so violates federal law. Under MPCA's new scheme, it appears that all the legislature would need to do to eliminate the sulfate standard as a practical matter is forbid MPCA from using state funds to gather the necessary data.	See MPCA's 11/22/17 Response to Comments.
269	Jane Reyer (Friends of the Boundary Waters)	14.2	In addition to a state legislature that is intent on finding a way around the federal Clean Water Act, we have an agency that has been paralyzed by its inability to enforce the current 10 mg/L standard. In light of this history, it simply is not reasonable to believe that the case-by-case equation proposed by MPCA will as a practical matter result in the limitation of sulfate to the degree necessary to protect and restore wild rice.	Comments about implementation issues were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. D (pg. 10) and Attachment 2)
270	Jane Reyer (Friends of the Boundary Waters)	10.1	Under the Clean Water Act, existing uses of all water bodies under federal jurisdiction must be protected from pollution from point source discharges. 40 C.F.R. § 131.12(a)(1). States do not have the discretion to limit protection to water bodies that have been specifically listed, if a use is in fact currently being met or has been met at some point since 1975. MPCA has proposed a list of wild rice waters that omits many water bodies despite evidence that wild rice grows or has grown in them.	This comment is addressed in MPCA's detailed rebuttal response.
271	Jane Reyer (Friends of the Boundary Waters)	10.1	Friends believes that many waterbodies were left off the list that should be included; we support including all water bodies included on lists prepared by the Minnesota Department of Natural Resources and by tribal resource agencies.	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)
272	Jane Reyer (Friends of the Boundary Waters)		Regardless of the water bodies that appear on the list, however, pursuant to 40 C.F.R. section 131.12(a)(1) we expect MPCA to continue requiring wild rice surveys of potentially impacted waters, including a search for evidence of the presence of wild rice in the past, in all NPDES/SDS permit proceedings. If wild rice proves to be an "existing use" of those waters, the Clean Water Act requires their protection.	statement- no response required
273	Jane Reyer (Friends of the Boundary Waters)	3	MPCA seems to have focused on these two issues at the expense of other issues that are also important. Many of those issues were encompassed by Dr. Susan Galatowich's admonishment that in order to know that wild rice will thrive over time, you cannot rely on data from a single growing season. As an annual plant, many things may affect the viability of wild rice that will not be reflected simply by the sulfide level in pore water, and those things may themselves be related to variables in the equation.	Comments about the other factors that influence wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. B. c. (pg. 7))

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274	Jane Reyer (Friends of the Boundary Waters)	27	The most obvious of these is the work that Dr. John Pastor is doing to examine the effects of iron precipitate and the resulting root plaque where iron is a significant factor in the standard equation. The effects would be seen as a declining wild rice crop over the years, rather than as a loss in plant weight or growth or a simple present/not present dichotomy. If a high iron level in sediments leads MPCA to allow a significant increase in sulfate, the ensuing increase in iron precipitation may result in the decline (and eventual elimination or severe degradation) in wild rice in that water body. Going ahead with the proposed standard without understanding the role of iron precipitation is not a reasonable way to proceed if the goal is actually to protect wild rice.	This comment is addressed in MPCA's detailed rebuttal response.
275	Jane Reyer (Friends of the Boundary Waters)	3.5	PCA presents several lines of evidence to show that 120 ug/l is sufficiently protective to ensure that wild rice will not be harmed by sulfate discharges when sulfide remains below that level. Some of these lines of evidence indicate that ninety percent of wild rice plants do not show a noticeable impact when subjected to various sulfide levels at or near 120 ug/l. This might be a proper application of the "EC10" level of protection if it also took account of impacts of regeneration over many growing seasons. However, MPCA also applies an "EC10" level of protection to wild rice water bodies. According to MPCA, the evidence indicates that wild rice stands in ninety percent of wild rice water bodies are not significantly impacted by pore water sulfide levels below 120 ug/l. See Technical Support Document, pp. 31-39. In other words, under MPCA's proposed rule, wild rice would be allowed to become degraded or to disappear in ten percent of wild rice waters. This is not acceptable, either as a practical matter or pursuant to the Clean Water Act.	This comment is addressed in MPCA's detailed rebuttal response.
276	Jane Reyer (Friends of the Boundary Waters)	28	Sulfate is a pollutant that is implicated not only in the decline of aquatic plants like wild rice due to sulfide levels in sediment pore water, but also in the methylation of mercury that results in high mercury levels in fish tissue. This is a critical public health issue in Northeastern Minnesota, where one out of tenbabies are born with enough mercury in their blood to affect neurological development. Allowing increases in sulfate in waters that support fishing is not only unreasonable, but unconscionable.	Comments about methyl mercury were addressed in MPCA's 11/22/17 Response to Comments (28 of Attachment 1 (pg. 21))
277	Jane Reyer (Friends of the Boundary Waters)	28	The potential for additional methylation of mercury due to increased sulfate is not ameliorated by the presence of iron. Therefore, in systems where the new standard would allow an increase in sulfate the outcome is likely to be increased mercury in fish tissue, and thus in human fetuses and children. We recognize that the 10 mg/l sulfate standard was designed to protect wild rice, and that the current effort is focused only on that use. But the practical impact of the change may be to make waters less "fishable," a use of high priority that must be protected under the Clean Water Act.	Comments about methyl mercury were addressed in MPCA's 11/22/17 Response to Comments (28 of Attachment 1 (pg. 21))
278	Barb Ulschmid (New Prague)	4.3	based on overconservative assumptions and incomplete analysis	This comment is addressed in MPCA's detailed rebuttal response.
279	Barb Ulschmid (New Prague)	15.3, 15.4	concerned that the magnitude, duration and frequency are overly conservative and the science supports less restrictive criteria.	This comment is addressed in MPCA's detailed rebuttal response.
280	Barb Ulschmid (New Prague)	19	costs	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)
281	Barb Ulschmid (New Prague)	18	availability of variances does not make over conservative 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.
282	Barb Ulschmid (New Prague)	18.4	object to use of the Interim Economic Guidance	The MPCA proposed to remove this incorporation by reference in the 11/22/17 Response.
283	Rachel Walker		am proud to live in a state that has taken on a task that is very complex with no clear path to resolution. This process, however, is necessary even if imperfect.	Thank you for the comment.

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284	Rachel Walker	3.1, 27	The MPCA has done a good job of organizing large, complex studies. They have hosted dozens of meetings over seven years and have sought input from a wide range of perspectives. Despite their efforts we are not there yet. We are still missing important data needed for a longer term solution that will protect wild rice. We need a better understanding of the following: a. The fate of sulfate in the water column depending on location b. The path of sulfur from water column sulfate to rooting zone sulfide depending on location c. How rooting zone sulfide is harmful to wild rice, specifically, and other aquatic life more broadly depending on location d. Whether iron plaques form on wild rice, and if so, how they impact it e. How sulfur species in the rooting zone interact with other factors and impact wild rice depending on location	The MPCA agrees that there is uncertainty, but does not find that this prevents us from setting a reasonable standard to protect wild rice from the impacts of sulfate.
285	Rachel Walker	3.4	When Dr. John Moyle was providing input to the MPCA regarding setting the initial standard of 10 mg/L, he and other scientists made judgment calls based on incomplete information. The MPCA will have to make a similar set of decisions now. They should not propose rules amending the Sulfate Water Quality Standard Applicable to Wild Rice, Minnesota Rules parts 7050.0130, 7050.0220, 7050.0224, 7050.0470, 7050.0471, 7053.0135, 7053.0205, and 7053.0406, since so doing would be based on insufficient information. While the science has come a long way, it still has a long way to go.	Comments about the protectiveness of the proposed standard were addressed in MPCA's 11/22/17 Response to Comments.
286	Rachel Walker	2.3	To protect wild rice, the following questions need to be addressed: a. What is the fate of sulfate in the water column near wild rice depending on location? b. What are the effects of other factors, such as groundwater, temperature, water level, and nutrients, to name several of the most likely, on wild rice growth over time depending on location? c. What is the relative effect of sulfate discharges on wild rice compared to other factors potentially affecting wild rice? d. And how can more traditional knowledge and wisdom about manoomin be included in these conversations? What questions have we missed because we have not adequately considered such knowledge?	The MPCA agrees that there is uncertainty, but does not find that this prevents us from setting a reasonable standard to protect wild rice from the impacts of sulfate.
287	Rachel Walker	34	I suggest a concept. After the amount of time, money and resources expended by taxpayers, as well as Tribes, companies, and individuals, rulemaking should not be an endpoint. Much expertise has been garnered. Many difficult conversations have been had. A task force, formed and adequately funded with diverse and cultural representation should be charged with addressing key unanswered questions. The ground has already been prepared. Much is at stake. This process will not be easy, as it has not been to date. We, collectively who have been part of this process, owe it to all of those living in Minnesota to make the most of this effort and reach solutions that better address unanswered questions.	Comments related to alternatives were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. E. (pg. 11)
288	Kristen Blann (Nature Conservancy)	3.1	10 mg/L is needed and reasonable	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)
289	Kristen Blann (Nature Conservancy)	3.4	The proposed shift to an equation incorporating iron concentrations is impractical and not adequately demonstrated by the science.	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)
290	Kristen Blann (Nature Conservancy)	3.1	Interactions between wetland sediments, plants such as wild rice, sulfate, and other water chemistry factors are an active area of scientific research and are not at all fully understood, particularly in actual field ecological settings of Minnesota's lakes and rivers. While the specifics of these complex interactions are not fully understood, research has shown that the existing 10 mg/L sulfate standard is reasonable and protective.	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)
291	Kristen Blann (Nature Conservancy)	21	Given the ecological, economic, and cultural significance of wild rice to Minnesota, it is incumbent on the State to continue research on and develop effective strategies for how best to protect what is left and restore the resource where possible.	This comment is addressed in MPCA's detailed rebuttal response.

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292	Kristen Blann (Nature Conservancy)	22, 3.1	Before making any changes to existing water quality standards, the state should demonstrate the full weight-of-evidence that the new standards would be fully protective of wild rice. Given the lack of baseline data to adequately assess historical declines, detect ongoing trends, or evaluate the effectiveness of the proposed model, the state should establish a comprehensive long-term monitoring program designed to understand what is needed to effectively protect wild rice. This would include establishing a thorough baseline of current and historic distribution.	The MPCA agrees that there is uncertainty, but does not find that this prevents us from setting a reasonable standard to protect wild rice from the impacts of sulfate.
293	Kristen Blann (Nature Conservancy)	2.3	In addition to clarifying protective water quality standards, the state should identify environmental flow protections designed to address threats such as sedimentation and flow alterations resulting from upstream land use, dams, water withdrawals, or other substantial watershed modifications.	Comments about the other factors that influence wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. B. c. (pg. 7))
294	Kristen Blann (Nature Conservancy)	3.1	Minnesota's 10 mg/ L sulfate standard for wild rice waters is based on peer reviewed ecological observations that, under natural conditions, wild rice is uncommon at any level of abundance in streams, rivers, and lakes that have high sulfate concentrations. The recent wild rice studies funded by MPCA provide mechanistic evidence in support of Moyle's early observations and thorough documentation of ecological relationships. These studies provide compelling evidence and insight into the mechanism by which sulfate levels impact wild rice.	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)
295	Kristen Blann (Nature Conservancy)	3.3	a recent article found that organic carbon plays an important role in regulating the interaction between sulfate and iron, yet organic carbon is not part of the proposed model.	Organic carbon is part of the model.
296	Kristen Blann (Nature Conservancy)	39	The historic loss of habitat reinforces the need for a process to designate waters that have potential for wild rice restoration.	Proposed part 7050.0471, subp.2 allows consideration of written or oral histories that demonstrate the existing use.
297	Kristen Blann (Nature Conservancy)	39	The Department of Natural Resource's 2008 report to the Minnesota Legislature on wild rice included the recommendation that the state "increase intensive natural wild rice lake management efforts and accelerate the restoration of wild rice stands within its historic range." The Conservancy supports this recommendation.	This comment is addressed in MPCA's detailed rebuttal response.
298	Kristen Blann (Nature Conservancy)	3.1, 10, 39,22	Minnesota's existing limit on sulfate pollution should be preserved and enforced year-round in all wild rice waters, without imposing additional restrictions for what constitutes a "wild rice water"	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)
299			Because of the global ecological and cultural significance of wild rice to Minnesota and the evidence that it continues to decline as a result of a variety of stressors, the Conservancy recommends a process by which a wild rice designation can be applied to waters that have restoration potential as evidenced by the historical presence of wild rice. As with currently designated "wild rice waters" these "restoration" waters would also be required to meet Minnesota's sulfate standard.	Proposed part 7050.0471, subp.2 allows consideration of written or oral histories that demonstrate the existing use.
300	Kristen Blann (Nature Conservancy)	28	there is a high level of uncertainty related to understanding the relationship between sulfate, wetland cycling, and conversion of inorganic mercury into methylmercury. Based on research on formation of methylmercury in domestic rice production, it is known that rice grain itself can bioaccumulate MeHg. Although there is no comparable research on wild rice, it is clear that a fuller understanding of methylmercury fate and transport is needed.	Comments about methyl mercury were addressed in MPCA's 11/22/17 Response to Comments (28 of Attachment 1 (pg. 21))
301	Kristen Blann (Nature Conservancy)	3.1	Given the evidence demonstrating negative impacts to wild rice from relatively low levels of sulfides, the positive correlation between sulfate in water column and sulfides in sediment, combined with the remaining uncertainties about the relationship between sulfate and methylmercury, the weight of evidence does not support changing the 10 mg/L sulfate standard.	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)

Comment ID	Commenter Name	Topic	Comment (Summary or Excerpt and Location)	Response or Response Location
302	Kristen Blann (Nature Conservancy)	15.3, 2.3	Based on the existing evidence as well as new and supporting evidence from the recently published MPCA wild rice studies, it is not appropriate to conclude that there is a seasonal period when wild rice is not "susceptible to damage" by sulfate levels higher than 10 mg/L. Not only does diffusion of sulfate from the water column and into saturated sediments continue to occur throughout the winter, bacterial reduction of sulfate to sulfide continues to occur during cold conditions at relatively high levels. Even in the most severe winters, it would be available as soon as temperatures reach the level to support sulfate reducing bacteria activity in the spring. Sulfide in many slow-moving shallow streams, wetlands, and lakes also has a long residence time. High sulfate concentrations in winter flows may be retained in wetlands, saturated sediments, and other off-channel habitats where they will remain readily available for conversion to sulfide in sediment when more favorable conditions are restored. This activity begins before and continues during the time when wild rice seeds are germinating and most vulnerable. Furthermore, ripening of natural wild rice and natural wild rice harvests extend into the fall. In many areas of Lake, Cook and St. Louis Counties, wild rice does not fully mature until early or mid-September. A "seasonal" standard that permitted high levels of sulfate discharge, particularly prior to seed maturation, could adversely impact both current harvests and future natural wild rice reproduction.	statement of support for the annual average
303	Kristen Blann (Nature Conservancy)	2.3	Wildrice is vulnerable not just to sulfates, but to any factor that significantly alters water quality, seasonal water levels, lakebed conditions, regional climate, aquatic vegetation, or the natural genetic diversity of wild rice. Changes in local hydrology are important factors in wild rice production, though poorly studied and characterized in the literature. There is a need to further understand the amount and kinds of flow alteration to establish protective criteria for wild rice during different stages of development. There is abundant observational evidence that wild rice production can be negatively impacted by flashy flows and unusually large flow events, especially those occurring early to mid-summer when the plant can be uprooted.	Comments about the other factors that influence wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. B. c. (pg. 7))
304	Kristen Blann (Nature Conservancy)		Water quality standards under the Clean Water Act are intended to be protective of designated uses. Environmental regulations are intended to protect water, land, air, and the life that depends on them, both human and other life. The purpose of those regulations should not be construed as aiming to allow for the maximum pollution possible without causing critical harm to life.	Comments about the protectiveness of the proposed standard were addressed in MPCA's 11/22/17 Response to Comments.
305	Kristen Blann (Nature Conservancy)	25, 15.1	A standard that varies by water body, which is unprecedented in Minnesota, is not grounded in sound science, and brings substantial practical challenges of implementation that may limit its effectiveness. For any given water body, sulfate levels in the water column as well as sulfide concentrations in sediments can vary significantly across space (i.e. throughout the water body) and time (i.e., seasonally, annually and long-term). Furthermore, in most cases, any particular water body is connected to other water bodies upstream and downstream, as part of the same watershed and interconnected flowages.	This comment is addressed in the MPCA's 11/22/17 Response to Comments and detailed rebuttal response.
306	Kristen Blann (Nature Conservancy)	15.1	Making measurement and enforcement more complex by introducing more water bodies and variables to monitor, interpret and enforce will further strain budgets and resources, while making it even more difficult for the public to understand the issue. This runs counter to principles of good environmental standards.	Comments about implementation issues were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. D (pg. 10) and Attachment 2)
307	Katy Lofquist (multiple letters)		same as recurring comment letter B identified in 11/22/17 Response to Comments	MPCA response provided in 11/22/17 Response to Comments

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308	Paula Maccabee (Water Legacy)		MPCA's failure to enforce Minnesota's existing wild rice standard, and the history of industry opposition and legislative interference undermine MPCA's claims that its proposed rule revisions are intended or needed to provide "effective protection" of wild rice or "clarify" its implementation	MPCA does not agree with how WaterLegacy has characterized this issue. In any event, this history is immaterial to the need for and reasonableness of this rulemaking. Comments about the protectiveness of the proposed standard were addressed in MPCA's 11/22/17 Response to Comments.
309	Paula Maccabee (Water Legacy)	3.1	MPCA's proposal to rescind Minnesota's existing water quality standard limiting sulfate to 10 milligrams per liter (mg/L) in wild rice waters is neither needed nor reasonable and is inconsistent with protecting the designated use of waters for wild rice under the Clean Water Act. H336	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)
310	Paula Maccabee (Water Legacy)	2.5	MPCA's proposal to adopt an equation that would calculate sulfate limits for each water body based on the flawed assumption that sediment iron protects wild rice from the harmful effects of sulfate conversion to sulfide would neither provide effective protection of wild rice nor clarify implementation, is neither needed nor reasonable, and is inconsistent with the requirements of the federal Clean Water Act.(a detailed discussion is provided in a later part of the letter.)	This comment is addressed in MPCA's detailed rebuttal response.
311	Paula Maccabee (Water Legacy)	10	MPCA's proposal to restrict the water bodies in which any wild rice sulfate standard would apply to an arbitrary and exclusive list would remove a designated use protected under existing Minnesota rules and de-list wild rice waters identified by Minnesota state agencies, including waters downstream of existing and potential mining discharge. Such de-listing is neither needed nor reasonable and exceeds the MPCA's delegated statutory authority under the federal Clean Water Act.(a detailed discussion is provided in a later part of the letter.)	This comment is addressed in MPCA's detailed rebuttal response.
312	Paula Maccabee (Water Legacy)	13	MPCA's proposed rule stating criteria by which wild rice waters can be added in future rulemaking is unnecessary, arbitrary and provides no benefit to those seeking to protect wild rice from sulfate pollution. (a detailed discussion is provided in a later part of the letter.)	This comment is addressed in MPCA's detailed rebuttal response.
313	Paula Maccabee (Water Legacy)	15	MPCA's proposed implementation mechanisms for its sulfate equation are biased against protection of wild rice and inconsistent with any effective implementation of water quality standards. They are neither needed nor reasonable and exceed the MPCA's delegated statutory authority under the federal Clean Water Act. (a detailed discussion is provided in a later part of the letter.)	The MPCA has demonstrated that the rule are adequately protective of wild rice.
314	Paula Maccabee (Water Legacy)	8.1	MPCA's proposal to remove protection of thousands of wild rice waters from material impairment or degradation as a result of factors other than sulfate pollution - such as hydrologic alteration - is baseless and inconsistent with the rule's history, its stated purpose, and the Clean Water Act.(a detailed discussion is provided in a later part of the letter.)	Comments about the other factors that influence wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. B. c. (pg. 7))

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315	Paula Maccabee (Water Legacy)	8.1	Although MPCA suggests otherwise in its current SONAR the Agency's post-hearing comments in the 1997 wild rice standard rulemaking did not state that the new narrative standard was applicable only to 24 Minnesota wild rice waters. The MPCA explained that the narrative standard was needed due to declines of natural wild rice throughout the State, not in a handful of listed waters and specifically referenced the threat posed by hydrologic modifications. This text is excerpted below:....The proposed amendments which specifically list 24 wild rice waters in Minn. R. 7050.0470 and the wild rice waters narrative standard in Minn. R. 7050.0224 are intended to provide a greater public awareness regarding the ecological importance of wild rice and create a regulatory basis to promote the study of.... this unique species. (pg. 51 of comment letter)	The MPCA stands by its discussion in the SONAR concerning the narrative standard.
316	Paula Maccabee (Water Legacy)		MPCA's failure to evaluate the impact of its proposed rules on eutrophication, aquatic life, methylmercury contamination of fish, and degradation of Treaty resources within tribal Ceded Territories, as compared to enforcement of Minnesota's existing rule, is unreasonable, arbitrary and inconsistent with the Clean Water Act. (a detailed discussion is provided in a later part of the letter.)	See November 22, 2017 response to comments on these issues and the rebuttal response, especially the portion on the beneficial use.
317	Paula Maccabee (Water Legacy)		requests that the following sections of the MPCA's proposed rulemaking be rejected as unnecessary to further the MPCA's stated rule objectives, arbitrary, capricious and unreasonable, and outside the scope of the Agency's delegated authority under the Clean Water Act.	The MPCA is acting within its delegated authority.
318	Paula Maccabee (Water Legacy)	15.2	Proposed rule Minn. R. 7050.0130, Subp. 2a (lines 1.6 to 1.10) and Minn. R. 7053.0135, Subp. 2a (lines 66.11-66.12) defining method to allow annual averaging of flow and make sulfate standards less stringent due to an excessive calculation of dilution.	This comment is addressed in MPCA's detailed rebuttal response.
319	Paula Maccabee (Water Legacy)	10	Proposed phrase in Minn. R. 7050.0130, Subp. 6c (line 2.3) stating "and are identified in part 7050.0471," which sets an arbitrary limit excluding "wild rice waters."	This comment is addressed in MPCA's detailed rebuttal response.
320	Paula Maccabee (Water Legacy)		Proposed deletion of Minn. R. 7050.0220, Subparts 3a (31) (lines 3.15 to 3.16), 4a (31) (lines 4.10 to 4.11), 5a (19) (lines 5.7 to 5.8), 6a (14) (lines 5.22 to 5.23) removing existing limit for sulfates of 10 mg/L where "wild rice present."	This comment is addressed in MPCA's detailed rebuttal response.
321	Paula Maccabee (Water Legacy)	3.1	remove the equation and retain the existing sulfate limit- Proposed addition to Minn. R. 7050.0220, Subparts 3a (line 3.17), 4a (line 4.12), 5a (lines 4.23 to 4.24, 5.8), 6a (line 5.24), applying the equation in proposed 7050.0224, subpart 5, to replace the sulfate limit.	This is addressed in the November 22, 2017 response and this detailed rebuttal response.
322	Paula Maccabee (Water Legacy)	10	Proposed phrase "4D when applicable to a wild rice water listed in part 7050.0471" arbitrarily limiting protection of water quality standards to certain wild rice waters in proposed rule text for Minn. R. 7050.0220, Subp. 1 (B)(1) (lines 2.19 to 2.20), (B)(2) (lines 2.22 to 2.23), (B)(3) (line 3.3), (B)(4) (line 3.5); Subp. 3a (lines 3.8 to 3.9); Subp. 4a (line 4.3); Subp. 5a (lines 4.20 to 4.21); Subp. 6a (line 5.14).	This comment is addressed in MPCA's detailed rebuttal response.
323	Paula Maccabee (Water Legacy)	8.1	narrative standard should apply to all wild rice waters-Proposed deletion of Minn. R. 7050.0224, Subp. 1 (lines 6.8 to 6.14) and proposed rule at Minn. R. 7050.0224, Subp. 6 (lines 9.13 to 9.18) arbitrarily excluding most wild rice waters so that they would not be protected from material impairment or degradation.	This comment is addressed in MPCA's detailed rebuttal response.
324	Paula Maccabee (Water Legacy)	3.1	remove the equation and retain the existing sulfate limit-Proposed deletion of Minn. R. 7050.0224, Subp. 2 (line 7.8 to 7.19) deleting fixed wild rice sulfate standard by removing the words "Sulfates (SO4) 10 mg/L, applicable to water used for the production of wild rice."	This is addressed in the November 22, 2017 response and this detailed rebuttal response.
325	Paula Maccabee (Water Legacy)	3.1	remove the equation and retain the existing sulfate limit-Proposed rule Minn. R. 7050.0224, Subp. 5 (lines 7.17 to 9.12) proposing use of an equation that would fail to protect wild rice, a rule for exceedance of standards that allows excessive pollution, implementation methods biased against the protection of wild rice, and error-prone sampling of parameters by dischargers.	This is addressed in the November 22, 2017 response and this detailed rebuttal response.
326	Paula Maccabee (Water Legacy)	13	Proposed rule Minn. R. 7050.0471, Subp. 2 (lines 11.18 to 12.6) constraining theoretical future identification of wild rice waters.	This comment is addressed in MPCA's detailed rebuttal response.

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327	Paula Maccabee (Water Legacy)	17	remove the option of no effluent limit based on site-specific conditions-Proposed rule Minn. R. 7053.0406, Subp. 1 (lines 67.6 to 67.10) biasing implementation against application of a sulfate water quality standard.	The MPCA proposed to remove this option in the 11/22/17 Response.
328	Paula Maccabee (attached expert opinions)			This comment is addressed in MPCA's detailed rebuttal response.
329	Elizabeth Wefel (Coalition of Greater Mn Cities)	33.1	existing standard should be repealed	This is addressed in the November 22, 2017 response
330	Elizabeth Wefel (Coalition of Greater Mn Cities)		Minnesota Pollution Control Agency (MPCA) has relied on assumptions and incomplete analysis. As a result, it has developed a proposed rule that offers more protection than necessary,	This comment is addressed in MPCA's detailed rebuttal response.
331	Elizabeth Wefel (Coalition of Greater Mn Cities)	15	We are concerned that the proposed criteria magnitude (EC10), duration (annual average) and exceedance frequency (once in 10 years) are all overly conservative and that the scientific data in the mesocosm study supports less restrictive criteria that will still protect wild rice.	This comment is addressed in MPCA's detailed rebuttal response.
332	Elizabeth Wefel (Coalition of Greater Mn Cities)	19.4	We are disappointed that the MPCA is moving forward with this rulemaking before the cost-impact study funded by the Legislative Citizens Commission on Minnesota Resources is complete.	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)
333	Elizabeth Wefel (Coalition of Greater Mn Cities)		MAPA requires a cost analysis in a Statement of Need and Reasonableness (SONAR), but the MPCA pays lip service to this requirement and suggests it can worry about it later.	The MPCA's cost analysis is provided in Part 10 of the SONAR (pgs.143 -218) and a discussion of costs is provided in the MPCA's 11/22/17 Response to Comments (Cover memo III. C. (pg. 8)
334	Elizabeth Wefel (Coalition of Greater Mn Cities)	31	Although the MPCA suggests it will address this cost issue through the use of variances, the potential availability of such variances does not absolve the Agency of the requirements that it develop a rule that is necessary and reasonable to protect wild rice and to perform appropriate cost analysis. Variances are not guaranteed approval by either the MPCA or the U.S.Environmental Protection Agency (EPA) and they may be challenged by third parties. Variances are not permanent; rather, they delay enforcement to a later date. Although we favor the use of variances as a method for complying with onerous regulations and applaud the proposal to waive the application fee for municipalities, variances are not a solution to incomplete rulemaking.	Although variances have not been extensively used in Minnesota, they have been an important tool over time. (See response exihibit 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.
335	Elizabeth Wefel (Coalition of Greater Mn Cities)		Interim Economic Guidance should not be included in the rule	The MPCA proposed to remove this incorporation by reference in the 11/22/17 Response.
336	Elizabeth Wefel (MESERB)		support amendment of the existing standard	Thank you for the comment.
337	Elizabeth Wefel (MESERB)	32	the Agency's proposed rule is not reasonably related to the underlying evidence and instead imposes overly conservative criteria that are not necessary to protect wild rice. In so doing, the Agency has failed to meet the requirements of the federal Clean Water Act (CWA), state law, and MAPA.	This comment is addressed in MPCA's detailed rebuttal response.
338	Elizabeth Wefel (MESERB)	3	When examining whether the standard is lawful, the question is not simply whether the organism (wild rice) is protected, but whether the standard is reasonable and necessary…."The numeric […] water quality standards in this chapter prescribe the qualities or properties of the waters of the state that are necessary for the designated public uses and benefits (emphasis added)."6 The law requires that criteria must be necessary because overprotection can have negative consequences, such as excessive costs and unintended ramifications. ..in this rulemaking, the proposed standard offers more protection than needed to protect the wild rice, which is unreasonable and should be rejected.	The MPCA has demonstrated that the rules are appropriately protective of wild rice.

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339	Elizabeth Wefel (MESERB)	15	A rule, or portions thereof, should be rejected if it fails to meet the "arbitrary and capricious test."Minnesota courts have repeatedly found that a "'searching and careful' inquiry of the record" is required "to ensure that the agency has a rational basis." The Agency has a duty to "explain on what evidence it is relying and how that evidence connects rationally with the agency's choice of action to be taken." With this rule, the MPCA has failed to meet these requirements. As demonstrated below, the Agency fails to establish a rational connection between scientific evidence and each constituent of its proposed criteria (magnitude, frequency, and duration). The result is a standard that violates the CWA and MAPA and is in excess of the Agency's statutory authority because it is more stringent than necessary to protect wild rice.	The SONAR, TSD, and responses demonstrate the rational connection between the supporting evidence and the magnitude, frequency and duration.
340	Elizabeth Wefel (MESERB)	15	There is an underlying issue with all three constituents of the proposed criteria. Throughout the SONAR, the Agency relies on field survey data as the basis for its proposed criteria.As explained in more detail by the Hall memorandum, this reliance is not appropriate because the scientific conclusions that can be drawn from this data are limited.	This comment is addressed in MPCA's detailed rebuttal response.
341	Elizabeth Wefel (MESERB)	15.4	The field survey considered whether wild rice was present or absent at a measured sulfide concentration.The observations do not inform us how long the wild rice was exposed to this concentration nor whether there are other factors present that could explain the observed condition, such as temperature fluctuations. In the SONAR, the Agency acknowledges that the density of wild rice, a self-seeding annual plant, is known to fluctuate wildly from year to year under natural conditions. While this data could be used to identify what factors, such as sulfide, pose a threat to wild rice, it is not reasonable to rely on such data to determine how much sulfide exposure wild rice can tolerate, how long of an exposure, or how often the wild rice can tolerate exposure. Because the calculation of magnitude, frequency and duration rely heavily on this field data despite these limitations, it is apparent that these criteria lack the necessary scientific underpinnings and are not reasonable.	This comment is addressed in MPCA's detailed rebuttal response.
342	Elizabeth Wefel (MESERB)	3.5	The magnitude selected by the MPCA should be rejected because it is contrary to well established EPA guidelines and is far more protective than required given the available data….In its guidelines, however, the EPA typically recommends the less stringent but still protective EC20 or EC25....The EPA recognizes that when protecting a single species, deviation from standard procedures may be needed, but not in the manner proposed by the MPCA...The EC10 level is not appropriate because it represents the "no effect" level. In other words, the appearance of a pollutant at that concentration level in a test sample would yield the same results as a control sample without the pollutant. A reasonable criterion is one that is statistically different from control tests, but not severe enough to cause adverse effects.	This comment is addressed in MPCA's detailed rebuttal response.
343	Elizabeth Wefel (MESERB)	3.5	The data developed for MPCA in the mesocosm study demonstrate how the EC10 represents a "no effect" level and is more protective than necessary to protect wild rice….The criteria should be revised, consistent with EPA's long-standing approach, using EC20 as the basis to ensure that the magnitude is not more protective than necessary.	This comment is addressed in MPCA's detailed rebuttal response.

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344	Elizabeth Wefel (MESERB)	15.3	the MPCA suggests that wild rice cannot survive if on average over the course of a year the sulfide concentration level is exceeded. This averaging period should be rejected because there is no evidence demonstrating that wild rice would suffer after a year's exposure at the proposed magnitude, while there is evidence that it can survive at a much greater exposure levels for several years....The underlying evidence from the field survey demonstrates that sulfide can harm wild rice, but it does not provide the information necessary to determine what length of exposure is necessary to harm wild rice. In other words, the field survey tells us that sulfate is harmful to wild rice after it has been converted to sulfide, but it does not tell us how long the wild rice can be exposed before it is harmed. Thus, there is not a rational relationship between the scientific evidence and the one-year duration.	This comment is addressed in MPCA's detailed rebuttal response.
345	Elizabeth Wefel (MESERB)	15.4	the mesocosm studies demonstrate wild rice can survive much longer than a year at a high exposure to sulfate. For example, sulfate was added to the wild rice in these studies, at the standard level, at four times the standard level, and at eight times the standard level and no effect was seen after one year. An effect was not seen until the third year in a sample that exposed the wild rice to sulfate at a level three times higher than the sample.When wild rice can survive at elevated levels for multiple years, it is not necessary nor reasonable to establish a one-year duration. Therefore, the one-year duration should be rejected and increased, at minimum, to a two-year duration.	This comment is addressed in MPCA's detailed rebuttal response.
346	Elizabeth Wefel (MESERB)	15.4	There is no data to support this overly conservative frequency. The Agency acknowledges that thescientific evidence is sparse to support the proposed frequency, but chooses an annual frequency because it "expects" that it will be protective...The Agency appears to ignore data from the mesocosm experiment that demonstrates how long it would take wild rice to reappear....In light of wild rice's demonstrated ability to recover in a relatively short period of time (two years in some instances), the 10-year frequency should be rejected as unnecessary in favor of a shorter exceedance return frequency such as once in three years	This comment is addressed in MPCA's detailed rebuttal response.
347	Elizabeth Wefel (MESERB)	15	Each of the three factors that make up the proposed sulfate criteria is set at a level that is more restrictive than necessary. When combined and used to determine waste load allocations for municipal wastewater treatment plants, the overprotective levels will compound and result in limits that are much higher than needed to protect wild rice.	This comment is addressed in MPCA's detailed rebuttal response.
348	Elizabeth Wefel (MESERB)		Costs	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)
349	Elizabeth Wefel (MESERB)	18	The Potential Availability of Variances Is Not a Substitute for a Valid Rule	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.
350	Elizabeth Wefel (MESERB)	31	MPCA Failed to Make a "Reasonable Effort" to Assess the Economic Impacts of the Proposed Standard on Municipalities...Although it refers to the cost elements in the SONAR, the Agency has treated cost as an afterthought, thereby violating the requirements of state and federal law.	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)

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351	Elizabeth Wefel (MESERB)		wait for the LCCMR report	Comments about the timing of the proposed rules in relation to a report on treatment costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. C. pg. 8)
352	Elizabeth Wefel (MESERB)	31	The MAPA also requires that "[t]he agency must consult with the commissioner of management and budget to help evaluate the fiscal impact and fiscal benefits of the proposed rule on units of local government."In the SONAR, however, the Agency stated that consultation would not take place until after the MPCA commissioner has approved the rules. In so doing, the Agency acknowledged that the input of MMB was not considered during the drafting of the rule.It is apparent that by providing MMB such a limited time to assist in providing the highly relevant and lawfully required evaluation of the fiscal impacts of the proposed standard on local governments—especially when the cost impacts on municipalities are of heightened concern in this rulemaking—the MPCA did not take its statutory requirements seriously. Indeed, it appears that MPCA's late request for assistance from MMB negatively impacted the substance of MMB's evaluation.	Minn. State. § 14.131 does not specify when the consultation with Management and Budget must occur. On a practical basis, it is reasonable to initiate the consultation after the agency has finalized a proposal and has obtained the Governor's approval to proceed with rulemaking. The State rulemaking manual, http://www.health.state.mn.us/rules/manual/ (pg. 77) states, in section 7.4: *Get Governor's Office approval to give notice;* ***consult with MMB*** *.This is also the time for the agency to consult with the Minnesota Department of Management and Budget (MMB) to help evaluate the fiscal impact and benefits of proposed rules on local governments. Send a copy of the Governor's Office form, SONAR, and draft rules to the Executive Budget Officer (EBO)* ***for your agency to initiate the consultation with MMB*** *.*
353	Elizabeth Wefel (MESERB)	31	The Agency Failed To Put Forth a Reasonable Effort in Its Assessment of the Cumulative Effects of the Proposed Standard. In the SONAR, however, the Agency avoids this analysis. They argue that that the cumulative effects analysis is not required because "proposed revisions do not duplicate an existing rule on either a state or federal level."59 This argument lacks merit and ignores the requirement to examine the regulations "related to the specific purpose of the proposed rule."Other regulations that pertain to protecting Minnesota waters and that will also require upgrades to water infrastructure are related to the same specific purpose. By avoiding this required analysis, particularly when the Agency has access to the MMB study that addresses the cumulative effects of various water quality regulations including the wild rice standard, the Agency has failed to make a reasonable effort to assess cumulative effects.	This comment is addressed in MPCA's detailed rebuttal response.
354	Elizabeth Wefel (MESERB)		oppose incorporation of the Interim Economic Guidance	The MPCA proposed to remove this incorporation by reference in the 11/22/17 Response.
355	Elizabeth Wefel (MESERB)		We support use of this alternate formula in such situations but also urge that use of an alternate standard be expanded to situations where wild rice is thriving with porewater concentrations above 120 g/L. The TSD highlights Monongalia Lake which exhibits high wild rice density even though the porewater sulfide concentrations were above the 120 g/L level and the sulfate concentrations were 4-5 times higher than the criterion. Although a site specific standard may be allowed under the rule, the procedure for obtaining one is onerous	These situations would fall under the site-specific standard, which requires EPA approval.
356	Elizabeth Wefel (MESERB)		Sulfate does not convert to sulfide as readily in a stream as it does in a lake because streams typically have more oxygen present in comparison to lakes. This makes sense because water moves much more in a stream than in a lake and this movement adds more oxygen to the water. The Agency has acknowledged there is a difference, yet makes no adjustments for streams within the rules. Given the differences, it is not reasonable to apply the same standard to both. Any application of the rule to streams should be rejected and the Agency should be directed to analyze and develop separate criteria for streams.	This comment is addressed in MPCA's detailed rebuttal response.
357	Elizabeth Wefel (MESERB)	16	The list of areas within wild rice waters that must be sampled is overly broad. Wild rice propagates through seed. The Agency should look for more than the presence of waterlilies, other plants or areas with a certain water depth to demand testing. An upstream source of seed should also be required. Similarly, if conditions that preclude establishment of wild rice are present, such as waters that are not clear or that support a population of carp, sampling should not be required	The MPCA never claimed that the presence of water lilies identifies suitable wild rice habitat in "all instances." Rather, consistent with the statistical analysis of the field data, MPCA demonstrated (TSD, p. 8) that there is a strong statistical association in Minnesota waters between waterlilies and wild rice.

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358	Elizabeth Wefel (MESERB)		attachment of Hall and Associates report with extensive comments	These comments are addressed in MPCA's detail;ed rebuttal response.
359	Elizabeth Wefel (attachment membership list)			No response necessary.
360	Mick Huska		comments on topics previously addressed	Addressed in MPCA's 11/22/17 Response to Comments
361	Arik Forsman (BIOBY)		comments on topics previously addressed	Addressed in MPCA's 11/22/17 Response to Comments
362	Mac Bonham		comments on topics previously addressed	Addressed in MPCA's 11/22/17 Response to Comments
363	Elanne Palcich (Save our Sky blue Waters)		comments on topics previously addressed	Addressed in MPCA's 11/22/17 Response to Comments
364	Elanne Palcich (Save our Sky blue Waters)	24	This is not a Waste Water Treatment Plant problem--this is a taconite mining problem. A sulfate reduction plan should not be based upon granting variances to WWTP's. It's the history of granting variances to taconite operations that has exacerbated the sulfate problem in the first place. WWTP's should be separated out and their sulfate issues handled separately. This would prevent unnecessary opposition to enforcement of a sulfide standard that is designed to protect wild rice as a natural resource and food crop.	Comments relating to mining were addressed in MPCA's 11/22/17 Response to Comments (24 of Attachment 1. (pg. 21)
365	Elanne Palcich (Save our Sky blue Waters)	24	The enforcement of a protective wild rice standard cannot be discussed without mentioning the elephant in the room--which is the potential permitting of the first ever highly polluting sulfide mine in the state. The proposed PolyMet copper-nickel sulfide mine lies adjacent to sulfide deposits claimed by Teck Resources, Twin Metals, and Encampment--the results of which would be a massive sulfide mining district. The fact that this type of mining extracts metals that are bonded to sulfide ores should be a huge wake-up call to the MPCA, to our state legislature, and to all agencies involved in protecting our water, our health, and our environment.	Comments relating to mining were addressed in MPCA's 11/22/17 Response to Comments (24 of Attachment 1. (pg. 21)
366	George Crocker		Has the Minnesota DNR done the calculations that document the total gallons of water in each water shed where each mining industry wants to develop a project and what dollar value does the MDNR assess to a gallon of water in each specific watershed?	out of scope- no response required
367	Jamie Johnson (Jonathan Holmes Arcelor Mittal)		Remove White Lake (WID 69-0571-00) and the Lower Embarrass River (WID 04010201-577) from the proposed wild rice waters list. Redefine the Embarrass River WID to only include the Embarrass River from Embarrass Lake to Esquagama Lake.	This comment is addressed in MPCA's detailed rebuttal response.
368	Jamie Johnson (Jonathan Holmes Arcelor Mittal)		MPCA has not met the Minnesota statutory requirements (Minnesota Statutes, Sections 14.131 and 115.43) to illustrate the benefits of implementing the Proposed Rules. MPCA must directly compare economic impacts to public and private dischargers versus the economic and health benefits to wild rice, and provide sound evidence and reproducible evidence that the Proposed Rules will provide measurable benefit to wild rice.	This comment is addressed in MPCA's detailed rebuttal response.
369	Jamie Johnson (Jonathan Holmes Arcelor Mittal)		Therefore, the Proposed Rules (Minn. R. 7050.0471, Subp. 2) must be revised to read "… evidence must demonstrate …such as by showing a history of human harvest, use of the grain as food for wildlife, and by showing that a cumulative total of at least two acres of wild rice are present."	This comment was addressed in MPCA's 11/22/17 Response to Comments .
370	Jamie Johnson (Jonathan Holmes Arcelor Mittal)		Neither the existing 10 mg/L water column sulfate standard nor the 120 µg/L sulfide porewater protective levels are scientifically supported.	The SONAR, TSD, and responses demonstrate the reasonableness of the proposal.
371	Jamie Johnson (Jonathan Holmes Arcelor Mittal)		MPCA has failed to consider factors other than sulfate and porewater sulfide to protect wild rice waters. Multiple additional factors are known to affect the growth of wild rice, and a rule that addresses porewater sulfide via sulfate discharges will not protect the existing wild rice or increase wild rice acreage or health. MPCA should remand the Proposed Rules and consider other factors (e.g. water levels, invasive species, and human development) that affect the growth of wild rice.	Comments about the other factors that influence wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. B. c. (pg. 7))

Comment ID	Commenter Name	Topic	Comment (Summary or Excerpt and Location)	Response or Response Location
372	Jamie Johnson (Jonathan Holmes Arcelor Mittal)		Implementation costs impose an economic hardship that far exceed the unproven benefits of the Proposed Rules and must be considered as part of the rulemaking per Minnesota Statute Sections 14.131 and 115.43. MPCA should directly compare economic impacts to public and private dischargers versus the economic and health benefits to wild rice, and provide sound evidence that the Proposed Rules will provide measurable benefit to wild rice.	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)
373	Jamie Johnson (Jonathan Holmes Arcelor Mittal)		The proposed method in Minn. R. 7050.0224 Subp. 5 (and as incorporated by reference in Sampling and Analytical Methods for Wild Rice Waters) for analyzing porewater sulfide is not a standard method for commercial labs, not approved by the USEPA, and cannot be used on the scale necessary to implement the Proposed Rules. Furthermore, the MPCA has recommended use of a method, “SM 4500 S2- D”, not referenced in the Sampling and Analytical Methods for Wild Rice Waters and has not vetted it against the proposed method, “SM 4500 S2- E”.	This comment is addressed in MPCA's detailed rebuttal response.
374	Jamie Johnson (Jonathan Holmes Arcelor Mittal)		The proposed method in Minn. R. 7050.0224 Subp. 5B.(1)(b) (and as incorporated by reference in Sampling and Analytical Methods for Wild Rice Waters) for determining Total Extractable Iron (TEFe) in sediment is not a standard method for commercial labs, not included in SW-846, and cannot be used on the scale to implement the Proposed Rules.	This comment is addressed in MPCA's detailed rebuttal response.
375	Jamie Johnson (Jonathan Holmes Arcelor Mittal)		The Proposed Rules do not explicitly specify sampling or analytical methods and instead cite that in order to derive the proposed calculated sulfate standard, data must be collected and analyzed in accordance with the document “Sampling and Analytical Methods for Wild Rice Waters, Minnesota Pollution Control Agency (reference (7))” (7050.0224, Subp. 5.B).	This comment is addressed in MPCA's detailed rebuttal response.
376	Jamie Johnson (Jonathan Holmes Arcelor Mittal)		The proposed rules will result in widespread variance requests authorized under Minn. R. 70530.0195 which contravenes the purpose of a variance. Variances are meant to address certain dischargers who, because of their unique circumstances, cannot meet a water quality standard.	Although variances have not been extensively used in Minnesota, they have been an important tool over time. (See response exihibit 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.
377	Jamie Johnson (Jonathan Holmes Arcelor Mittal)		RO treated wastewater discharges can have potentially inadvertant toxic effect on aquatic organisms. The net effect is the degradation of the environmental performance for the receiving water while the water naturally returns to a form that is favorable to aquatic life.	Addressing toxicity concerns from reverse osmosis treated water with low dissolved solids and micronutrients is discussed on page 181 of the SONAR. The MPCA expects that minerals will need to be added back into the effluent to ensure the effluent is not toxic. Every effluent treated with reverse osmossis in MN is requried to pass a whole effluent toxicity test (WET) to ensure protection of the environment from a wide range of toxic effects which includes low mineral content.
378	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		MPCA must comply with Minn. Stat. Section 115.43. The MPCA must consider the burdern of a municipality of any tax which may result therefrom and shall take or provide for such actions as may be reasonable, feasible and practical under the circumstances.	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)
379	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		MPCA must include cost information from LCCMR study in order to fulfill the requirements in Minn. Stat. Section 14.131. The appropriation language in law clearly shows that the study results are to be used to inform the development of the standard, not just the implementation of the standard as the MPCA suggests:	Comments about the timing of the proposed rules in relation to a report on treatment costs were addressed in MPCA’s 11/22/17 Response to Comments (Cover Memo III. C. b. (pg. 9)
380	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		MPCA has not given "due consideration" and disregards to economic factors in Minn. Stat. 116.07. The SONAR is only a "general overview" and mentions costs but does not give them "due consideration". MPCA fails to provide any federal law, federal rule or case law under which it may claim to be acting when it says cost cannot be considered in water quality standard development.	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)

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381	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		The MPCA maintains that the proposed revisions are consistent with the intent of the CWA as well as reasonable interpretations of federal guidance, and meet the federal expectation that states develop state-specific water quality standards.' The MPCA also states in the SONAR that "water quality standards are based on environmental science and the CWA and case law prevents consideration of cost from being a factor in establishing the magnitude of a standard. in order to be approved at the federal level, economic effects cannot be a factor in establishing or revising the standard.' Such general statements provide no support for any assertions or conclusions regarding federal law requirements. Furthermore, MPCA's proposed rule goes far beyond simply "establishing the magnitude of a standard.' The MPCA SONAR contains no citations or analysis supporting an assertion that MPCA's rule modification are in any way required by the Clean Water Act or that any federal requirement excuses compliance with state law. The MPCA does not provide any description of the referenced "intent of the CWA." It does not provide any reference or citation to "federal guidance", much less describe the MPCA's "interpretation" of it or whether that interpretation is "reasonable,"	This comment is addressed in MPCA's detailed rebuttal response.
382	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		MPCA fails to consider feasibility and practicability. "Since MPCA failed to consider cost in this rule you cannot even test if it is practicable as the required information is not available." The MPCA must also consider practicability. MPCAs proposal is not feasible or practical because variances will likely be required in abundance.	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)
383	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		MPCA fails to assess rule alternatives. MPCA artificially limits the alternatives in the SONAR by stating that the "specific purpose of the proposed revisions is to identify wild rice waters and protect the wild rice beneficial use in those waters from the negative effect of elevated sulfide through controlling sulfate". MPCA should consider water level and other factors that could impact wild rice.	Comments about the other factors that influence wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. B. c. (pg. 7))
384	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		The MPCA SONAR fails to assess afternative methods it identified in its 1997 rulemaking related to the protection of wild rice. In the 1997 SONAR the MPCA stated that "water level fluctuation in wild rice waters has been identified as the most critical factor influencing sustained wild rice production.' The SONAR contains no significant analysis of the alternative of state regulatory actions to influence water Fevel fluctuation. MPCA properly states several times that there are other factors that impact both wild rice presence and density. However, MPCA chose to exclude those factors and inappropriately narrowed the supposed purpose of the rule to focus on sulfate and sulfide which does not meet the intent of the rule. Inclusion of the other factors would result in a more robust alternatives analysis as conducted during the 1997 rulemaking. The 1997 SONAR and related rule documents also describe significant MPCA plans to proceed with implementation of wild rice protection "best management practices" or "BMPs". For example, MPCA SONAR Exhibit 16 contains staff responses to comments on that rule. The staff references pages of the SONAR and states that "the MPCA plans to integrate voluntary wild rice best management practices (BMPs) into existing BMPs already used by state and local agencies instead of developing a stand-alone wild rice BMP document. The process by which these BMPs are developed will be an open process where input and review will be encouraged by any and all parties interested in participating in the process." The MPCA has not performed any significant analysis of that alternative method in the 2017 SONAR. In addition, due to the structure and uncertainty of the proposed rule, it is a disincentive for parties to look at conducting voluntary wild rice restoration projects as dischargers may then be subject to costly water treatment after being able to restore rice.	Comments about the other factors that influence wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. B. c. (pg. 7))

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385	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		MPCA clearly failed to properly assess alternatives to its proposed rule language related to the new Class 4D waters. Therefore, the MPCA's proposed rule language starting after "humans" on line 7.19 and through 9.12, and proposed rule language from line 9.19 and through line 67.2 should be disapproved,	Comments related to alternatives were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. E. (pg. 11)
386	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		Creation of the new Class 4D waters sub-category on lines 7.16 and through line 7.19 ending with "humans' and MPCA's proposed language in lines 9,13 and through 9.18 regarding Class 4D WR waters needs to include all factors that are directly related to the beneficial use. This includes factors such as water depth, invasive species, water temperature, and others as outlined in the TSD and SONAR as being causative. In fact, the 1997 SONAR identified water level fluctuations in wild rice waters as the most critical factor influencing sustained wild rice production. Since MPCA has not demonstrated the proposed rule meets the intent of protecting the beneficial use, a new subcategory is not needed at this time.	Comments about the other factors that influence wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. B. c. (pg. 7))
387	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		The MPCA has inappropriately discarded the work done by Fort Environmental Labs (FEL) because the result was drastically different from the other studies. On page 37 of the TSD, the MPCA states that "staff hypothesize that once the wild rice sprouts emerged into the room air, access to oxygen in the room air allowed the sprouts to internally detoxify sulfide by oxidizing it to non-toxic forms of sulfur." The MPCA staff hypothesis is flawed, since once wild rice shoots emerge from the water body sediment the emergent portions of the plant have access to oxygen, allowing sulfide detoxification, which would result in tolerance to higher levels of porewater sulfide. This is confusing as MPCA previously stated on page 5 of the TSD that a key limitation of the MPCA-sponsored study was that they were "unable to simultaneously keep roots anaerobic and shoots aerobic." The FEL study was able to simultaneously do that, and MPCA has chosen to disregard the results. Page 71 of the SONAR states that "Neither experimental design is necessarily more correct than the other design" but that is completely false. The MPCA's own Peer Review Panel recommended the changes to the Pastor study that were incorporated into the FEL study. To say that neither design is better than the other is a misrepresentation of the facts. The FEL Study was a better design, a design based on the MPCA's Peer Review Panel recommendations and published in a rigorous Scientific journal, but MPCA has disregarded the findings,The MPCA should not have eliminated the results of the FEL study based on the reasoning of the seed depth and the water depth when the effects of these factors are poorly understood. The study should have remained incorporated and indicated to the MPCA that the mechanisms of the wild rice growth are not supported by the proposed 120 g/L porewater sulfide protective level. The growth is much more complex	The MPCA reviewed the Fort study and information about it is included throughout the TSD and in the MPCA's 11/22/17 response.

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388	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		The MPCA acknowledges on page 65 of the TSD that "When an equation is developed only with data from waterbodies with wild rice, the median potential sulfate standard increases to 61 mg/L, which would allow much more porewater sulfide to develop. The effect is magnified if an equation is developed with a protective sulfide concentration of 300 g/L. If developed with all 108 sites, the median potential Sulfate standard would be 20 mg/L. But, if the equation is developed with only data from sites with wild rice, the median potential sulfate standard would be 209 mg/L (Table 1-15). Calculated sulfate standards are clearly influenced by the dataset used to develop the equation." and that "...it is evident that excluding waterbodies without wild rice would likely also exclude waterbodies that have high sulfide, which could skew the results of the regression." When incorporating all the studies, the MPCA should also ensure the appropriate data set is used in the analysis from each study, The fact that the potential Sulfate standard varies so significantly when using the full Class B dataset of 108 sites versus the smaller data set where wild rice is present indicates the relationship between the sulfide, extractable iron and organic matter is likely affected by the growth of wild rice in the sediment. This Concept should have been explored further, and the smaller dataset should have been used in the analysis as noted in the Rambol (2017) proposal.	This comment is addressed in MPCA's 11/22/17 Response to Comments and the detailed rebuttal response.
389	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		This is noted on pages 5-6 of the TSD. MPCA saw this lack of data and knowledge of chemistry on the wild rice rooting zone as an opportunity to better predict wild rice presence and absence, and then narrowly focused the proposal on developing a porewater sulfide Fimitation to protect the rice. MPCA falsely determined a sulfide concentration greater than 120 g/L begins to exhibit negative growth and reproductive effects on the wild rice. However, the MPCA has been unable to definitively state how sulfide impacts wild rice. MPCA has several theories, but none have been properly tested and wetted. How can you set a "protective" value when you do not know what mechanism, if any, is causing an issue with the resource?	This comment is addressed in MPCA's 11/22/17 Response to Comments and the detailed rebuttal response.
390	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		These are just some of the examples of water bodies having porewater sulfide concentrations over the proposed 120 g/L limit with prospering wild rice. There are too many of these examples to consider them outliers as MPCA has done. The mechanisms of wild rice growth are clearly not well understood, In the case of Monongalia Lake, there were no other variables that clearly had an impact on the wild rice proliferation. Porewater sulfide clearly did not limit growth, and there is no other variable to point to that could have created an exception or other explanation. There is strong evidence in the MPCA sponsored field-Surveys and studies to conclude that porewater sulfide may be one of the factors impacting the presence and density of wild rice, but controlling just porewater sulfide will not sufficiently protect the proposed beneficial use. It is unreasonable to establish 120 g/L as the sulfide limitation when 120 g/L clearly does not limit the health of the wild rice.	Comments relating to Lake Monongalia were addressed in MPCA's 11/22/17 Response to Comments (Attachment 2, St. Paul hearing, response to testimony of Kurt Anderson.)

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391	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		Page 120 of the TSD states the following regarding the MPCA-sponsored field survey: "Note that the uncertainty around the calculated EC10 values is relatively large, ranging from the sulfide reporting limit in the field Survey, <11 g/L to 239 g/L (Table A7-1)." On page 69 of the SONAR: "Nearly all of the lines of evidence have wide confidence intervals, but cluster towards the lower sulfide levels, This supports the MPCA's proposal to set the protective level of sulfide at 120 g/L (0.120 mg/L)." There is significant variation in the results within each study, as well as between the studies themselves. This high degree of variation does not confidently support a definitive sulfide limit from any study, Merely sharing a Common range of wide confidence intervals does not provide a reasonable basis for a new water quality standard. The lines of evidence should independently draw a more clear, definitive level of protection. Please see the Comments prepared by Michael Bock, Rambol Environ for additional information,	This comment is addressed in MPCA's 11/22/17 Response to Comments and the detailed rebuttal response.
392	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		The impact of negative effects could be evaluated on the plant germination, or on the number of viable seeds since the wild rice creates a bank of seeds in the sediment so that all seeds to do not grow in the same season (page 97 of the TSD). The absence of growth does not necessarily indicate poor health in the rice bed because of the bank, and so conclusions cannot accurately be made about future germination from one growing season. For example, on page 33 of the TSD the EC10 based on regression of percent of filled seeds (228 g/L) is higher than the EC10 based on regression of number of plant that germinated (163 g/L) in the mesocosm experiment. In several studies, both viable seeds and density were measured, both of which resulted in different percentages of growth potential. A portion of the rice seeds are intentionally filled but do not sprout as a means of protection for future growth in the event of a debilitating seasonal impact on the rice that did sprout. MPCA erroneously chose to evaluate the protective sulfide level using the germination and presence of wild rice and not the percentage of viable seeds. It is unreasonable to develop a protective level based on growth that does not indicate health.	MPCA relied on multiple lines of evidence to identify the protective sulfide concentration; those lines of evidence looked at a number of endpoints including those involving seeds. Aspects of this comment are further addressed in MPCA's 11/22/17 Response to Comments and the detailed rebuttal response.
393	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		MPCA calculated, or estimated, an EC10 minimal effect observed concentration from the hydroponic, mesocosm and field survey studies conducted. Per page 35 of the TSD "Note that the EC10 is determined by calculating the sulfide concentration associated with a 10% decrease in wild rice growth relative to the growth in the control treatments. The control growth rate is taken as the area of "no effect" observed at the lowest sulfide concentrations." Then on Page 36 of the TSD the MPCA provides estimates of the protective sulfide concentration based on the MPCA-sponsored field surveys and states, "In the absence of a flat area of the curve, MPCA defined the baseline value as the proportion of sites with wild rice for the 10 sites with the lowest sulfide concentrations (0.80, Appendix 7)." MPCA invented a way to make the data fit. This is not an actual statistical methodology and is definitely not appropriate to be used when setting a water quality standard. This was done merely out of Convenience to converge the studies to one value, and MPCA's desire to draw conclusions, where they do not exist, in order to justify the proposed porewater sulfide value,	This comment is addressed in MPCA's 11/22/17 Response to Comments and the detailed rebuttal response.

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394	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		In the mesocosm experiments, the EC10 values were calculated using linear regressions from (1) the percent filled (viable) seeds and (2) the number of plants that germinated in the spring. Page 35 of the TSD notes "Calculation of EC10 values from linear regressions (Appendix 6) yields EC10 values of 228 and 121 g/L, respectively, with relatively wide 95% confidence intervals." On Table 1-8, the EC10 95% confidence interval ranges from 0-414 g/L based on percent of filled seeds, and from 0-242 based on the germination. This is extremely wide and gives no confidence in the 120 g/L protective limit. In fact, all of the confidence intervais noted in the studies range significantly. There is too much "noise" in the data to have any confidence that a sulfide protective value will protect the beneficial use of wild rice	This comment is addressed in MPCA's 11/22/17 Response to Comments and the detailed rebuttal response.
395	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		Page 39 of the TSD states: "Not only is 120 g/L at a visual break in the proportion of sites with wild rice, but it is within the range of the most defensible estimates of protective sulfide concentrations." The MPCA cannot justify a value based on other studies. Each analysis must independently draw the same conclusion. It is not reasonable for MPCA to "eyeball" a sulfide value when statistical methods are available to more clearly delineate what is the appropriate and supported value.	A multiple lines of evidence approach does not mean that each line of evidence muust draw the same conclusion, but rather that they are supportive of each other. This comment is furether addressed in the MPCA's 11/22/17 Response to Comments and detailed rebuttal response.
396	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		Finally, MPCA States on page 128 of the TSD: "Therefore, based on presence/absence data it is not possible to determine whether the 120 g/L or 300 g/L sulfide concentration threshold is more protective." And "Since there is not a significant difference between the 120 to 300 group versus the over 300 group, it is not possible to definitely say that 300 is protective." The MPCA evaluated the odds of wild rice presence between any two sulfide concentration groups using a chiscuare test for independence. This test showed neither 120 g/l nor 300 g/L is protective. A definitive break-point in the data is not apparent using visual or statistical analysis. MPCA chose 120 g/L as a point in which the multiple Studies overlapped their large Confidence intervals. An independent evaluation of the tests does not converge at 120 g/L. MPCA did not perform a thorough analysis and therefore 120 g/L porewater sulfide as the basis for a water quality standard for wild rice waters is unreasonable as a protective concentration. The MPCA has adopted 120 g/L as a supposedly supported value, but the poor statistics, data variability, limited data set, and other factors that affect wild rice growth and presence do not support a porewater sulfide limit of 120 pg/.	This comment is addressed in MPCA's 11/22/17 Response to Comments and the detailed rebuttal response.

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397	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		Page 43 TSD states: "In the case of the MPCA field survey, it is reasonable to assume that most of the 108 different sites have experienced no significant change in average surface water sulfate or sediment concentrations of TOC, iron, or sulfide. Monthly sampling at 15 different wild rice waters showed no significant change in TOC, iron or porewater sulfide from June through September (Myrbo et al., in press-1). But on the same page, MPCA also states "Wild rice waters are dynamic ecological systems, with continuous external loading of sulfate and iron, coupled with variable amounts of annual production of wild rice plants, followed by variable decomposition. Yet it is likely that for decades most wild rice waters have experienced relatively constant processes, such as watershed loading of nutrients and sulfate, and soil erosion that carries organic matter and iron. Sulfate concentrations do fluctuate seasonally, but the field data from the MPCA study showed the sulfide concentrations do not fluctuate to a statistically significant degree. It is likely that porewater sulfide is a function of the long-term (e.g., year or more) average sulfate concentration." These statements are contradictory. The System cannot be both dynamic as well as seasonally and annually stable. The monthly sampling at 15 waters to evaluate variability was from June through September which is just one season, and not an entire year. This data set is insufficient to make any long-term conclusions.The MPCA needs to Collect more data over time in the same water body location to determine the extent of variability more accurately,	This comment is addressed in MPCA's 11/22/17 Response to Comments and the detailed rebuttal response.
398	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		Per pages 85-86 of the TSD: "in June 2015 a pilot study was conducted to examine spatial variability in sediment TOC total organic carbon and TEFe total extractable iron found in six wild rice waters." Four rivers and two lakes each had 25 individual sediment samples (sediment cores) collected and analyzed for TOC and TEFe. As expected, the measured sediment TOC and TEFe concentrations were variable (Table 3-1). Analysis of variance performed on this data set showed significant differences ($p<0.05$) between wild rice waters, which infers the variability of sulfate values calculated within a waterbody varied less than the variability between wild rice waters." The coefficient of variation (CV%) ranged from 12-42% for mean TOC and 8-36% for mean TEFe in a waterbody. This is an unacceptable range of significant variability for developing an equation to best fit these values.	This comment is addressed in MPCA's 11/22/17 Response to Comments and the detailed rebuttal response.
399	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		Page 97 of the TSD states: "Wild rice is infamous for oscillating between low and high populations under natural conditions on a 3- to 5-year cycle (Pastor and Walker, 2006). The existence of the seed bank allows wild rice to recolonize a waterbody even ifall growing plants are eliminated by an environmental disturbance in a given year (MDNR, 2008)." It is unreasonable to develop a model and statistical analysis on a field Survey and mesocosm and hydroponic tests that did not span a five year cycle	This comment is addressed in MPCA's 11/22/17 Response to Comments.

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400	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		Page 84 of SONAR states: "The MPCA recognizes that there is great variability in wild rice waters and that the sampling method must be flexible enough to accommodate that variability but still provide the most accurate characterization of the sediment in the wild rice growing areas of each wild rice water." On page 87 of the SONAR, "The MPCA has determined that 25 cores is sufficient to capture the natural variability of both sediment organic carbon and iron given a reasonable amount of effort and resources devoted to field Collection and laboratory analysis." Collection of 25 samples is much greater than one (1). On page 91 of the SONAR "For sediment sampling, 25 core samples are required. Forporewater sampling, ten (10) porewater samples are required...", yet MPCA only collected one sediment sample of iron, organic matter and porewater sulfide when developing the equation. The Sampling method is very labor intensive and will be difficult to maintain in subsequent sampling of the 1300 water bodies, MPCA cannot support and implement their own protocol.	This comment is addressed in MPCA's 11/22/17 Response to Comments and the detailed rebuttal response.
401	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		Pages 48-49 of the TSD states: "The refined approach presented in Section E of this TSD of Calculating the sulfate standard using multiple binary logistic regression (MBLR) and the same three environmental variables produces a misclassification rate of 16% (9% false positive and 7% false negative). The MBER equation was validated by applying it to an independent data set (dataset Class V, N=47), which produced a slightly higher misclassification rate of 19%". A false positive error occurs when the ambient sulfate concentration exceeds the standard, but porewater sulfide is actually below the protective concentration of 120 g/L. False negative occurs when ambient sulfate is less than the standard, but the porewater sulfide is above the protective concentration. This is a misclassification of the Sulfide/sulfate relationship, and does not address the presence/absence relationship classification. Nearly one of every five of the surveyed waterbodies is misclassified based on the equation error rate. The error rate associated with the equation is unreasonable and extremely high,	This comment is addressed in MPCA's 11/22/17 Response to Comments and the detailed rebuttal response.
402	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		Paddy rice growers use fertilizer with sulfate because as MPCA stated, it is an essential nutrient for plant growth. Because of the implementation practices MPCA is proposing, a sulfate level of < 1 mg/L could be required. This could result in detrimental harm to plants and organisms as the water would be too clean for survival.	A discussion of why the conditions for growing paddy rice are different than the natural conditions in wild rice waters is provided in SONAR pg. 35
403	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		It is completely unreasonable to take a position that extremely conservative decisions must be made when other factors, which are being ignored, impact wild rice. To say that using the lowest value addresses the need to protect rice is not supported by any actual data. MPCA Stated Several times during the testimony hearings that lakes next to each other could have completely different iron and carbon values. However, what they fail to mention is that within a waterbody, or within a bed of rice, there could be drastically different iron and carbon levels. Taking the lowest of five values is not scientifically supported and completely unreasonable. Other regulations evaluate monitoring results and then complete a statistical analysis, such as a 95 percent upper Confidence limit (UCL). While taking the lowest value may be easier for MPCA to implement than calculating a percentile value, they have failed to provide evidence to support the need to take the owest of the five, and moreover have shown that the proposed approach is unreasonable, MPCA needs to reevaluate the determination for setting the calculated protective sulfate concentration and use a method such as the 95% UCL.	This comment is addressed in MPCA's detailed rebuttal response.

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404	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		Page 23 of the TSD states: "Interestingly, sulfate, TOC total organic carbon, and TEFe total extractable iron do not have any statistically significant effect on wild rice occurrence when considered individually...These three environmental variables only have a relationship to the occurrence of wild rice when they are Considered simultaneously, given that particular combinations of the three can produce excessive Concentrations of porewater sulfide." This is likely because the three do not have a strong definitive relationship on the wild rice health. There are too many factors contributing to wild rice health for the MPCA to focus only on two variables in a single equation that calculates one water quality standard. This is a gross simplification.	This is addressed in MPCA's 11/22/17 Response to Comments
405	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		MPCA needs to move away from forcing a sulfate-sulfide relationship to protect the rice, and determine the root cause for impacts to the beneficial use. A mechanistic model would be critical in meeting this goal.	This comment is addressed in MPCA's 11/22/17 Response to Comments and the detailed rebuttal response.
406	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		As a discharger, you are left to wonder what your limit will be, how it will be incorporated into a permit Condition and how compliance will be determined. The sulfate water quality standard should be implemented like the other water quality standards promulgated at the federal and state level. The mass balance of the discharge from the permittee and the flow rate and background concentration of the receiving water body should use the same approach for the sulfate as other pollutants. Also, MPCA does not provide any details about how the need for concentration-based limits will be demonstrated.	This comment is addressed in MPCA's 11/22/17 Response to Comments and the detailed rebuttal response.
407	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		Additionally, the MPCA has not considered how the treated discharge will impact the receiving water with respect to the constituent levels after treatment. Sulfate is a dissolved constituent and cannot selectively be removed from the other dissolved constituents, many of which are essential minerals. The potential significant reduction of dissolved minerals may cause the discharge to dissolve more minerals from the soil or sediment in the waterbody, or starve aduatic biological of the essential micronutrients for proper functioning, growth and reproduction.	Addressing toxicity concerns from reverse osmosis treated water with low dissolved solids and micronutrients is discussed on page 181 of the SONAR. The MPCA expects that minerals will need to be added back into the effluent to ensure the effluent is not toxic. Every effluent treated with reverse osmossis in MN is requried to pass a whole effluent toxicity test (WET) to ensure protection of the environment from a wide range of toxic effects which includes low mineral content.
408	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		One sample point per waterbody is not sufficient for understanding the entire waterbody and overlooks spatial and annual fluctuations. MPCA states on Page 43 of the TSD: "... the field data from the MCPA study showed that sulfide concentrations do not fluctuate to a statistically significant degree." There is no proof available to support that statement because MPCA did not follow their own guidance on collecting samples. MPCA must follow their own guidance when collecting data for a waterbody. In addition to making sure that a data collected follows their proposed sampling and analytical protocol, MPCA needs to further develop the sampling protocol with much better guidance on where to take a Sample in a bed, and how to compare data from year-to-year. Just collecting a sample in the waterbody to "check the box" for assessing the waterbody is completely unreasonable.	Development of the equation is addressed in the SONAR, TSD, and responses. MPCA will follow its Sampling and Analytical Methods when establishing a numeric sulfate standard.
409	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		Another problem with the data that was used in development of the rule, is the fact that MPCA used water lilies as a surrogate for wild rice to determine where in a waterbody to sample. In addition to water lilies not representing wild rice locations, they are also a documented competing species, MPCA acknowledges this on page 27 of the TSD	The MPCA never claimed that the presence of water lilies identifies suitable wild rice habitat in "all instances." Rather, consistent with the statistical analysis of the field data, MPCA demonstrated (TSD, p. 8) that there is a strong statistical association in Minnesota waters between waterlilies and wild rice.
410	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		If that was the case, and MPCA was purely interested in the interaction of sulfate, iron, carbon and sulfide, they also would have sampled a dataSet in the Southern part of the state which is known to have higher sulfate and lower iron, to test that theory and Corresponding interaction. It would have been reasonable for the MPCA to have a more robust data set, including higher suifate water bodies, to test the theory,	Questions about the dataset were addressed in the MPCA's 11/22/17 Response to Comments.

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411	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		Page 116 of TSD states: "There was a statistical outlier, mesocosm #29, which had a porewater sulfide of 1180 g/L but still had 53.3% of the seeds filled. The number of plants that emerged was low, Since this mesocosm had a Cook's distance of 0.6, which was twice as high as the next highest distance (Fig. A6-1), the regression was calculated without mesocosm #29." Based on the significant variability seen, this may not be an outlier. MPCA removed the data point without proper justification to bias lower.	MPCA followed established scientific practices in idenfying and removing outliers.
412	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		"Sampling and Analytical Methods for Wild Rice Waters". It is inappropriate to incorporate by reference rather than providing as rule language subject to public Comment. The document must be converted to rule language and placed on public Comment prior to finalizing a rulemaking. These requirements should be placed in the rule, and subject to public comment, not incorporated by reference. As currentiy proposed, this document is unpromulgated rulemaking.	A document incorporated by reference is subject to the same notice and public review requirements as rule language. The MPCA has made the Sampling and Analytical Methods document available through the rulemaking process and met all requirements of the Minn. Stat. ch. 14.
413	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		Basically, the alternative standard appears to be a feel-good section to allow dischargers to think they have an alternative, but after reviewing the process they would come to realize the extremely onerous and vague descriptions that are provided will result in a permittee chasing an alternative that has no practicable application. The process may require an unreasonable amount of additional studies to be performed by the permittee. And during the establishment of an alternative, the rule does not suspend adherence to the equation-based standard, which would result in continued noncompliance for a permittee. This could lead to an unreasonable expenditure and equipment installation where it is not needed.	Addressed in MPCA's 11/22/17 Response to Comments
414	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		Then on page 71 of the TSD the MPCA states: "It might be problematic to set the sulfate standard at the ambient Concentration observed over just a few years of monitoring, since natural hydrologic fluctuation may produce an exceedance of the standard. A protective approach to calculating an alternate sulfate standard would be to adjust the observed ambient sulfate concentration by the factor that the protective Sulfide concentration of 120 ug/L exceeds the observed ambient porewater sulfide concentration." This ignores MPCA's position regarding multiple dischargers to a waterbody. If the permit limit is to be a mass loading limit, then setting a limit based on the concentration value does not Support the MPCA premise that sulfate mass loading converting to sulfide is the issue.	This comment is addressed in the MPCA's detailed rebuttal response.
415	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		What the SONAR fails to mention is that the site specific standard process can take years to develop and will only be implemented if the MPCA chooses to take action on it. U. S. Steel submitted a Site Specific Standard request in October 2015, and only after litigation in early 2017 did MPCA respond, in September 2017, with their "initial thoughts". How will the MPCA be able to process all the site-specific requests submitted due to the proposed rule? MPCA cited limited resources when justifying their inability to fully study all potential environmental variables that may affect the growth and propagation of Wild rice during the development of this rule. It is highly likely that resource limitations will restrict MPCA's ability to take action on these types of requests after promulgation.	It is true that site-specific standards actions can take years to work through, since it is necessary to gather and evaluate the site-specific information that is needed to provide a basis for establishing a site-specific standard. However, one of the benefits of the MPCA's proposed rule (over the existing standard), is that it reduced the need for site-specific standards by tailoring the stndard (via the equation approach to calculating the standard) to understood environmental variables.
416	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		"The process for designating a wild rice water can be as simple as oral testimony without physical evidence of meeting any particular criteria. Dating back to 1975 is over 40 years ago. This is dependent on memory that may now be inadvertently altered over time as to the size and density of wild rice. More concrete criteria must be established to avoid over designating uses that don't, or didn't, properly exist. Reference to 2011 wild rice density law.	This comment is addressed in MPCA's detailed rebuttal response.
417	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		General: MPCA needs to improve the transparency of waterbody listing process.	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12) A detailed discussion of the MPCA's listing process is also included in the SONAR.

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418	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		MPCA should delist the twin lakes. See reasons in letter.	Comments related to the listing of Twin Lakes are addressed in the MPCA's 11/22/17 Response to Comments (11 of Attachment 1 pp.15-17)
419	Chrissy Bartovich (Lawrence Sutherland U.S. Steel)		Use of the 1995 (Interim Economic Guidance) document is inappropriate, as is incorporating the document by reference. This rule section requires the commissioner to base the decision on an interim document from 1995... Even though EPA itself says that the document is guidance and not intended to be an absolute decision point, MPCA takes it a step farther and in the proposed rule requires that the commissioner must base the determination on the procedures in the guidance. It is not reasonable to take guidance that is over twenty years old and require it to be implemented like a rule.	The MPCA proposed to remove this incorporation by reference in the 11/22/17 Response.
420	Rob Beranek (Cleveland Cliffs)		COMMENT 1: ELIMINATION OF THE EXISTING 10 mg/L SULFATE STANDARD IS REASONABLE Based on our review of the studies and field data, as well as the review by experts in relevant fields, we support the conclusion that removal of the 10 mg/L sulfate standard is reasonable. This proposed change to Minnesota Rules Part 7050.0224 Subpart. 2 is detailed on pages 116-– 117 of the MPCA's Statement of Need and Reasonableness SONAR within Part 7 Proposed Change 13 for the amended wild rice sulfate standard (SONAR). (See page 35 of the SONAR p. 35, "Two important research efforts on the toxicity of sulfate to wild rice, Pastor et al., 2017 (Exhibit 19) and Fort et al., 2014, have shown that sulfate is not directly toxic to wild rice at levels commonly found in wild rice waters in Minnesota".) (p. 3)	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
421	Rob Beranek (Cleveland Cliffs)		COMMENT 2: THE NEED FOR A SULFATE OR SULFIDE STANDARD HAS NOT BEEN DEMONSTRATED Fifty-one of the waterbodies that did not have rice present in the field study are not proposed as waters to be designated as wild rice waters. The premise that toxic sulfide is the reason for these waterbodies, or any of the proposed listed waterbodies, to not have wild rice has not been established. (p. 3)	The MPCA takes a statistical approach to the field data, and found that the probability of wild rice presence and high density declines with rising sulfide. The MPCA acknowledged in the TSD that factors other than sulfide can also be responsible for the absence of wild rice, which is why a statistical approach was required.

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422	Rob Beranek (Cleveland Cliffs)		COMMENT 3: ESTABLISHING A TOXIC SULFIDE THRESHOLD OF 120 µg/L IS NOT REASONABLE We will emphasize one point from Dr. Michael Bock here: My re-evaluation of the MPCA 'breakpoint' analysis is based on well-defined statistical methods that avoid the biases and uncertainties associated with relying entirely on professional judgement. Based on these statistical analyses, the true breakpoint is at a minimum more than twice the MPCA value, and, if Bean is included, it is orders of magnitude higher than the MPCA value. However, it is important to recognize that only 16% of the data (n=17) exhibited porewater sulfide concentrations above 300 µg/l, meaning that there is insufficient data to confidently derive a breakpoint if the true breakpoint is higher than 300 µg/l. More simply put, the true threshold could be substantially higher than 300 µg/l....The unreasonableness is further supported by the findings from Dr. Douglas Hawkins. He observes that sulfide is a statistically significant but weak predictor of wild rice presence: [S]ulfide explains only 10.53, or 7%, of the total deviance in wild rice presence, leaving the remaining 132.87, or 93% unexplained. Performing the same calculation on the 96 water body data set gives the same substantive conclusions. The P value for sulfide in the regression is a 0.0114, still significant though not quite as strong as the full data set. However in this data set, sulfide explains an even-smaller 6% of the total deviances, leaving 94% unexplained. .... In summary, it is unreasonable for the MPCA to rely on "visible assessment" of Figure 2 on page 69 of the SONAR for sulfide, which only explains 6–7% of total deviance in wild rice presence. (p. 4-6)	The MPCA did not rely excluvsively on the visual breakpoint in wild rice presence at 120 µg/l, as stated. Rather, the MPCA relied on multiple lines of evidence from quantitative analyses of the MPCA-sponsored hydroponic, mesocosm, and field data, which tend to cluster near 120 µg/l, albeit with relatively large 95% uncertainty ranges (TSD Table 1-8, page 33). The multiple lines of evidence do not support the higher protective sulfide levels proposed in these comments.
423	Rob Beranek (Cleveland Cliffs)		COMMENT 4: USING THE MPCA-SPONSORED MESOCOSM EXPERIMENT TO SUPPORT ESTABLISHING A TOXIC SULFIDE THRESHOLD OF 120 µg/L IS NOT REASONABLE As Michael Hansel further describes in his comments in the section titled "State-of- the-Art Controlled sulfate and sulfide toxicity experiments," this experiment had two primary shortcomings: 1) Unacceptably high mortality in the control group, i.e. 85% in 2013, indicating that the experimental design is flawed or that significant confounding factors were present, and 2) The water was not replenished frequently enough to meet US EPA guidance, nor were nutrients added as they would be in nature. Conclusions: Therefore, the results of the mesocosm experiment should be given little to no weight in the multiple lines of evidence and it is not reasonable to utilize the results to support establishing the toxic sulfide threshold of 120 µg/L. (p. 6)	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.

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424	Rob Beranek (Cleveland Cliffs)		COMMENT 5: USING THE MPCA-SPONSORED HYDROPONICS EXPERIMENT TO SUPPORT ESTABLISHING A TOXIC SULFIDE THRESHOLD OF 120 µg/L IS NOT REASONABLE As Michael Hansel further describes in his comments in the section titled "State-of- the-Art Controlled sulfate and sulfide toxicity experiments," this experiment had two primary shortcomings: 1) The experimental design exposed the "green parts" of the wild rice plant that would not normally be exposed to sulfide by submerging the entire plant in the solution, and 2) It calculated an EC10 for sulfide based on observed effects to the "green parts" of the wild rice plant. ... Conclusions: Using the MPCA-sponsored hydroponics experiment to support establishing a toxic sulfide threshold of 120 µg/L is scientifically flawed, and not reasonable. (p.6-7)	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 concentratons 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 sufide 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 Cover Memorandum to this Response and the Attachement 1 reponse to topic areas 4.1 and 4.2.
425	Rob Beranek (Cleveland Cliffs)		COMMENT 6: THE MPCA'S DISMISSAL OF FORT ET AL. (2017) IS NOT REASONABLE Yet, in spite of all of the recommendations of the Peer Review Panel, the MPCA chooses to give no weight to the Fort et. al (2017) study because they "hypothesize that once the wild rice sprouts emerged into the room air, access to oxygen in the room air allowed the sprouts to internally detoxify sulfide by oxidizing it to non-toxic forms of sulfur." (See page 37 of the Technical Support Document.) In his comments, Dr. Douglas Fort elaborates on the point that the observed sulfide loss during the study does not support this hypothesis.. Instead, the presence of iron is the principal factor mitigating sulfide concentrations. As Dr. Douglas Fort explains in his comments, (p. 7-8)	These comments, nor Dr. Fort's comments, do not address the MPCA's suggestion that Fort et al. (2017) observed internal detoxification of sulfide, which of course would not be observed as sulfide loss from the large hydroponic vessel. The seedlings would only detoxify sulfide that had been absorbed, which would not produce a detectable change in vessel concentrations.
426	Rob Beranek (Cleveland Cliffs)		New Fort results further support the multiple lines of evidence to establish the sulfide toxic endpoint above 120 µg/l, and according to Figure 1, at a level above a minimum value greater than 300 µg/l.	The new Fort hydroponics study, attached to these comments as a non-peer reviewed report, do not have any bearing on whether the wild rice seedlings in Fort et al. (2017) were able to detoxify sulfide because the young seedlings were afforded access to the elevated oxygen of the atmosphere. Rather, the new study repeated a similar exposure reported in Pastor et al. (2017). Both of these studies germinated seeds for 10 or 11 days in anoxic, dark conditions against a range of sulfide concentrations. Both studies showed that germination is not a growth stage that is not very sensitive to elevated sulfide. The fact that the new Fort study showed that adding iron reduces the toxicity of sulfide has no bearing, despite assertions, on the reduced toxicity of sulfide when seedlings have access to the atmosphere. The new study did not even report the same biological endpoints, such as mesocotyl length, but rather just reported germination rate.

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427	Rob Beranek (Cleveland Cliffs)		COMMENT 7: THE USE OF WATER LILIES AS INDICATORS OF SUITABLE WILD RICE HABITAT IS NOT REASONABLE Commenter O'Neill Tedrow offers his expert opinion on this and finds that identifying wild rice habitat based on the presence of water lilies is not an ecologically supported conclusion in all instances. Commenter Kurt Anderson expands on this point as well with a review of the field data set; he chronicles the overwhelming instances where the association between the two organisms is not observed. Conclusions: For the reasons stated above, the use of water lilies as indicators of suitable wild rice habitat is scientifically flawed and is not reasonable and must not be considered as an indicator of wild rice habitat. (p. 9)	The MPCA never claimed that the presence of water lilies identifies suitable wild rice habitat in "all instances." Rather, consistent with the statistical analysis of the field data, MPCA demonstrated (TSD, p. 8) that there is a strong statistical association in Minnesota waters between waterlilies and wild rice.
428	Rob Beranek (Cleveland Cliffs)		COMMENT 8: THE INCLUSION OF NON–WILD RICE WATERS IN DEVELOPMENT OF THE STANDARD IS NOT REASONABLE The only support for the agency's policy judgment to leave them in is conjecture contained in a footnote on page 68 of the SONAR. That footnote states, "Although wild rice was not present at all 96 sites, the MPCA included them in the survey because elevated sulfide could be the reason for the absence of wild rice" (emphasis added). Speculating on the reason that wild rice is absent in these water bodies, which could be caused by a multitude of factors, is arbitrary and unreasonable. Using the data from non-wild rice waters in this rulemaking is akin to using data for warm water fish to develop water quality standards for cold water fish. It is simply not done, and the agency has not provided sufficient rationale for doing so. (p. 9)	The decision by the MPCA to include all waters in the development of the equation relating sulfate to sulfide is extensively discussed in the TSD (pp 63-65).
429	Rob Beranek (Cleveland Cliffs)		COMMENT 9: THE ERROR RATE OF THE PROPOSED EQUATION IS NOT REASONABLE Conclusions: It is unreasonable to dismiss the high error rate concerns and unreasonable to not conduct an additional review of these recommendations to reduce the error rate of the proposed equation to 4 percent (down from 20%) in light of the new information being provided for a potential regulation that can incur over a billion dollars in treatment costs to residents and businesses in the State of Minnesota. (p. 10-11)	The MPCA conducted extensive review of the Ramboll recommendation to increase the protective sulfide concentration to 300 ug/L and thereby reduce the error rate to 4% (TSD, pp 65-66).
430	Rob Beranek (Cleveland Cliffs)		COMMENT 10: THE ALTERNATE STANDARD AND SITE-SPECIFIC STANDARD PORTIONS OF THE PROPOSAL ARE REASONABLE Because this novel standard is based on a theory that water- borne sulfate in all manner of rivers and lakes interacts similarly with sediment to produce sulfide, it will be wrong from time to time. Research on Second Creek detailed on page 69 of the Technical Support Document demonstrates that elevated sulfate was not causing elevated sulfide as the proposed equation predicts. (p. 12)	No response necessary.

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431	Rob Beranek (Cleveland Cliffs)		COMMENT 11: THE USE OF THE LOWEST CALCULATED PROTECTIVE SULFATE VALUE IS NOT REASONABLE Furthermore, the protocol unreasonably proposes to apply the lowest sulfate standard to be the water body's sulfate standard. This introduces an additional level of conservatism for two reasons: 1. MPCA has not specified that only areas of the water body capable of supporting wild rice based on criteria such as water depth and sediment type be sampled. Therefore, the water body specific sulfate standard could be designed to control pore water sulfide in areas incapable of supporting wild rice and therefore wild rice would not benefit from implementation of the standard. 2. Statistically, the lowest sulfate standard approximates the 20th percentile of the distribution of possible sulfate standards. In brief, 4/5 samples, or 80% will have higher standards. We can combine the probabilities associated with the EC10 and the 20th percentile by multiplication as such: 10% x 20% is 2 %. That means that 2 % of the potential population of wild rice could be affected while 98% are predicted to be unaffected. This is much more conservative that limiting the effects to a 10% level specified by the EC10. This pattern is repeated because additional conservative inputs have been added, such as the currently recommended sulfide threshold of 120 µg/L, which is a factor of 10 lower than the NOEC from both the Fort et al. (2017) as well as the newly conducted Fort November of 2017 results. The final probability is the product of the individual probabilities. For example, if we take that 95% confidence level of the Ec10 and apply that to the 20th percentile sulfate standard for a sulfide standard that is over a factor of 100 too low. The true level of conservatism is 5% x 10% x 20% x 10% or in other words 0.01 %. Conclusions: Conservatism on the order of one one-hundredth of a percent or more is not reasonable, and therefore the use of the lowest calculated protective sulfate value for a water body is not reasonable. We recommend using some type of averaging of the results. (p. 12-13)	This comment is addressed in MPCA's detailed rebuttal response.

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432	Rob Beranek (Cleveland Cliffs)		COMMENT 12: THE USE OF SULFIDE ANALYTICAL RESULTS FROM THE MINNESOTA DEPARTMENT OF HEALTH TO ESTABLISH A TOXIC SULFIDE THRESHOLD OF 120 µg/L IS NOT REASONABLE Robin Richards expands on this issue in her comments, Ramboll has reached out to over 10 reputable certified (e.g., NELAC) commercial water testing laboratories and none of them either are set-up to run this method or routinely run this method to be confident in the quality of their results at a RL of 10 to 15 ug/L sulfide. One commercial lab who has been a leader in AVS and sulfide analytical method development, Alpha Analytical, noted that colorimetric methods have a high potential for false positives due to naturally colored water. It is concerning that dischargers have limited knowledge on the accuracy and precision of the state laboratory execution of Method 4500-S2- E Sulfide and has no information on what to expect for interlaboratory variability. One of the Peer Reviewer Panel commenters also touched on this issue noting that: Quoting Dr. Robert Hare: The key is measurement. Science cannot progress without reliable and accurate measurement of what it is they're trying to study. Simple as that. A few concerns under mining my confidence in the quality of the spectrophotometric sulfide analytical data include: The instrument was calibrated using a 1 inch flow path cell, while the samples were measured using a 1 cm flow path cell...Conclusion: MPCA's reliance on sulfide data below 78 µg/L may not be reasonable. The laboratory procedures must be reviewed to ensure that the laboratory is not over-reporting the accuracy and precision with which they can detect sulfide.. (p. 13-14)	In analyzing samples for the MPCA, the Minnesota Department Health (MDH) and the Science Museum of Minnesota labs both avoided the problem mentioned here--the potential for false positives due to naturally colored water--by separating the sulfide from the water sample prior to quantification. Standard Method 4500--S2-E, used by MDH, first separates the sulfide from the sample via gas dialysis, and only then quantifies the sulfide via colorimetric methods. The Standard Methods book states, "The automated methylene blue method (E) is similar to Method D. A gas dialysis technique separates the sulfide from the sample matrix. Gas dialysis eliminates most interferences, including turbidity and color." Standard Methods notes that this method can accurately quantify sulfide as low as 2 µg/L sulfide, lower than the MDH reporting limit of 11 µg/L sulfide.
433	Rob Beranek (Cleveland Cliffs)		COMMENT 13: MPCA Misconstrues Its Obligation to Conduct Water-Specific Analyses Before Assigning the Wild Rice Beneficial UseAs the Minnesota Chamber of Commerce outlined in its December 30, 2013, letter to MPCA Commissioner John Linc Stine, the MPCA is required under the federal Clean Water Act (CWA) to conduct a Use Attainability Analysis (UAA) when it assigns the wild rice beneficial use classification to a water body for the first time. ...(p. 14-15)	This comment is addressed in MPCA's detailed rebuttal response and Attachment 1 of MPCA's November 22 Response to comments in topic area 1.
434	Rob Beranek (Cleveland Cliffs)		COMMENT 14: The MPCA's Approach to Classifying Waters as Wild Rice Waters Is Unreasonable Because It Is Inconsistent with the Legislature's Directive and Lacks Sufficient Specificity The Proposed Rule Is Contrary to the Legislature 's Directive Because It Proposes Waters for Regulation as Wild Rice Waters Without First Adopting Listing Criteria Through Rulemaking...B. The "Criteria" MPCA Used to Identify the 1,300 Proposed Wild Rice Waters Fail to Meet Statutory Requirements...C. MPCA's Proposed Criteria for Listing Additional Wild Rice Waters Also Fail to Follow the Legislature's Requirements, Are Overly Broad , and Lack Necessary Clarity (p. 15-18)	This comment is addressed in the MPCA's detailed rebuttal response.
435	Rob Beranek (Cleveland Cliffs)		COMMENT 15: THE LISTING OF CERTAIN WILD RICE WATERS IS NOT REASONABLE In Cliffs' comments upon MPCA's July 2016 draft Technical Support Document, Cliffs identified a list of specific waterbodies that must be clarified or removed from the draft list of wild rice waters. Cliffs reiterates the concerns and requests expressed in the 2016 letter regarding these waters, many of which have now been included as wild rice waters in the proposed amendments. Cliffs also adds the comments set forth in the following table with regard to some of the specified waters:... (p. 18-23)	The MPCA agrees that there is insufficient information to propose Mud Lake (69-0652-00) and Round Lake (69-0649-00) at this time. MPCA plans to remove these two waters from the list of proposed Class 4D wild rice waters. MPCA also agrees that it would be appropriate to split the Embarrass River WID 04010201-577 into two separate WIDs--one from Embarrass Lake through Esquagama Lake and the other from Esquagama Lake to the St. Louis River. The WID from Embarrass Lake through Esquagama Lake will be proposed as a Class 4D wild rice water and the segment from Esquagama Lake to the St. Louis River will be added to the MCPA database as an insufficient information water. MPCA will complete this WID split before the final rule is proposed. See MPCA's detailed rebuttal response.

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436	Rob Beranek (Cleveland Cliffs)		COMMENT 16: THE MPCA's Analysis of the Costs of Complying with the Proposed Rule Is Inadequate and Unreasonable Under State and Federal Law The SONAR Fails to Meet the Statutory Requirement to Evaluate the Costs to Dischargers of Complying with the Proposed Rule…. B. The CWA Does Not Prohibit MPCA from Evaluating the Cost of Compliance in this Rulemaking…C. The Alleged Difficulty of Obtaining Information on Cost of Compliance to Dischargers Does Not Excuse MPCA from Its Statutory Duty to Evaluate Such Costs... D. Minnesota Law Not Only Requires Consideration of Costs of Compliance, It Also Requires Balancing Policy Interests in the Affected Waters...E. The Cost Implications Are Real. (p. 23-29).	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)
437	Frank Ongaro (Barr Engineering)	9	the water identification number or WID approach as proposed by MPCA has the effect of giving the agency virtually unfettered discretion to identify and regulate "wild rice waters" after the rulemaking process has been completed. There are no objective criteria included in the Proposed Rule for determining WIDs, and there is no public process by which interested parties can provide MPCA with information as to how to determine WIDs or their boundaries other than in the cumbersome rulemaking process. Also, there is no process included in the Proposed Rule to correct errors or otherwise object to WID determinations once they have been made by MPCA	This comment is addressed in MPCA's detailed rebuttal response.
438	Frank Ongaro (Barr Engineering)	9	the WID provision departs from the statutorily-required definition of "wild rice waters," and does not even appear to require the presence of natural beds of wild rice	This comment is addressed in MPCA's detailed rebuttal response.
439	Frank Ongaro (Barr Engineering)	9	The Proposed Rule neither identifies with reasonable specificity how WIDs will be used in the wild rice regulatory program, nor the criteria or process for identifying WIDs.	This comment is addressed in MPCA's detailed rebuttal response.
440	Frank Ongaro (Barr Engineering)	11	there are multiple instances where MPCA has included water bodies or parts of them in the "wild rice waters" or WID lists under the Proposed Rule where Barr has found no wild rice in its surveys. These gaps in the Proposed Rule are critical because the MPCA intends to substitute WIDs for the statutorily-defined term "wild rice waters" without adequate public regulatory process or public information as to how these WIDs were or will be determined. The effect is that there objective criteria and process are lacking for determining whether a water body is properly classified as a "wild rice water" or how its regulatory boundaries will be established.	This comment is addressed in MPCA's detailed rebuttal response.
441	Frank Ongaro (Barr Engineering)		On page 40 of the SONAR, the MPCA states that it "assigns WIDs using the following considerations: hydrologically homogenous areas, a change in use class identified in Minnesota Rules, chapter 7050, biology, and site-specific considerations…. WIDs can range in length from less than one river mile to upwards of 70 river miles." These criteria are too broad for specifying "wild rice waters." Moreover, these criteria are not included in the Proposed Rule, and neither regulated parties nor the public are provided an opportunity to present evidence on WID classifications or to object to MPCA determinations, which MPCA has indicated will continue to be made on an ad hoc basis after this rulemaking has been completed.	This comment is addressed in MPCA's detailed rebuttal response.

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442	Frank Ongaro (Barr Engineering)		It is concerning that SONAR (Reference (3), p 40 - 41) states that wild rice does not need to be present for a water body to be defined as a "wild rice water" for purposes of the Proposed Rule. This seems to directly contradict both the definition of "wild rice waters" provided in the 2011 Sessions Laws enacted by the Legislature, and the definition in Minnesota Rules, part 7050.0130, subpart 6c (proposed), which makes the proposed regulations applicable to "water bodies [that] contain natural beds of wild rice.". MPCA expressly rejected in the SONAR that recommendation that "a given river may have wild rice growing in a certain area and the listed 'wild rice water' could be some defined area around the wild rice." The MPCA stated that it considered "this approach but found it to be unreasonable because a) it creates a completely new system to identify a water and b) wild rice beds are known to "move" within a stream reach from one year to the next depending on hydrology and possibly other factors."	This comment is addressed in MPCA's detailed rebuttal response.
443	Frank Ongaro (Barr Engineering)		We suggest that MPCA develop a system that defines "wild rice waters" as requiring the actual presence of wild rice in water bodies regulated as "wild rice waters" or WIDs and an opportunity for public input on this essential criterion.	This comment is addressed in MPCA's detailed rebuttal response.
444	Frank Ongaro (Barr Engineering)		Second, our perspective is that it is possible to scientifically and reliably determine when wild rice is actually present in a water body for a reasonably defined time period, as well as how much wild rice populations move within a water body. Therefore, we suggest that MPCA should require documentation of the presence of wild rice in a water body over a defined period, such as four to six years, or the length of a wild rice cycle, before it can be designated as a "wild rice water" (Reference (4)).	This comment is addressed in MPCA's detailed rebuttal response.
445	Frank Ongaro (Barr Engineering)		Third, it seems incongruous that an entire lake or river can be identified as a WID or "wild rice water" if there is no evidence of wild rice in substantial portions of the water body. This approach seems to contradict both the legislative requirements in the recent wild rice laws, and to expand the sulfate standard from the existing MPCA rule, which is premised on damage to wild rice production during the growing season. Thus, we suggest that the MPCA not include entire water bodies, especially long stretches of rivers, as "wild rice waters," and instead designate only those discrete portions where the actual presence of rice has been documented.	This comment is addressed in MPCA's detailed rebuttal response.
446	Frank Ongaro (Barr Engineering)		Fourth, we suggest that MPCA revise its proposed WID approach. Grafting the existing WID classification scheme of MPCA and DNR into the Proposed Rule does not accomplish this result. We suggest that a wild-rice specific system should be developed, and it should be one that involves public input before specific WID determinations are made. The current proposal to make WID determinations on an ad hoc basis after the rulemaking will subject parties to potential significant regulatory consequences without any meaningful opportunity to present evidence, understand the agency's information, and correct potential errors.	This comment is addressed in MPCA's detailed rebuttal response.
447	Frank Ongaro (Barr Engineering)		The Proposed Rule references the MPCA guidance document entitled "Sampling and Analytical Methods for Wild Rice Waters" could be improved by providing explanations as to which sampling methods must be followed and why, by providing information as to how sampling methods for sediment and porewater are related, by providing direction as to how to interpret results from each applicable method, and by providing guidance on how to interpret potential discrepancies in results.	This comment is addressed in MPCA's detailed rebuttal response.
448	Frank Ongaro (Barr Engineering)		The MPCA Sampling Methods do not include a clear description of the purpose of the porewater sampling.	This comment is addressed in MPCA's detailed rebuttal response.

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449	Frank Ongaro (Barr Engineering)		The MPCA suggests that the Proposed Rule "allows the commissioner to establish an alternate standard based on the actual amount of sulfide in the sediment porewater. The equation-based numeric standard is designed for the vast majority of water bodies, where changes in the porewater sulfide concentration is proportional to changes in sulfate in surface water. An alternate standard may be appropriate when the sulfide in the sediment porewater is being controlled by sulfate in the groundwater, rather than surface water. The MPCA is also proposing to adopt porewater sampling and analytical procedures that will be the basis for establishing an alternate standard" (Reference (3), p. 14). These terms in the Proposed Rule create substantial confusion as to what water quality standards actually be applied by MPCA in any given circumstances.	This comment is addressed in MPCA's detailed rebuttal response.
450	Frank Ongaro (Barr Engineering)		The basis for the alternate standard is not adequately supported. How does the MPCA know when sulfide in the sediment porewater is being controlled by sulfate in the groundwater? That information is necessary to understand the basis for measuring sulfide in the sediment as the applicable standard versus calculating the standard based on the equation using iron and carbon data.	This comment is addressed in MPCA's detailed rebuttal response.
451	Frank Ongaro (Barr Engineering)		It is unclear, however, why it is necessary to also collect porewater sulfide data, since the calculated standard is based on iron and organic carbon data in the collected sediment samples.	This comment is addressed in MPCA's detailed rebuttal response.
452	Frank Ongaro (Barr Engineering)		It is unclear how porewater sulfide data are to be analyzed and considered in relation to the calculated sulfate standard.	This comment is addressed in MPCA's detailed rebuttal response.
453	Frank Ongaro (Barr Engineering)		It is also unclear how to interpret porewater sulfide data. The MPCA Sampling Methods include direction that two porewater samples be collected at each of five transects used for the previous sediment sampling for a total of ten porewater samples per "wild rice water." It is unclear, however, which porewater sulfide value will be considered relevant for compliance. Is it the lowest of the ten values in the dataset, an average, or some other value? If sulfide values in the same location differ by hundreds of micrograms per liter or more, how will that data be evaluated and for what purpose? How will results be interpreted if they differ from the calculated sulfate standard based on sediment iron and total organic carbon data?	This comment is addressed in MPCA's detailed rebuttal response.
454	Frank Ongaro (Barr Engineering)		Pollman et al. discusses that "a key result from the SE model is that variations in the three external variables (sulfate, sediment TOC and sediment iron) contribute nearly equally to the observed variations in porewater sulfide" (Reference (5), p. 2) Therefore, one would expect the results from calculating a sulfate standard based on sediment iron and total organic carbon to be consistent with sulfide measurements in the porewater. For example, in a given location, if the lowest calculated sulfate standard based on ten samples is higher than the measured surface water sulfate, the wild rice in the water body should be considered protected. The above ambiguous terms in the Proposed Rule, however, can be interpreted to say that if the measured porewater sulfide in that location exceeds 120 micrograms per liter, then the water body would not be in compliance with the standard. If the reverse were true, that water body may also not be considered protected. In other words, if the measured porewater sulfide concentration was less than 120 micrograms per liter, but the calculated sulfate standard using the equation was less than the measured surface water sulfate concentration, the water body would not be considered protected and in compliance, even though the sulfide level was below 120 micrograms per liter.	This comment is addressed in MPCA's detailed rebuttal response, the TSD and the SONAR.
455	Frank Ongaro (Barr Engineering)		The Proposed Rule fails to explain the relationship between the required sulfate standard calculations based on sediment sampling and the sulfide level calculations based on porewater sampling.	This comment is addressed in MPCA's detailed rebuttal response.
456	Frank Ongaro (Barr Engineering)		The Proposed Rule also does not clearly identify how the applicable water quality standard is to be determined and applied.	This comment is addressed in MPCA's 11/22/17 response to Comments and detailed rebuttal response. Furthermore, the MPCA discussed at length the determination and application of the standard throughout the TSD and SONAR.

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457	Frank Ongaro (Barr Engineering)		Because MPCA is specifying an analytical method that must be used under the Proposed Rule for porewater sampling, the MPCA should also consider whether commercial laboratories are willing to perform the specified method, and if laboratories become available, whether they are able to conduct the testing within the required detection limits and QA/QC standards.	This comment is addressed in MPCA's detailed rebuttal response.
458	Frank Ongaro (Barr Engineering)		Based on discussions with MPCA and the Public Health Laboratory of the Minnesota Department of Health (MDH lab), Barr determined that the MDH lab used Method E for the analysis of sulfide samples starting in approximately 2012-2013. The MDH lab's objective was to try to analyze sulfide porewater samples in a manner consistent with the methodology used previously by the Minnesota Science Museum for the analysis of porewater samples when the State first began to evaluate the existing wild rice standard. The Science Museum had used Standard Methods 4500 S2 I, which is Distillation, Methylene Blue Flow Injection Analysis Method ("Method I"). Both Methods I and E use a multi-channel flow injection analyzer commonly referred to as a Lachat. The difference lies in the distillation step. Method E uses an automated distillation, while Method I uses a manual distillation. Unfortunately, MPCA has incorporated Method E as the sole approved porewater sampling methodology without regard to its historical purpose or commercial availability.	This comment is addressed in MPCA's detailed rebuttal response.
459	Frank Ongaro (Barr Engineering)		between Barr and the other consultant, approximately 30 separate laboratories in the United States and Canada were contacted, and none were able to conduct a Method E analysis.	This comment is addressed in MPCA's detailed rebuttal response.
460	Frank Ongaro (Barr Engineering)		Most of the laboratories contacted by Barr could provide porewater sulfide analysis using Standard Methods S2 D Methylene Blue Method ("Method D"), but this is not an approved methodology under the Proposed Rule. The typical range of the reporting limit available for Method D was 500-1,000 micrograms per liter (µg/L), which is higher than the MDH lab's reporting limits at ~10 µg/L for Method E. Because the target measurement for sulfide is 120 µg/L under the MPCA Sampling Methods, the standard sulfide reporting limits from the laboratories using Method D were too high. A laboratory was finally identified that could achieve a reporting limit at ~ 20 µg/L, but this could be accomplished only through modification of the laboratory's Method D procedures.	This comment is addressed in MPCA's detailed rebuttal response.
461	Frank Ongaro (Barr Engineering)		The Proposed Rule creates an untenable situation for regulated parties. The current reality is that implementation of the Proposed Rule will be impractical for the foreseeable future because there are no commercially available laboratories that perform the Method E analysis, the sole methodology allowed under the Proposed Rule. These circumstances could be addressed by expanding the options for approved sampling methodologies, before the Proposed Rule is finalized.	This comment is addressed in MPCA's detailed rebuttal response.
462	Frank Ongaro (Barr Engineering)		Ng et al. (Reference (6)) claim that sulfate reduction to sulfide is a major component of redox (reduction and oxidation) processes in wetlands and streams in one northern Minnesota location. Yet Barr, which has been evaluating wild rice conditions in northern Minnesota for over a decade, has found that wild rice grows, and has consistently grown, in that location for nine years. Their research is incomplete for the purposes of rulemaking.	MPCA has reasonably considered the work by Ng et al as an information source to assist in developing and evaluating the rulemaking proposal, as part of the MPCA's multiple lines of evidence approach.
463	Frank Ongaro (Barr Engineering)		Myrbo et al. (Reference (7)) claim that "high concentrations of porewater sulfide greatly decrease the probability that a wild rice population will be found in a waterbody." That claim is based on a statistical relationship between field data that warrants additional scrutiny. Their research is incomplete for the purposes of rulemaking.	MPCA disagrees, particularly given the corroboration provided by the multiple lines of evidence approach.

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464	Frank Ongaro (Barr Engineering)		As noted by Pollman et al. (Reference (5)), however, “the functional role of surface water concentrations of sulfate vis-à-vis the development of porewater concentrations of sulfide . . . is complex and likely involves direct, mediated, and feedback pathways.” This complexity cannot be overstated. These multiple pathways have not been sufficiently researched. Furthermore, there is not a consensus in the scientific community as to how these pathways affect wild rice growth and production in northern Minnesota waters.	This comment is addressed in MPCA’s detailed rebuttal response.
465	Frank Ongaro (Barr Engineering)		Based on field observations and modeling (reactive transport), Ng. et al. (Reference (6)) claim that sulfate reduction to sulfide is a major component of reduction and oxidation processes in wetlands and streams. They claim that sediment organic carbon content drives sulfate reduction rates, and consequently the formation of sulfide. While of interest, these results are based on data sampled at only one location, and therefore should be considered preliminary and limited in application. The authors acknowledge that their findings “stem from a relatively simplistic reactive transport modeling approach.” Such approach simplifies many complex relationships between organic carbon, iron, microbes, and other environmental processes.	Statement -- no response necessary
466	Frank Ongaro (Barr Engineering)		Ng. et al. (Reference (6)) acknowledges that large spatial and temporal differences in groundwater and surface water movement are simplified to a small set of scenarios (Reference (6)), p. 19). They are not able to explain “model results [showing] orders of magnitude lower sulfate concentrations in the groundwater compared to surface water produce similar reduction rates in the [stream] channel” (Reference (6)).	statement -- no response necessary
467	Frank Ongaro (Barr Engineering)		It is therefore important to appropriately qualify the results from Ng et al. (Reference (6)), since they rely on data collected at just one location, incorporate modeling which oversimplifies complex processes, and rely on first time observations of some key results (dominance of sulfate reduction over Fe (III) reduction). It is important to further consider and evaluate these preliminary results before they can be relied on for state policy- and rule-making.	MPCA has reasonably considered the work by Ng et al as an information source to assist in developing and evaluating the rulemaking proposal, as part of the MPCA's multiple lines of evidence approach.
468	Frank Ongaro (Barr Engineering)		Myrbo et al. (Reference (7)) claim that “high concentrations of porewater sulfide greatly decrease the probability that a wild rice population will be found in a waterbody.” This conclusion, however, is based on a dataset with assumptions that require additional scrutiny. Some of the waterbodies in this water dataset include waters with no wild rice, but with conditions that the authors claim should support wild rice. In other words, some waterbodies without wild rice were treated as proxies for waterbodies with wild rice.	Statement -- no response needed. Comments about the datasets used by MPCA ind eveloping the rule proposal are addressed in MPCA's 11/22/17 Response to Comments and MPCA’s detailed rebuttal response.

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469	Frank Ongaro (Barr Engineering)		Myrbo et al. (Reference (7)) explain that since there were not sufficient waters with high sulfate and wild rice, additional waters were selected with "potential habitat for wild rice" (Reference (6), p.6). They further explain that "most Minnesota lakes that host wild rice populations have low sulfate concentrations. If only those waters hosting abundant wild rice were sampled, most would be low in sulfate and little would be learned about how elevated sulfate concentrations might affect wild rice." Yet their proposed solution, to include waters that may support wild rice, but in which there is no wild rice, is tenuous. In order to address the deficit of high sulfate waters with wild rice, the authors chose waters "with a range of sulfate concentrations without regard to whether the waterbody hosted wild rice." When these waterbodies with high sulfate but no wild rice are removed from the dataset, there is no statistical significance between sulfide and wild rice presence.	This comment is addressed in MPCA's 11/22/17 Response to Comments and MPCA's detailed rebuttal response.
470	Frank Ongaro (Barr Engineering)		We are concerned that the procedures in the MPCA Sampling Methods are too restrictive to be practical for laboratories that will be retained to assist in the required sampling and analysis, which will make it even more difficult to encourage commercial laboratories to perform the work required by the Proposed Rule.	This comment is addressed in MPCA's detailed rebuttal response.
471	Frank Ongaro (Barr Engineering)		The MPCA Sampling Methods represent the first time the agency allowed oven drying of sediment samples. Prior to this, samples had to be freeze dried. The MPCA Sampling Methods state that the oven dried sample is to be pulverized using a mill. The document should allow alternate methods to pulverize the sample since not all laboratories are likely to have a mill. MPCA should consider adding a specific sieve size for the sample to pass to determine if it was pulverized sufficiently.	This comment is addressed in MPCA's detailed rebuttal response.
472	Frank Ongaro (Barr Engineering)		The laboratory located by Barr that used modified Method D analysis, as described above, used microwave digestion to meet the same temperature and time. Requirements. The Science Museum was contacted to discuss this substituted procedures, and since the microwave temperature and time were the same as contemplated by Method E, the Science Museum staff did not consider the microwave alternative to be a major departure from the Method E requirements. We recommend that MPCA allowing alternate methods for digestion as long as temperature and time requirements are met.	This comment is addressed in MPCA's detailed rebuttal response.
473	Frank Ongaro (Barr Engineering)		The MPCA Sampling Methods requires results to be reported in mg/Kg (dry weight), but the sulfate equation lists µg/g. Both of these units are part per million (ppm) but to avoid confusion, we recommend that MPCA consider using the same units throughout.	This comment is addressed in MPCA's detailed rebuttal response.
474	Frank Ongaro (Barr Engineering)		The MPCA Sampling Methods states that a blank is analyzed to determine if contamination is present. The document further states that the blank must be below the report level before samples are analyzed. Typically, a method blank is prepared and analyzed with the samples, not before the samples are analyzed. Ideally, the method blank would be below the report level; however, a blank detection that is < 10x a sample concentration should also be considered acceptable since the blank detection would have little to no impact on the data.	This comment is addressed in MPCA's detailed rebuttal response.
475	Frank Ongaro (Barr Engineering)		The MPCA Sampling Methods indicate that the Laboratory Control Sample (LCS) should be prepared at the concentrations similar to those expected in the field samples. MPCA Sampling Methods list the same acceptance criteria for the LCS and matrix spike (MS). Many methods allow for a slightly wider range for the MS than the LCS to account for potential matrix effects. MPCA should consider using 75-125% for the MS range.	This comment is addressed in MPCA's detailed rebuttal response.
476	Frank Ongaro (Barr Engineering)		We recommend that MPCA consider adding the analysis of a matrix spike duplicate (MSD) as an option as noted in the TOC section.	This comment is addressed in MPCA's detailed rebuttal response.

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477	Frank Ongaro (Barr Engineering)		When a second laboratory was contacted (one that processed MPCA samples) for TOC analysis, we learned that this laboratory did not follow the MPCA Sampling Methods. In particular, MPCA requires that for TOC, samples should be dried and prepared in accordance with the agency guidance in item 2a (oven drying at 50 °C) or item 2b (freeze drying) (Sampling Methods, p.9). The second laboratory, however, explained that it did not oven dry the samples prior to the addition of acid when conducting analysis for MPCA Unless the samples were dried prior to arriving at the second laboratory, it appears that the MPCA Sampling Methods were not followed as part of MPCA's own data analysis. This suggests that other protocols should be considered for inclusion in the MPCA Sampling Methods. EPA Method 9060A is cited in the MPCA Sampling Methods as the basis for the TOC analysis. This EPA method is actually not a soil method, but modifications for soil can be performed. MPCA should also allow actual solid methods such as ASTM E1915 or Lloyd Kahn.	This comment is addressed in MPCA's detailed rebuttal response.
478	Frank Ongaro (Barr Engineering)		The MPCA Sampling Methods state that the sample must be treated with H3PO4 to remove any inorganic carbon. We recommend that MPCA consider allowing the use of other acids since EPA Method 9060A cited in the document uses HCl or H2SO4.	This comment is addressed in MPCA's detailed rebuttal response.
479	Frank Ongaro (Barr Engineering)		The MPCA Sampling Methods require all samples to be analyzed in duplicate, but does not provide direction as to whether the original sample result or the average should be used for reporting. This should be clarified.	This comment is addressed in MPCA's detailed rebuttal response.
480	Frank Ongaro (Barr Engineering)		The MPCA Sampling Methods require reporting of sampling results in mg/Kg (dry weight) and % (dry weight). Many commercial laboratories do not have the ability to report one result in different units. Since the equation uses the % TOC, only the % reporting should be required.	This comment is addressed in MPCA's detailed rebuttal response.
481	Frank Ongaro (Barr Engineering)		We recommend allowing a wider MS range, which for TOC would be 65-135%.	This comment is addressed in MPCA's detailed rebuttal response.
482	Frank Ongaro (Barr Engineering)		In its precision section, the MPCA Sampling Methods include a frequency for laboratory duplicates; however, earlier in the document and in the last bullet, the document states that every sample is analyzed in duplicate. This discrepancy should be clarified.	This comment is addressed in MPCA's detailed rebuttal response.
483	Frank Ongaro (Barr Engineering)		MPCA Sampling Methods state that the laboratory must inject an antioxidant reagent into each sample bottle regardless of the analytical methodology used. This method is only relevant to Method E.	This comment is addressed in MPCA's detailed rebuttal response.
484	Frank Ongaro (Barr Engineering)		The document requires reporting of results in mg/L. To maintain consistency with the criteria of 120 µg/L, it would be better if the laboratories reported in the same units or reference the standard as 0.12 mg/L.	This comment is addressed in MPCA's detailed rebuttal response.
485	Frank Ongaro (Barr Engineering)		The MPCA Sampling Methods require reporting of sample results to three significant figures. Many laboratories have set their significant figures (often two) and do not have the capability to report to three significant figures. Use of three significant figures typically is unnecessary for accuracy.	This comment is addressed in MPCA's detailed rebuttal response.
486	Frank Ongaro (Mining Minnesota)		The Proposed Rules exceed the statutory authority granted to MPCA to regulate discharges to waters that may impact wild rice by failing to designate the specific water bodies or portions thereof to which the wild rice water quality standards apply and instead designate waters containing no wild rice.	This comment is addressed in MPCA's detailed rebuttal response.
487	Frank Ongaro (Mining Minnesota)		The Proposed Rules exceed the statutory authority granted to MPCA to regulate discharges to waters that may impact wild rice by seeking to apply the wild rice water quality standards to waters that contain no wild rice.	This comment is addressed in MPCA's detailed rebuttal response.

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488	Frank Ongaro (Mining Minnesota)		The Proposed Rules exceed the statutory authority granted to MPCA to regulate discharges to waters that may impact wild rice by omiting some of the statutorily mandated criteria for designation of the waters to which the new standards apply.	This comment is addressed in MPCA's detailed rebuttal response.
489	Frank Ongaro (Mining Minnesota)		By applying the proposed new wild rice water quality standard to the "entire WID" rather than those portions of the WID where waters actually contain beds of wild rice, the Proposed Rules do not comply with the statutory directive to identify specific waters or portions thereof to which the standard is applicable. Instead, the agency effectively declined to sufficiently specify the location of the wild rice waters, relying on convenient administrative classifications currently used by MPCA and/or MDNR rather than scientific data to create arbitrary and uncertain boundaries.	This comment is addressed in MPCA's detailed rebuttal response.
490	Frank Ongaro (Mining Minnesota)		Instead of establishing, by rule, a list of specific waters in which natural beds of wild rice are present, MPCA proposes an administrative default that waters in certain areas presumptively contain wild rice and are therefore within MPCA's jurisdictional authority. This is not appropriate. MPCA does not have statutory authority to designate waters that contain no wild rice as "wild rice waters" subject to the requirements of Minn. R. ch. 7050.	This comment is addressed in MPCA's detailed rebuttal response.
491	Frank Ongaro (Mining Minnesota)		The practical effect of the over-broad listing of WIDs instead of wild rice waters is severe. MPCA has provided an interactive map to help the public understand the impact of the Proposed Rules. When the map showing existing wild rice waters as currently listed by MPCA under Minn. R. ch. 7050 (Figure A) is compared to a map showing the scope of WIDs set forth in the Proposed Rules (Figure B), it is apparent that the proposed wild rice waters cover a substantial portion of Minnesota even though MPCA has not identified the presence of wild rice in many of these specific waters.	This comment is addressed in MPCA's detailed rebuttal response.
492	Frank Ongaro (Mining Minnesota)		MPCA is seeking to regulate waters that contain no wild rice as though they meet the statutory and proposed regulatory criteria for wild rice waters. This overreaching approach does not conform to either the statutory language or the legislature's intent.	This comment is addressed in MPCA's detailed rebuttal response.
493	Frank Ongaro (Mining Minnesota)		The statute provides no basis for MPCA to impose a new wild rice water quality standard on waters that do not contain natural beds of wild rice. It is an unquestionable exceedance of MPCA's statutory authority and will inflict significant hardship on industry, companies, and private citizens across the state in a manner that is contrary to legislative intent.	This comment is addressed in MPCA's detailed rebuttal response.
494	Frank Ongaro (Mining Minnesota)		MPCA apparently seeks to empower its staff to define at a later date the boundaries of any particular WID rather than establish objective, clear, and understandable standards for ascertaining these boundaries. In direct conflict with the statutory mandate of "specific waters" or parts thereof, the Proposed Rules set up a system in which, according to MPCA staff, people must email MPCA to ascertain the boundaries of a WID. A MPCA staff person will then, based on unspecified criteria, determine the boundaries of the WID and communicate this information to that member of the public. This approach provides neither clarity nor transparency to permittees and other members of the public, nor does it provide a regulated party with any legal process to protect its legal rights.	This comment is addressed in MPCA's detailed rebuttal response.
495	Tony Kwilas (Chamber of Commerce)	3.9	First, there is a 20% error rate associated with the equation. With such a high error rate, the justification for expending resources to comply with the proposed standard is difficult, as the prediction of the protection or restoration of wild rice is uncertain. Through a systematic examination of the basis of the equation, it has been determined that by adjusting the inputs used, an alternative, but technically sound, equation with a reduced error rate, can be generated that is still protective of wild rice.	Comments related to the error rate were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. b (pg. 6) and 3.9 of Attachment 1 (pg. 5)

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496	Tony Kwilas (Chamber of Commerce)	4.2	Second, the MPCA commissioned a group of experts known as the Peer Review Panel, to review the MPCA's wild rice study upon which the proposed rule is based. The Peer Review Panel made numerous recommendations concerning the laboratory studies, the Mesocosm study, and field surveys that the MPCA did not address in the proposed rule. The MPCA also has not strengthened the Synthesis section of the study by developing a linkage of the sulfate/sulfide iron biogeochemical process to other processes that may impact wild rice (e.g. phosphorus cycling) and the feedback loops among these processes.	Comments about peer review were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A(pg. 4) and 4.1 of Attachment 1 (pg. 5))
497	Tony Kwilas (Chamber of Commerce)	2.2	Third, the Chamber commissioned a sulfide toxicity study which incorporated the Peer Review Panel recommendations, met the United States Environmental Protection Agency guidance and adhered to Good Laboratory Practices (GLP). The results demonstrate that sulfide does not impede the growth of wild rice until if reaches very high concentrations (e.g. 3,100 µg/L)--concentrations observed only in a few isolated lakes in the Prairie Ecosystem Region and which have not been observed in the vast majority of Minnesota waters. The Chamber had suggested these changes to the equation, but they were not included in the proposed rule.	The MPCA reviewed the Fort study and information about it is included throughout the TSD and in the MPCA's 11/22/17 response.
498	Tony Kwilas (Chamber of Commerce)	19.4	Fourth, the Chamber is concerned that the MPCA is proceeding with the rulemaking before an important economic impact study is completed. The Legislature in 2016 required the MPCA to issue a request for proposals for an engineering feasibility and cost analysis of the potential impacts of any new proposed rule. The Legislature during the 2017 legislative session extended the deadline for rulemaking regarding the proposed wild rice water quality standard until January 2019, from January 2018, specifically to allow the engineering feasibility and cost analysis to be included in the supporting documents for the rulemaking. The study is not anticipated to be completed until May of 2018. The technical support document (TSD) and the Statement of Need and Reasonableness (SONAR) both have economic and socioeconomic impacts, but do not include all factors that would be assembled in a complete cost analysis of the proposed rule. The MPCA estimates that, at a minimum, 130 permitted facilties will be evaluated for the possibility of requiring additional permit limits to protect wild rice under the new rule. Without an understanding of the feasibility and cost of meeting these new limits, it is difficult for these 130 facilities to plan for future development and commit capital investment into their facilties.	Comments about the timing of the proposed rules in relation to a report on treatment costs were addressed in MPCA’s 11/22/17 Response to Comments (Cover Memo III. C. b. (pg. 9)
499	Tony Kwilas (Chamber of Commerce)	18.3	The MPCA has testified in legislative hearings that they anticipate numerous applications for variances from municipalities, as well as industrial applicants, in regards to the proposed new rule. The MPCA has made a decision to waive the $10,280 variance application fee for municipalities, but not for industrial applicants. The Chamber believes taht the decision to not waive the fee for industrial applicants is arbitrary, and should be corrected by the MPCA so industrial applicants do not pay a variance application fee.	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.

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500	MCEA (Eric Lindberg)	1, 10	Under the Clean Water Act, wild rice must be protected against water pollution everywhere it is an "attainable use." The MPCA has done a great deal of work to identify "wild rice waters," but much of this work while useful for some purposes is not directly relevant to determining what must be protected through water quality standards under the Federal Clean Water Act (CWA). 33 U.S.C. §1251 et seq. The main object of MPCA's effort should have been to identify waters where the growing of wild rice is "attainable" as attainability is explained at 40 CFR 131.10. MPCA, however, appears to have focused its efforts on identifying water where wild rice has actually been harvested since November 28, 1975, a subset of what should have been identified.	This comment is addressed in MPCA's detailed rebuttal response.
501	MCEA (Eric Lindberg)	1	The proposed standard does not protect wild rice in all of the waters in which it must be protected under the Clean Water Act. Protecting wild rice is a Section 101 (a)(2) use because wild rice is properly seen as a form of "wildlife."	This comment is addressed in MPCA's detailed rebuttal response.
502			Wild rice is a Section 101 (a)(2) use because it is closely related to propagation of wildlife.	This comment is addressed in MPCA's detailed rebuttal response.
503	MCEA (Eric Lindberg)	1	Wild rice should be considered a Section 101 (a)(2) use because it is recreation.	This comment is addressed in MPCA's detailed rebuttal response.
504	MCEA (Eric Lindberg)	1	MPCA should have identified waters in which wild rice would grow if not for poor water quality because it is a 101 (a) (2) use. MPCA could then have considered UAAs or variances.	This comment is addressed in MPCA's detailed rebuttal response.
505	MCEA (Eric Lindberg)	10.3	Still further, it appears at many points in the Statement of Need and Reasonableness (July 2017) (the "SONAR"), that MPCA did not even try to include all of the "existing" use waters on its list of "wild rice waters" as "existing use" is defined by U.S. EPA. The SONAR indicates that only waters were designated in which there was documented actual use of water bodies for wild rice harvesting since 1975.	This comment is addressed in MPCA's detailed rebuttal response.
506	MCEA (Eric Lindberg)	10	An "existing use" under the law also includes uses that were attained as a possibility even if they were not actually used by people. As explained in Appendix G to the EPA Water Quality Standards Handbook (August 1985):An existing use can be established by demonstrating that fishing, swimming, or other uses have actually occurred since November 28, 1975, or that the water quality is suitable to allow such uses to occur (unless there are physical problems which prevent the use regardless of water quality). An example of the latter is an area where shellfish are propagating and surviving in a biologically suitable habitat and are available and suitable for harvest. Such facts clearly establish that shellfish harvesting is an "existing" use, not one dependent on improvements in water quality. To argue otherwise would be to say that the only time an aquatic protection use "exists" is if someone succeeds in catching fish. (emphasis in original)	This comment is addressed in MPCA's detailed rebuttal response.
507	MCEA (Eric Lindberg)	10.1	Further, MPCA's handling of the recommendations of scientists and other sources appears to be arbitrary. MPCA eliminated numerous waters from the list compiled by MDNR if they were under the two acre threshold unless there was evidence of actual use of the sites by humans. SONAR at 42-43 MPCA included "most of" the water bodies identified in the 1854 Treaty Authority's March 2016 inventory of wild rice waters…The SONAR does not explain why MPCA thought it knew better thatn the Treaty Authoriy as to the water bode is listed by the Treaty Authority that MPCA chose not to include. See attached map that shows MDRN and 1854 Treaty Authority wild rice waters that are eliminated by the MPCA's proposed list.	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)

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508	MCEA (Eric Lindberg)	10.3	MPCA also rejected waters bodies less than two acres that were submitted by U.S. Fish and Wild Rice, U.S.G. S., Metropolitan Council Environmental Service or Robert Pillsbury of the University of Wisconsin-Oshkosh. SONAR p. 44	In response to the 2013 Call for Data, the USFWS submitted 20 waters for possible inclusion in Minn. R. 7050 as Class 4D wild rice waters. (See SONAR Exhibit 29). Currently eighteen of these waters are being proposed as Class 4D waters. Two waters from the USFWS list, Beaver Valley wetland and Evans Lake are not being proposed at this time; Evans Lake was overlooked and should have been on the list and Beaver Valley wetland needs a WID assignment. MPCA plans to include these two waters in a future rulemaking as Class 4D waters. Robert Pillsbury submitted 19 waters during the 2013 Call for Data. Twelve are currently proposed as Class 4D waters, one is already listed in Minn. R. 7050 as a wild rice water, two lakes did not have observed wild rice, and two waterbody locations could not be determined, and two lakes that were originally proposed as Class 4D waters are wholly within the Fond du Lac reservation and are being removed from the list of proposed Class 4D waters. The USGS submission provided wild rice locations within several pools of the Mississippi River; these reaches are proposed as Class 4D waters. Metropolitan Council Environmental Services shared sulfate data with the MPCA .
509	MCEA (Eric Lindberg)	15	The standard cannot be implemented in a timely and protective manner. The formula at the heart of the proposed standard is much more complex and requires much more data than the current standard. As MPCA acknowledges, "It takes time to collect and evaluate data in order to calculate sulfate limits and establish effluent limits." It is unclear how the MPCA intends to protect wild rice waters while the necessary data are collected and effluent limits are calculated.	Comments about implementation issues were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. D (pg. 10) and Attachment 2)
510	MCEA (Eric Lindberg))	15	MPCA has rejected the altermatives of keeping the 10 mg/L standard in place while data are collected and also the alternative of specifying that there shall be no net increase in sulfate discharges until a numeric standard is developed that can be used to set protective effluent limits. SONAR at 62. MPCA rejects the "no net increase" alternative as difficult and unnecessary because "new or expanding sources will need to collect the data to calculate the numeric sulfate standard in order to complete permitting [so] there will not be new discharges without a standard being calculated." SONAR at 162. However, sulfate loadings cannot be relied on to stay constant until new permit limits are calculated. Dischargers are not generally discharging the full amount of pollutants that their NPDES permits allow them to discharge and, thus, there is frequently room for increasing the flow or discharges of particular pollutants without obtaining a new permit. Indeed, municipal discharger do not currently even monitor sulfate (SONAR p. 169) and, through new development or changes in the nature of the effluent coming into their palnt, could increase the discharge of sulfate without even knowing it. Further, discharges are occurring under general permits that do not precisely set load limits for sulfate and mining operations may, without substantially changing their operations, increase their discharge of sulfate as they encounter different geology as they mine.	Statement -- no response needed.

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511	MCEA (Eric Lindberg)	15	The unpredictability and clear possibility of increases in sulfate loadings in the absence of regulation can be seen from the data presented in the SONAR. Table 14 shows very wide ranges of sulfate concentrations from a single municipal plant with one utility wastewater plant discharging varying levels between 339 mg/L and 4710 mg/L. There are also wide ranges in sulfate dischargers from taconite mining operations (SONAR Table 15). What causes these wide variations is not explored in the SONAR or the TSD. There is no reason to believe that discharges will not increase their loadings, particularly if MPCA does not limit or monitor them.	Statement -- no response needed.
512	MCEA (Eric Lindberg)	15.2	Based on work study effects of sulfate on aquatic life in the laboratory by Dr. David Soucek of the Illinois Natural History Survey, Illinois and Indiana have adopted water quality standards to protect aquatic life from acute and chronic toxicity…The levels of sulfate found to be harmful by Dr. Soucke as incorporated into the Illinois and Indiana standards are definitely levels show by the discharge reports reported in the SONAR to be present potentially in waters and Minnesota. (Note commenter cites several publications and reports)	Statement -- no response needed.
513	MCEA (Eric Lindberg)		Minnesota should not weaken its protection against sulfate pollution without developing a standard to protect aquatic life. At hight concentrations, sulfate is harmful to a number of aquatic uses. While probably in most cases, the 10 mg/L sulfate standard is more stringent than necessary to protect uses other than wild rice, Minnesota should not throw out its only numeric sulfate standard without establishing standards to protect other uses. Doing so would have the effect of weakening protections for aquatic life from sulfate protection. The effect of changes to water quality standards must be considered in setting standards. Florida Public Interest Research Group v. EPA, 386 F.3d 1070, 1088 (11th Cir. 2004)	This comment is addressed in MPCA's detailed rebuttal response
514	MCEA (Eric Lindberg)	28, 29	MPCA fully acknowledges that sulfate can be directly toxic to aquatic life at sufficient concentrations (TSD p. 98) Further, sulfate may act to create sulfide that will increase water column levels of methylmercury and phosporus so as to damage the healthfulness of fish consumption and water clarity. (TSD pp. 98-99) This could be a problem both in waters where wild rice is a concern but limits are not required and waters that will not even be considered for sulfate limits under the standard because they have not yielded wild rice since 1975.	comments about methyl mercury were addressed in MPCA's 11/22/17 Response to Comments (28 of Attachment 1 (pg. 21))
515	MCEA (Eric Lindberg)	35	Based on work study effects of sulfate on aquatic life in the laboaratory by Dr. David Soucek of the Illinois Natural History Survey, Illinois and Indiana have adopted water quality standards to protect aquatic life from acute and chronic toxicity…The levels of sulfate found to be harmful by Dr. Soucke as incorporated into the Illinois and Indiana standards are definitely levels show by the discharge reports reported in the SONAR to be present potentially in waters and Minnesota. (Note commenter cites several publications and reports)	Statement -- no response needed.
516	MCEA (Eric Lindberg)	8	Further, it would not be protective to amend the sulfate standard now in place and rely on a narrative standard to protect wild rice. As MPCA acknowledges, it would be necessary to develop a numeric translator to put a sulfate narrative standard into effluent limits	MPCA agrees.

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517	Nancy Schuldt (Fond du Lac)	22	From historical reports, Band member accounts, and current Minnesota Department of Natural Resources ("DNR") and tribal reports, manoomin has extensively declined throughout Minnesota, and in southern Minnesota it has virtually disappeared because of dramatic transformations of the landscape and alterations of natural hydrology over the lastcentury. (pg 1)	Statement -- no response needed.
518	Nancy Schuldt (Fond du Lac)	3.1	…the existing federally approved sulfate criterion is well-supported by multiple lines of evidence and should be maintained and enforced.	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)
519	Nancy Schuldt (Fond du Lac)	33	the contorted name of the beneficial use in current rule ("waters used for the production of wild rice") is unnecessarily confusing, and in recent years has been purposefully misinterpreted with the intent to circumvent regulatory controls, albeit unsuccessfully. We support the beneficial use name change to "wild rice waters". (pg 2)	Thank you for the comment.
520	Nancy Schuldt (Fond du Lac)	33	the existing rule applies the numeric sulfate standard "during periods when the rice may be susceptible to damage", which had been interpreted on occasion as only during the growing season. Scientific investigations conducted as part of the MPCA's research program, and subsequently with tribal support, have clearly shown that there is no seasonal component in wild rice susceptibility to the effects of sulfate pollution. We support the elimination of that limited seasonal applicability condition. (pg 2)	Thank you for the comment.
521	Nancy Schuldt (Fond du Lac)	5	These rule revisions will not protect manoomin. (pg 2)	Comments about the protectiveness of the proposed standard were addressed in MPCA's 11/22/17 Response to Comments.
522	Nancy Schuldt (Fond du Lac)	23	Wild rice continues to be of profound importance both as a source of food, and for its role in the culture, traditions and spiritual life of the Chippewa people. Wild rice is relied upon to meet ceremonial and religious needs that define unique aspects of Chippewa culture...the Treaties also reserved to the Chippewa the right to hunt, fish, and gather natural resources, including wild rice, from the lands ceded by the Treaties, which extend over a large part of northeastern Minnesota. The continued existence of Chippewa's usufructuary rights under these treaties has been recognized and given effect by the federal courts. (pg 4) As a result of these Treaties, the Band has legally protected rights and a direct interest in the protection and proper management of the natural resources on which those rights depend...The exercise of these rights requires access to natural resources, including natural resources that are not degraded or contaminated. (pg 5)	See November 22, 2017 Attachment 1 response to topic area 23.
523	Nancy Schuldt (Fond du Lac)	23	The EPA has determined that a state's compliance with the CWA and EPA regulations must be considered in light of Indian treaties, because these treaties are the supreme law of the land...In requiring that the State of Washington consider tribal treaty rights when revising certain WQS relating to waters for fish, EPA further explained that the "purpose for which tribes reserved [off-reservation] fishing rights through treaties with the U.S. has important implications for water quality regulation under the CWA. Fundamentally, the tribes' ability to take fish for their subsistence purposes under the treaties would be substantially affected or impaired if it were not supported by water quality sufficient under the CWA to ensure that tribal members can safely eat the fish for their own subsistence...water quality standards must ensure that water quality must be "sufficient under the CWA to ensure that tribal members can safely" consume plants and animals that they are guaranteed for subsistence and cultural reasons under treaties...A water quality standard that killed or significantly harmed the resource on which the tribal members depend would be as destructive to the treaty right as a water quality standard that made that resource unsafe to consume." (pg 6)	The MPCA has presented evidence showing that the proposed rule revisions will protect wild rice from significant harm or extirpation due to sulfide/sulfate.

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524	Nancy Schuldt (Fond du Lac)	31.6	As noted above, the Chippewa have significant expertise regarding the proper care and management of wild rice...Notwithstanding the Band's federally protected treaty rights and significant expertise related to wild rice, we are deeply troubled to find that MPCA has ignored the Band's substantive comments and expertise. Instead, MCPA's proposed rule improperly relies on an untested "line of scientific inquiry" that does not satisfy the requirements of the Clean Water Act or its implementing regulations to permit a change in the existing wild rice rules. (pg 7 - 8)	This comment is addressed in the MPCA's 11/22/17 Response to Comments.
525	Nancy Schuldt (Fond du Lac)	1	The CWA protects both "designated" and "existing" uses of water bodies...Designated uses are not dependent on whether or not conditions currently support the use…Federal CWA regualtions give the most protections to existing uses of waterbodies. An existing use cannot be modified or removed unless designated uses are added that require more stringent water quality criteria...the State can remove designated uses that are not "existing" uses, but only if it follows a procedure prescribed by regulation...But a designated use cannot be removed if the use can be attained by implementing effluent limits and best management practices. (pg 8 - 9)	This seems to be background information; responses are provided later.
526	Nancy Schuldt (Fond du Lac)	1.2	The revised rule proposal to create a new wild rice waters subclass, Class 4D, does not recognize the uniqueness of the wild rice beneficial use...This standard, however, improperly limits the beneficial uses of wild rice. During this rule revision process, the MPCA had both the authority and opportunity to take a hard look at all existing rules related to the protection of wild rice, and fundamentally improve and modernize state rules in light of new research and their growing understanding of the ecological requirements of wild rice. That is their role and charge under their delegated Clean Water Act authorities. The agency should have considered tribal recommendations that elevate the unique qualities and characteristics of manoomin beyond simply "food"...The broad ecological benefits of wild rice require a proper classification of these waterbodies under the Clean Water Act...However, Minnesota's Class 4 waters, which cover agricultural and wildlife uses, is intended to define *waters that are suitable for the irrigation of crops, consumption by livestock, support of vegetation for range grazing, and other uses in support of farming and ranching and protects livestock and crops from injury due to irrigation and other exposures...* Fond du Lac and other tribal staff have consistently held up the state's water quality protection framework for trout streams as a model for how the agency can use its CWA authorities to protect manoomin...The Band has regularly advised the MPCA that water quality protections for manoomin should focus on preserving and enhancing the sustainability of the resource, not the anthropocentric construct of "production." We maintain that the appropriate classification for manoomin is in Minnesota's Class 2 waters, with its own separate subclassification...MPCA has never provided the Band with any rationale for refusing to protect manoomin as a distinct aquatic life use, only asserting that "it disagrees". (pg 10 - 14)	The proposed rule does not create a new wild rice water subclass, merely moves (for clarification) an existing sub categorization (waters used for production of wild rice) under the Class 4A subclass. The MPCA agrees that we have the authority to change the use class, and the SONAR on page 165 shows that the MPCA considered establishing an entirely new use classifications. Comments about the beneficial use are addressed in more depth in the detailed rebuttal response. It should also be noted that the language the commenters cites about the intention of the Class 4 use class is a general statement about agricultural uses from the EPA water quality standards handbook. That does not reflect the fact that in 1973 Minnesota established the unique wild rice beneficial use within Class 4 and that the language in Class 4A speaks not only to irrigation but also to "crops or vegetation usually grown in the waters".

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527	Nancy Schuldt (Fond du Lac)	8.1	MPCA proposes to limit the narrative standard to only 24 named water bodies, and not include others, as the MPCA promised to do when the narrative standards were first adopted, is not rational…This aspect of the wild rice water quality rules – the limited number of water bodies to which the narrative standard was applied – is a relic of the 1997-98 rulemaking for waters in the Lake Superior basin....The agency clearly reached a conclusion during rulemaking twenty years ago that this narrative standard was necessary and reasonable to protect wild rice, and that there was sufficient data existing to support it...The MPCA has not honored or fulfilled the commitments they explicitly made with the Tribes in the 1997-98 rulemaking...By failing to do so, they have acted contrary to the purported purpose of the narrative criteria without giving any rational basis for doing so. Nor has MPCA explained why it has frozen the narrative criteria at these 24 wild rice waters...	The comment mischaracterizes the conclusion reached by the MPCA during the 1997 - 1998 rulemaking. The narrative standard is separate from the sulfate standard, and the MPCA is correctly construing it to apply to a subset of waters. (Even the MDNR notes that there are different categories of wild rice waters; there is a list of 350 important wild rice waters that is separate from the 2008 MDNR inventory.) The MPCA understands that the Tribes want more waters to be considered for the [WR] designation and the protection of the narrative standard. The MPCA has neither "frozen the list" nor does the narrative standard apply to all wild rice waters. In this rulemaking the MPCA is revising the existing sulfate standard. In future rulemakings, we may consider adding to the list of waters protected by the narrative standard.
528	Nancy Schuldt	ORVW	The Band believes that wild rice waters throughout the state of Minnesota should be designated Outstanding Resource Value Waters, as we have done with our reservation manoomin waters, thereby providing comprehensive protection under the state's anti-degradation requirements. (pg 17)	The MPCA believes this is out of scope for this rulemaking focused on revising the existing sulfate standard.
529	Nancy Schuldt (Fond du Lac)	1.6	The CWA mandates the continued designation and listing of all wild rice waters, regardless of their specific production or use unless the reclassification process is followed. Minnesota's wild rice rules currently require that the quality of listed and unlisted wild rice waters and the aquatic habitat necessary to support the propagation and maintenance of wild rice plant species not be materially impaired or degraded. So Minnesota already requires the listing of all wild rice waters regardless of production...the Proposed Rule "remov[es]" the designated use of "waters used for the production of wild rice" from its current categorization as a Class 4A water designation...places it in the new Class 4D...renames it "wild rice waters," applies the new sulfate standard, and deletes the current sulfate standard for Class 4A waters... ...this removes the designated use of "used for the production of wild rice" or "wild rice waters" from those waters without a UAA justification of non-attainment, which is required by the CWA. (pg 17 - 18)	The proposed rule does not create a new wild rice water subclass, merely moves (for clarification) an existing sub categorization (waters used for production of wild rice) under the Class 4A subclass. A key goal of the rulemaking was to clarify where the standard applies by coming up with a list of waters; as the MPCA has described, this list of waters should be the same as those that would be considered "waters used for production of wild rice" under a case-by-case determination.
530	Nancy Schuldt (Fond du Lac)	10.1	The objective of the 2008 MDNR Study was "to consolidate and update existing natural wild rice information and produce an inventory of those waters."...The more than 900 excluded waterbodies have the "designated use" of wild rice waters because that use was "specified in water quality standards" for those waters, 40 C.F.R. § 131.3(f), when the State designated all surface waters in the state as Class 4A waters used for the production of wild rice...Moreover, the water bodies were "designated" as wild rice waters when they were included on the inventory of wild rice water body locations identified in the 2008 MDNR report to the Legislature...The MPCA asserts that "[g]enerally, the wild rice information from these resources was originally gathered to serve a specific program interest and was not intended for regulatory use." To the contrary, the MDNR list was "intended for regulatory use."...The 2008 MDNR Study list was also actually used by MPCA for regulation of water quality. After 2008, the MPCA used the list to review water discharge permits, to ensure that pollution discharges did not violate water quality standards for "waters used for the production of wild rice." (pg 19 - 21)	The existing Class 4A rule has a sulfate standard that is only "applcable to water used for production of wild rice". This language is a modifier that serves to limit the scope of the waters to which the sulfate standard applies - not all Class 4A waters, but just those waters that are "used for production of wild rice". This modifier establishes a new sub-class of Class 4A, clearly demonstrating that not all Class 4A waters are wild rice waters. The discussion provided by the commenter concerning how the MPCA conducted the permit review process to determine if waters were "waters used for production of wild rice" shows that the MPCA did NOT treat the 2008 MDNR list as definitive or presumptively valid. As noted there, the MPCA reviewed multiple wild rice records and databases maintained by the MDNR (as done to establish the list of Class 4D wild rice waters for this rulemaking) and, in many cases, requested permit applicants to conduct a survey of wild rice stands in the receiving waters. If the MDNR 2008 list was definitive, then no additional surveys would have been necessary. The MPCA's list of wild rice waters compiled for this rulemaking is consistent with how the MPCA used sources for case by case determinations of "waters used for production of wild rice"

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531	Nancy Schuldt (Fond du Lac)	1.6	By “winnowing” the list, the MPCA in effect “delisted” Minnesota wild rice waters with an existing use, because it excludes water bodies that the State recognized as wild rice waters, and that were designated for that purpose under Minnesota regulations.But under 40 C.F.R. § 131.10, if a designated use is an existing use for a particular water body, the existing use cannot be removed unless a use requiring more stringent criteria is added. Yet the State’s “winnowing” of the list effectively removes those existing uses without adding a use with more stringent criteria, in violation of the CWA...As a first principle, it is not consistent with the Clean Water Act, to ‘winnow’ the MDNR list according to some arbitrary minimum acreage...based on the MPCA’s reasonable assumption that two acres is sufficient rice to demonstrate the beneficial use.”…The State provides no explanation for why this assumption is “reasonable,” and in fact it is particularly questionable in light of the large amount of evidence that many waters with less than two acres of manoomin are harvestable...Moreover, the methodology described in the SONAR violates the CWA because it will not identify all of the existing uses of surface water in the State, causing the removal of “existing uses” from some water bodies without the substitution of more stringent criteria...The MPCA also excluded some corroborating evidence from consideration without explanation. In particular, according the SONAR, the MPCA did not include all of the waters listed on the 1854 Treaty Authority’s March 24, 2016 list of wild rice waters...Moreover, the State admits that its methodology for identifying existing uses may fail, because it provides a process for parties to add water bodies to its list in the future by proving that a water has been used for wild rice in the past (pg 21 - 23)	As described above, the MPCA has not winnowed or otherwise delisted wild rice waters. A response to the discussion of the 1854 Treaty Authority list was provided on November 22, 2017. The MPCA does not agree that having a process to add water bodies in the future means that the existing methodology "fails".
532	Nancy Schuldt (Fond du Lac)	1	MPCA conflates existing use and designated use and the approach to designated uses that may not be existing uses is deficient	This comment is addressed in MPCA’s detailed rebuttal response.
533	Nancy Schuldt (Fond du Lac)	5	We believe the state’s multi-pronged research program actually affirmed the protectiveness of the existing 10 mg/l sulfate criterion, and clearly negated the application of any seasonal exemption for sulfate loadings to wild rice waters. Although not disclosed in the SONAR, the records released under the Minnesota Data Practices Act show that as of February 2014, the MPCA had concluded, based on the scientific study done, that the existing 10mg/l standard was proper and should remain in effect. (pg 25 - 26)	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)

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534	Nancy Schuldt (Fond du Lac)	27	Fond du Lac has supported additional years of mesocosm research...The wild rice populations in those same mesocosms have now experienced three more growing seasons of exposure to continued sulfate loading (at the same concentrations as earlier years), providing confirmation of the cumulative and adverse effect of sulfate loading at lower concentrations...During the course of these experiments, it was observed that wild rice roots in tanks with more than 50 mg/l sulfate had become blackened...accumulation of FeS plaques on roots of plants grown under high sulfate concentrations increased very rapidly and suddenly in midsummer at the time that wild rice plants are beginning to flower and take up additional nutrients for the ripening seeds. By the end of the growing season, FeS concentrations were two orders of magnitude higher on black root surfaces than in the surrounding sediment. Plants with the black FeS plaques on their roots produced fewer and smaller seeds containing less nitrogen Id. at (Fig. 5), perhaps because the plaques potentially impair the uptake of nitrogen. This suggests that even if the precipitation of FeS in the bulk sediment reduces aqueous sulfide and partly ameliorates sulfide toxicity to seedlings, precipitation on the root surfaces somehow impedes seed formation, perhaps by blocking nutrient uptake. These results clearly refute the MPCA's fundamental assumption for their equation-based sulfate standard that sufficient porewater iron will protect wild rice plants from adverse effects of sulfate (pg 26 - 28)	This comment is addressed in MPCA's detailed rebuttal response.
535	Nancy Schuldt (Fond du Lac)	2.4	The SONAR at p. 67 states that EPA's general guidelines on effect concentrations recommend the use of an EC 20 or EC 25 to protect aquatic communicates (assemblages of species) from chronic exposure to a chemical. This was the agency's justification in their 2014 preliminary analysis for proposing to base their "protective" sulfide concentration on the EC20...The MPCA Peer Review panel had suggested using a more conservative protective concentration than the generic guidance (e.g., EC10 or EC5) because the goal was to protect a single species, not a community where multiple species may fill the same ecological niche...Field survey data would best characterize the conditions under which wild rice populations are self-perpetuating over many generations, but at this time MPCA simply does not have sufficient data to show that any wild rice water body is self-perpetuating. To be more conservative (i.e., protective) a lower EC value should be used; we agree with the Scientific Peer Review team recommendation that an EC5 be considered. relevant example is the field-based benchmark conductivity standard that EPA developed for the Appalachian coal mining region; that Scientific Advisory Board-approved process used an 'extirpation coefficient' of 5, in order to protect aquatic communities from degradation as compared to reference streams...The Band maintains that any measurable diminishment in wild rice should be considered significant, and the "protective" sulfide threshold should be set at the concentration where a negative correlation between wild rice presence and sulfide concentration becomes evident...We assert that the EC5 or even the "no effect" concentration (NOEC) is the reasonable protective concentration (pg 28 - 31)	This comment is addressed in MPCA's detailed rebuttal response.

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536	Nancy Schuldt (Fond du Lac)		It is problematic that MPCA has failed to provide any data, or even propose a monitoring plan for collecting data, that is directly related to their defined use: a harvestable food source for humans and wildlife. For a waterbody to serve as a harvestable food source for humans or wildlife, it must have a sustained population of wild rice from year to year, with allowances or understanding of natural cyclical variability. To demonstrate that a given wild rice water is actually meeting that designated use would require population or stand density surveys over time...the agency has also neglected to validate their proposed equation derived "protective" sulfate standard with any kind of study or analysis that could positively correlate the calculated standard with some measure of the health or condition (biological integrity) of the wild rice water...we have strongly suggested using a floristic quality index approach to actually monitor the condition of the state's wild rice waters...the agency should develop a productivity index, similar to the FQA or other appropriate plant indices, defining ranges that incorporate acreages or linear extents (GIS polygons) and densities representative of the range of natural variability...Compliance with an untested sulfate standard is simply insufficient for assessing the health and integrity of a wild rice water. (pg 31 - 33)	The rule proposal is focused on the sulfate standard to protect the wild rice beneficial use, not the process for assessing if the beneficial use is attained. MPCA will consider this comment when developuing its approaching for assesing Class 4D wild rice waters under the CWA 303(d) to identiy waters that are impaired (or not impaired).
537	Nancy Schuldt (Fond du Lac)	29	MPCA is deliberately ignoring other sulfate effects on wild rice, such as its interaction with phosphorus, which can lead to eutrophication and degradation of wild rice populations, despite explicit direction from MN Legislature to explore the correlation between wild rice and sulfate levels to better understand the way(s) in which sulfate affects wild rice...MPCA intentionally omits data from sites that did not have "sufficient transparency" to support wild rice, in its analyses for identifying a protective sulfide concentration (TSD p. 64), and maintains that the EC 10 estimate of 91µg/L sulfide calculated without the turbid waters is more defensible than the EC 10 estimate of 58 µg/L sulfide calculated with them included. The agency claims that elevated sulfide is not responsible for the lack of wild rice when transparency is inadequate to support wild rice. This statement is inaccurate, at best; in the case of the excluded waters, sulfide is not directly responsible for the lack of wild rice (i.e., toxic effects), but it most certainly is indirectly responsible for the lack of wild rice by diminishing water clarity and affecting seed germination and early growth... (pg 33)	This comment was addressed in MPCA's 11/22/17 Response to Comments.
538	Nancy Schuldt (Fond du Lac)	28	MPCA has also deliberately excluded any analysis or evaluation of sulfate effects on mercury methylation and bioaccumulation, despite this clear adverse relationship. (pg 33)	comments about methyl mercury were addressed in MPCA's 11/22/17 Response to Comments (28 of Attachment 1 (pg. 21))
539	Nancy Schuldt (Fond du Lac)	28	the agency simply does not evaluate any potential adverse effects of sulfate loading on the nutritional quality of wild rice as an important food source for humans…MPCA's narrow focus on only direct sulfide toxicity effects to wild rice is an inadequate response to the Legislature's instruction, and is not scientifically defensible. (pg 34)	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.
540	Nancy Schuldt (Fond du Lac)	3	In all probability there exists an acute toxic sulfide concentration for wild rice, but MPCA has not experimentally or in any other manner derived it...And the iron sulfide plaques that formed in the newer experimental treatments appeared relatively quickly at the point in the growing season when the wild rice plants ceased to release oxygen at the root zone. This suggests that there actually may be a discrete time in the growing season when wild rice plants are exceptionally vulnerable to the effect of sulfate loading and reduction to sulfide. (pg 34)	This comment is addressed in MPCA's detailed rebuttal response.

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541	Nancy Schuldt (Fond du Lac)	15.4	the MPCA argues that surface water grab samples used to develop the equation "were taken in a fashion that approximated random samples of the waterbodies, and therefore, approximated the average sulfate concentration." (SONAR p. 80) But these were single (one-time) grab samples that were then related to sediment organic matter and iron via the binary logistic regression. They do not represent any natural seasonal variability in sulfate concentration, and certainly do not represent any anthropogenic variability in sulfate concentrations that may result from fluctuating (volume and concentration) wastewater discharges from a regulated facility.	MPCA has not asserted that the grab samples represent seasonal variability. MPCA did collect multiple samples from some sites to gain some information about seasonal variability, which is discussed in the TSD.
542	Nancy Schuldt (Fond du Lac)	3.6	The MPCA also assumes that the variables known to control porewater sulfide (sulfate, sediment organic carbon, and sediment iron) are in steady state	This comment is addressed in MPCA's detailed rebuttal response.
543	Nancy Schuldt (Fond du Lac)	15.4	MPCA claims (SONAR p. 82) that average concentrations of sulfate above the allowable standard in one year out of ten would not have a significant impact on wild rice populations in the long run, citing Dr. Pastor's experiments in support of this conclusion. While the agency must consider the allowable frequency of excursions as part of revising its water quality standards, it should also be stated clearly that Dr. Pastor's experiments were not designed to determine what that frequency might be...The final rationale provided for allowing a one-in-ten year excursion from the annual average sulfate limit improperly interprets 1854 Treaty Authority long term field data...The MPCA cannot assume that this natural resilience of wild rice will be realized if an anthropogenic disturbance such as excessive pollutant loading occurs. The only existing data that is relevant to that issue are the latest mesocosm results (Pastor progress report, June 2017), where only about half of the high sulfate treatment mesocosms rebounded when the sulfate loadings ceased.	This comment is addressed in MPCA's detailed rebuttal response.
544	Nancy Schuldt (Fond du Lac)	11.1	The Fond du Lac Band here advises the MPCA that the State's water quality standards for wild rice should not apply to waters that are completely or partly within the Fond du Lac Reservation.	In the 11/22/17 Response to Comments the MPCA proposed removing these waters from the proposed list of wild rice waters.
545	Nancy Schuldt (Fond du Lac)	23	The MPCA then concludes that because, in its view, the proposed new standard for wild rice "provide more accurate protection" it will "not have any negative effect on the growth, harvesting, or sustainability of wild rice. It will not exacerbate any existing disproportionate impacts or environmental justice concerns." SONAR at 134-135. The conclusion is wrong because its premise is wrong.	Responses to prior comments show that the MPCA's proposed equation is protective.
546	Nancy Schuldt attachment		Hearing Testimony	Responded to in November 22, 2017 response.
547	Nancy Schuldt attachment		September 6, 2016 Comments by Fond du Lac and Grand Portage Environmental Programs Re: Draft Technical Support Document: "Refinements to Minnesota's Sulfate Water Quality Standard to Protect Wild Rice," July 18, 2016.	
548	Nancy Schuldt attachment		December 18, 2015 Comments by Fond du Lac and Grand Portage Environmental Programs Re: MPCA's March 2015 Proposed Approach for Minnesota's Sulfate Standard to Protect Wild Rice.	
549	Nancy Schuldt attachment		March 15, 2017 Letter from the Minnesota Chippewa Tribe Re: MPCA's Proposed Revisions for Minnesota's Sulfate Standard to Protect Wild Rice	
550	Nancy Schuldt attachment		February 7, 2014 Letter from the Minnesota Chippewa Tribe Re: Definition of "waters used for the production of wild rice"; wild rice water quality standards	
551	Nancy Schuldt attachment		May 25, 2017 Letter from Indian Affairs Council Re: MPCA's Proposed Rule Revisions for Minnesota's Sulfate Standard to Protect Wild Rice	

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552	Nancy Schuldt attachment		June 13, 2016 Memo from John Pastor Re: Progress Report on Experiments on Effects of Sulfate and Sulfide on Wild Rice	
553	Nancy Schuldt attachment		April 6, 2014 Star Tribune article by Josephine Marcotty - Iron Range rebellion halted wild rice initiative	
554	Rob Beranek (attachment)		September 2016 Comments on Draft Technical Support Document: Refinements to Minnesota's Sulfate Water Quality Standard to Protect Wild Rice	
555	L. K Touminen		In general, the MPCA has taken a “weight-of-evidence” approach to rulemaking, which is in keeping with what I, as a scientist, consider to be sound science.	statement of support
556	L. K Touminen		Recent peer-reviewed research supports the interpretation that sulfide, rather than sulfate, is the more toxic of the two substances to wild rice growth.	statement of support
557	L. K Touminen		Available studies on wild rice toxicity in response to sulfide levels show somewhat mixed outcomes. The differences in outcomes are at least partly attributable to methodological differences.	statement of support
558	L. K Touminen		The current law is written to regulate sulfate. Effective regulation therefore necessitates a method, such as that developed by MPCA, that captures the relationships among sulfate, sulfide, and wild rice.	statement of support
559	L. K Touminen		The proper use of the existing model equation, like all models, is limited; this does not make it irrelevant, but it has potential for improvement. The level of sulfide defined as the toxicity threshold for wild rice is a key feature of model performance.	statement of support
560	L. K Touminen		The current threshold of acceptable wild rice density would benefit from revision. Analyses of field data suggest that a 1% or a 5% cover threshold can be used to develop a measure of sulfide effects in the field, while a 10% cover threshold is too high to quantify sulfide effects.	MPCA's approach to identifying a protective sulfide level is explaned at length in the TSD, SONAR, and responses to comments, including MPCA's affirmative demonstration of how the porposal is protective of the wild rice beneficial use. The commenters suggestion of an aklternate approach or refinement to the MPCA's approach does not negate the MPCA's demonstration of the need for and reasonableness of the proposed rules.
561	L. K Touminen		The peer-reviewed research does not effectively account for additional physiological or ecological factors that would be likely to influence wild rice success, mainly because these factors are beyond the scope of toxicological study. These unknowns do not negate the need for the standard, because sulfide impacts are more likely to be worsened than mitigated by biological factors.	statement of support
562	L. K Touminen		I personally advocate for the use of a 5% wild rice cover threshold in determining a protective sulfide toxicity limit, to be implemented in a model that clearly links (at minimum) sulfide, sulfur, iron, and organic carbon.	MPCA's approach to identifying a protective sulfide level is explaned at length in the TSD, SONAR, and responses to comments, including MPCA's affirmative demonstration of how the porposal is protective of the wild rice beneficial use. The commenters suggestion of an aklternate approach or refinement to the MPCA's approach does not negate the MPCA's demonstration of the need for and reasonableness of the proposed rules.
563	J. Chell (Northern Counties Land Use Coordinating Board)		requested that the Statement of Need and Reasonableness (SONAR) provide a background narrative that documented the geographic and temporal decline in wild rice waters and to generally provide a hierarchy of natural and anthropogenic factors leading to that decline. A MPCA representative indicated to our board verbally that such evidence was only anecdotal and would not be reflected in the SONAR.	Comments related to whether or not wild rice is declining in Mn were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. B. a. pg. 6)
564	J. Chell (Northern Counties Land Use Coordinating Board)		anticipated an MPCA assessment of the effectiveness of the new standard in addressing the goal for preserving and enhancing wild rice ecosystems generally and wild rice specifically. There does not appear to be any assurance in the SONAR or appended documentation that the standard will achieve its stated purpose. The SONAR acknowledges many other factors besides sulfate/sulfide affect the presence or absence of wild rice: soil characteristics, sediment type, land use practices, hydrology, and invasive species. The SONAR simply states that these other factors are outside the scope of this regulatory proposal.	Comments related to the effectiveness of the standard were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. pg. 4)

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565	J. Chell (Northern Counties Land Use Coordinating Board)		Field observations presented to the NCLUCB board indicate that wild rice stands are present in waters where ambient sulfide concentrations in the host sediments are from three to ten times greater than the targeted sulfide level. This field level observation suggests that the MPCA's rulemaking is not "reasonable" given the millions of dollars projected to achieve compliance with a sulfate discharge standard that is not assured to achieve the environmental benefits envisioned.	Comments related to the effectiveness of the standard were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. pg. 4)
566	J. Chell (Northern Counties Land Use Coordinating Board)		The MPCA suggests that municipalities and manufacturers that cannot comply with the discharge standard due to unreasonable costs of treatment or technologically unachievable compliance may apply for a variance from the calculated discharge level. In our discussions with municipalities and industry representatives, the variance alternative does not inspire confidence.	This comment is addressed in MPCA's detailed rebuttal response.
567	Matt Norton (Northeastern Minnesotans for Wilderness)		iron richness in sediment is not necessarily protective of wild rice. While iron by removes sulfide form solution, the resulting iron-sulfide still precipitates on aquatic plant root systems, including the root systems of wild rice. That damages wild rice root systems and reduces nutrient uptake by roots, which retards the growth and vigor of wild rice plants and impedes the development of cuts production of wild rice seed	This comment is addressed in MPCA's detailed rebuttal response.
568	Matt Norton (Northeastern Minnesotans for Wilderness)		The new sulfate standard is inconsistent with national goal and policy language in the Clean Water Act, in that it would allow massive increases of sulfate concentrations in many wild rice waters, which increases would be harmful to water quality and to wild rice....it is the national policy that the discharge of any toxic pollutant in toxic amounts be prohibited; …." 33 USC § 1251(a)... Sulfide is a toxic pollutant to aquatic organisms including but not limited to wild rice.	Comments related to the effectiveness of the standard were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. pg. 4)
569	Matt Norton (Northeastern Minnesotans for Wilderness)		Sulfate is a highly mobile pollutant. Any standard retained or adopted by the MPCA should ensure that sulfate concentrations in permitted effluent are not higher than receiving waters or waters downstream in outstanding national resource value waters, including all waters of the BWCA.....NMW objects to the proposed new standard on the grounds that it allows the setting of new sulfate "protective" standards at levels far above (one, even two or more orders of magnitude above) actual current sulfate levels in waters of northeastern Minnesota.	Comments related to the effectiveness of the standard were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. pg. 4)
570	Matt Norton (Northeastern Minnesotans for Wilderness)		proposed list..does not include waters added to the 1854 Treaty Authority's list in 2017 – a glaring omission that should be corrected by adding those new 1854 Treaty Authority waters to the MPCA's proposed list.	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)
571	Matt Norton (Northeastern Minnesotans for Wilderness)		NMW objects for several reasons to the omission by MPCA from its proposed wild rice waters list of waters where evidence shows wild rice presence, whether above or below the "thresholds" used by MPCA.	Comments related to the list of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10.1 of Attachment 1 (pg. 12)
572	Matt Norton (Northeastern Minnesotans for Wilderness)		First, snapshot measurements of wild rice stand extent and density are not suitable as a screening method because the species and the presence, distribution, extent, and density of its stands is so widely known to vary substantially over time. Those same lakes found during the year(s) surveyed to have small, scattered, or sparse wild rice presence periodically would have substantially more wild rice presence (and periodically, perhaps, less).	Comments related to the identification of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10 of Attachment 1 (pg. 12)

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573	Matt Norton (Northeastern Minnesotans for Wilderness)		Second, the MPCA's characterization of what constitutes a beneficial use leaves unprotected waters that have wild rice stands, though the MPCA characterizes them as small, scattered, or sparse.	This comment is addressed in MPCA's detailed rebuttal response.
574	Matt Norton (Northeastern Minnesotans for Wilderness)		Third, if wild rice stands are sparser, more scattered, or smaller in extent than the MPCA's arbitrarily selected threshold, that in no way establishes those wild rice stands as unimportant or without benefit to wildlife. Food and shelter resources offered by one-acre or 1.5-acre or 0.5-acre stands of wild rice do not languish unexploited by waterfowl; far from it.	Comments related to the identification of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10 of Attachment 1 (pg. 12)
575	Matt Norton (Northeastern Minnesotans for Wilderness)		Fourth, small, scattered stands, particularly but not only at the upper reaches of distinct watersheds, not only hold wildlife-related importance and an important role as the source of wild rice seeds that flow and propagate downstream, but also are important reservoirs of wild rice genetic strains distinct from those in other watersheds.	Comments related to the identification of wild rice waters were addressed in MPCA's 11/22/17 Response to Comments (10 of Attachment 1 (pg. 12)
576	Matt Norton (Northeastern Minnesotans for Wilderness)		The selection of 120 µg/L porewater sulfide as the "protective" standard is arbitrary and wasimpermissibly influenced by the MPCA's untimely consideration of economic considerations.	Comments about political influences were addressed in MPCA's 11/22/17 Response to Comments (20 Attachment 1,pg.19)
577	Matt Norton (Northeastern Minnesotans for Wilderness)		Maintenance of the existing high quality of the natural resources within the Ceded Territory, including within the Rainy River–Headwaters and Vermilion Headwaters, maintains the ability of enrolled members of the Bands to exercise their retained rights.	Comments about tribal consultations and tribal authority were addressed in MPCA's 11/22/17 Response to Comments (31.6 of Attachment 1 pg.(23))
578	Matt Norton (Northeastern Minnesotans for Wilderness)		By proposing to set sulfate limits based solely on the variables of sediment iron content and organic carbon, the proposed rule fails to reflect or take into account sulfate's other aquatic environmental interactions and compounding negative effects on water quality.	Comments about the other factors that influence wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. B. c. (pg. 7))
579	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		State-of-the-art toxicity testing (hydroponic testing by Pastor et al and Fort et al) shows that sulfide in the rooting zone is not toxic to wild rice at concentrations observed in Minnesota wild rice waters	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
580	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		MPCA unreasonably excluded (i.e. made a policy decision) that the research by Fort et al was "deserving less weight in the weighing of multiple lines of evidence. MPCA erred in excluding the research by Fort et al, which unlike the other state-of-the-art toxicity testing was conducted according to Good Laboratory Practices, and followed the recommendations of the MPCA's own Peer Review Panel. MPCA's reasons for excluding that research are clearly shown to be specious by Fort and others.	The MPCA reviewed the Fort study and information about it is included throughout the TSD and in the MPCA's 11/22/17 response.
581	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		MPCA unreasonably interpreted its own state-of-the-art testing which showed no wild rice impact from sulfide in the rooting zone (e.g. porewater and sediment). MPCA made the policy decision to include impacts to the "green" portions of the plant (shoots and leaves) which are not exposed to sulfide in wild rice waters, but are instead exposed to oxygenated water where sulfide cannot exist.	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
582	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		Fort Environmental Laboratories conducted another hydroponics study in November 2017 (unpublished) in response to the MPCA speculations that the water depth was not deep enough in the previous Fort hydroponics study….results confirmed-	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)

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583	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		1.sulfide is not toxic at levels found in MN.	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
584	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		2. adequate oxygen was not present at sufficient levels in the test media to support detoxification based on the hypoxic environment, as speculated by the MPCA in their rejection of the 2017 Fort et al study.	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
585	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		3. Rather complexation with Fe is the primary mitigating factor in terms of sulfide toxicity. Thus, the results suggest that detoxification of sulfide in the Fort et al.were also the result of Fe complexation rather than detoxification by the plant itself.	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
586	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		4. The November 2017 study provides even more evidence that MPCA unreasonably rejected the published 2017 Fort et al study and should have given much more weight to its results.	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
587	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		...these values are more than 10 times higher than the MPCA's proposed "protective" sulfide value, and demonstrate that, when all other variables arecontrolled, sulfide is not as toxic as MPCA's analysis portends to show.	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
588	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		At higher concentrations of iron (2.8 mg/L iron), NOEC and LOEC concentrations were even higher – 3.12 and 7.78 mg/L respectively; again much higher than the proposed MPCA's "protective" sulfide value.	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
589	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		As the Fort et al studies followed GLP and the Peer Review Panel recommendations, they should have been given much more weight by the MPCA.	The MPCA reviewed the Fort study and information about it is included throughout the TSD and in the MPCA's 11/22/17 response.
590	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		MPCA unreasonably derived the "protective" sulfide level using naïve statistical analysis (Hawkins, Bock, Anderson)	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
591	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		IMA recommends "protective" sulfate equation based on "protective" sulfide level in Minn. Rules 7050.0224, Subp. 5. B. 1. (Lines 7.22 through 8.17) be remanded as it is neither reasonable nor needed.	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
592	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		MPCA has not, and frankly cannot resolve the inconsistencies between the state-of-the-art toxicology research (Pastor et al and Fort et al) and the outdoor container experiments and field surveys. MPCA has not and cannot defend its statistical development of the proposed "protective" sulfide level and "protective" sulfate equation.	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
593	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		MPCA should take a page from EPA and use guidance to implement the porewater sulfide threshold. Certainly MPCA would have far more flexibility to allow implementation of the porewater sulfide threshold concentration into water column sulfate concentrations to exist as guidance, and notregulation. This would also allow MPCA the nimbleness needed to respond to additional data, evolving understanding the geochemistry of wild rice waters, and improved statistical methods.	MPCA is conducting rulemaking to eliminate the ambiguity associated with the use of "guidance."

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594	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		the field data contains an incredible amount of conflicting information that the MPCA has chosen not to evaluate. For example, the densest natural wild rice stand in the entire MPCA filed study, Lake Monongalia, had sulfide levels up to eleven times higher (1,370 ppb) than the proposed protective standard.	Comments relating to Lake Monongalia were addressed in MPCA's 11/22/17 Response to Comments (Attachment 2, St. Paul hearing, response to testimony of Kurt Anderson.)
595	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		Fifty seven percent (57%) of waterbodies with sulfide above 120 ppb have wild rice present, including some of the densest stands in the state.	Comments related to the effect of sulfate on wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover Memo III. A. a. pg. 4)
596	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		It is also striking to note that the MPCA has chosen to exclude commercial paddy rice data they collected, despite the fact commercial wild rice stands have the same species of wild rice, and operators and owners specifically design paddies to optimize wild rice production. These commercial paddies, described in more detail later in this document, unsurprisingly have dense wild rice stem counts. They also have high sulfide levels; eight of the twelve are above the MPCA proposed protective level, with the highest sulfide value over 800 ppb.	A discussion of why the conditions for growing paddy rice are different than the natural conditions in wild rice waters is provided in SONAR pg. 35
597	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		we must strip away the MPCA's unsupportable assumption that wild rice should be present if lily pads are present.	The MPCA never claimed that the presence of water lilies identifies suitable wild rice habitat in "all instances." Rather, consistent with the statistical analysis of the field data, MPCA demonstrated (TSD, p. 8) that there is a strong statistical association in Minnesota waters between waterlilies and wild rice.
598	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		MPCA ignored the confounding effects of other wild rice stressors in the field surveys. Focus on specific chemical characteristics of surface waters and associated sediment porewaters of wild rice (WR) areas may currently be non-warranted. Initially, system-wide physical and biological characteristics – specifically, water depth and competing vegetation – of waters containing WR should be the focus, if maintenance or management of that resource for WR production is the overall objective. Multiple examples of each of these influences can be observed occurring independently or, as is sometimes the case, concurrently.	Comments about the other factors that influence wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. B. c. (pg. 7))
599	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		MPCA's model incorrectly neglects the significant interaction between groundwater, sediment and porewater.	This comment is addressed in MPCA's detailed rebuttal response.
600	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		IMA contends that MPCA did not adequately specify implementation methods, particularly laboratory analytical methods.	A discussion of the reasonableness of the Analytical Methods being incorporated by reference is provided in SONAR, pg. 87.
601	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		As of today, no certified commercial water testing labs are available to conduct this method to a RL of 10 to 15 ug/L sulfide.	The MPCA disagrees and can provide references to laboratories able to conduct the required testing.
602	Kelsey Johnson (Expert Comments on behalf of Arcelor/Cliffs/IMA/Mesabi Nugget/MP/USS)		MPCA did not fully explain the costs to comply with the proposed rules, and thus does not fulfill its statutory requirements under Minn. Stat. § 14.131 (3) and (4)	Comments about costs were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III.C pg. 8)

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603	Kelsey Johnson (Additional Findings of Expert Witnesses (Anderson, Bock, Fort, Hansel,Hawkings, Richards, Tedrow)		Individual comments by expert witnesses are not itemized in this spreadsheet but the MPCA's detailed rebuttal response addresses the issues identified in their comments.	
604	David Schimpf		MPCA's approach was not designed to protect human use of wild rice in Minnesota; MPCA's proposed means of predicting sulfide levels in sediment is inadequate; and until sulfide can be predicted well the beneficial use of wild rice could be protected by enforcing a general sulfate standard higher than 10 mg/L but less than 50 mg/L.	Dr. Schimpf expresses an opinion that is not supported by the MPCA study. For instance, MPCA finds that some wild rice waters will need a sulfate standard that is less than 10 mg/L (e.g., the nine waterbodies given in TSD Table 1-12, page 58).
605	David Schimpf		1. The existing numeric sulfate standard is based on a description with some ambiguity. It is reasonable to reassess it.	The MPCA agrees that the existing standard of 10 mg/L needed to be reassed.
606	David Schimpf		2. The field survey data from MPCA's recent sulfate standard study should be the basis for deciding the numeric standard. This data set has extensive good, if incomplete, information.	statement- no response required
607	David Schimpf		3. Wild-rice grain productivity is what is important, but we are stuck for now with using stem density as a rather flawed statistical proxy for that.	statement- no response required
608	David Schimpf		4. MPCA's proposed numeric sulfide standard is based on a wild-rice abundance that looks to be far too low to provide for the beneficial use for humans.	Dr. Schimpf erroneously asserts that the MPCA based its proposed protective value on presence alone; density was also included (e.g. change-point analysis of wild rice density on TSD page 33, and the discussion of why 300 ug/L is less protective than 120 ug/L on TSD pages 65-66).
609	David Schimpf		5. My substitution of a wild-rice abundance that is probably much closer to providing for the beneficial use for humans indicates that MPCA's proposed sulfide-based numeric standard is too high to be adequately protective.	Comment suggest alternatives to the design of MPCA's research that are not possible at this time.
610	David Schimpf		6. MPCA's proposed sulfide-based numeric standard is not one that emerges clearly from its analysis. It is arbitrary.	statement- no response required
611	David Schimpf		7. The ability of MPCA's model to predict sulfide level may not be enough of an improvement over the ability to predict effects from sulfate level alone to justify the added costs of using a sulfide concentration as the basis for the numeric standard.	statement- no response required
612	David Schimpf		8. Analysis of the field survey data indicates that some value to be chosen in the range 10–50 mg sulfate/L, if enforced for all wild-rice waters, would be broadly protective for beneficial-use stem densities of wild rice, and that a 10 mg sulfate/L limit is not necessary to protect all of the wild-rice waters. The standard might be higher for streams than for lakes.	Dr. Schimpf expresses an opinion that is not supported by the MPCA study. For instance, MPCA finds that some wild rice waters will need a sulfate standard that is less than 10 mg/L (e.g., the nine waterbodies listed in TSD Table 1-12, page 58).
613	David Schimpf		9. A sulfate numeric standard higher or lower than the one referenced in point 8) could be set for some specific sites where stakeholders demonstrate a need for it, based on what has been learned about sediment chemistry from the sulfate standard study and future advances in that understanding.	statement- no response required
614			**Comments identified below were submitted to OAH by means other than e-comment.**	**MPCA Response**
615	Seward Co-op		Comments regarding topics previously addressed	Addressed in MPCA's 11/22/17 Response to Comments
616	Alexandria Lake Area Sanitary District		Comments regarding topics previously addressed	Addressed in MPCA's 11/22/17 Response to Comments
617	Alexandria Lake Area Sanitary District		we are concerned that the 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 to protect wild rice	This comment is addressed in MPCA's detailed rebuttal response.
618	Grand Rapids Area Chamber of Commerce		wild rice is not only important economically, but it is significant to the spiritual and cultural values of the 11 indpendent sovereign Indian Nations in the State of Minnesota	Comments about tribal consultations and tribal authority were addressed in MPCA's 11/22/17 Response to Comments (31.6 of Attachment 1 (pg.23))

Comment ID	Commenter Name	Topic	Comment (Summary or Excerpt and Location)	Response or Response Location
619	Grand Rapids Area Chamber of Commerce		the Minnesota Indian Affairs Council is the official liaison between the State of Minnesota and the eleven federally recognized tribes in the state, and states that this rule revision process will not result in the protections of wild rice for either meeting the MPCA's defined beneficial use, or the Minnesota tribe's expressed values	statement- no response required
620	Grand Rapids Area Chamber of Commerce		MPCA has acknowledgeded that there are multiple factors other than sulfide that impact wild rice but are choosing not to evaluate those factors, against the recommendation of the Minnesota Indian Affairs Council	Comments about other stressors to wild rice were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. B. c (pg. 7)
621	US Forest Service		Comments are the same as the comments identified under Topics (e-comments) and are addressed above.	
622	Friends of the Boundary Waters Canoe Area Wilderness and the Quetico-Superior Ecosystem		These comments were the same as the recurring letter H addressed in the MPCA's 11/22/17 Response to Comments	Comments related to retaining the existing standard were addressed in MPCA's 11/22/17 Response to Comments (Cover memo III. A. (pg. 5) and 3.1 of Attachment 1 (pg.3)
623	Minnesota Medical Association, The Minnesota Academy of Family Practice, The Minnesota Public Health Association and the Minnesota Nurses Association		Comments regarding topics previously addressed	Addressed in MPCA's 11/22/17 Response to Comments
624	Kris Wegerson		Comments are the same as the comments identified under Topics (e-comments) and are addressed above.	
625	Mike Sundin		Comments are the same as the comments identified under Topics (e-comments) and are addressed above.	
626	City of Red Wing (Sean Dowse)		Comments are the same as the comments submitted by City of New Prague addressed above.	Addressed in MPCA's 11/22/17 Response to Comments
627	David Schimpf		Comments are the same as the comments identified under Topics (e-comments) and are addressed above.	
628	John Chell (Northern Counties Land Use Coordinating Board)		Comments are the same as the comments identified under Topics (e-comments) and are addressed above.	
629	Tony Kwilas (Minnesota Chamber)		Comments are the same as the comments identified under Topics (e-comments) and are addressed above.	
630	Alex Spitzer (Water Legacy Petition)		Comments are the same as the comments identified under Topics (e-comments) and are addressed above.	Addressed in MPCA's 11/22/17 Response to Comments
631	Paula Maccabee (attachments 1-85)		Attachments to comments submitted via e-comment webpage	