Exhibit I

Written Comments Received by the MPCA During the Public Notice Comment Period

Exhibit I.1.

Molloy, Kevin (MPCA)

From: Kristi Pursell <kristi@crwp.net>
Sent: Monday, December 19, 2016 12:24 PM
To: *MPCA_TALU Rulemaking
Subject: Support for Proposed Change

I think establishing a Tiered Aquatic Life Uses (TALU) framework is a great idea. Please proceed and thank you for all your work.

-- Kristi A. Pursell

Kristi Pursell
Community Engagement Coordinator
Cannon River Watershed Partnership
400 Washington St. Northfield, MN 55057
(507) 786-3913
www.crwp.net

Exhibit I.2.

Molloy, Kevin (MPCA)

From: Melberg, Charles <Charles_Melberg@smbsc.com>
Sent: Wednesday, January 18, 2017 2:29 PM
To: *MPCA_TALU Rulemaking
Subject: MPCA water hearing

My name is Charles Melberg. I farm in southwestern Minnesota. I am requesting a hearing on the MPCA's water quality policy on returning our water to pristine levels.
We have always had wildfires and 5 to 10 inch rains that created erosion. Our streams and ditches were formed from erosion. If we make rules that hinder ag production, it will take more acres to produce enough food to feed our country. I believe in 10 foot buffer strips where I decide what grasses should be planted with no government compensation.
Charles Melberg

Sent from my iPad

Exhibit I.3.

Molloy, Kevin (MPCA)

From: Corinne Elfelt <Celfelt@cooncreekwd.org>
Sent: Monday, January 23, 2017 12:45 PM
To: Bouchard, Will (MPCA)
Subject: Public Comments on TALU
Attachments: 20170123123915181.pdf

On behalf of Coon Creek Watershed District, please accept the attached Public Comments on the Proposed Amendments to Minnesota Rules, Chapters 7050 and 7052, relating to Tiered Aquatic Life Uses (TALU) and Modification of Class 2 Beneficial Use Designations.

I hard copy of the letter is being submitted via USPS.

Regards,

Corinne Elfelt
Corinne Elfelt
Coon Creek Watershed District
Executive Assistant
12301 Central Ave NE, Suite 100
Blaine, MN 55343
763.755-0975
www.cooncreekwd.org

Exhibit I.3.

COON CREEK WATERSHED DISTRICT
12301 Central Avenue Northeast • Suite 100 • Blaine • Minnesota 55434

January 23, 2017

Will Bouchard
Minnesota Pollution Control Agency
Environmental Analysis and Outcomes Division
520 Lafayette Road North
Saint Paul, MN 55155-4194

RE: Public Comment on the Proposed Amendments to Minnesota Rules, Chapters 7050 and 7052, relating to Tiered Aquatic Life Uses (TALU) and Modification of Class 2 Beneficial Use Designations

Dear Mr. Bouchard:

The Coon Creek Watershed District (District) has reviewed the above document and submits the enclosed comments. The District has an interest in the proposed amendments as the District manages over 100 miles of public ditches, established via MS 103E, that will be directly affected by the amendments.

The District believes the concept of TALU is a significant improvement in the biological assessment methodology. However, there are a number of ambiguous and subjective terms used throughout the proposed amendments that raise significant concerns about how TALU will actually be implemented. Although there are lengthy resources available it is still unclear which Class 2 designation will be applied to the drainage ditches we manage.

If you have questions about the enclosed comments or if you need additional information please contact me at tkelly@cooncreekwd.org or at 763-755-0975 or Jon Janke at jjanke@cooncreekwd.org. Thank you for your consideration.

Sincerely,

Tim Kelly
District Administrator

CC
Michelle Ulrich, District Attorney

Printed on recycled paper

COON CREEK WATERSHED DISTRICT
12301 Central Avenue Northeast • Suite 100 • Blaine • Minnesota 55434

Comment 1 - (Page 2) 7050.0150 Subp.3a., (Page 7) 7050.0150 Subp.4.BB., (Page 41) 7050.0222 Subp.2c.A.(4), (Page 55) 7050.0222 Subp.3c.A.(4), (Page 74) 7050.0222 Subp.4c.A.(4), (Page 81) 7050.0470 Subp.1., (Page 102) 7050.0470 Subp.2., (Page 108) 7050.0470 Subp.3., (Page 115) 7050.0470 Subp.4., (Page 131) 7050.0470 Subp.5., (Page 145) 7050.0470 Subp.6., (Page 149) 7050.0470 Subp.7., (Page 163) 7050.0470 Subp.8., and (Page 165) 7050.0470 Subp.9. - *'...not subject to frequent change'*- Define or clarify the intended use of "frequent" in this case. Frequent is an ambiguous term subject to interpretation; does it mean monthly or annually or bi-annually? Also, will there be notice and/or opportunity for comment or participation on any future changes to these documents incorporated by reference in the proposed Rule? Will such changes be made under the chapter 14 administrative procedure rule requirements?

Comment 2 - (Page 57) Subp.3c.D.(1) and (Page 75) Subp.4c.D.(1) - *'...found to be incapable of supporting and maintaining...'*- Define or clarify the intended use of "incapable" in this case. Incapable can be interpreted as an absolute term. In absolute terms, all waters are capable of supporting and maintaining general beneficial uses with unlimited resources. Therefore, no waters could technically be designated as modified use. Also, why the need for this language in the Rule rather than simply be included as an additional step in the Use Attainability Analysis?

Comment 3 - (Page 57) Subp.3c.D.(1) and (Page 75) Subp.4c.D.(1) - *'...found to be incapable of supporting and maintaining...*- Define or clarify the use of "maintaining" in this case. This language seems inconsistent with the guidelines outlined in the Use Attainability Analysis section of the MPCA reference document for designating Aquatic Life Uses, "Technical Guidance for Reviewing and Designating Tiered Aquatic Life Uses in Minnesota Streams and Rivers." These guidelines state, "if both biological assemblages have met General Use biocriteria on or after November 28, 1975, then at a minimum a recommendation of General Use can be made." In the case of drainage ways managed under Minnesota Statute 103E (the Drainage Law), legally mandated maintenance (e.g. ditch cleaning) may preclude the ability of a stream-reach to *maintain* the General Use biocriteria even if the assessment reach previously *supported* the Class 2Bdg beneficial use.

Comment 4 – "(Page 57) Subp 3c.D.(1) and (Page 75) Subp. 4c.D.(1) – *"that preclude the potential for recovery of the fauna."* – Define or clarify the intended use of "potential" in this case. The term is ambiguous.

Comment 5- It is unclear who is responsible for determining water body type, possible Water body ID (WID) splits, and beneficial use designations. Language needs to clarify name of entity making these determinations (example, Page 1, 7050.0150 Subp. 3a: "The criteria by which water bodies are assessed [by whom?] to determine if beneficial uses are supported..." Does the public, local drainage authorities and/or Local Governmental Units have an opportunity for comment or participation in these determinations? Will the agency follow the chapter 14 administrative procedure rule requirements in making these determinations?

Exhibit I.4.

Molloy, Kevin (MPCA)

From: Theresa Stasica <TStasica@ricecreek.org>
Sent: Tuesday, January 31, 2017 11:20 AM
To: *MPCA_TALU Rulemaking
Cc: Phil Belfiori
Subject: RCWD comment letter_ Proposed Amendments to MPCA State Water Quality Standards, which will establish a Tiered Aquatic Life Uses (TALU) Framework
Attachments: RCWD-MPCA ltr_comments on proposed TALU amendments.pdf

Good Morning. Please find attached Rice Creek Watershed Districts comment letter to MPCA regarding MPCA's proposed changes to WQ standards . A papercopy of the letter has also been mailed today.

Thanks,
Theresa

Theresa Stasica, Office Manager
Rice Creek Watershed District
4325 Pheasant Ridge Drive NE, Suite 611
Blaine, MN 55449
Phone: 763-398-3070
Fax: 763-398-3088
Email: tstasica@ricecreek.org

RCWD
RICE CREEK WATERSHED DISTRICT

Please consider following the RCWD on Facebook.

Exhibit I.4.

RCWD
RICE CREEK WATERSHED DISTRICT

January 31, 2017

Mr. Will Bouchard
MPCA, Environmental Analysis and Outcomes Division
520 Lafayette Road North
Saint Paul, MN 55155-4194

Re: Comments on Proposed Tiered Aquatic Life Use Amendments to MPCA State Water Quality Standards

Dear Mr. Bouchard:

The Rice Creek Watershed District (RCWD) staff have reviewed the proposed amendments to MPCA State Water Quality Standards and have the following comments.

1. As the steward of public drainage systems, the RCWD believes the proposed Tiered Aquatic Life Uses (TALU) standard is inappropriate for application to public drainage systems, especially constructed or highly modified natural channels.
2. Constructed and highly modified open channels, which are components of many public drainage systems were not explicitly considered in the studies, used to establish the proposed TALU standards and the Index of Biotic Integrity values. (Calibration of Biological Condition for Streams of Minnesota, Gerritson et al (2012)). The MPCA should refrain from implementing the TALU approach, until specific data can be collected to inform the IBI for these systems.
3. Many of the public drainage systems managed by the RCWD are now classified as 2B (they are unnamed water of the state). These will default to the 2Bg classification. This classification seems inappropriate considering the highly modified nature of the open channels comprising the drainage systems (see comment no.'s 1 and 2).
4. It is unclear how the TALU standard will be used to manage the resource. Specifically, it is unclear how when an IBI is exceeded, a TMDL will be completed to address the stressors mostly commonly leading to the impairment; i.e., hydrology, lack of habitat. THe MPCA is advised to think through how they plan to incorporate the standard into TMDLs and Watershed Restoration and Protection Strategies, in a meaningful way, which addresses the specific stressors leading to a lower than expected IBI.
5. Considerable expense will be incurred to complete use attainability analyses, to identify an appropriate TALU standard for constructed and highly modified open channels, should the MPCA automatically apply a 2Bg classification. It is unclear whether public drainage authorities possess the authority incur such expenses on behalf of the drainage systems

they manage. The concern is that this investment, from whatever source, could be placed elsewhere, to manage resources which in fact do provide important aquatic habitat. The classification as limited resource habitat is more appropriate than 2Bg, especially in the absence of data for public drainage system open channels.

Based on the above mentioned comments, the RCWD recommends that the TALU standards not be applied public drainage systems and at a minimum, they be classified as limited resource habitat.

Thank you for the opportunity to provide these RCWD staff comments. If you have any questions please do not hesitate to contact me at pbelfiori@ricecreek.org or 763-398-3071.

Sincerely,

RICE CREEK WATERSHED DISTRICT

Phil Belfiori
Administrator

Exhibit I.5.

Molloy, Kevin (MPCA)

From: Meghan Funke <mfunke@eorinc.com>
Sent: Tuesday, January 31, 2017 12:14 PM
To: Bouchard, Will (MPCA)
Cc: kkill@mnwcd.org; jshaver@cmscwd.org; Camilla Correll; Carl Almer
Subject: Comments on the proposed amendments to Minn.R. 7050 and 7052, TALU and Class 2 beneficial use
Attachments: BCWD and CMSCWD Comment Letter - TALU Proposed Amendments_final.pdf

Dear Mr. Bouchard,

Please consider the attached joint comments from the Brown's Creek Watershed District and the Carnelian-Marine-St. Croix Watershed District on the Proposed Amendments to Minnesota Rules, Chapters 7050 and 7052, relating to Tiered Aquatic Life Uses (TALU) and Modification of Class 2 Beneficial Use Designations.

Thank you for the opportunity to comment.

Meghan Funke, PhD
Limnologist
651.203.6049. mfunke@eorinc.com

EOR: water | ecology | community
651 Hale Avenue North. Oakdale. MN 55128
o: 651.770.8448 f: 651.770.2552 www.eorinc.com

2016 FIDIC INTERNATIONAL ENGINEERING AWARD RECIPIENT - AMONG TOP 20 ENGINEERING PROJECTS WORLDWIDE

Exhibit I.5.

BROWN'S CREEK WATERSHED DISTRICT

CARNELIAN-MARINE-ST. CROIX WATERSHED DISTRICT

January 20, 2017

Will Bouchard
Environmental Analysis and Outcomes Division, Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

RE: Proposed Amendments to Minnesota Rules, Chapters 7050 and 7052, relating to Tiered Aquatic Life Uses (TALU) and Modification of Class 2 Beneficial Use Designations

Dear Mr. Bouchard,

This letter is in response to the 45-day comment period for the Proposed Amendments to Minnesota Rules, Chapters 7050 and 7052, relating to Tiered Aquatic Life Uses (TALU) and Modification of Class 2 Beneficial Use Designations. This comment letter is written on behalf of the Brown's Creek Watershed District (BCWD) and the Carnelian-Marine-St. Croix Watershed District (CMSCWD) in the Lower St. Croix Major Watershed. The BCWD and CMSCWD support the adoption of the Proposed Amendments with a few minor comments as noted below:

1) **TALU Classification Pre-Screening**: The next Intensive Watershed Monitoring (IWM) year for the Lower St. Croix River Watershed begins in 2019, at the earliest. Is it possible for MPCA to query the existing state IBI data in advance of the IWM schedule to flag streams that may potentially meet the Modified or Exceptional Use criteria? This is difficult for other organizations to assess without access to the applicable fish or macroinvertebrate class of each biological monitoring station and the database of fish and macroinvertebrate IBI scores. For example, it appears that Brown's Creek (07030005-520) had numerous macroinvertebrate IBI scores at or above the exceptional use threshold for their invertebrate class, and that Old Mill Stream (07030005-549) and Willow Branch (07030005-904) had fish IBI scores just below the exceptional use threshold for their fish class.
2) **TALU Classification & IBI Thresholds:** On the MPCA online Environmental Data Access, it would be useful for MPCA to report the new TALU fish and macroinvertebrate class and associated biocriterion/confidence limits with the biological monitoring station IBI scores.
3) **Technical Guidance for Reviewing and Designating Tiered Aquatic Life Uses in Minnesota Streams and Rivers**:
   a) Will there be future revisions to this document? It's still designated as DRAFT.
   b) Section 3.1.1 Data Review: "This data will need to include at least one reportable/assessable visit from either fish or macroinvertebrates, although it is preferable that data from both assemblages are present". We would recommend that more than one IBI score be required for designating TALU classifications, and that streamflow at the time of sampling be considered.
4) **Biological Monitoring Station Location**: Will there be any attempt to standardize the location of biological monitoring stations as part of the TALU approach? For example, streams often have historic biological monitoring stations located at numerous and sometimes unrepresentative locations.

Please let me know if you have any questions about the comments or suggestions submitted for the Proposed Amendments to Minnesota Rules, Chapters 7050 and 7052, relating to Tiered Aquatic Life Uses (TALU) and Modification of Class 2 Beneficial Use Designations.

Sincerely,

Jim Shaver
CMSCWD Administrator

Karen Kill
BCWD Administrator

Meghan Funke, PhD
Emmons & Olivier Resources, Inc.

Exhibit I.6.

Molloy, Kevin (MPCA)

From: Nathan Schmalz <schmalzn@hotmail.com>
Sent: Tuesday, January 31, 2017 9:01 PM
To: *MPCA_TALU Rulemaking
Subject: TALU Comments / MPCA

To Mr. William Bouchard,

Thank you for allowance of comments from our local government unit pertaining to proposed TALU framework.

I would like to make 2 comments against the proposal.

1) I would request that the proposals go through the hearing process.

This would allow the public to be more engaged, with additional information presented.

It would also allow stakeholders a better understanding of the affects, both pro and con, with the adoption of the new framework.

2) In general, I am against the TALU proposed framework.

Our Local and County governing bodies have not been given enough time to respond to the new framework, or even understand it.

I would like our McLeod County Association Of Townships, along with our legal representatives, review the proposals prior to amendment adoption.

With McLeod County being in the South Central region of Minnesota's farm country, our needs are vastly different than those of the Lake Superior Region in Northern Minnesota.

Without further research, the newly proposed framework could be far more cumbersome to interpret than what we presently have.

Respectfully Submitted,
Nathan Schmalz
Winsted Township Supervisor
McLeod County Minnesota

Exhibit I.7.

Molloy, Kevin (MPCA)

From: Zabel, Mark <Mark.Zabel@CO.DAKOTA.MN.US>
Sent: Wednesday, February 01, 2017 1:34 PM
To: *MPCA_TALU Rulemaking; Bouchard, Will (MPCA)
Cc: Thiel, Travis; Fischer, Georg
Subject: TALU Rule Amendments Comments
Attachments: TALU Comment Letter.pdf

Attached is a letter containing comments on the Proposed Amendments to Minnesota Rules Chapters 7050 and 7052, relating to Tiered Aquatic Life Uses (TALU) and Modifications of Class 2 Beneficial Use Designations.

Mark Zabel

Administrator for the Vermillion River Watershed Joint Powers Organization
Surface Water Unit Supervisor
Dakota County
14955 Galaxie Avenue
Apple Valley, MN 55124

952-891-7011
mark.zabel@co.dakota.mn.us
www.vermillionriverwatershed.org

Exhibit I.7.

Vermillion River watershed reflecting life

February 1, 2017

Will Bouchard
MPCA, Environmental Analysis and Outcomes Division
520 Lafayette Road North
St. Paul, MN 55155-4194

Re: Comments on Tiered Aquatic Life Uses

Dear Mr. Bouchard,

The Vermillion River Watershed Joint Powers Organization (VRWJPO) appreciates the opportunity to provide comments on the Minnesota Pollution Control Agency's (MPCA) proposed amendments to Minnesota Rules, Chapter 7050 and 7052, relating to Tiered Aquatic Life Uses (TALU). The following comments are offered for consideration:

- If a modified use is being considered for a water resource, a use attainability analysis (UAA) is required to justify the modified use. It is unclear to the VRWJPO who is required to conduct and/or pay for the cost of the UAA.
- Class 2B waters are separated into three uses under the proposed amendments; exceptional, general, and modified. However, Class 2A is not separated in the same manner, only providing two uses; exceptional or general use. The VRWJPO understands that Class 2A waters are typically a higher quality resource that may support a cold water community, but the same significant alterations have the ability to exist in Class 2A waters as they do in Class 2B waters. Our watershed has both Class 2A and 2B waters that have been significantly altered prior to the MPCA's identified date of November 28, 1975 that may justify a modified use. Based on the proposed amendments, the Class 2A waters are unable to be considered for a modified use.
- Amendments to 7050.02222, Subp. 2 on page 28 states that, "The quality of Class 2A surface waters shall be such as to permit the propagation and maintenance of a healthy community of cold water aquatic biota, and their habitats according to the definitions in Subpart 2c." It does not state within this section that the cold water sport or commercial fish be a native fish. If you refer to page 40 Subpart 2c.A.(2) states "The attributes of species composition, diversity, and functional organization are measured using: (a) the fish-based IBI as defined in Development of a Fish-based Index of Biological Integrity for Minnesota's Rivers and Streams, Minnesota Pollution Control Agency (2014)." The current fish IBI for 2A waters utilizes two metrics that require native cold water species: 1) Percent native cold water individuals, and 2) Percent native cold water taxa. In the Vermillion River Watershed, the fishery supports brown trout, a non-native cold water species that currently exists in the watershed based on previous stocking efforts and successful natural reproduction. This is similar to other streams and rivers within Minnesota that are actively managed by the Minnesota Department of Natural Resources (DNR) as trout streams. Stream segments within the Vermillion River watershed were designated as DNR trout stream based primarily on the presence and successful reproduction of brown trout, which subsequently resulted in a Classification

as 2A by the MPCA. The VRWJPO is supportive of maintaining and improving a brown trout fishery. The current Class 2A IBI coldwater metrics provide little or no points for having brown trout as they are non-native, and only considers them a sensitive species. If the new rulemaking refers to a Class 2A fishery as having cold water biota, and does not specify the cold water fish be native, then the IBI should also be modified to consider brown trout within the two cold water metrics or consider compelling the Minnesota DNR to stock only native species of fish within Minnesota's waters.

- Example activities identified under 7050.0222, Subp. 3.c.D.(2), on page 57 of the draft amendments are cited as those legally occurring under authority of "sections 401 and 404 of the Clean Water Act; or Minnesota Statute, Chapter 103E." While these examples may be regulated activities that are potentially controllable for the sake of improvements to the water resource, these modifications can be substantial and can have an effect on the biological community. However, modifications that aren't regulated can also have significant impacts to the biological communities. The hydrological alterations of tiling and private ditching, and its effect on water resources is an example of a modification that could justify the modified use that should be considered. Tiling and private ditching are non-regulated alterations, so tracking these activities and trying to improve watershed conditions without a regulatory mechanism to manage the alteration provides little leverage aside from volunteer activities to make improvements and meet standards.
- On page 29 of the Statement of Need and Reasonableness it states: "If habitat structure is limiting and determined to be the result of natural conditions (e.g. wetland characteristics, bedrock substrate, barrier falls, etc.), then the options available are development of new IBI models for this type of water body or the development of a site-specific standard." It is unclear as to how the development of new IBI models or the development of a site specific standard is triggered, or how the choice between the two will be made to address limitations due to natural conditions. Would a Use Attainability Analysis be required, and if so, who would conduct the analysis and how would it be funded? What criterion would be applied to choose to create a new IBI model or a site specific standard?

Sincerely

Mark Zabel
Administrator for the Vermillion River Watershed Joint Powers Organization

Exhibit I.8.

Molloy, Kevin (MPCA)

From: John Harrington <johnrharrington@gmail.com>
Sent: Thursday, February 02, 2017 8:01 AM
To: *MPCA_TALU Rulemaking
Subject: Comments on the Matter of proposed revisions of Minnesota Rules, chapters 7050 and 7052
Attachments: TALU JH comments.docx

Please find my comments attached

John Harrington
johnrharrington [at] gmail [dot] com

My Minnesota
http://my-minnesota.blogspot.com/

"A patriot must always be ready to defend his country against his government."

— Edward Abbey

Exhibit I.8.

February 2, 2017

To:

Will Bouchard (talurulemaking.pca@state.mn.us)
MPCA, Environmental Analysis and Outcomes Division
520 Lafayette Road North, Saint Paul, MN 55155-4194

From:

John Harrington
30726 Ivywood Trl
Stacy, MN 55079
johnrharrington@gmail.com
(651) 257-9508

Re: Comments on the Matter of proposed revisions of Minnesota Rules, chapters 7050 and 7052, relating to Tiered Aquatic Life Uses (TALU) and modification of Class 2 beneficial use designations.

Mr. Bouchard,

I commend the Minnesota Pollution Control Agency's efforts to improve Minnesota's water quality standards and beneficial use designations. However, my initial review of the proposed rule and modification of Class 2 designations leads me to conclude their adoption as drafted will do little more than provide an expedient way to reduce the number of stream segments in Minnesota classified as "nonattainment." There are several other concerns that, if properly addressed, would make the TALU adoption actually beneficial. In no particular order of importance I list them below.

1. MPCA should take the proposed TALU to a much more holistic level, if it's to be used at all. The current draft framework does not appear to envision the types of water quality and aquatic life and riparian improvements that are expected to result from Governor Dayton's "water ethic" and the recently enacted "buffer law;" it also seems to fail to adequately address and incorporate the relationship between aquatic habitat, riparian zones and the rest of a local ecosystem. Insights into these topics can be found in Professor Kurt D. Fausch's recent book *For the Love of Rivers* and in the linked resources at item 6. The following quotation from page 179 of Fausch's book, referencing a role of aquatic insects, is indicative of a more holistic perspective:

> *...Birds like warblers and flycatchers that migrate to these forests for their four-month summer breeding season, after wintering in Central America, rely on emerging insects for nearly a third of their energy needs. These insects are critical to their survival after the long migration and supply the energy needed for males to defend territories and females to lay eggs. Loss of this much emergence would eliminate the food required by seventy-one birds per mile, which a study by Nakano and Murakami along Horonai Stream in Japan suggested would be two-thirds of the birds breeding there.*

2. The proposed TALU rule, as drafted, would modify both beneficial use classifications and the classes of more than 100 stream segments. This must become a two step process if the public is to have meaningful participation, particularly in light of the limitations in accuracy and coverage in the Agency's referenced data base. For several segments that I tried to check, there were no records in the database, although relevant information was found in water quality assessment reports for those watersheds. I doubt that many Minnesotans would have the knowledge or patience to do such crosschecking, especially since the database does not provide linkages to the relevant reports. Furthermore, if the proposed rules are modified to any extant, it is unclear how, if at all, or which, if any, stream segments would be affected. This is an unacceptable status for meaningful engagement and transparency.

3. The Agency's database notes that number of the segments proposed for downgraded classification do not have adequate information to support the change in class. Stream identification number: **07010207-641** is but one example where the database states "Not enough data is available on this waterbody to determine recreation, aquatic life, or fish consumption condition." Lack of information is a totally unacceptable basis on which to propose a downgrade. Such an approach would clearly, in my opinion, undermine the Governor's "water ethic" strategy.

4. It appears that the TALU approach, as proposed, either does not concur with or is unaware of the emphasis on Ecological System Services contained in Minnesota's Water Sustainability Framework of 2011, which states, on page 71:

> *In addition, there are costs that are not yet figured into the true cost of losing ecological benefits. Ecosystem services that water resources provide to Minnesotans include water for agricultural, industrial, and residential use; fish, waterfowl, mussels, and aquatic foods such as aquaculture and wild rice; recreation opportunities (boating, swimming, fishing, hunting, nature viewing); flood control; and aesthetic, spiritual, and cultural benefits. Studies that have tried to estimate the value of ecosystem services provide an indication of the magnitude of their worth. One study estimated a value of $5 million per year in cost reduction of treating groundwater in Rochester. Another estimated a value of $9.37 per milligram of sediment prevented from entering a water body. The value of wild rice harvest in Minnesota is approximately $5 million annually. The value of sport fishing is estimated at $465 per year per person.*

5. Furthermore, Minnesota once had, but appears to have abandoned, an additional tool that would work well in helping to address some of the concerns about the limitations and deficiencies in the current TALU proposal. The federal areawide water quality management planning process, as described in part in this Lake Superior document [PART VI, MINNESOTA COASTAL NONPOINT SOURCE PROGRAM, A. SUMMARY OF DEVELOPMENT AND STATUS OF STATE NPS PROGRAMS] offers a potential foundation for the type of watershed-based, holistic approach the Agency is moving toward and must embrace. But that approach, to be effective, requires an integrated, not a fragmented, set of rules and designated beneficial uses. Minnesota appears to have a draft, statewide plan prepared to meet Section 208 requirements but I find no reference to an EPA approved plan.

6. Finally, there are existing examples of nongame wildlife benefits that arise as complementary opportunities to stream restoration efforts. Minnesota has been involved in some of them in the Driftless Area in the southeast corner of the state. There is an accompanying *regional Driftless Area conservation strategy that addresses the causes of habitat loss, fragmentation and alteration of lotic systems and outlines objectives and strategies to more effectively and efficiently improve riparian and stream habitat for fish and other aquatic organisms.* I respectfully suggest that the proposed TALU could be vastly improved if it better reflected the "Driftless Area" strategies and tactics in the linked resources.

According to the SONAR, MPCA proposes the draft TALU, in part, to attain "increased water quality management efficiency because resources are not used to restore waters beyond what is currently attainable." This, in my opinion, ignores the forward looking emphasis in the Clean Water Act. At the time it was enacted, many major rivers in the U.S. would most likely have failed an aquatic life use evaluation for many of their reaches. What is currently attainable will always be less than what may be attainable in the future, should more, and more appropriate, resources be brought to bear. The proposed TALU fail to reflect such a philosophy and so I strongly object to their adoption as proposed. Minnesota, through your agency, can and must do better.

I appreciate the opportunity to comments on the MPCA's proposed TALU rules and modification of Class 2 beneficial use designations. Please notify when you have determined whether a hearing will be held on these rules, and feel free to contact me if you have any questions.

Thank you.

John Harrington

Exhibit I.9.

Molloy, Kevin (MPCA)

From: Paula Maccabee <pmaccabee@justchangelaw.com>
Sent: Thursday, February 02, 2017 11:24 AM
To: *MPCA_TALU Rulemaking
Subject: Proposed Amendments to Minnesota Rules, Chapters 7050 and 7052, relating to Tiered Aquatic Life Uses (TALU) and Modification of Class 2 Beneficial Use Designations
Attachments: WaterLegacyTALURuleComment(Feb.2,2017).pdf; WL TALU Comment Exhibit 1.pdf; WL TALU Comment Exhibit 2.pdf; WL TALU Comment Exhibit 3.pdf

Dear Mr. Bouchard,

Attached with this email, please find WaterLegacy's comments on the MPCA's Proposed Amendments to Minnesota Rules, Chapters 7050 and 7052, relating to Tiered Aquatic Life Uses (TALU) and Modification of Class 2 Beneficial Use Designations, along with our three Exhibits to these comments.

As reflected in the comments, WaterLegacy has requested a hearing on the proposed rules and beneficial use designations.

We would appreciate receiving email confirmation that our comments and exhibits have been received, as well as notification as to whether a hearing will be held on these issues.

Please do not hesitate to contact me if you have any questions regarding our comments.

Best regards,

Paula Maccabee, Esq.
Advocacy Director/Counsel for WaterLegacy
1961 Selby Ave.
St. Paul MN 55104
phone: 651-646-8890
fax: 651-646-5754
Cell: 651-775-7128
e-mail: pmaccabee@justchangelaw.com

Exhibit I.9.

Paula Goodman Maccabee, Esq.
Just Change Law Offices
1961 Selby Ave., St. Paul, Minnesota 55104, pmaccabee@justchangelaw.com
Ph: 651-646-8890, Fax: 651-646-5754, Cell 651-775-7128
http://justchangelaw.com

February 2, 2017

Will Bouchard (talurulemaking.pca@state.mn.us)
Minnesota Pollution Control Agency
Environmental Analysis and Outcomes Division
520 Lafayette Road North
Saint Paul, MN 55155-4194

RE: Proposed Amendments to Minnesota Rules, Chapters 7050 and 7052, relating to Tiered Aquatic Life Uses (TALU) and Modification of Class 2 Beneficial Use Designations

Dear Mr. Bouchard,

These comments are submitted on behalf of WaterLegacy, a grassroots non-profit founded in 2009 to protect Minnesota's water resources and the communities that rely on them.

WaterLegacy requests a hearing on the Minnesota Pollution Control Agency (MPCA) Proposed Amendments to Minnesota Rules, Chapters 7050 and 7052, relating to Tiered Aquatic Life Uses (TALU) and Modification of Class 2 Beneficial Use Designations. WaterLegacy objects to the entire proposed TALU rule and the designations of 109 water bodies as Class 2 "Modified Use" waters based on the evidence in the MPCA Statement of Need and Reasonableness (SONAR) Appendix A. We also object to portions of the proposed TALU rule. *See* Minn. R. 1400.2800, Subp. 3, Item E.

WaterLegacy appreciates all of the efforts of the MPCA to assess water quality through biological criteria for beneficial use. We believe that there are benefits in conducting biological assessments to evaluate the abundance and diversity of pollution-tolerant and pollution-sensitive fish and benthic macroinvertebrates and comparing these assessments with present and historical reference waters that are unimpacted by anthropogenic stressors. However, we also believe that any rule or guidance to apply biological assessments to create tiered aquatic life uses must meet all of the following criteria:

1. Class 2 waters that do not meet biological criteria for aquatic life uses should be listed as impaired waters, studied and restored pursuant to the Clean Water Act (CWA) Section 303(d) where a pollutant or pollutants may be contributing to impairment.

2. Even where a biological impairment is due solely to hydrologic alteration, waters should not be sub-classified for "Modified Use" without specific findings that there was no "existing" general use under the CWA and that restoration is not feasible.

3. Waters that have had an exceptional beneficial use for cold, cool or warm water fish and habitats at any time since November 28, 1975 should be protected as existing exceptional use waters.

4. Methods and requirements for biological assessments should be clearly specified and reviewable in the rule so that the way in which sub-classifications are made is clear, rigorous and mandatory.

5. Numeric and narrative standards pertaining to chemical parameters should apply to all Class 2 waters, and Class 2 waters should be protected for consumption of aquatic biota by humans and wildlife.

6. Listing and sub-classification of waters should be consistent with ecological and watershed divisions and readily available and transparent to the public.

The TALU proposed rules and the proposed modification of Class 2 beneficial use to downgrade 109 waters to "Modified Use" meet none of the above criteria.

The TALU proposed rules would downgrade beneficial uses and prevent study and restoration of impaired waters where both hydrologic alteration and pollutants contribute to impairment. As applied, the TALU rules would result in downgrading of beneficial uses in violation of the CWA and federal regulations. The SONAR and its Appendix A demonstrate that the TALU rules would reduce the potential for restoration of a staggering proportion of Minnesota stream miles.

The proposed TALU rule to sub-classify "Exceptional Use" waters fails to provide enhanced protection to streams that were exceptional at some time after November 28, 1975, but do not currently meet bioassessment criteria. Further, the proposed TALU rules would provide no consistent application and preclude effective public scrutiny of sub-classification, since no specific methodology is provided in the rules themselves or in the hundreds of pages incorporated by reference.

The proposed TALU rules would create ambiguity as to the application of existing Minnesota water quality standards and the protection of human health and wildlife as a result of consumption of contaminated fish. Citizen scientists have concerns that sub-classification at the water body identification (WID) scale fragments the connection between upstream waters and downstream beneficial uses. Providing listings in a huge number of unsearchable documents separate from the rule undermines transparency and accountability for members of the public interested in knowing how a ditch, stream or river reach is classified for beneficial use.

1. The proposed TALU rules downgrading Class 2 waters for "Modified Use" are inconsistent with the Clean Water Act and federal regulations and guidance to identify, study and restore impaired waters.

The proposed TALU rules provide that Class 2 aquatic beneficial uses can be downgraded to "Modified Use" waters, which have lower expectations for the diversity and abundance of fish

and aquatic life, based on a current lack of attainment of the Clean Water Act interim goals in Section 101(a)(2).[1] This reclassification would be based on the biological assessment score provided for the water body in question.

If the TALU rules were adopted, a "Modified Use" could still be listed as impaired for a specific chemical parameter that exceeded a numeric standard. However, "Modified Use" waters with chemical stressors for which there are no Minnesota numeric water quality standards (WQS) set to protect aquatic life - such as specific conductivity, sulfate or calcium - would no longer be listed as impaired. MPCA, U.S. Environmental Protection Agency (EPA), and peer-reviewed research demonstrate that these and various other pollutants for which Minnesota has no Class 2 numeric WQSs impair aquatic ecosystems by harming pollutant-sensitive native species and/or increasing survival of invasive species.

Under existing Minnesota rules, when the abundance and diversity of fish or lower aquatic biota are found to be impaired as a result of biological assessment, that water is listed under CWA Section 303(d) as an impaired water (Category 5). The SONAR acknowledges that the effect of the proposed TALU rules would be to remove from MPCA the obligation to perform additional stressor identification studies should an impaired water have physical habitat conditions limiting attainment of the aquatic life use.[2] The MPCA determined that selecting its TALU framework, rather than the evaluation of stressors in waters that may be impaired both by pollutants and by hydrologic alterations, would be the best alternative since it was the "least costly."[3]

The EPA and U.S. Geological Survey recently completed a draft technical report, *Protecting Aquatic Life from Effects of Hydrologic Alteration* (EPA-USGS Hydrologic Alteration Report).[4] EPA and USGS recommended a different and far more protective approach to waters that may be stressed both by hydrologic changes and by pollutants:

> Where there is no associated pollutant, EPA recommends reporting impairments due to hydrologic alteration in Category 4c, which are those impairments due to pollution not requiring a TMDL (U.S. Environmental Protection Agency, 2005) . . . *Where the specific pollutant causing the impairment has not been identified (for example, for biological impairments), EPA recommends that states list those waters in Category 5 (the 303[d] list, impaired by a pollutant and requiring a TMDL), unless they can demonstrate that the impairment is solely attributable to a nonpollutant* (for example, flow) (U.S. Environmental Protection Agency, 2003; 2005). Additionally, EPA's guidance has noted that assessment categories are not mutually exclusive, and waters may be placed in more than one category (for example, categories 4c and 5) (U.S. Environmental Protection Agency, 2005).[5]

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[1] MPCA, SONAR, p. 14.
[2] *Id.*, p. 65.
[3] *Id.*
[4] Draft EPA-USFS Technical Report: *Protecting Aquatic Life from Effects of Hydrologic Alteration*, EPA Report 822–P–15–002, USGS Scientific Investigations Report 2015–5160 available at https://www.epa.gov/sites/production/files/2016-03/documents/aquatic-life-hydrologic-alteration-report.pdf
[5] *Id.*, p. 51 (emphasis added)

The EPA-USGS Hydrologic Alteration Report also cited with approval narrative water quality standards enacted by ten states and tribes that prohibit changes in the natural hydrologic regime that impair existing and designated beneficial uses.[6] The Report emphasized, "Water quality programs implemented to address the Clean Water Act (CWA) objective of restoring and maintaining the chemical, physical and biological integrity of waters ideally consider strategies to maintain key components of the natural flow regime."

MPCA's proposed TALU roles do not consider the contribution of point or nonpoint source pollutants to impairment when a Class 2 water is downgraded to "Modified Use."[7] Under the proposed rules, once a water was downgraded to "Modified Use," no Section 303(d) listing, TMDL study or restoration plan would be prepared. The "Modified Use" would not lapse or require re-evaluation for restoration at any time.

In addition, even as they downgrade and give up on restoration of beneficial uses due to past hydrologic alterations, the MPCA's proposed TALU rules contain no narrative standards prohibiting future hydrologic changes that could impair additional Class 2 uses. WaterLegacy recommends changes to the proposed TALU rules to address our concerns.

Recommendations:

a. Preclude "Modified Use" listing unless impairment is solely attributable to a nonpollutant. Change the text in proposed Minn. R. 7050.0222, Subp. 3c, Beneficial use definitions for warm or cool water stream and river habitats (Class 2Bd), Item D (1), proposed TALU rules p. 57.3 to 57.8 and Subp. 4c, Beneficial use definitions for warm or cool water stream and river habitats (Class 2B), Item D (1), p. 75.22 to 76.2, as follows[8]:

> To meet the definition in this item, waters must have been the subject of a use attainability analysis, and a determination must have been made ~~found to be~~ that the water is incapable of supporting and maintaining the Class 2Bdg [or Class 2Bg] beneficial use because of human-induced modifications of the physical habitat that preclude the potential for recovery of the fauna, and that the failure to support such general use does not result in whole or in part from a point source or nonpoint source pollutant. Waters where nonattainment of beneficial uses is attributable in part to a pollutant shall remain classified for general use and shall be listed as impaired under the Clean Water Act Section 303(d) (Category 5) whether or not that pollutant has been identified. Human-induced ~~These~~ modifications must be the result of direct alteration to the channel, such as drainageway maintenance, bank stabilization, and impoundments.

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[6] *Id.*, pp. 44-45.
[7] MPCA proposed TALU rules, Minn. R. 7050.0222, Subp. 3c (Class 2Bd), Item D, p. 56.21 to 57.8; Subp. 4c (Class 2B), Item D, p. 75.16 to 76.2.
[8] Underline and strikeout refer to MPCA proposed TALU rules text.

b. Provide narrative criteria requiring that hydrological natural flow regimes be maintained at levels adequate to protect existing and designated uses. Amend existing Minn. R. 7050.0150, Subp. 3, Narrative Standards,[9] to add an additional sentence:

> Any change from the natural flow regime as a result of impoundments, channelization, water withdrawal, point or nonpoint source discharges to surface water shall provide for maintenance of flow characteristics that ensure the full support of all uses and comply with all applicable water quality criteria.

2. As implemented by the MPCA, the proposed TALU rules could result in a staggering downgrading of Class 2 uses to "Modified Uses," inconsistent with the Clean Water Act and federal regulations

The Clean Water Act (CWA) and federal regulations prohibit removing or downgrading an "existing" beneficial use for aquatic life or wildlife, which is defined as a beneficial use existing at any time since November 28, 1975. 33 U.S.C. § 1251(a)(2); 40 C.F.R. §§ 131.3(e), 131.10(g), 131.10(h)(1), 131.10(j). Federal regulations allowing removal or downgrading of a use through a use attainability analysis (UAA) due to hydrologic modifications that preclude the attainment of the use also require a finding "that it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use." 40 C.F.R. § 131.10(g)(4).

The SONAR states that, if habitat quality has been limited by legal human activities, such as maintenance of drainage, a water body would be downgraded to "Modified Use" if there are no feasible options for restoration or recovery and the water body is not likely to recover on its own in five years.[10] The SONAR decision chart suggests yet a less searching definition of feasibility: "Can Modified Attributes Be Reversed with Proven Restoration Designs?" Again, a general use can be downgraded if "natural recovery" is not "likely" within the next 5 years.[11]

The proposed modification of Class 2 beneficial use designations for 109 Minnesota waters to "Modified Use" classifications in Attachment A of the SONAR underscores that the MPCA's proposed TALU rules as implemented by the Agency would fail to protect existing uses and result in a wholesale reclassification of Class 2 waters for "Modified Use," effectively preventing the additional study and application of best management practices to restore these waters.

First, WaterLegacy finds it troubling that the public notice for the proposed TALU rule did not state that *any* waters would actually be downgraded to "Modified Use" if the rule were to be enacted, let alone providing a list of the waters proposed to be downgraded. The SONAR made the strong and reassuring statement that the TALU framework "**IS NOT** a mechanism for downgrading the existing beneficial use class for a water body."[12]

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[9] Addition would be after p. 1.23 in the MPCA's proposed TALU rules.
[10] MPCA, SONAR, p. 29
[11] *Id.*, p. 30
[12] *Id.*, p. 15 (emphasis in original)

However, when read carefully, Appendix A to the MPCA's SONAR appears to do just that -- downgrading 109 streams, ditches and river segments from Class 2 beneficial uses to "Modified Use" waters.[13] WaterLegacy confirmed in a conversation with MPCA staff that the listings in Appendix A would become final classifications if the TALU rule were adopted.

WaterLegacy reviewed the redesignations of waters to "Modified Use" proposed in Appendix A to the SONAR. Each redesignation we reviewed proposed the reclassification on the basis of a biological assessment with only the following evidence of the absence of an existing use or restoration options:

> This reach has been altered for drainage and available evidence (e.g., aerial imagery) indicates that the reach was maintained for drainage before November 28, 1975. In addition, no evidence indicates that fish and macroinvertebrate assemblages attained the aquatic life use goals for General Use on or after November 28, 1975. . . The poor habitat condition cannot be reversed at this time and is not likely to recover naturally due to drainage maintenance.[14]

WaterLegacy confirmed in discussions with staff that there was no other UAA for the waters proposed to be downgraded other than what is included in Appendix A. We learned that no guidance on best practices was used by the MPCA to evaluate whether poor habitat conditions could be restored or beneficial use for aquatic life improved. We were informed that, where waters were modified by ditching before 1975 and did not currently meet biological assessment criteria, the MPCA assumed that the water body would not have met standards for a general aquatic life use at any time since November 28, 1975. Finally, we were advised that, as the TALU rules were applied, about two-thirds of the ditches reviewed by the MPCA would not remain classified as "General Use," but would be reclassified for "Modified Use."

Information in the SONAR suggests that the proposed TALU rules and the implementation practices reflected in Appendix could result in downgrading of a staggering portion of Minnesota stream miles to "Modified Use" waters. MPCA's analysis of streams in Minnesota determined that "approximately 53% of stream miles are modified by humans either through channelization, channel creation, or impoundment." MPCA noted that the majority of these alterations are the result of channelization to improve drainage in agricultural and urban areas of the state.[15]

The implications to dischargers of downgrading Class 2 beneficial uses to "Modified Use" were also evaluated by the MPCA. In analyzing its own rules, the MPCA found that *no* existing wastewater dischargers would have more costs to protect the 30 streams this rulemaking is designating "Exceptional Use," while at least 31 point source pollution dischargers could save money as a result of new designations of "Modified Use" waters and the avoidance of TMDL review and conditions on discharge.[16] The proposed TALU rules could also result in cost

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[13] See attached WL TALU Comment Exhibit 1, which is copied and exported from the SONAR Appendix A.
[14] MPCA, SONAR Appendix A, Appendix pp, 10, 11, 12 *et seq.*
[15] MPCA, SONAR, p. 46.
[16] *Id.*, pp. 85, 90.

savings for nonpoint pollution sources, since best management practices would not be required to attempt to restore general use biological goals.[17]

In the preliminary assessment under the proposed TALU rules of 1,733 WIDs (waterbody IDs) comprising 12,472 stream miles, 39 (2%) of the WIDs were assigned "Exceptional Use," and 389 (22%) were assigned "Modified Use."[18] We don't know if this assessment provides a representative sample, but in this analysis more than one-fifth of the streams reviewed were downgraded to "Modified Use," and 10 times as many streams were downgraded and removed from restoration goals under the Clean Water Act as were classified as "Exceptional Use," with a potential for increased protection.

Recommendations:

a. Clarify the requirement for proposed TALU definition of a use attainability analysis (UAA) to prevent mass downgrading of uses to "Modified Use" without individualized determinations inconsistent with 40 C.F.R. §§ 131.3, 131.10(g), (h), (j). Amend the definition of UAA in proposed rule 7050.0150, Subp. 4, Item LL, p. 8.22 to 9.2 as follows[19]:

> LL. "Use attainability analysis" for the purpose of removing a Class 2 general beneficial use means an individualized determination that general beneficial use is not an existing use of the waters, which cannot be presumed based on the presence of hydrologic alteration prior to November 28, 1975, ~~and~~ a structured scientific assessment of the physical, chemical, biological, and economic factors ~~and~~ affecting attainment of the uses of the water body ~~bodies~~; and an evaluation of restoration best practices as well as natural recovery to make an individualized determination that no restoration of general aquatic life beneficial uses is feasible. A use attainability analysis is required to remove a designated use specified in section 101(a)(2) of the Clean Water Act that is not an existing use. The allowable reasons for removing a designated use are described in Code of Federal Regulations, title 40, section 131.10(g).

b. Require an individualized determination and a 5 year sunset on any designation that removes a general class 2 beneficial use, consistent with 40 C.F.R. Part 131 and the MPCA's SONAR using 5 years as the time horizon for natural stream recovery. Amend the text of Minn. R. 7050.0222, Subp. 3c (Class 2Bd) Item D (1) and Subp. 4c (Class 2B), Item D (1), pp. 57.3 to 57.8, 75.22 to 76.2, and add an additional sub-Item D (3) to each as follows[20]:

> (1) To meet the definition in this item, waters must have been the subject of a use attainability analysis, and an *individualized* determination must have been made ~~found to be~~ that the water is incapable of supporting and maintaining the Class 2Bdg [or Class 2Bg]

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[17] *Id.*, p. 90
[18] MPCA, Development of Biological Criteria for Tiered Aquatic Life Uses, June 2016, p. 40, available at https://www.pca.state.mn.us/sites/default/files/wq-bsm4-02.pdf
[19] Underline and strikeout refer to MPCA proposed TALU rules text.
[20] Underline and strikeout refer to MPCA proposed TALU rules text. Amended text for sub-Item D(1) includes recommendations made in Section 1 above, with new recommendations italicized and underlined.

beneficial use because of human-induced modifications of the physical habitat that preclude the potential for recovery of the fauna, and that the failure to support such general use does not result in whole or in part from a point source or nonpoint source pollutant. Waters where nonattainment of beneficial uses is attributable in part to a pollutant shall remain classified for general use and shall be listed as impaired under the Clean Water Act Section 303(d) (Category 5) whether or not that pollutant has been identified. Human-induced ~~These~~ modifications must be the result of direct alteration to the channel, such as drainageway maintenance, bank stabilization, and impoundments *and both natural recovery and restoration best practices must be considered to evaluate the potential for recovery of general beneficial use*.

(3) Any designation of modified use under this part shall expire in 5 years, and the water shall be designated for general use and listed under the Clean Water Act Section 303(d) as impaired unless an individualized determination is made that no feasible practices or natural recovery will restore general beneficial use.

c. Invalidate the 109 reclassifications of Modified Use waters proposed in Appendix A of the SONAR pending the following actions by MPCA:
(i) analysis of whether the impairment was attributable in part to pollutants (as discussed in the previous section);
(ii) individualized reassessment of whether general Class 2 uses were an existing use under the CWA and whether there is no feasible restoration; and
(iii) transparent public notice of MPCA's intend to remove general Class 2 beneficial uses, naming and identifying on map waters proposed to be reclassified.

3. The proposed TALU rules create an improper presumption that streams not found to be "Exceptional" in a current assessment are not "Exceptional" existing uses.

The proposed TALU Rules would only consider today's biological condition gradient level in classifying Minnesota streams, including trout streams, for "Exceptional Use." Streams that may have had exceptional quality for cold, cool or warm water fish and biota at any time during the past 41 years, but have since been polluted or stressed, would not be considered an existing exceptional use under the proposed TALU rules.[21]

The proposed TALU rules' restrictive definition of exceptional use is inconsistent with the Clean Water Act and with federal regulations that define existing uses as "uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards." 40 C.F.R. § 131.3. Classifying what had been an exceptional trout stream or warm water stream at any time since November 28, 1975 as a "General Use" stream would, in effect, remove an "Exceptional Use" that is an existing use, contrary to federal regulations. See 40 C.F.R. §131.10(g), (h).

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[21] *See* MPCA proposed TALU rules, Minn. R. 7050.0222, Subp. 2c (Class 2A), Item B, p. 41.15 to 41.20; Subp. 3c (Class 2Bd), Item B, p. 56.7 to 56.13; Subp. 4c (Class 2B), Item B, p. 75.4 to 75.9.

Although it may not be possible to completely rectify Minnesota's four-decade delay in specifying exceptional trout streams, sturgeon rivers and other exceptional stream habitats for fish and other aquatic biota, the exclusionary nature of the proposed reclassification language can and must be rectified.

Recommendation

Revise the language designating an "Exceptional Use" in proposed TALU rules, Minn. R. 7050.0222, Subp. 2c, Item B (Class 2A), p. 41.15 to 41.20; Subp. 3c, Item B (Class 2Bd), p. 56.7 to 56.13; and Subp. 4c, Item B (Class 2B), p. 75.4 to 75.9 to conform with the definition of "existing uses" under the CWA and implementing federal regulations as follows[22]:

> B. "Exceptional cold water aquatic life and habitat" or "Class 2Ae" [Class 2Bde, Class 2Be] is a beneficial use that means waters with an existing exceptional use capable of supporting and maintaining an exceptional and balanced, integrated, adaptive community of cold water aquatic organisms, which existing exceptional use shall be designated where a water has ~~having~~ a species composition, diversity, and functional organization comparable to the 75th percentile of biological condition gradient level 3 as established in Calibration of the Biological Condition Gradient for Streams of Minnesota, Gerritsen et al. (2012) or where it is more likely than not, based on assessments or other verifiable data, that the water had an exceptional aquatic life beneficial use at any time since November 28, 1975.

4. The proposed TALU rules provide no clear methods or requirements for assessment of fish and macroinvertebrates or designation of uses.

The MPCA proposed TALU rules contain an unprecedented series of incorporations of documents by reference in the place of a statement in rules of methods and requirements for biological assessment. Prompted by the question of a citizen expert as to whether the rules would require assessment of benthic macroinvertebrates (aquatic insects) to the level of genus and species so that pollution-tolerant and pollution-sensitive aquatic life could be counted, WaterLegacy searched for and reviewed all of the documents referenced in the proposed TALU rules.

What we learned was striking. The MPCA's proposed TALU rules rely on cross-referencing or incorporating five documents, comprising a total of 318 pages, for everything from assessment criteria to designation of beneficial uses.[23]

The rules provide no direct links to any of these documents; to find them one must use a search engine. Most troubling, once one finds and reviews the many referenced documents in the

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[22] Underline and strikeout refer to MPCA proposed TALU rules text.

[23] *See* MPCA proposed TALU rules, Minn. R. 7050.0150, Subp. 3a, p. 1.24 to 2.3; Minn. R. 7050.0222, Subp.2c (Class 2A), p. 40.12 to 41.14; Subp. 3c (Class 2Bd), p. 55.2 to 56.6; Subp. 4c (Class 2B), p. 73.25 to 75.3 for incorporations by reference.

proposed TALU rules,[24] it becomes clear that these references are sprawling documents to justify biological assessment practices and or the biocriteria for the proposed TALU rules. They provide no clear requirements for methodology or timing of assessment.

WaterLegacy has insufficient scientific expertise to identify all of the methodological requirements that are critical for a valid assessment of the biological condition of waters. However, our work with citizen experts and review of EPA guidance and literature for the past four years to understand the impacts of specific conductivity on aquatic life has demonstrated that biological assessment of macroinvertebrates must be taken at appropriate locations and in multiple samples; must be at least at the genus level, if not at the species level; must identify pollution-tolerant and pollution-sensitive species/genera; must search for data collected prior to human-induced changes; and must include sampling in the late spring/early summer as well as in the fall. We believe that specifying these and other requirements in rule is necessary as well as eminently practical.

We are particularly concerned about the lack of rule criteria for macroinvertebrate sampling based on the highly indeterminate language of the SONAR, which states, "Minnesota's biological monitoring tools identify most fish individuals to species whereas the taxonomic level of identification for macroinvertebrates varies depending on the group. As a result, *macroinvertebrates are identified to different levels such as species, genus, family, or order* depending on the feasibility of identifying these organisms to the lowest level."[25] This statement is inconsistent with EPA guidance and the peer-reviewed literature[26] and assumes an incapacity to identify insects that

WaterLegacy also believes that the way in which the specific biocriterion numbers listed in the proposed TALU rules are generated requires rule explanation. The MPCA's justification for using various percentiles of the biological gradient or a certain biocriterion number to indicate exceptional, general or modified use may appropriately be provided in the SONAR or in documents cross-referenced in the SONAR as justification for the rule. However, we believe that the way in which the characteristics of a water are actually counted to reach the biocriterion number or any other assessment used to determine beneficial use should be specified in the rule.

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[24] Guidance Manual for Assessing the Quality of Minnesota Surface Waters for Determination of Impairment: 305(b) Report and 303(d) List (2014 and as subsequently amended)(77 pages), currently available at https://www.pca.state.mn.us/sites/default/files/wq-iw1-04i.pdf; Development of a Fish-based Index of Biological Integrity for Minnesota's Rivers and Streams, MPCA (2014)(63 pages), currently available athttps://www.pca.state.mn.us/sites/default/files/wq-bsm2-03.pdf; Development of a Macroinvertebrate-based Index of Biological Integrity for Minnesota's Rivers and Streams, MPCA (2014)(57 pages), currently available at https://www.pca.state.mn.us/sites/default/files/wq-bsm4-01.pdf; Calibration of the Biological Condition Gradient for Streams of Minnesota, Gerritsen et al. (2012)(57 pages), currently available at available athttps://www.pca.state.mn.us/sites/default/files/wq-s6-32.pdf; Development of Biological Criteria for Tiered Aquatic Life Uses, Minnesota Pollution Control Agency (2016)(64 pages), currently available athttps://www.pca.state.mn.us/sites/default/files/wq-bsm4-02.pdf.

[25] MPCA, SONAR, p. 13, fn 4 (emphasis added).

[26] *See e.g.* Cormier et al., "Derivation of a Benchmark for Freshwater Ionic Strength," Envt'l Toxicol. & Chem., Vol. 32, No. 2, pp. 263-271, attached as WL TALU Comment Exhibit 2; EPA, Field-Based Methods for Developing Aquatic Life Criteria for Specific Conductivity, EPA-822-R-07-010, Public Review Draft, December 2016, available at https://www.epa.gov/sites/production/files/2016-12/documents/field-based-conductivity-report.pdf.

We would note that Appendix A, even as it proposed to reclassify 109 waters to "Modified Use," disclosed no biocriterion or index of biological integrity (IBI) scores to justify the new designation. Appendix A proposed reclassifications to "Modified Use" also applied a habitat metric for good and poor habitats that is not reflected anywhere in the TALU rules. From our perspective, the first implementation of the proposed TALU rules to remove general Class 2 beneficial uses failed to provide any intelligible evidence that the waters proposed to be downgraded met the TALU criteria in the proposed rules.

We would request that the TALU rules specify how the biocriterion number must be determined. In addition, if determinations are to be made based on habitat metrics, as in Appendix A to the SONAR, the proposed TALU rules should state how the habitat metric will be used and what will be assessed to determine that habitat metric.

Recommendations:

a. Complete the rigorous analysis and writing process needed for rulemaking. Write in clear and concise rule language what methodology will be required to sample, quantify and assess biological conditions and reclassify beneficial uses and make that methodology explicit in rule language, so that it is intelligible, mandatory and reviewable.[27]

b. Include in rule language methodology for the following aspects of assessment and designation, among other methods and requirements:
   (i) number, location, season and specificity of macroinvertebrate sampling, including sampling to a genus level in all cases, to a species level wherever feasible and identification of pollution-tolerant and pollution-sensitive genera/species;
   (ii) explanation of how the determination of biologic criterion numbers/ IBI scores shall be counted and determined for a specific water;
   (iii) explanation of how habitat metrics will be determined and used for designation/ reclassification of uses.

5. The proposed TALU rules create ambiguity about the application of numeric and narrative standards for chemical parameters to Class 2 waters and the protection of wildlife and human health from consumption of contaminated aquatic biota.

WaterLegacy has identified a number of inconsistencies and gaps in drafting of the proposed TALU rules that would have unfortunate consequences. We believe that drafting issues, rather than intentions, have the potential to create ambiguities and gaps regarding the application of numeric and narrative standards to Class 2 waters. These concerns can be readily addressed with text amendments.

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[27] MPCA's theoretical and scientific justifications for methodology selected need not be reflected in rule text, but should be summarized in the SONAR, with documents relied upon attached as appendices.

The first ambiguity is created by the treatment of Class 2A, 2Bd and 2B exceptional, general and modified use as classes of waters, rather than as categories as "subcategories" or "tiers" of beneficial uses, as described in the SONAR.[28] The MPCA's proposed TALU rules strike existing use classes Class 2A, 2Bd and 2B and replace them with 2Ae, 2Ag, 2Bde, 2Bdg, 2Bdm, 2Be, 2Bg, and 2Bm Classes.[29] The proposed TALU rules make the same change in the sections of existing Minnesota rules that make numeric water quality standards applicable to beneficial use classes, striking the existing Class 2A, 2Bd and 2B beneficial uses and replacing them with 2Ae, 2Ag, 2Bde, 2Bdg, 2Bdm, 2Be, 2Bg, and 2Bm Classes.[30]

However, all numeric water quality standards under the proposed TALU rules, as well as under existing Minnesota rules, would apply to Class 2A, 2Bd or 2B waters.[31]

This is highly problematic since no Minnesota waters are currently designated under the new TALU subcategories. The MPCA's Beneficial Use Designations for Stream Reaches use the designations 2A, 2Bd and 2B for the many thousands of waters in its database.[32] Even were an aggressive reclassification strategy adopted, it would take many years for all of Minnesota's waters to be subcategorized. Should the proposed TALU rules be adopted without amendment, neither narrative nor numeric water quality standards would apply to Minnesota waters pending TALU assessment and rulemaking.

This problem is easily rectified as proposed in recommendation (a) below by clarifying that TALU subcategories are subclasses within Class 2A, 2Bd and 2B uses. MPCA staff has informed WaterLegacy that the intent of the TALU rules was that both narrative and numeric chemical parameter standards would apply to all Class 2 waters.

The second gap where water quality standards would cease to apply to a significant number of waters pertains to the 41waters that are currently designated as Class 2C under Minnesota Rules 7050.0470. The proposed TALU rules would remove the existing designations of Class 2C waters.[33] The proposed TALU rules also specifically strike Class 2C uses from every section

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[28] MPCA, SONAR, p. 16.
[29] MPCA proposed TALU rules, Minn. R. 7050.0220 (water quality standards by associated use classes), Subp. 1, Items A through C, p. 20.21 to 21.3.
[30] MPCA proposed TALU rules, Minn. R. 7050.0222, Subp. 3a (Class 2A), p. 22.2 to 22.4; Subp. 4a (Class 2Bd), p. 22.7 to 22.9; Subp. 5a (Class 2B), p. 22.12 to 22.16.
[31] *See e.g.* MPCA proposed rules Minn. R. 7050.0218 (toxic pollutants), Subp. 4, Items A and B, p. 18.1-18.17; Minn. R. 7050.0220 (water quality standards by associated use classes), Subp. 1, p. 20.21 to 21.3 and headings for pollutants at pp. 22.18, 22.22, 23.9 *et seq.*; Minn. R. 7050.0222 (specific water quality standards for class 2 waters), Subp. 2 (Class 2A), pp. 28.21, 29.7, 29.29 *et seq.*; Subp. 3 (Class 2Bd), pp. 42.12, 44.22, 43.12 *et seq.*; Subp. 4 (Class 2B), pp. 59.1, 59.11, 60.4 *et seq.*; Minn. R. 7052.0100 (water quality standards), Subp. 5, p. 167.22; Subp. 6, p. 169.19. This listing is illustrative, not exhaustive.
[32] See MPCA, Tiered aquatic life uses (TALU) framework, Beneficial Use Designations for Stream Reaches, available at https://www.pca.state.mn.us/water/tiered-aquatic-life-uses-talu-framework. WaterLegacy has randomly reviewed a dozen of the 80 separate documents for categories of stream reaches and found consistent references to current designated uses, even when new sub-classifications are proposed in Appendix A of the SONAR.
[33] MPCA proposed TALU rules, Minn. R. 7050.0470, Subparts 1 through 9, pp. 81- 167.

where water quality standards are applied.[34] As with the prior Class 2A, 2Bd and 2B designations, the Beneficial Use Designations for Stream Reaches on the MPCA website continue to use 2C designations.[35]

Although the SONAR states "The MPCA is removing all references to Class 2C and reclassifying all Class 2C waters as Class 2B,"[36] no text in the proposed Rule states that Class 2C waters are being reclassified as 2B waters. A simple text amendment providing for the intended redesignation would solve what could be a significant gap in the application of water quality standards.

The proposed TALU rules create confusion and inconsistency in use of the terms "aquatic biota" and "aquatic life." The rules provide a new definition of "aquatic biota," which does not refer to consumption by humans and includes only a limited reference to use by wildlife.[37] Neither the existing nor the proposed rules define "aquatic life." The proposed TALU rules use the term "aquatic life" to define Class 2 beneficial uses in the definition section of the rule,[38] in the sections of the rule explaining various use classes,[39] and in the new rule sections explaining tiered aquatic life uses.[40]

Although the term "aquatic life" is used in the headings pertaining to specific Class 2 water quality standards, the text of the subparts pertaining to water quality standards applicable to beneficial uses modifies the existing text to strike "aquatic life" and substitute "aquatic biota."[41] It is not clear what is intended by the MPCA's varying use of the terms "aquatic biota" and "aquatic life."

What is clear under Minnesota rules is that the existing and proposed purpose of Minnesota water quality standards includes protecting Class 2 waters for "the consumption of fish and edible aquatic life by humans" and "the consumption of aquatic organisms by wildlife" as well as for the "propagation and maintenance of aquatic biota." Minn. R. 7050.0217, Subp. 1.[42] Water quality standards in the pertinent sections of Minnesota rules, including but not limited to standards for mercury and PCBs, are set to protect the health of humans and wildlife consuming aquatic life as well as the health of aquatic organisms.

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[34] *See e.g.* Minn. R. 7050.0128 (toxic pollutants), Subp. 4, Item B, p. 18.6 and Subp. 10, Item A, p. 19.17; Minn. R. 7050.0220 (water quality standards by use class), Subp. 1, Item C, p. 21.2; Subp. 5a, p. 22.13 and pp. 22.18, 22.22, 23.9 *et seq.*; Minn. R. 7052.0100 (water quality standards), Subp. 5, p. 167.22; Subp. 6, p. 169.18; Minn. R. 7052.0110 (methodologies), Subp. 3, p. 170.17.

[35] See for example, Beneficial Use Designations for Stream Reaches: Minnesota River – Mankato Watershed, available at https://www.pca.state.mn.us/sites/default/files/wq-s6-48a.pdf.

[36] MPCA, SONAR, p. 17.

[37] MPCA proposed TALU rules, Minn. R. 7050.0150, Subp. 4, Item C, p. 2.16 to 2.21.

[38] *Id.*, Minn. R. 7050.0150, Subp. 3, Items F and G, p. 3.3 to 3.10.

[39] *Id.*, Minn. R. 7050.0220, Subp. 1, Items A through C, p. 20.21 to 21.3; Subp. 3a, p. 22.2; Subp. 4a, p. 22.7; Subp. 5a, p. 22.12;

[40] *Id., Minn.* R. 7050.0222, Subp. 2c, p. 41.12 to 41.26; Subp. 3c, p. 56.4 to 57.2; Subp. 4c, p. 75.1 to 75.21.

[41] *Id.,* Minn. R. 7050.0222, Subp. 2, p. 28.23; Subp. 3, p. 42.14; Subp. 4, p. 59.3.

[42] *Id.*, Minn. R. 7050.0217, Subp. 1, p. 10.8 to 10.12. *See also* Minn. R. 7050.0140, Subp. 3.

In updating federal antidegradation rules in 2015, the EPA also explained that Clean Water Act Section 101(a)(2) uses of water for "fish" includes human health consuming fish as well as the propagation of aquatic life. 80 Fed. Reg. 51027 (Aug. 21, 2015).

WaterLegacy's recommended change to address this problem suggests that consumption of aquatic biota be included in the new definition of "aquatic biota" and that the definition be modified to define "aquatic biota" or "aquatic life." This change is probably the simplest way to protect Clean Water Act uses and avoid potential gaps or inconsistencies in the language.

Recommendations:

a. Wherever current text strikes out Class 2A, 2Bd or 2B uses in favor of the new sub-classifications, modify the text to define the new exceptional, general or modified designations as sub-classes within the existing uses. This would change existing Minnesota Rules at 7050.0220, Subp. 1, Items A through C to read as follows[43]:

A. cold water ~~sport fish (trout waters)~~ aquatic life and habitat, also protected for drinking water: Classes 1B, 2A (and sub-classes 2Ae or 2Ag); 3A or 3B; 4A and 4B; and 5 (subpart 3a);

B. cool and warm water ~~sport fish~~ aquatic life and habitat, also protected for drinking water: Classes 1B or 1C, 2Bd (and sub-classes 2Bde, 2Bdg, or 2Bdm); 3A or 3B; 4A and 4B and 5 (subpart 4a);

C. cool and warm water ~~sport fish, indigenous aquatic life, and wetlands~~ aquatic life and habitat and wetlands: Classes 2B (and sub-classes 2Be, 2Bg, 2Bm) ~~2C,~~ or 2D; 3A, 3B, 3C, or 3D; 4A and 4B or 4C; and 5 (subpart 5a).

Similar changes are recommended for Minnesota Rules 7050.0222, Subp. 3a, 4a and 5a as follows[44]:

Subp. 3a. Cold water ~~sport fish~~ aquatic life and habitat, drinking water, and associated use classes. Water quality standards applicable to use Classes 1B, 2A, (and sub-classes 2Ae or 2Ag); 3A or 3b; 4A and 4B; and 5 surface waters.

Subp. 4a. Cool and warm water ~~sport fish~~ aquatic life and habitat, drinking water, and associated use classes. Water quality standards applicable to use Classes 1B or 1C, 2Bd (and sub-classes 2Bde, 2Bdg, or 2Bdm); 3A or 3B; 4A and 4B; and 5 surface waters.

[43] Strikeout and underline are based on existing rules and incorporate changes from fish to aquatic life and habitat contained in MPCA proposed TALU rules, Minn. R. 7050.0220, Subp. 1, Items A through C, p. 20.21 to 21.3.
[44] Strikeout and underline are based on existing rules and incorporate changes from fish to aquatic life and habitat contained in MPCA proposed TALU rules, Minn. R. 7050.0222, Subp. 3a, 4a and 5a, p. 22.2 to 22.16.

Subp. 5a Cool and warm water ~~sport fish~~ aquatic life and habitat and associated use classes. Water quality standards applicable to use Classes 2B (and sub-classes 2Be, 2Bg, 2Bm), 2C~~,~~ or 2D; 3A, 3B, or 3C; 4A and 4B; and 5 surface waters.

b. Ensure protection of Class 2C waters requires adding a single sentence to Minnesota Rules. We are suggesting the addition be made in Minn. R. 7050.0220, Subp. 1, Item C as follows[45]:

C. . . . All waters previously classified as Class 2C waters in Part 7050.0470 are reclassified as Class 2B waters.

c. WaterLegacy recommends changes to the definition of "aquatic biota" in MPCA proposed TALU rules to address potentially inconsistent uses of the terms "aquatic biota" and "aquatic life" and ensure that Class 2 uses for consumption by humans and wildlife are protected, changing text for Minn. R. 7050.0150, Subp. 4, Item C as follows[46]:

C. "Aquatic biota" or "aquatic life" means the aquatic community composed of game and nongame fish, minnows and other small fish, mollusks, insects, crustaceans and other invertebrates, submerged or emergent rooted vegetation, suspended or floating algae, substrate-attached algae, microscopic organisms, and other aquatic-dependent organisms that require aquatic systems for food or to fulfill any part of their life cycle, such as amphibians and certain wildlife species. Where applied in connection with water quality standards, "aquatic biota" or "aquatic life" also includes the consumption of fish and edible aquatic life by humans and wildlife.

6. The proposed listing of waters is neither accessible nor explicable.

WaterLegacy has heard from citizen scientists that sub-classification of streams based on water identification (WID) or assessment unit identification code (AUID) numbers may fragment stream habitats required to be considered together due to effects of upstream uses on the characteristics of downstream segments. We did not find any explanation in the SONAR of reasoning behind sub-classification at the scale of individual WIDs or AUIDs. Although the SONAR contained a brief discussion of the costs or savings to dischargers *upstream* of sub-classified waters, we did not find any discussion addressing of the impacts that sub-classification would have on preservation of *downstream* uses.

WaterLegacy has an additional concern about the MPCA's proposed listing of Minnesota waters by their beneficial use designations. We have found the current method of listing to be virtually opaque even for sophisticated citizen scientists and counsel. Existing rules contain readily searchable text that the State Revisor maintains without change until rules are amended. Any

[45] See MPCA proposed TALU rules, Minn. R, 7050.0220, Subp. Item C, adding text at p. 21.3.
[46] Underline and strikeout refer to MPCA Proposed Rule text on p. 2.16 to 2.21.

citizen can search the rules and quickly find out the designated use of a particular stream that has been assigned something other than a default use.

MPCA's proposed method to list beneficial uses would make no distinction between default classifications of many thousands of water bodies and specifically designated uses. The MPCA's current Beneficial Use Designations for Stream Reaches are contained in 80 separate pdf documents.[47] These 80 documents, which each must be individually opened and searched to find a water body of concern may contain many hundreds of individual WIDs. Stream and river segments for the same river may be listed in multiple documents, and there is no obvious way to figure out which documents contain which streams or to compile them together to figure out the designation of a segment of concern. A citizen wanting to know if a particular stream reach was a Class 2A use or whether a particular reach had been sub-classified for exceptional or modified use, would have no way to find that information.

WaterLegacy requests that additional explanation, if not additional analysis as well, be provided as to the reason for sub-classification at the scale of WIDs. We also recommend that the MPCA significantly change the way in which designated waters are listed in order to make the listings transparent and searchable for the public as well as to reduce the risk that errors or changes in listings will be undetected.

Recommendation:

Develop listing of waters to maximize public transparency and accountability, including the following concepts:

i. List all waters with default classifications in one spreadsheet and all waters with specific designations by rule in a second separate spreadsheets, to make it easier to check and verify specific designations;
ii. Include with all specific rule designations the date on which the specific designation was approved in rule;
iii. In addition to the WID/AUID number for any ditch, stream segment, or river segment, identify in separate sortable columns the county, Basin, watershed and sub-watershed for that segment;
iv. For any water body with a specific use designation approved in rule, include a hyperlink identifying the location of the stream segment on a map;
v. Specify in rule a specific url listing for the beneficial use designations;
vi. Give citizens an opportunity to request individual notice when any designations are proposed to be changed, which notice will include both the existing and proposed designation.

WaterLegacy has appreciated the opportunity to comments on the MPCA's proposed TALU rules and modification of Class 2 beneficial use designations.

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[47] See WL TALU Comment Exhibit 3, which exports MPCA's list of Beneficial Use Designation documents into one spreadsheet and shows an example using the first document on the list, Use Designations for Lake Superior – North Watershed, which lists 765 individual WIDs.

Please notify us when you have determined whether a hearing will be held on these rules, and feel free to contact me if you have any questions.

Sincerely yours,

Paula Goodman Maccabee
Advocacy Director and Counsel for WaterLegacy

Exhibits Enclosed

cc: Linda Holst, USEPA Region 5
David Pfeiffer, USEPA Region 5
Barbara Wester, USEPA Region 5

List of Waters proposed for Designation exported from MPCA SONAR. Appendix A

#	AUID	Watershed (HUC 8)	Water-body Name	Current Use Class	Proposed Use Class	Modified Use Proposed*
1	07010205-502	South Fork Crow River	Buffalo Creek	2B*	2Bm	1
2	07010205-504	South Fork Crow River	Judicial Ditch 67	2B*	2Bm	1
3	07010205-506	South Fork Crow River	Judicial Ditch 29	2B*	2Bm	1
4	07010205-509	South Fork Crow River	Judicial Ditch 15	2B*	2Bm	1
5	07010205-529	South Fork Crow River	Unnamed Creek	2B*	2Bm	1
6	07010205-533	South Fork Crow River	Unnamed Creek	2B*	2Bm	1
7	07010205-549	South Fork Crow River	Belle Creek	2C	2Bm	1
8	07010205-550	South Fork Crow River	Judicial Ditch 18	2C	2Bm	1
9	07010205-555	South Fork Crow River	County Ditch 23	2B*	2Bm	1
10	07010205-571	South Fork Crow River	Judicial Ditch 1	2B*	2Bm	1
11	07010205-585	South Fork Crow River	Unnamed Creek	2B*	2Bm	1
12	07010205-591	South Fork Crow River	Judicial Ditch 8	2B*	2Bm	1
13	07010205-592	South Fork Crow River	Unnamed Ditch	2B*	2Bm	1
14	07010205-607	South Fork Crow River	Big Kandiyohi Channel	2B*	2Bm	1
15	07010205-608	South Fork Crow River	State Ditch Branch 2	2B*	2Bm	1
16	07010205-609	South Fork Crow River	County Ditch 18	2B*	2Bm	1
17	07010205-610	South Fork Crow River	County Ditch 24A	2B*	2Bm	1
18	07010205-612	South Fork Crow River	Unnamed Ditch	2B*	2Bm	1
19	07010205-613	South Fork Crow River	King Creek	2B*	2Bm	1
20	07010205-614	South Fork Crow River	Unnamed Creek	2B*	2Bm	1
21	07010205-615	South Fork Crow River	Unnamed Creek	2B*	2Bm	1
22	07010205-616	South Fork Crow River	McCuen Creek	2B*	2Bm	1
23	07010205-617	South Fork Crow River	Unnamed Creek	2B*	2Bm	1
24	07010205-620	South Fork Crow River	Judicial Ditch 1	2B*	2Bm	1
25	07010205-621	South Fork Crow River	Unnamed Creek	2B*	2Bm	1
26	07010205-625	South Fork Crow River	Judicial Ditch 9	2B*	2Bm	1
27	07010205-626	South Fork Crow River	Judicial Ditch 15 Branch	2B*	2Bm	1
28	07010205-627	South Fork Crow River	Judicial Ditch 15 Branch	2B*	2Bm	1
29	07010205-628	South Fork Crow River	Judicial Ditch 15 Branch	2B*	2Bm	1
30	07010205-630	South Fork Crow River	Unnamed Ditch	2B*	2Bm	1
31	07010205-631	South Fork Crow River	County Ditch 7A	2B*	2Bm	1
32	07010205-639	South Fork Crow River	County Ditch 13	2B*	2Bm	1
33	07010205-642	South Fork Crow River	Otter Creek	2B*	2Bm	1
34	07010205-648	South Fork Crow River	County Ditch 9	2B*	2Bm	1
35	07010205-658	South Fork Crow River	Crow River, South Fork	2B*	2Bm	1
36	07040004-578	Zumbro River	Unnamed Creek	2B*	2Bm	1
37	07040004-585	Zumbro River	Trout Brook	2B*	2Bm	1
38	07040004-633	Zumbro River	Unnamed Creek	2B*	2Bm	1
39	07040004-966	Zumbro River	Judicial Ditch 7	2B*	2Bm	1
40	07040004-970	Zumbro River	Zumbro River, North Fork	2B*	2Bm	1
41	07040004-987	Zumbro River	Judicial Ditch 1	2B*	2Bm	1
42	07040004-988	Zumbro River	Dodge Center Creek	2B*	2Bm	1
43	09020303-505	Red Lake River	Pennington County Ditch 76	2B*	2Bm	1
44	09020303-545	Red Lake River	Unnamed Ditch	2B*	2Bm	1
45	09020303-546	Red Lake River	Judicial Ditch 60	2B*	2Bm	1
46	09020303-547	Red Lake River	County Ditch 43	2B*	2Bm	1
47	09020303-549	Red Lake River	Unnamed Creek (County Ditch 53)	2B*	2Bm	1
48	09020303-551	Red Lake River	Burnham Creek	2C	2Bm	1
49	09020303-557	Red Lake River	Black River	2B*	2Bm	1
50	09020306-515	Grand Marais Creek	County Ditch 2	2B*	2Bm	1
51	09020306-517	Grand Marais Creek	County Ditch 43 (Judicial Ditch 75)	2B*	2Bm	1
52	09020306-520	Grand Marais Creek	Judicial Ditch 75	2B*	2Bm	1
53	09030009-560	Lake of the Woods	County Ditch 20	2B*	2Bm	1
54	04010101-518	Lake Superior - North	Cross River	2A	2Ae	
55	04010101-528	Lake Superior - North	Greenwood River	2A	2Ae	
56	04010101-531	Lake Superior - North	Irish Creek	2A	2Ae	
57	04010101-532	Lake Superior - North	Kimball Creek	2A	2Ae	
58	04010101-534	Lake Superior - North	Manitou River	2A	2Ae	
59	04010101-536	Lake Superior - North	Mistletoe Creek	2A	2Ae	
60	04010101-547	Lake Superior - North	Two Island River	2A	2Ae	
61	04010101-566	Lake Superior - North	Little Devil Track River	2A	2Ae	
62	04010101-569	Lake Superior - North	Heartbreak Creek	2A	2Ae	
63	04010101-571	Lake Superior - North	Houghtaling Creek	2A	2Ae	

List of Waters proposed for Designation exported from MPCA SONAR, Appendix A

64	04010101-573	Lake Superior - North	Caribou River	2A	2Ae	
65	04010101-575	Lake Superior - North	Caribou River	2A	2Ae	
66	04010101-581	Lake Superior - North	Crown Creek	2A	2Ae	
67	04010101-590	Lake Superior - North	Cascade River	2A	2Ae	
68	04010101-646	Lake Superior - North	Bluff Creek	2A	2Ae	
69	04010101-717	Lake Superior - North	Elbow Creek	2A	2Ae	
70	04010101-783	Lake Superior - North	Wanless Creek	2A	2Ae	
71	04010101-814	Lake Superior - North	Lullaby Creek	2A	2Ae	
72	04010101-827	Lake Superior - North	Manitou River, South Branch	2A	2Ae	
73	04010101-B35	Lake Superior - North	Sixmile Creek	2A	2Ae	
74	04010101-B66	Lake Superior - North	Swamp River	2A	2Ae	
75	04010101-D50	Lake Superior - North	Baptism River, West Branch	2A	2Ae	
76	04010101-D53	Lake Superior - North	Kadunce River (Kadunce Creek)	2A	2Ae	
77	04010101-D55	Lake Superior - North	Portage Brook	2A	2Ae	
78	04010101-D56	Lake Superior - North	Temperance River	2A	2Ae	
79	04010101-D58	Lake Superior - North	Baptism River, East Branch	2A	2Ae	
80	04010101-D61	Lake Superior - North	Woods Creek	2A	2Ae	
81	04010101-D79	Lake Superior - North	Devil Track River	2A	2Ae	
82	07010101-747	Mississippi River - Headwaters	Unnamed Ditch	2B*	2Bm	1
83	07010101-751	Mississippi River - Headwaters	Schoolcraft River	2B*	2Be	
84	07010207-534	Rum River	County Ditch 4	2B*	2Bm	1
85	07010207-535	Rum River	County Ditch 4	2B*	2Bm	1
86	07010207-587	Rum River	Unnamed Ditch	2B*	2Bm	1
87	07010207-641	Rum River	Washburn Brook	2B*	2Bm	1
88	07010207-676	Rum River	Tibbetts Brook	2C	2Bm	1
89	07010207-684	Rum River	Prairie Brook	2C	2Bm	1
90	07020007-525	Minnesota River - Mankato	County Ditch 3	2B*	2Bm	1
91	07020007-531	Minnesota River - Mankato	Minneopa Creek	2B*	2Bm	1
92	07020007-535	Minnesota River - Mankato	County Ditch 27	2B*	2Bm	1
93	07020007-541	Minnesota River - Mankato	Cherry Creek	2B*	2Bm	1
94	07020007-545	Minnesota River - Mankato	County Ditch 4/County Ditch 39	2B*	2Bm	1
95	07020007-548	Minnesota River - Mankato	Unnamed Creek	2B*	2Bm	1
96	07020007-557	Minnesota River - Mankato	County Ditch 56 (Lake Crystal Inlet)	2B*	2Bm	1
97	07020007-593	Minnesota River - Mankato	Judicial Ditch 48	2B*	2Bm	1
98	07020007-636	Minnesota River - Mankato	County Ditch 52	2B*	2Bm	1
99	07020007-646	Minnesota River - Mankato	Unnamed Creek (County Ditch 11)	2B*	2Bm	1
100	07020007-656	Minnesota River - Mankato	County Ditch 28-1	2B*	2Bm	1
101	07020007-657	Minnesota River - Mankato	County Ditch 11	2B*	2Bm	1
102	07020007-661	Minnesota River - Mankato	County Ditch 11	2B*	2Bm	1
103	07020007-664	Minnesota River - Mankato	County Ditch 115	2B*	2Bm	1
104	07020007-665	Minnesota River - Mankato	County Ditch 100	2B*	2Bm	1
105	07020007-666	Minnesota River - Mankato	Judicial Ditch 8	2B*	2Bm	1
106	07020007-667	Minnesota River - Mankato	County Ditch 105	2B*	2Bm	1
107	07020007-670	Minnesota River - Mankato	County Ditch 124	2B*	2Bm	1
108	07020007-671	Minnesota River - Mankato	County Ditch 22	2B*	2Bm	1
109	07020007-673	Minnesota River - Mankato	County Ditch 115	2B*	2Bm	1
110	07020007-678	Minnesota River - Mankato	County Ditch 46A	2B*	2Bm	1
111	07020007-681	Minnesota River - Mankato	Altermatts Creek	2B*	2Bm	1
112	07020007-686	Minnesota River - Mankato	Little Rock Creek (Judicial Ditch 31)	2B*	2Bm	1
113	07020007-688	Minnesota River - Mankato	County Ditch 106A (Fort Ridgley Creek)	2B*	2Bm	1
114	07020007-692	Minnesota River - Mankato	Shanaska Creek	2B*	2Bm	1
115	07020007-696	Minnesota River - Mankato	Unnamed Creek	2B*	2Bm	1
116	07020007-699	Minnesota River - Mankato	Wabasha Creek	2B*	2Bm	1
117	07020007-701	Minnesota River - Mankato	Judicial Ditch 10	2B*	2Bm	1
118	07020007-711	Minnesota River - Mankato	County Ditch 124	2B*	2Bm	1
119	07020007-716	Minnesota River - Mankato	Judicial Ditch 13	2B*	2Bm	1
120	07020010-505	Watonwan River	Unnamed Creek (Mountain Lake Inlet)	2B*	2Bm	1
121	07020010-526	Watonwan River	Unnamed Creek	2B*	2Bm	1
122	07020010-545	Watonwan River	Unnamed Ditch	2B*	2Bm	1
123	07020010-552	Watonwan River	Unnamed Creek	2B*	2Bm	1
124	07020010-553	Watonwan River	County Ditch 1	2B*	2Bm	1
125	07020010-555	Watonwan River	Unnamed Creek	2B*	2Bm	1
126	07020010-565	Watonwan River	Watonwan River, North Fork	2B*	2Bm	1
127	07020010-567	Watonwan River	Watonwan River	2B*	2Bm	1
128	07020010-569	Watonwan River	Watonwan River, South Fork	2B*	2Bm	1
129	07020010-574	Watonwan River	Spring Branch Creek	2C	2Bm	1

130	07020010-576	Watonwan River	St James Creek	2C	2Bm	1
131	07020010-580	Watonwan River	Judicial Ditch 1	2B*	2Bm	1
132	07020010-584	Watonwan River	Unnamed Creek	2B*	2Bm	1
133	09020309-515	Snake River	Unnamed Ditch	2B*	2Bm	1
134	09020309-518	Snake River	Unnamed Ditch	2B*	2Bm	1
135	09020309-529	Snake River	Unnamed Ditch	2B*	2Bm	1
136	09020309-538	Snake River	Middle River	2B*	2Bm	1
137	09020309-541	Snake River	Middle River	2B*	2Bm	1
138	09020312-515	Two Rivers	Lateral Ditch 4 of State Ditch 91	2B*	2Bm	1
139	09020312-539	Two Rivers	Lateral Ditch 1 of State Ditch 95	2B*	2Bm	1
140	09020312-550	Two Rivers	Unnamed Ditch (along 210th Ave)	2B*	2Bm	1
141	09020312-551	Two Rivers	Unnamed Ditch (along 190th Ave)	2B*		
*	**TOTAL Modified Use**	(Added to spreadsheet - WaterLegacy)				**109**

WL TALU Comment Exhibit 2 Exhibit I.9.

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Water Quality

DERIVATION OF A BENCHMARK FOR FRESHWATER IONIC STRENGTH

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Abstract—Because increased ionic strength has caused deleterious ecological changes in freshwater streams, thresholds for effects are needed to inform resource-management decisions. In particular, effluents from surface coal mining raise the ionic strength of receiving streams. The authors developed an aquatic life benchmark for specific conductance as a measure of ionic strength that is expected to prevent the local extirpation of 95% of species from neutral to alkaline waters containing a mixture of dissolved ions in which the mass of $SO_4^{2-} + HCO_3^- \geq Cl^-$. Extirpation concentrations of specific conductance were estimated from the presence and absence of benthic invertebrate genera from 2,210 stream samples in West Virginia. The extirpation concentration is the 95th percentile of the distribution of the probability of occurrence of a genus with respect to specific conductance. In a region with a background of 116 µS/cm, the 5th percentile of the species sensitivity distribution of extirpation concentrations for 163 genera is 300 µS/cm. Because the benchmark is not protective of all genera and protects against extirpation rather than reduction in abundance, this level may not fully protect sensitive species or higher-quality, exceptional waters. Environ. Toxicol. Chem. 2013;32:263–271. © 2012 SETAC

Keywords—Conductivity Benthic invertebrate Species sensitivity distribution Extirpation Sulfate

INTRODUCTION

Ionic strength is a key physiological determinant of the distribution of aquatic organisms. In most studies of the physiological adaptation of organisms to different concentrations of dissolved ions, Na^+ and Cl^- are the predominant environmental ions [1–3]. However, the constituents can be quite different when land disturbance increases ionic strength [4]. Surface coal mining involves blasting and crushing the surface layers of sandstone, shale, limestone, and dolomite. The surface runoff and leachate from the crushed rock are neutral to mildly alkaline but contain much higher levels of HCO_3/CO_3^-, SO_4^{2-}, Cl^-Ca^{2+}, and Mg^{2+} than occur in undisturbed stream systems [5,6]. This effluent is of particular concern because the amount of dissolved ions entering streams below surface coal-mining operations can be very high and the areal extent of mining may have exceeded the assimilative capacity of streams and entire drainage basins [5,7–10]. A protective benchmark is needed to inform decision making because there is currently no regulatory criterion to protect aquatic life from ionic stress.

We chose to develop the benchmark using a field–based method because all life stages are exposed and sensitive taxa are adequately sampled in the field, whereas they have not been tested in the laboratory. Furthermore, the mixture of dissolved ions addressed in this case presents a particular challenge for testing. It contains a large proportion of HCO_3^-, which at times is at saturation levels and interacts with other ions in the mixture affected by atmospheric, hydrological, geological, and biological processes. These processes cannot be faithfully replicated in the laboratory. Furthermore, because many genera are absent at or near HCO_3^- saturation, simulation of exposure with this ionic matrix may be difficult in the laboratory. Finally, the organisms—in particular, the Ephemeropterans—that are most sensitive to the ionic mixture are not available as cultured animals for toxicity tests; their sensitive life stages are unknown, and life–cycle effects are suspected.

The present study demonstrates the use of field data to develop a protective benchmark for ionic strength using a method developed by Cormier and Suter [11]. This method is adapted from the U.S. Environmental Protection Agency's (U.S. EPA's) standard method for deriving water–quality criteria [12]. Because field data are used, the many decisions that influence the final data set are explained and the data set is characterized with respect to background exposure levels and to the composition of the ionic matrix. This benchmark assessment also illustrates ways to evaluate uncertainty and validates the benchmark with an independent data set.

Because field data are used, analyses that are not usually performed with a laboratory method are needed to ensure that the benchmark is reasonable and valid. These include an assessment to determine that the observed association between this specific mixture of dissolved ions and the absence of benthic invertebrates is indeed causal and not confounded. These methods and detailed assessments of causation and confounding are described separately [13,14].

APPROACH

Measure of exposure

The mixture of ions measured in West Virginia streams contains Ca^{2+}, Mg^{2+}, SO_4^{2-}, Cl^- and HCO_3^- at a circumneutral to alkaline pH (Table 1). Because the toxicity is related to the ionic mixture and not to a single ion [13], a measure of ionic strength was selected as the measure of exposure, rather than measures of individual ions. For freshwaters, there are several methods for measuring ionic concentration [4]. With practical use of the benchmark in mind, specific conductance, hereafter referred to as conductivity, was selected as the exposure measurement of ionic strength for the following reasons: (1) it measures all ions; (2) the technology has become fast,

All Supplemental data may be found in the online version of this article.
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Table 1. Summary statistics of the measured water–quality parameters[a]

Parameter	Units	Min	25th percentile	Median	75th percentile	Max	Mean	Valid *n*
Conductivity	µS/cm	15.4	146	261	563	11,646	281.5	2,210
Hardness	mg/L	0.5	50.2	91.1	188	1,492	97.1	1,148
Alkalinity	mg/L	0.2	30.5	66.7	117	560	55	1,425
SO_4^{2-}	mg/L	1	17	37	159	6,000	51. 6	1,428
Cl^-	mg/L	1	3	5.2	11.95	1,153	6.5	1,118
Ca, total	mg/L	0.002	13.6	25.1	49.2	430	25.5	1,154
Mg, total	mg/L	0.05	3.7	6.3	14	204	7.3	1,150
TSS	mg/L	1	3	4	6	190	4.3	1,442
Fe, total	mg/L	0.005	0.123	0.26	0.5	110	0.26	1,433
NO_2–NO_3	mg/L	0.01	0.1	0.2	0.37	30	0.20	1,178
Al, total	mg/L	0.01	0.09	0.11	0.23	12	0.15	1,436
Al, dissolved	mg/L	0.01	0.02	0.05	0.06	0.93	0.04	1,287
Fe, dissolved	mg/L	0.001	0.02	0.042	0.06	11.8	0.05	1,259
Mn, total	mg/L	0.003	0.02	0.04	0.1	7.25	0.05	1,430
Mn, dissolved	mg/L	0.01	0.03	0.07	0.22	1.06	0.07	20
Total phosphate	mg/L	0.01	0.02	0.02	0.03	2.36	0.03	1,181
Se, dissolved	mg/L	0.001	0.001	0.001	0.001	1.26	0.001	313
Se, total	mg/L	0	0.001	0.001	0.005	1.26	0.002	496
Fecal coliform	Counts/100 mL	0	36	170	600	250,000	151	2,035
DO	mg/L	1.02	8.2	9.2	10.3	18.35	9.3	2,182
pH	Standard units	6.02	7.27	7.62	7.96	10.48	7.59	2,210
Catchment area	km^2	0.173	2.311	6.965	25.836	153.014	7.644	717
Temperature	°C	−0.28	15.1	18.4	21.3	31.9	17	2,210
Habitat	RBP score	49	115	130	145	192	127.8	2,186

[a] K^+ and Na^+ not measured; all means are geometric means except pH, DO, temperature, and habitat score.
DO = dissolved oxygen; catchment area = delimited from highest elevation to sampling pore point; RBP = rapid bioassessment protocol; TSS = total suspended solids.

inexpensive, accurate, precise, and reliable; (3) it can provide continuous monitoring records with deployed systems; (4) it is less influenced by other nonfilterable material such as oils and carbohydrates that may be dissolved in water; and (5) many monitoring programs routinely include a conductivity measurement.

Measure of biological effect and threshold effect levels

Extirpation is the depletion of a population to the point that it is no longer a viable resource or is unlikely to fulfill its function in the ecosystem [15]. In the present study, extirpation is operationally defined for a genus as the conductivity value below which 95% of the observations of the genus occur. In other words, the probability is 0.05 that an observation of a genus occurs above its extirpation concentration (XC95). The proportion of extirpated genera was selected as the effect for the benchmark. The laboratory–based method uses 5% of affected genera, so the 5th percentiles was also used in this field–based method to identify the hazardous levels of ionic strength (HC05).

Data sets

The Central Appalachia (69) and Western Allegheny Plateau (70) ecoregions (Fig. 1) were selected for development of a benchmark for conductivity because available data were of sufficient quantity and quality and because conductivity has been implicated as a cause of biological impairment in these ecoregions [5,8,13,16,17]. These two regions were judged to be similar in terms of water quality, including resident biota and sources of mineral ions. Confidence in the quality of reference sites in West Virginia was relatively high owing to the extensively forested areas of the region and a well-documented process by which the West Virginia Department of Environmental Protection (WVDEP) assigns reference status. The WVDEP uses a tiered approach. We used only tier 1 when analyses involved the use of reference sites, thus avoiding the use of conductivity as a the characteristic of reference condition. Conductivity values from WVDEP's reference sites were low and similar in different months collected over several years (Fig. 2a), providing evidence that they were reasonable reference sites. The 75th percentiles of reference sites were <200 µS/cm in most months. The 25th percentiles from samples from randomly selected sites and from the full data set were <200 µS/cm in most months (Fig. 2b and c). Also, a wide range of conductivity levels were sampled, which is useful for modeling the response of organisms to different levels of ionic strength.

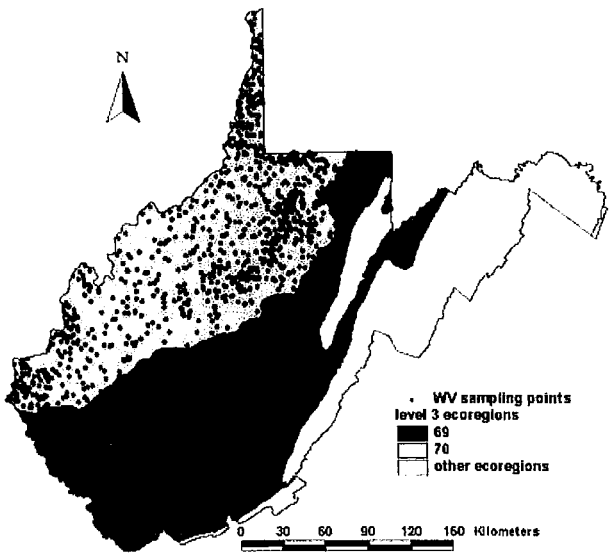

Fig. 1. Points are sampling locations used to develop the benchmark from level III spatial scale for ecoregions 69 (dark gray) and 70 (light gray) in West Virginia.

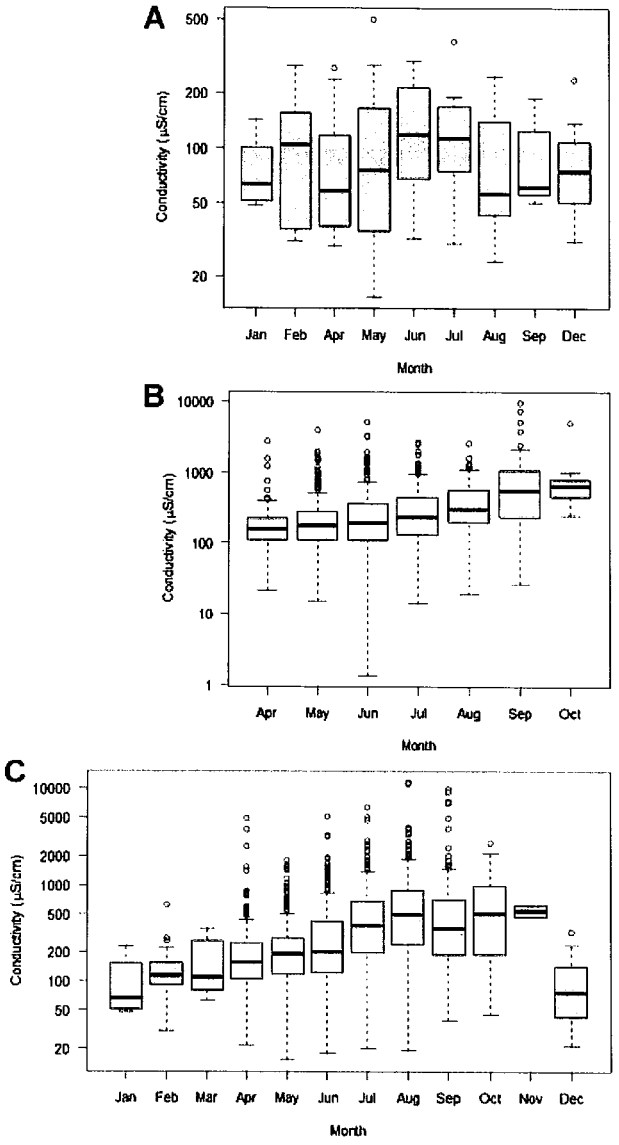

Fig. 2. (**A**) Box plot showing seasonal variation of conductivity (µS/cm) in the reference streams of ecoregions 69 and 70 in West Virginia from 1999 to 2006. A total of 97 samples from 70 reference stations were used for this analysis. The 75th percentiles were below 200 µS/cm in all months except June. (**B**) Box plot showing seasonal variation of conductivity (µS/cm) from a randomly selected sample of streams of ecoregions 69 and 70 in West Virginia from 1997 to 2007. A total of 1,271 samples were used for this analysis. The 25th percentiles were below 200 µS/cm (horizontal dashed line) except in the September and October samples. (**C**) Box plot showing seasonal variation of conductivity (µS/cm) from the data set used to develop the benchmark. A total of 2,210 samples from 2000 to 2007 from ecoregions 69 and 70 in West Virginia are represented. The 25th percentiles were less than 200 µS/cm except in the August and November ($n = 2$) samples. The wide range of conductivities allows the 95th percentiles extirpation concentration to be well characterized.

All data used for benchmark derivation were taken from the WVDEP's in-house water analysis database (WABbase) from 1999 to 2007. The WABbase contains data from the level III spatial scale for ecoregions 66, 67, 69, and 70 in West Virginia [18,19]. In this assessment, only data from ecoregions 69 and 70 were used (Fig. 1). Chemical, physical, and/or biological samples were collected from 2,542 distinct locations (2,668 samples) during the sampling years 1999–2007. The WVDEP uses a tiered sampling design that collects measurements from long-term monitoring stations, targeted sites within watersheds on a rotating basin schedule, randomly selected sample sites [20], and sites chosen to further define impaired stream segments in support of total maximum daily load development [21]. Most sites are sampled once during an annual sampling period, but most total maximum daily load sites are sampled monthly for water-quality parameters. Some targeted sites represent least-disturbed or reference sites that have been selected by a combination of screening values and best professional judgment [22]. Water quality, habitat, watershed characteristics, macroinvertebrate data (both raw data and calculated metrics), and supporting information are used by the state to develop U.S. Clean Water Act–mandated reports to the U.S. EPA [21]. All sites were in perennial reaches of streams.

The WVDEP collects macroinvertebrates from a 1–m^2 area of a 100–m reach at each site. When using a 0.5–m–wide rectangular kicknet (595–µ mesh), four 0.25–m^2 riffle areas are sampled. In narrow or shallow water, nine areas are sampled with a 0.33–m–wide D–frame dipnet of the same mesh size. Composited samples are preserved in 95% denatured ethanol. A random subsample of 200 individuals (± 20%) is identified in the laboratory. All contracted analyses for chemistry and macroinvertebrate identification follow WVDEP's internal quality-control and quality-assurance protocols [23,24]. We judged the quality assurance to be excellent, based on the database itself and supporting documentation.

Multiple biological samples from the same location were not excluded from the data set. Summary statistics for ion concentrations and other parameters for the data set are provided in Table 1. The benchmark applies to waters with a similar composition to those in Table 1. We used a total of 2,210 samples from ecoregions 69 and 70 to determine the conductivity benchmark (Fig. 1 and Table 2). The data set resulted from a larger data set with some sites excluded. We excluded 10 sampling sites that lacked a conductivity measurement. We excluded 295 samples from large rivers (>155 km^2) because the sampling methods differed [25]. We excluded four sites that had an ionic mixture with more Cl^- than $SO_4^{2-} + HCO_3^-$ (conductivity > 1,000 µS/cm, SO_4 < 125 mg/L, and Cl^- > 250 mg/L). This ionic mixture is expected to have a different toxicity [11,13]. Because Cl^- was not measured at all sites, some sites with a different ionic composition may still occur in the data set.

The effects of low pH were eliminated by excluding 147 sites with pH <6. This prevented confounding of conductivity effects by acid mine drainage [8,14]. An existing freshwater chronic criterion already requires waters to be maintained between pH 6.5 and 9 [26]. The conductivity benchmark was derived from waters having pH between 6.0 and 10. Thus, the circumneutral range of the data encompasses pH levels that are seldom toxic to freshwater organisms.

A taxon was excluded from calculations if it was not identified to the genus level, and a genus was excluded if it was never observed at reference sites or it was observed in fewer than 25 samples. Invertebrate genera that did not occur at WVDEP tier 1 reference sites represented 11.4% of all genera [27]. They were excluded so that the data would be relevant to potentially unimpaired conditions and to reduce the influence of nonnative and opportunistic salt–tolerant organisms. Genera observed at fewer than 25 sampling locations in the composited ecoregions were excluded to ensure reasonable confidence in the evaluation of the relationship between conductivity and the presence or absence of a genus.

Table 2. Number of samples with reported genera and conductivity meeting our acceptance criteria for calculating the benchmark value[a]

Region	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
69	8	4	1	63	187	103	79	269	232	54	0	6	1,006
70	4	33	4	187	232	179	194	237	120	8	2	4	1,204
Total	12	37	5	250	419	282	273	506	352	62	2	10	2,210

[a] Presented for each month and ecoregion.

In the WABbase, 497 benthic invertebrate genera were identified in Ecoregions 69 and 70. Those ecoregions had 308 genera in common. Of these, 220 genera occurred at least once at one of the 70 reference sites in the two ecoregions. Greater than 95% of genera observed at reference sites as defined by the WVDEP occur in both ecoregions 69 and 70. This indicates that the same sensitive genera exist in both ecoregions, which is one of the reasons it was reasonable to combine the two regions for analysis. Of the 220 genera, 163 occurred at 25 or more sampling locations in ecoregions 69 and 70. Of the genera occurring at 25 or more sampling sites, 162 occurred in ecoregion 69 and 163 in ecoregion 70.

We verified the benchmark value using a data set from the coal–producing regions in eastern Kentucky, USA [28]. The ionic composition and conductivity range were similar to the West Virginia data set, but the relative number of samples across the range was more uniform. Similar genera were collected in both states. The Kentucky data set represents fewer sites ($n = 282$); however, 105 genera were identified in at least 25 samples in the Kentucky data set. The actual number of 105 genera is greater than the 59 genera predicted to arise from a similarly sized data set from West Virginia (Fig. 3). This occurs because more invertebrate specimens are identified from each Kentucky sample (all specimens identified per sample) than in the WVDEP protocol (200 specimens identified per sample).

METHODS

The approach used to derive the benchmark [11] is based on an adaptation of the standard method for U.S. EPA's published Section 304(a) Ambient Water–Quality Criteria [12]. We used the statistical package R, Version 2.12.1 (December 2010), for all statistical analyses [29].

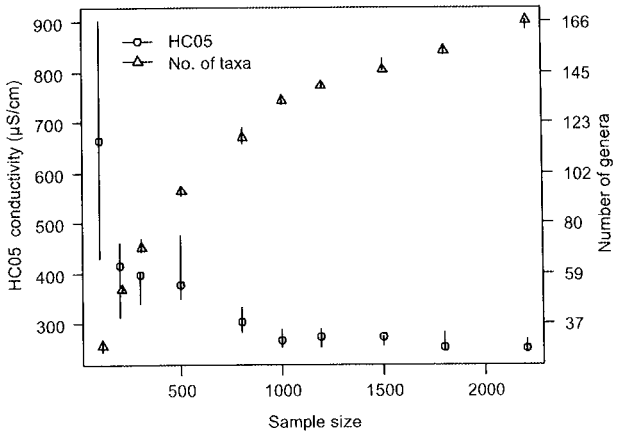

Fig. 3. Adequacy of the number of samples used to model the 5th percentiles hazardous concentration (HC05) based on the West Virginia data set. As sample size increases the number of genera included in the species sensitivity distribution increases (triangles). The HC05 stabilizes, reaching an asymptote at approximately 800 sites sampled (circles) and 120 genera evaluated. The 95% confidence intervals are indicated by vertical bars.

The calculation of HC05 involved four steps: First, the relationship between conductivity and the probability of observing each genus was modeled using a weighted cumulative distribution function. Second, the XC95 conductivity value for each genus was identified from the 95th percentiles using two-point interpolation. Third, the XC95 values for all genera were ordered from lowest to highest conductivity value. Fourth, the HC05 was determined as the 5th percentiles of the distribution of genera.

RESULTS

Calculating extirpation concentrations

Observed conductivity values were nonuniformly distributed across a range of possible values [27], and therefore, we were more likely to observe a genus at certain conductivity values simply because more samples were collected at those values. To correct for the uneven sampling frequency, a weighted cumulative distribution function was used to estimate the XC95 values for each genus. Each XC95 value was estimated from the cumulative distribution of probabilities of observing a genus at a site with respect to the concurrently measured conductivity at that site. An example of a weighted cumulative distribution function is shown in Figure 4 for the mayfly *Epeorus*.

Not all 95th percentiles correspond to extirpation, and some imprecisely estimate the extirpation threshold. To examine the trend of occurrence along the conductivity gradient, we used a nonparametric function (generalized additive model with 3 degrees of freedom) to model the likelihood of a taxon being observed with increasing conductivity (Fig. 5) ([27] Appendix E 1–29). Results for individual genera are available from the U.S. EPA ([27] Appendix D 2–7). If the generalized additive model mean curve at maximum conductivity was approximately equal to 0 (defined as <1% of the maximum modeled probability), then the XC95 was listed without qualification. If the generalized additive model mean curve at maximum conductivity was >0 but the lower confidence limit approximated 0 (<1% of the maximum mean modeled probability), the value was listed as approximate. If the generalized additive model lower confidence limit was >0, then the XC95 was listed as greater than the 95th percentiles. For example, the XC95 for *Cheumatopsyche* (an extremely salt-tolerant genus) is >9,180 µS/cm (Fig. 5c). We also visually inspected all model fits and the scatter of points for anomalies, and if the model poorly fit the data, the uncertainty level was increased to either approximately or greater than designation. A list of XC95 results for individual genera is available in the Supplemental Data. The values, which are designated as approximately and greater than, do not affect the HC05 because most cases occur well above the 5th percentiles; but the qualified values indicate the uncertainty of some XC95 values for other uses such as comparison with toxicity test results or with results from other geographic regions [13].

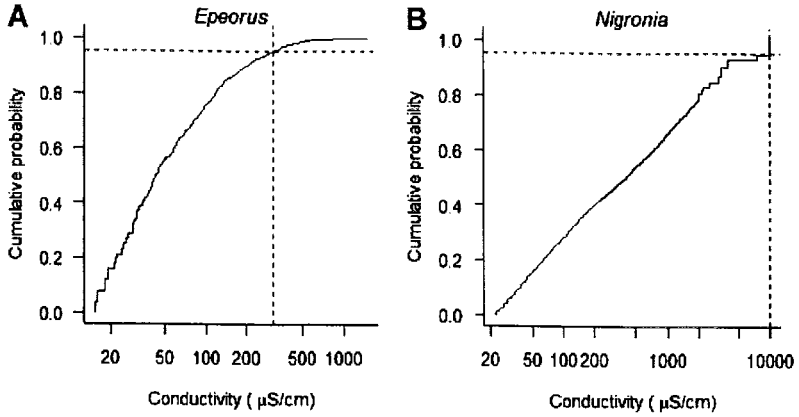

Fig. 4. Examples of weighted cumulative distribution functions and the associated 95th percentiles extirpation concentration (XC95) values. The step function shows weighted proportion of samples for (**A**) *Epeorus* and (**B**) *Nigronia* present at or below the indicated conductivity value (µS/cm). Horizontal dashed line indicates the point of extirpation where $F(x) = 0.95$ intersects the cumulative distribution functions. Vertical dashed line indicates the XC95 conductivity value on the x axis. (**A**) Genera that are affected by increasing conductivity (e.g., *Epeorus*) show a steep slope, whereas (**B**) genera unaffected by increasing conductivity (e.g., *Nigronia*) have a steady increase and do not reach a clear asymptote.

Calculating the HC05 and benchmark

The exposure–response model is a species sensitivity distribution (SSD) that characterizes the proportion of genera that are extirpated with increasing conductivity. This relationship can be plotted as a cumulative distribution plot of XC95 values for each genus relative to conductivity (Fig. 6).

The HC05 is the conductivity at which 5% of genera are extirpated. The cumulative proportion for each genus P is calculated as $P = R \div (N + 1)$, where R is the rank of the genus's XC95 value and N is the number of genera. The HC05 was derived using a two–point interpolation to estimate the centile between the XC95 values bracketing $P = 0.05$ (i.e., the 5th percentiles of modeled genera). The benchmark of 300 µS/cm is obtained by rounding the HC05 to two significant figures [12].

Confidence bounds

Because the XC95 values were estimated from field data and then the HC05 values were derived from those XC95 values, we used a method that generated distributions and confidence bounds in the first step and propagated the statistical uncertainty of the first step through the second step [14].

Bootstrap estimates of the XC95 were made for each genus used in the derivation of the benchmark by resampling 2,210 times (the number of observations in the data set) with replacement [14]. From each bootstrap sample, the XC95 was calculated for each genus by the same method applied to the original data. That process was repeated 1,000 times to create a distribution of XC95 values for each genus. These distributions were used to calculate a two–tailed 95% confidence interval on the XC95 for each genus [11,27].

Uncertainty in the HC05 value was evaluated by generating an HC05 from each of the 1,000 sets of bootstrapped XC95 estimates. The distribution of 1,000 HC05 values was used to generate two–tailed 95% confidence bounds on these bootstrap–derived values. The estimated two–tailed 95% lower confidence bound of the HC05 point estimate is 228 µS/cm and the upper bound is 303 µS/cm. (See Figure 5 in [11] for a graphed illustration.)

Defining the region

For the present study, we chose two adjoining regions that have abundant data, >95% of genera in common, and a common

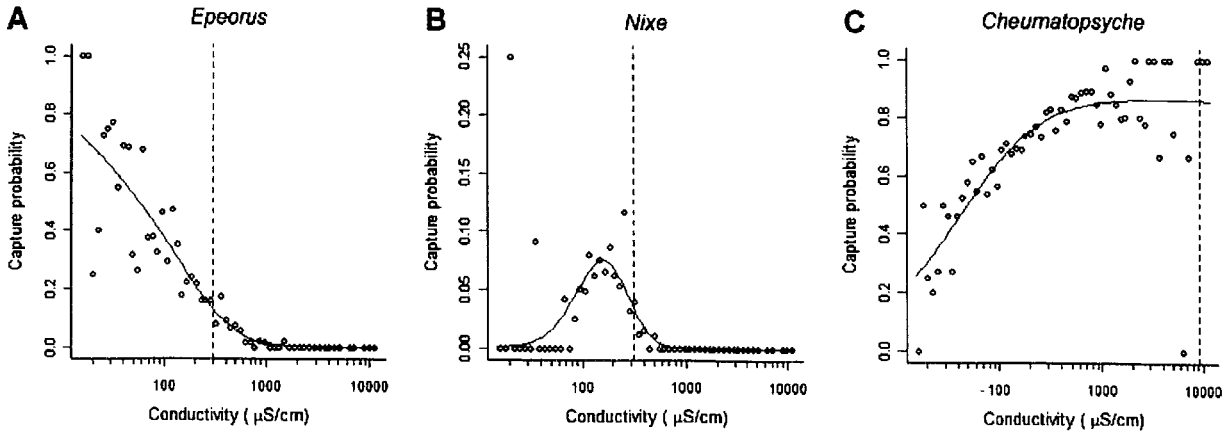

Fig. 5. Three typical distributions of observation probabilities. Open circles are the probabilities of observing the genus within a range of conductivities. Circles at zero probability indicate no individual at any site was found at these conductivities. Solid line is the mean smoothing spline fitted to the probabilities. Vertical dashed line indicates the 95th percentiles extirpation concentration (XC95) from the weighted cumulative distribution. Genera respond differently to increasing ionic strength: (**A**) *Epeorus* declines, (**B**) *Nixe* has an optimum, and (**C**) *Cheumatopsyche* increases. The XC95 for genera like *Cheumatopsyche* is reported as "greater than" because extirpation did not occur in the measured range.

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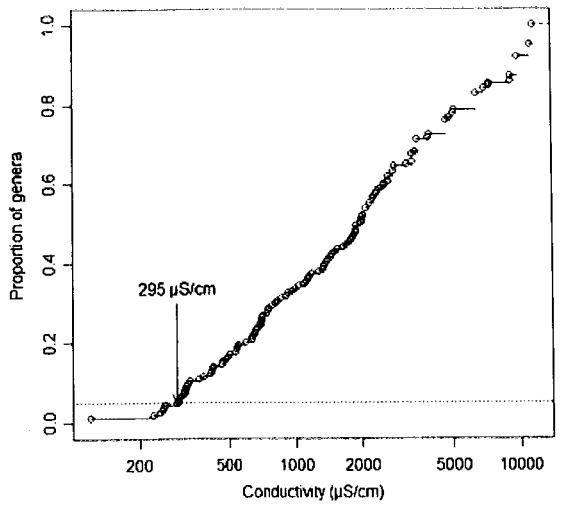

Fig. 6. Species sensitivity distribution (SSD). Each point is a 95th percentiles extirpation concentration value for a genus (total 163 genera). The 5th percentiles hazardous concentration (HC05; 295 µS/cm) is the conductivity at the intercept of the SSD with the horizontal line at the 5th percentiles.

dominant source of the stressor of concern. Ecoregions 69 (central Appalachia) and 70 (Western Allegheny Plateau) in the eastern United States are very similar, including having similar bedrock types; but the relative abundances of rock types differ. The coal–producing subregions of the ecoregion 69 are 69a (forested hills and mountains) and 69d (Cumberland Mountains). According to Woods et al. [19], "Ecoregion 69 . . . is a high, dissected, and rugged plateau made up of sandstone, shale, conglomerate, and coal of Pennsylvanian and Mississippian age. The plateau is locally punctuated by a limestone valley (the Greenbrier Karst; subregion 69c) and a few anticlinal ridges." Ecoregion 70 has more heterogeneous bedrock formations than subregions 69a and 69d. It is underlain by shale, siltstone, limestone, sandstone, and coal, including the interbedded limestone, shale, sandstone, and coal of the Monongahela group and the Pennsylvanian sandstone, shale, and coal of the Conemaugh and Allegheny groups [19].

Individual analyses of ecoregions 69 and 70 result in a somewhat lower HC05 value for ecoregion 69 and a somewhat higher value for 70 (254 µS/cm in ecoregion 69 and 345 µS/cm in ecoregion 70). This difference might be attributed to the background water chemistry, but this did not seem to be the case. If the genera were adapted to high conductivity in ecoregion 70 and low conductivity in 69 or if they were represented by more resistant species in 70 and more sensitive species in 69, it would be expected that the XC95 values would consistently go up in ecoregion 70 and down in ecoregion 69 relative to the values in the combined data set. However, XC95 values go up and down in both ecoregions when they are analyzed individually.

The differences in HC05 values appear to result from random differences in which rarer genera do not meet the minimum sample size of 25 occurrences in a smaller data set. When the data set is split by ecoregion, the SSD model is reduced by 31 genera for ecoregion 69 and 35 genera for ecoregion 70. Furthermore, the two ecoregions had similar genera; and although ecoregion 70 had a slightly higher estimated background, there were sites that had conductivity below 100, suggesting that the truly undisturbed background would be low. Hence, we did not derive benchmarks for individual ecoregions because the evidence did not justify the increase in uncertainty associated with the reduced sample size and number of genera.

Replicate samples

Although most sites in the WABbase were sampled only once, 3.5% of sites were sampled twice and 0.7% more than twice. Inverse weighting sites sampled more than once did not materially change the result (HC05 = 293 µS/cm). Therefore, we have not deleted or differentially weighted the replicate samples. In future applications of this method, however, if there is a potential for bias due to replication of some samples, an appropriate weighting scheme could be applied. It was not necessary in this case.

Evaluating adequacy of number of samples

Bootstrapping was also used to evaluate the effect of sample size on the HC05 values and their confidence bounds. Means and confidence bounds on HC05 values were calculated, as described previously, for selected sample sizes ranging from 100 to 2,210 samples (Fig. 3). The HC05 is consistent for SSDs composed of more than 123 genera for this data set using this method. The HC05 values stabilize at approximately 800 to 1,000 samples, suggesting that 800 is a minimum sample size for this data set using this method.

Treatment of potential confounders

Potentially confounding variables for the relationship of conductivity with the extirpation of stream invertebrates were evaluated in several ways (see Suter and Cormier [14], this issue, for a description of evaluation methods). We evaluated habitat, organic enrichment, nitrates and phosphates, deposited sediments, pH, selenium, water temperature, lack of headwaters, catchment area, settling ponds, dissolved oxygen, and metals. These variables do affect species in the region, but their effects do not alter the relationship with conductivity or the benchmark value. The signal from conductivity was strong, and other potential confounders that were not strongly influential could be ignored with reasonable or greater confidence. However, one potential confounder, low pH, was known to cause effects and was controlled by removing sites with pH < 6.

Estimating background conductivity

In general, a benchmark should be greater than natural background. The background conductivities of streams were estimated using the portion of the WABbase that consists of probability–based samples (i.e., samples from locations selected to represent streams within a stream order with equal probability). We selected the 25th percentiles of these randomly selected samples to estimate the upper limit of background because disturbed and even impaired sites are included in the sample [30]. A total of 1,271 randomly selected samples were collected from ecoregions 69 and 70. The background values were 72 µS/cm for ecoregion 69, 153 µS/cm for ecoregion 70, and 116 µS/cm when samples from ecoregions 69 and 70 were combined (Fig. 2b).

We also estimated the background conductivity using reference sites in the WABbase (Fig. 2a). Sampling locations were among the least disturbed based on the WVDEP's best professional judgment [21,24]. It is conventional to use the 75th percentiles of reference sites to estimate background based on precedent and on the collective experience of U.S. EPA field ecologists [30]. The 75th percentiles from 43 sites in ecoregion 69 and 27 sites in ecoregion 70 are 66 and 214 µS/cm, respectively.

Exhibit I.9.
WL TALU Comment Exhibit 2

When samples from ecoregions 69 and 70 were combined, the 75th percentiles was 150 μS/cm.

Background between ecoregions 69 and 70 appears to be different; however, none of these values exceeds the benchmark of 300 μS/cm. The higher estimates of background conductivity in ecoregion 70 relative to ecoregion 69 may be attributed to the variable occurrence of limestone and limestone–derived soils. The higher level of development and population density in ecoregion 70 may also contribute, but this was not evaluated.

Selection of invertebrate genera

Only genera observed in at least one reference site were included in the SSD. In this particular case, using all genera, including invasive species, would increase the HC05 by <2%. Mussels were not represented because genera did not occur in a minimum of 25 samples, probably owing to the WVDEP sampling methods. Genera were also selected for statistical reasons. We restricted genera used in the analyses to those recorded at a minimum of 25 sampling sites to reduce the chance that an apparent extirpation is due to sampling variance and to increase the likelihood that the models and quantitative analyses for potential confounding were reasonably strong. This decision was made because an analysis showed that the benchmark varied within <5% when SSD models were constructed from 20 or more occurrences of each genus, whereas the benchmark steadily decreased when XC95 values were derived from fewer than 15 occurrences (Supplemental Data, Fig. S1).

Inclusion of sensitive taxa

Only benthic macroinvertebrates sampled by a kicknet method were included in the SSD. Fish were not included because their occurrence is strongly affected by stream size, making it difficult to determine XC95 values. Indeed, some of the affected streams naturally have no fish. In addition, the WABbase data set used to derive the benchmark does not contain data for fish. Other data sets that do contain fish are not as large and do not contain as great a range of conductivity values. An SSD might be developed for fish once these technical issues are resolved. Data for plants and amphibians are not available. To date, no evidence has been presented that fish, amphibians, or plants are more sensitive than benthic invertebrates.

Seasonality, life history, and sampling methods

The seasonality of life-history events such as emergence of aquatic insects can affect the probability of detecting a species because eggs and early instars are not captured by the sampling methods. As a result, annual insects that emerge in the spring, although present, are less likely to be detected in the summer, when conductivities increase in some streams.

We evaluated the effects of seasonality and life history by comparing HC05 values partitioned into spring and summer based on seasonal patterns of conductivity in the full data set (Fig. 2c). The spring season was March through June, and the summer season was July through October. The HC05 values were 317 μS/cm for spring (132 genera) and 415 μS/cm for summer (120 genera). The greater summer HC05 resulted from the loss of sensitive taxa from the SSD. The lower end of the SSD for the full data set and spring samples are fairly similar [27]. Lower effect levels in the spring are not the result of an insufficient test range of conductivities because exposures as high as 5,200 μS/cm occurred in the spring samples. Because the spring data set included both sensitive genera and a full range of exposures, we judged it more reliable than the summer model.

Selection of the effects end point

We used the extirpation concentration as the effects end point because it is easy to understand that an adverse effect has occurred when a genus is lost from an ecosystem. However, for the same reason, it may not be considered as protective. Because this endpoint is based on full life–cycle exposures and responses of populations to multigenerational exposures, it is considered a chronic benchmark.

Treatment of mixtures

In natural waters, salinity is a result of mixtures of ions. A metric is required to express the strength of that mixture. We use conductivity because it is a measure of the ionic strength of the solution, because it is related to biological effects, and because it is readily measured accurately. However, conductivity per se is not the cause of toxic effects, and waters with different mixtures of ions but the same conductivity may have different toxicities [31]. In this case, the benchmark value was calculated for a relatively uniform mixture of ions in Appalachian streams with Ca^{2+}, Mg^{2+}, SO_4^{2-}, Cl^-, and HCO_3^- ions at circumneutral to mildly alkaline pH (pH 6–10). Recent increases in drilling for natural gas may change the toxicity of ionic strength in this region, and monitoring should be designed to evaluate differences. The relative contributions of individual ions from large–scale surface coal mining are described by Pond et al. [5]. Whereas Ca^{2+}, Mg^{2+}, SO_4^{2-}, and HCO_3^- are the four most abundant ions to drain from surface coal mines [32], ions of Na^+ and Cl^- are the two most common in seawater and brines from Marcellus shale drilling operations [13]. Because the few sites with very elevated Cl^- were found to be outliers in the distributions of occurrence, they were deleted from the data set used to derive the XC95 values. Hence, the use of the benchmark value in other regions or in waters that are contaminated by other sources, such as road salt or irrigation return waters, may not be appropriate. However, for the circumneutral to alkaline drainage from similar geological sources these four primary ions are highly correlated with conductivity (Table 3).

Forms of exposure–response relationships

The diversity of the forms of the exposure–response relationships (i.e., decreasing, unimodal, increasing, and no relationship) (Fig. 5 and [27], Appendix E) has required some methodological decisions. The forms are expected, given the nature of the ionic regulation and the variance in sensitivity. The ionic mixture includes nutrients and essential elements, and like other pollutants that are essential at low exposure levels (e.g., copper and selenium), the response to this mixture is expected to have a unimodal distribution (Fig. 5b). In the ascending (left) limb, nutrient and essential element needs are increasingly being met. In the descending (right) limb, toxicity is increasing. However, many of the empirical exposure–response relationships do not display both limbs. They may show the descending portion of the curve, because none of the observed conductivity levels are sufficiently low to show deficiency for the taxon (Fig. 5a); the entire unimodal curve, because their optimum is near the center of observed conductivity levels and the range from deficiency to toxicity is relatively narrow (Fig. 5b); the ascending portion, because none of the observed conductivity levels are sufficiently high to show toxicity for the taxon (Fig. 5c); or no trend, because the optimum is more of a plateau

WL TALU Comment Exhibit 2 Exhibit I.9.

Table 3. Spearman rank correlation (|r|) of water-quality parameters[a]

	Conductivity	Alkalinity	Sulfate	Chloride	Hardness	Mg	Ca
Conductivity	1.00	0.78	0.89	0.64	0.95	0.93	0.92
Alkalinity	0.78	1.00	0.60	0.56	0.78	0.70	0.79
Sulfate	0.89	0.60	1.00	0.41	0.85	0.90	0.80
Chloride	0.64	0.56	0.41	1.00	0.50	0.43	0.50
Hardness	0.95	0.78	0.85	0.50	1.00	0.96	0.99
Mg	0.93	0.70	0.90	0.43	0.96	1.00	0.91
Ca	0.92	0.79	0.80	0.50	0.99	0.91	1.00

[a] HCO_3^- measured as alkalinity.

than a peak, so it extends across the range of observed conductivities (see Nigronia [27] Appendix E–26).

To estimate effects to sensitive genera, it may be necessary to exclude genera favored by the pollutant if the region is highly modified. This was not done with the Appalachian data set. All genera, regardless of the exposure–response form, were included in the SSD. However, the XC values for those that do not descend to zero in the observed range, such as *Cheumatopsyche*, are treated as "greater than" values. Because the 5th percentiles of the SSD is derived by interpolation, it is not necessary to provide point estimates of the XC values for resistant taxa. The setting of the benchmark in a conductivity range in which the occurrence of some genera is increasing suggests that the benchmark could result in the extirpation of some genera. However, that is not the case. All but one of the 163 genera occur in sites with low conductivity (<100 μS/cm). Even if that were not the case, the concern for resistant taxa is unwarranted. This benchmark is designed to protect taxa that occur in unpolluted streams, not taxa that require pollution.

Validation of the benchmark

The aquatic life benchmark was validated with an independent data set. Application of the same methodology to data from the state of Kentucky gave a very similar result, 282 μS/cm with a lower confidence bound of 169 μS/cm and an upper bound of 380 μS/cm ([27], Appendix G).

Characterization of the benchmark

The aquatic life benchmark of 300 μS/cm is appropriate for year–round application. This level is expected to prevent the extirpation of 95% of invertebrate genera in this region. The estimated two–tailed 95% lower confidence bound of the HC05 point estimate is 228 μS/cm and the upper bound is 303 μS/cm.

The method used to develop the benchmark is an adaptation of the standard method for deriving water–quality criteria for aquatic life (i.e., Stephen et al, [12]), so it is supported by precedent. Because the organisms are exposed throughout their life cycle, this is a chronic value. Acute exposures were not evaluated.

The aquatic life benchmark for conductivity is provided as scientific advice for reducing the increasing loss of aquatic life associated with ionic mixture with Ca^+, Mg^+, SO_4^{2-}, Cl^- and HCO_3^- at circumneutral pH. Because there are well-documented studies of the physiological role of anions in the function of chloride cells, a reasonable characterization of the mixture on a mass basis is $SO_4^{2-} + HCO_3^-$ greater than or equal to Cl^-. The aquatic life benchmark for conductivity is applicable to the parts of West Virginia that provided the data for its derivation and to Kentucky, which gave essentially the same result. It may be relevant to ecoregions 68, 69, and 70 outside the sampled area [33]. This is because the ionic matrix and background are expected to be similar throughout the ecoregions. Note that ecoregion 68, Southwestern Appalachia, does not occur in West Virginia and is not included in the derivation of the benchmark value; but it is included in the validation data set from Kentucky. The aquatic life benchmark may also be appropriate for other nearby regions. However, this benchmark level may not be relevant when the relative concentrations of dissolved ions are different.

DISCUSSION AND CONCLUSIONS

The derivation of this aquatic life benchmark using conductivity illustrates the practical use of the field–based method for developing water-quality benchmarks for pollutants that are not amenable to laboratory methods [11]. The method is credible because it is adapted from methods that have been successfully used for nearly 30 years to develop water-quality criteria using laboratory data and because the field-based method has withstood extensive public and peer review. The derived benchmark is credible because it has been validated and has withstood tests of the models, causation, and potential confounding.

Ecological relationships are dependent on environmental conditions. Regions where many genera are already extirpated would result in a benchmark that would protect only remaining species. Field data that are collected after susceptible taxa have emerged as terrestrial insects—in this case, in the summer after spring emergence—will be based on more tolerant taxa and could result in the extirpation of many genera. Inclusion of other ionic mixtures may also lead to higher XC95 values that are not protective of the ionic mixture evaluated in the present study.

For these reasons, when we used the method, we restricted the case to a well-defined region and a relatively homogeneous set of streams with a common type of source. It will be important to develop experience and guidelines for using the method in more complex situations.

The sensitivity distribution is a model of how representative species in general respond to a stressor and does not require that the species or genera be the same in all applications or at all locations. In this example, the SSD represents genera inhabiting naturally dilute waters. Therefore, the conductivity benchmark may be relevant outside of the region tested with the data set if there is no contradictory information such as evidence that undisturbed background is naturally greater than the benchmark and if the ionic composition on a mass basis contains $SO_4^{2-} + HCO_3^- \leq Cl^-$. Based on these restrictions for the extrapolation of the benchmark outside the tested area, we speculate that the conductivity benchmark developed in the present study will be applicable to all naturally low-conductivity streams affected by leachates from calcareous minerals but that it is not applicable to streams affected by coastal saltwater intrusion or road salt application in winter. We expect that a different benchmark would be needed where the ionic composition is primarily Na^+ and Cl^-. Those hypotheses must be tested by further research.

Some situations require field data to develop a protective or remedial benchmark. This method worked well in this case and might be useful for other environmental agents that have measurable deleterious effects in the field, such as dissolved oxygen, nitrates and phosphates, suspended and deposited sediment, organic enrichment, and hydrologic flow.

SUPPLEMENTAI DATA

Table S1.
Figure S1. (279 KB DOC)

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Exhibit I.9.

List of Beneficial Use Designation Documents Copied from MPCA Website

https://www.pca.state.mn.us/water/tiered-aquatic-life-uses-talu-framework

Beneficial Use Designations for Stream Reaches

- pdf I.A.(I) 04010101 Lake Superior - North (wq-s6-46a)
- pdf I.A.(2) 04010102 Lake Superior - South (wq-s6-46b)
- pdf I.A.(3) 04010201 St. Louis River (wq-s6-46c)
- pdf I.A.(4) 04010202 Cloquet River (wq-s6-46d)
- pdf I.A.(5) 04010301 Nemadji River (wq-s6-46e)
- pdf 2.A.(I) 09030001 Rainy River - Headwaters (wq-s6-46f)
- pdf 2.A.(2) 09030002 Vermilion River (wq-s6-46g)
- pdf 2.A.(3) 09030003 Rainy River - Rainy Lake (wq-s6-46h)
- pdf 2.A.(4) 09030005 Little Fork River (wq-s6-46i)
- pdf 2.A.(5) 09030006 Big Fork River (wq-s6-46j)
- pdf 2.A.(6) 09030007 Rapid River (wq-s6-46k)
- pdf 2.A.(7) 09030008 Rainy River - Lower (wq-s6-46l)
- pdf 2.A.(8) 09030009 Lake of the Woods (wq-s6-46m)
- pdf 3.A.(I) 09020101 Bois de Sioux River (wq-s6-46n)
- pdf 3.A.(2) 09020102 Mustinka River (wq-s6-46o)
- pdf 3.A.(3) 09020103 Otter Tail River (wq-s6-46p)
- pdf 3.A.(4) 09020104 Upper Red River of the North (wq-s6-46q)
- pdf 3.A.(5) 09020106 Buffalo River (wq-s6-46r)
- pdf 3.A.(6) 09020107 Red River of the North - Marsh River (wq-s6-46s)
- pdf 3.A.(7) 09020108 Wild Rice River (wq-s6-46t)
- pdf 3.A.(8) 09020301 Red River of the North - Sandhill River (wq-s6-46u)
- pdf 3.A.(9) 09020302 Upper/Lower Red Lake (wq-s6-46v)
- pdf 3.A.(10) 09020303 Red Lake River (wq-s6-46w)
- pdf 3.A.(11) 09020304 Thief River (wq-s6-46x)
- pdf 3.A.(12) 09020305 Clearwater River (wq-s6-46y)
- pdf 3.A.(13) 09020306 Red River of the North - Grand Marais Creek (wq-s6-46z)
- pdf 3.A.(14) 09020309 Snake River (wq-s6-47a)
- pdf 3.A.(15) 09020311 Red River of the North - Tamarac River (wq-s6-47b)
- pdf 3.A.(16) 09020312 Two Rivers (wq-s6-47c)
- pdf 3.A.(17) 09020314 Roseau River (wq-s6-47d)
- pdf 4.A.(I) 07010101 Mississippi River - Headwaters (wq-s6-47e)
- pdf 4.A.(2) 07010102 Leech Lake River (wq-s6-47f)
- pdf 4.A.(3) 07010103 Mississippi River - Grand Rapids (wq-s6-47g)
- pdf 4.A.(4) 07010104 Mississippi River - Brainerd (wq-s6-47h)

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- pdf 4.A.(5) 07010105 Pine River (wq-s6-47i)
- pdf 4.A.(6) 07010106 Crow Wing River (wq-s6-47j)
- pdf 4.A.(7) 07010107 Redeye River (wq-s6-47k)
- pdf 4.A.(8) 07010108 Long Prairie River (wq-s6-47l)
- pdf 4.A.(9) 07010201 Mississippi River - Sartell (wq-s6-47m)
- pdf 4.A.(10) 07010202 Sauk River (wq-s6-47o)
- pdf 4.A.(11) 07010203 Mississippi River - St. Cloud (wq-s6-47p)
- pdf 4.A.(12) 07010204 North Fork Crow River (wq-s6-47q)
- pdf 4.A.(13) 07010205 South Fork Crow River (wq-s6-47r)
- pdf 4.A.(14) 07010206 Mississippi River - Twin Cities (wq-s6-47s)
- pdf 4.A.(15) 07010207 Rum River (wq-s6-47t)
- pdf 5.A.(l) 07020001 Minnesota River - Headwaters (wq-s6-47u)
- pdf 5.A.(2) 07020002 Pomme de Terre River (wq-s6-47v)
- pdf 5.A.(3) 07020003 Lac qui Parle River (wq-s6-47w)
- pdf 5.A.(4) 07020004 Minnesota River - Yellow Medicine River (wq-s6-47x)
- pdf 5.A.(5) 07020005 Chippewa River (wq-s6-47y)
- pdf 5.A.(6) 07020006 Redwood River (wq-s6-47z)
- pdf 5.A.(7) 07020007 Minnesota River - Mankato (wq-s6-48a)
- pdf 5.A.(8) 07020008 Cottonwood River (wq-s6-48b)
- pdf 5.A.(9) 07020009 Blue Earth River (wq-s6-48c)
- pdf 5.A.(10) 07020010 Watonwan River (wq-s6-48d)
- pdf 5.A.(11) 07020011 Le Sueur River (wq-s6-48e)
- pdf 5.A.(12) 07020012 Lower Minnesota River (wq-s6-48f)
- pdf 6.A.(l) 07030001 Upper St. Croix River (wq-s6-47n)
- pdf 6.A.(2) 07030003 Kettle River (wq-s6-48g)
- pdf 6.A.(3) 07030004 Snake River (wq-s6-48h)
- pdf 6.A.(4) 07030005 Lower St. Croix River (wq-s6-48i)
- pdf 7.A.(l) 07040001 Mississippi River - Lake Pepin (wq-s6-48j)
- pdf 7.A.(2) 07040002 Cannon River (wq-s6-48k)
- pdf 7.A.(3) 07040003 Mississippi River - Winona (wq-s6-48l)
- pdf 7.A.(4) 07040004 Zumbro River (wq-s6-48m)
- pdf 7.A.(5) 07040006 Mississippi River - La Crescent (wq-s6-48n)
- pdf 7.A.(6) 07040008 Root River (wq-s6-48o)
- pdf 7.A.(7) 07060001 Mississippi River - Reno (wq-s6-48p)
- pdf 7.A.(8) 07060002 Upper Iowa River (wq -s6-48q)
- pdf 8.A.(l) 07080102 Upper Wapsipinicon River (wq-s6-48r)

List of Beneficial Use Designation Documents Copied from MPCA Website

- pdf 8.A.(2) 07080201 Cedar River (wq-s6-48s)
- pdf 8.A.(3) 07080202 Shell Rock River (wq-s6-48t)
- pdf 8.A.(4) 07080203 Winnebago River (wq-s6-48u)
- pdf 8.A.(5) 07100001 Des Moines River - Headwaters (wq -s6-48v)
- pdf 8.A.(6) 07100002 Lower Des Moines River (wq-s6-48w)
- pdf 8.A.(7) 07100003 East Fork Des Moines River (wq-s6-48x)
- pdf 9.A.(l) 10170202 Upper Big Sioux River (wq-s6-48y)
- pdf 9.A.(2) 10170203 Lower Big Sioux River (wq-s6-48z)
- pdf 9.A.(3) 10170204 Rock River (wq-s6-49a)
- pdf 9.A.(4) 10230003 Little Sioux River (wq-s6-49b)

Exhibit I.9.

WL TALU Comment Exhibit 3

Beneficial Use Designations for Stream Reaches: Lake Superior - North Watershed (04010101)

Beneficial Use Legend	
1A	Domestic Consumption (does not require treatment)
1B	Domestic Consumption (requires moderate treatment)
1C	Domestic Consumption (requires heavy treatment)
2Ae	Aquatic Life and Recreation - Exceptional Cold Water Habitat (streams)
2Ag	Aquatic Life and Recreation - General Cold Water Habitat (lakes and streams)
2Bde	Aquatic Life and Recreation also protected as a source of drinking water - Exceptional Warm Water Habitat (streams)
2Bdg	Aquatic Life and Recreation also protected as a source of drinking water - General Warm Water Habitat (lakes and streams)
2Bdm	Aquatic Life and Recreation also protected as a source of drinking water - Modified Warm Water Habitat (streams)
2Be	Aquatic Life and Recreation - Exceptional Warm Water Habitat (streams)
2Bg	Aquatic Life and Recreation - General Warm Water Habitat (lakes and streams)
2Bm	Aquatic Life and Recreation - Modified Warm Water Habitat (streams)
2C	Aquatic Life and Recreation - Indigenous aquatic life and their habitats (streams)
2D	Aquatic Life and Recreation - Wetlands
3A	Industrial Consumption (no treatment)
3B	Industrial Consumption (moderate treatment)
3C	Industrial Consumption(heavy treatment)
3D	Industrial Consumption (wetlands - moderate treatment)
4A	Agriculture and Wildlife (irrigation)
4B	Agriculture and Wildlife (livestock and wildlife)
4C	Agriculture and Wildlife (wetlands - livestock and wildlife)
5	Aesthetic Enjoyment and Navigation
6	Other Uses
7	Limited Resource Value Water
ORVW	Outstanding Resource Value Water; The [month/day/year/letter] code following the name of the outstanding resource value water in brackets is the effective date the water resource was designated as an outstanding resource value water. The letter code (P or R) indicates the applicable discharge restrictions in part Minn. R. 7050.0180. The letter code P corresponds to the prohibited discharges provision in Minn. R. 7050.0180, subp. 3. The letter code R corresponds to the restricted discharges provision in Minn. R. 7050.0180, subp. 6.

‡ ***Some stream miles within the watershed have not been assigned their own water body id. These water bodies are not included in the use table, but they are labeled xxxxxxxx-999 in the Minnesota Pollution Control's databases. The default uses (2Bg, 3C, 4A, 4B, 5, 6) apply to these waters.***

* ***Abbreviations: * = Tiered aquatic life use review has not been performed; + = use confirmed; f = use confirmed by fish only; m = use confirmed by macroinvertebrates only; WR = Wild Rice water; AUID = Assessment Unit Identification code; ORVW = Outstanding Resource Value Water; CD = County Ditch; JD = Judicial Ditch; R = River; Cr = Creek; Bk = Brook; Lk = Lake; N = North; S = South; W = West; E = East; Fk = Fork; Br = Branch; M = Middle; ND = North Dakota.***

Exhibit I.9.

WL TALU Comment Exhibit 3

Beneficial use designations for stream reaches[‡] in the Lake Superior - North Watershed (04010101) (Table created August 9, 2016).

Reach Name and Description[#]	AUID	Uses	V[#]	ORVW
Pigeon River - South Fowl Lk to Pigeon Bay	04010101-501	1B, 2Bd, 3A, 3C, 4A, 4B, 5, 6	*	
Brule River - Greenwood R to Lk Superior	04010101-502	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Poplar River - Headwaters (Crescent Lk 16-0454-00) to Silver Lk	04010101-507	2B, 3C, 4A, 4B, 5, 6	*	
Baptism River - W Br Baptism R to Lk Superior	04010101-508	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Assinika Creek - Kindle Lk to Assinika Lk	04010101-512	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Blind Temperance Creek - Headwaters to Temperance R	04010101-513	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Brule River - T63 R2E S33, west line to Greenwood R	04010101-514	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Cross River - Fourmile Cr to Lk Superior	04010101-518	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Cross River - Cross River Lk to Fourmile Cr	04010101-519	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Junco Creek - Headwaters (Circle Lk 16-0110-00) to Duke Lk	04010101-522	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Durfee Creek - Headwaters to Lk Superior	04010101-523	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Baptism River, East Branch - Headwaters to Lk Twenty-three	04010101-524	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Fourmile Creek - Headwaters (Fourmile Lk 16-0639-00) to Cross R	04010101-525	2B, 3C, 4A, 4B, 5, 6	*	
Gauthier Creek - T62 R3E S20, north line to Brule R	04010101-527	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Greenwood River - Greenwood Lk to Brule R	04010101-528	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Indian Camp Creek - T60 R2W S3, west line to Lk Superior	04010101-530	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Irish Creek - Headwaters to Swamp River Reservoir	04010101-531	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Kimball Creek - Headwaters to Lk Superior	04010101-532	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Little Marais River - Headwaters to Lk Superior	04010101-533	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Manitou River - S Br Manitou R to Lk Superior	04010101-534	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Onion River - Headwaters to Lk Superior	04010101-535	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Mistletoe Creek - Halls Pond to Poplar R	04010101-536	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Sawbill Creek - Sawbill Lk to Temperance R	04010101-539	1B, 2A, 3B, 4A, 4B, 5, 6	*	
South Brule River - Headwaters (Lower Trout Lk 16-0175-00) to Brule R	04010101-541	2B, 3C, 4A, 4B, 5, 6	*	
Stump River - T64 R3E S8, west line to Pigeon R	04010101-542	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Swamp River - Swamp River Reservoir to Pigeon R	04010101-543	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Temperance River - Marsh Lk to Sawbill Cr	04010101-545	1B, 2Bd, 3C, 4A, 4B, 5, 6	*	
Timber Creek - Headwaters to Brule R	04010101-546	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Two Island River - Unnamed cr to Lk Superior	04010101-547	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Poplar Creek - Unnamed lk (16-0008-00) to Unnamed cr	04010101-561	2B, 3C, 4A, 4B, 5, 6	*	
Poplar Creek - Unnamed cr to Pigeon R	04010101-562	2B, 3C, 4A, 4B, 5, 6	*	
Grand Portage Creek - Unnamed cr to Lk Superior	04010101-563	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek - Wetland to Tom Lk	04010101-564	2B, 3C, 4A, 4B, 5, 6	*	
Little Devil Track River - Unnamed cr to Devil Track R	04010101-566	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Tait River - Christine Lk to Mistletoe Cr	04010101-567	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Plouff Creek - Paoli Lk to Temperance R	04010101-568	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Heartbreak Creek - Unnamed cr to Temperance R	04010101-569	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Houghtaling Creek - Headwaters to Unnamed cr	04010101-570	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

WL TALU Comment Exhibit 3

Reach Name and Description#	AUID	Uses	v#	ORVW
Houghtaling Creek - Unnamed cr to Unnamed cr	04010101-571	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Houghtaling Creek - Unnamed cr to Cross R	04010101-572	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Caribou River - Amenda Cr to Unnamed cr	04010101-573	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Caribou River - Unnamed cr to Unnamed cr	04010101-574	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Caribou River - Unnamed cr to Unnamed cr	04010101-575	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Caribou River - Unnamed cr to Lk Superior	04010101-576	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Crown Creek - Crown Lk to Unnamed cr	04010101-577	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Crown Creek - Unnamed cr to Unnamed cr	04010101-579	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Crown Creek - Unnamed cr to Fry Cr	04010101-580	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Crown Creek - Fry Cr to Unnamed cr	04010101-581	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Crown Creek - Unnamed cr to W Br Baptism R	04010101-582	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Schoolhouse Creek - Headwaters to E Br Baptism R	04010101-583	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Hockamin Creek - Headwaters to Heffelfinger Cr	04010101-584	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Hockamin Creek - Heffelfinger Cr to Unnamed cr	04010101-585	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Hockamin Creek - Unnamed cr to Unnamed cr	04010101-586	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Hockamin Creek - Unnamed cr to W Br Baptism R	04010101-587	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek - Wetland to Gaskin Lk	04010101-588	1B, 2Bd, 3B, 3C, 4A, 4B, 5, 6	*	[11/05/84P]
Cascade River - Cascade Lk to T62 R2W S9, east line	04010101-589	2B, 3C, 4A, 4B, 5, 6	*	
Cascade River - N Br Cascade R to Lk Superior	04010101-590	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Poplar River - Rice Lk to T61 R4W S3, south line	04010101-591	2B, 3C, 4A, 4B, 5, 6	*	
Poplar River - T61 R4W S10, north line to Mistletoe Cr	04010101-592	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Assinika Creek - Assinika Lk to Brule R	04010101-594	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Brule River - South Brule R to Northern Light Lk	04010101-596	1B, 2Bd, 3C, 4A, 4B, 5, 6	*	
Junco Creek - Duke Lk to Junco Lk	04010101-599	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Junco Creek - Junco Lk to Devil Track Lk	04010101-601	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Gauthier Creek - Headwaters to T62 R3E S17, south line	04010101-602	2B, 3C, 4A, 4B, 5, 6	*	
Indian Camp Creek - Headwaters to T60 R2W S4, east line	04010101-603	2B, 3C, 4A, 4B, 5, 6	*	
Irish Creek - within Swamp River Reservoir, to Swamp R	04010101-604	2B, 3C, 4A, 4B, 5, 6	*	
Unnamed creek - T61 R3W S24, east line to Halls Pond	04010101-606	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Swamp River - Headwaters (Tom Lk 16-0019-00) to Stevens Lk	04010101-609	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Temperance River - Sawbill Cr to T62 R4W S33, south line	04010101-610	1B, 2Bd, 3C, 4A, 4B, 5, 6	*	
Two Island River - Headwaters (Hare Lk 38-0026-00) to Unnamed cr	04010101-611	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Poplar River - Mistletoe Cr to Superior Hiking Trail bridge	04010101-612	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Poplar River - Superior Hiking Trail bridge to Lk Superior	04010101-613	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Caribou Creek - Caribou Lk to Poplar R	04010101-614	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Spruce Creek (Deer Yard Creek) - Unnamed cr (Ward Lk outlet) to Lk Superior	04010101-615	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Assinika Creek - Headwaters to Kindle Lk	04010101-616	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Bally Creek - Headwaters (Digit Lk 16-0152-00) to Cascade R	04010101-617	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Bally Creek Tributary) - Headwaters (Unnamed lk 16-0866-00) to Bally Cr	04010101-618	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

WL TALU Comment Exhibit 3

Reach Name and Description#	AUID	Uses	v#	ORVW
Unnamed creek (East Branch Baptism River Tributary) - Headwaters to E Br Baptism R	04010101-621	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (East Branch Baptism River Tributary) - Blesner Lk to E Br Baptism R	04010101-622	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (East Branch Baptism River Tributary) - Cramer Homestead Lk to Lk Twenty-three	04010101-623	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (East Branch Baptism River Tributary) - Headwaters to E Br Baptism R	04010101-624	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (East Branch Baptism River Tributary) - Unnamed Wetland to Lk Twenty-three	04010101-625	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Egge Creek - Egge Lk to E Br Baptism R	04010101-626	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Baptism River Tributary) - T56 R7W S9, west line to Baptism R	04010101-627	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Baptism River Tributary) - Headwaters to Baptism R	04010101-628	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Baptism River Tributary) - Headwaters to Baptism R	04010101-629	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Baptism River Tributary) - Headwaters to Baptism R	04010101-630	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (West Branch Baptism River Tributary) - T59 R8W S34, west line to W Br Baptism R	04010101-631	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (West Branch Baptism River Tributary) - Headwaters to Unnamed cr	04010101-632	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (West Branch Baptism River Tributary) - Headwaters to Unnamed cr	04010101-633	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (West Branch Baptism River Tributary) - T58 R8W S9, west line to Unnamed cr	04010101-634	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (West Branch Baptism River Tributary) - Unnamed cr to W Br Baptism R	04010101-635	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Barker Creek - Headwaters to Barker Lk	04010101-636	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Barker Creek - Barker Lk to Poplar R	04010101-637	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Barker Creek) - Frisk Lk to Barker Cr	04010101-638	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Beaverdam Creek - Headwaters to Powers Lk	04010101-639	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Beaverdam Creek - Powers Lk to Unnamed cr	04010101-641	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Beaverdam Creek - Unnamed cr to Portage Bk	04010101-642	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Beaverdam Creek Tributary) - Headwaters to Beaverdam Cr	04010101-643	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Blesner Creek - Headwaters to E Br Baptism R	04010101-644	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Blind Temperance Creek Tributary) - Headwaters to Blind Temperance Cr	04010101-645	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Bluff Creek - East Twin Lk (16-0145-00) to South Brule R	04010101-646	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Bluff Creek - West Twin Lk (16-0186-00) to East Twin Lk (16-0145-00)	04010101-647	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Brule River Tributary) - Unnamed lk (16-0016-00) to Brule R	04010101-648	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Brule River Tributary) - Lost Lk (16-0022-00) to Brule R	04010101-649	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Brule River Tributary) - Headwaters to Unnamed cr	04010101-650	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Brule River Tributary) - T62 R2E S2, west line to Unnamed cr	04010101-651	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Brule River Tributary) - Headwaters to Unnamed cr	04010101-652	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Brule River Tributary) - Unnamed cr to Brule R	04010101-653	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Brule River Tributary) - Unnamed lk (16-0059-00) to Brule R	04010101-654	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Little Brule River) - Unnamed lk (16-0017-00) to Lk Superior	04010101-655	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Little Brule River) - Headwaters to Unnamed lk (16-0017-00)	04010101-656	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Burnt Creek - BWCA boundary to Unnamed cr	04010101-657	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Burnt Creek - Unnamed cr to Sawbill Cr	04010101-658	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Burnt Creek Tributary) - Headwaters to Burnt Cr	04010101-659	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Burnt Creek - Burnt Lk to BWCA boundary	04010101-660	1B, 2A, 3B, 4A, 4B, 5, 6	*	[11/05/84P]

Exhibit I.9.

WL TALU Comment Exhibit 3

Reach Name and Description#	AUID	Uses	v#	ORVW
Cabin Creek - Cabin Lk to T59 R6W S20, south line	04010101-661	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Caribou River - Headwaters to Amenda Cr	04010101-662	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Caribou River Tributary) - Headwaters to Caribou R	04010101-663	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Caribou River Tributary) - Headwaters to Caribou R	04010101-664	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Caribou River Tributary) - T58 R6W S13, east line to Caribou R	04010101-665	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Amenda Creek - Headwaters to Caribou R	04010101-666	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Carlson Creek - Headwaters to Lk Superior	04010101-667	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Carlson Creek Tributary) - Headwaters to Carlson Cr	04010101-668	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - Headwaters to Cascade R	04010101-669	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - Headwaters to Cascade R	04010101-670	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - Headwaters to Cascade R	04010101-671	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - Headwaters (Swamp Lk 16-0256-00) to Cascade R	04010101-673	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (North Branch Cascade River Tributary) - BWCA boundary to N Br Cascade R	04010101-674	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Cascade River, North Branch - BWCA boundary to Cascade R	04010101-675	1B, 2A, 3B, 4A, 4B, 5, 6	*	[11/05/84P]
McDonald Creek - McDonald Lk to Cascade R	04010101-676	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - T61 R2W S26, north line to Cascade R	04010101-677	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - T61 R1W S21, north line to Cascade R	04010101-678	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Fry Creek - T62 R1W S30, east line to Cascade R	04010101-679	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Thompson Creek - Headwaters to Cascade R	04010101-680	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Cascade River, North Branch - Shrike Lk to T62 R2W S3, south line	04010101-681	1B, 2A, 3B, 4A, 4B, 5, 6	*	[11/05/84P]
Nester Creek - Headwaters to Cascade R	04010101-682	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Nester Creek Tributary) - Headwaters to Nester Cr	04010101-683	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Cedar Creek - Headwaters to Heartbreak Cr	04010101-684	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cedar Creek Tributary) - Headwaters to Cedar Cr	04010101-685	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cedar Creek Tributary) - Headwaters to Cedar Cr	04010101-686	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Cliff Creek - Headwaters to Lk Superior	04010101-687	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cliff Creek Tributary) - Headwaters to Cliff Cr	04010101-688	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (East Colville Creek) - Headwaters to Lk Superior	04010101-689	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cross River Tributary) - Headwaters to Cross R	04010101-690	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cross River Tributary) - Headwaters (East Lk 38-0020-00) to Cross R	04010101-691	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Wilson Creek (Cross River Tributary) - T60 R6W S24, west line to Cross R	04010101-692	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Stumble Creek - Headwaters to Cross R	04010101-693	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Crown Creek Tributary) - Headwaters to Crown Cr	04010101-694	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Crown Creek Tributary) - Headwaters to Crown Cr	04010101-695	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Crown Creek Tributary) - Ferman Lk to Crown Cr	04010101-696	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Crown Creek Tributary) - Headwaters to Crown Cr	04010101-697	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Crown Creek Tributary) - Headwaters to Fry Cr	04010101-698	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Fry Creek (Crown Creek Tributary) - Unnamed cr to Crown Cr	04010101-699	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Cut Face Creek - T61 R1W S29, north line to Lk Superior	04010101-700	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

WL TALU Comment Exhibit 3

Reach Name and Description#	AUID	Uses	v#	ORVW
Spruce Creek (Deer Yard Creek) - Deer Yard Lk to Unnamed cr (Ward Lk outlet)	04010101-701	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Spruce/Deer Yard Creek Tributary) - Ward Lk to Spruce Cr	04010101-702	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Devil Track River Tributary) - Headwaters to Devil Track R	04010101-703	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Devil Track River Tributary) - Headwaters to Devil Track R	04010101-704	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Little Devil Track River - Unnamed cr to Unnamed cr	04010101-706	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Little Devil Track River - Unnamed cr to Unnamed cr	04010101-707	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Little Devil Track River - Headwaters to Unnamed cr	04010101-708	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Little Devil Track River Tributary) - Headwaters (Blueberry Lk 16-0151-00) to Little Devils Track R	04010101-709	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Little Devil Track River Tributary) - Headwaters to Little Devil Track R	04010101-710	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Monker Creek - Headwaters (Pendant Lk 16-0163-00) to Monker Lk	04010101-711	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Monker Creek - Monker Lk to Little Devil Track R	04010101-713	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Dragon Creek) - Headwaters to Lk Superior	04010101-714	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Elbow Creek - T62 R1E S15, east line to Mud Cr	04010101-715	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Elbow Creek - Mud Cr to Unnamed cr	04010101-716	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Elbow Creek - Unnamed cr to Devil Track R	04010101-717	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Elbow Creek - Elbow Lk (16-0096-00) to T62 R1E S14, west line	04010101-718	2B, 3C, 4A, 4B, 5, 6	*	
Elbow Creek - Headwaters to Unnamed cr	04010101-719	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Elbow Creek - Unnamed cr to Unnamed cr	04010101-720	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Elbow Creek - Unnamed cr to Unnamed cr	04010101-721	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Elbow Creek - Unnamed cr to Elbow Lk (16-0096-00)	04010101-722	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Elbow Creek Tributary) - Headwaters to Elbow Cr	04010101-723	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Elbow Creek Tributary) - Headwaters to Elbow Cr	04010101-724	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Elbow Creek Tributary) - T62 R1E S10, east line to Elbow Cr	04010101-725	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Elbow Creek Tributary) - T62 R1E S27, west line to Elbow Cr	04010101-726	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Mud Creek - Headwaters to Unnamed cr	04010101-727	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Mud Creek - Unnamed cr to Elbow Cr	04010101-728	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Binagami Lake Outlet) - T62 R1E S21, west line to Mud Cr	04010101-729	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Farquhar Creek) - Headwaters to Lk Superior	04010101-730	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fiddle Creek) - T64 R1W S34, south line to T64 R1W S34, east line	04010101-731	1B, 2A, 3B, 4A, 4B, 5, 6	*	[11/05/84P]
Unnamed creek (Fiddle Creek) - T64 R1W S35, west line to Unnamed cr	04010101-732	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fiddle Creek) - Headwaters (Lima Lk 16-0226-00) to Fiddle Cr	04010101-733	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Fiddle Creek - Unnamed cr to Fiddle Lk	04010101-734	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Fiddle Creek - Fiddle Lk to Unnamed cr	04010101-736	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Fiddle Creek - Unnamed cr to South Brule R	04010101-737	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fiddle Creek Tributary) - Dislocation Lk to Fiddle Cr	04010101-738	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fiddle Creek Tributary) - Sled Lk to Dislocation Lk	04010101-740	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fiddle Creek Tributary) - T63 R1W S3, west line to Dislocation Lk	04010101-741	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fiddle Creek Tributary) - T63 R1W S3, west line to T63 R1W S3, north line	04010101-742	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

WL TALU Comment Exhibit 3

Reach Name and Description#	AUID	Uses	V#	ORVW
Unnamed creek (Flute Reed River Tributary) - Headwaters to Unnamed cr	04010101-743	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Flute Reed River Tributary) - Headwaters to Unnamed cr	04010101-744	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Flute Reed River Tributary) - Unnamed cr to Flute Reed R	04010101-745	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Flute Reed River Tributary) - T63 R3E S36, east line to Flute Reed R	04010101-746	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Flute Reed River Tributary) - Headwaters to Flute Reed R	04010101-747	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Flute Reed River Tributary) - Headwaters to Flute Reed R	04010101-748	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Cabin Creek - T59 R6W S29, north line to Moose Cr	04010101-749	2B, 3C, 4A, 4B, 5, 6	*	
Moose Creek - Cabin Cr to Moose Lk (38-0036-00)	04010101-750	2B, 3C, 4A, 4B, 5, 6	*	
Moose Creek - Moose Lk to Unnamed cr	04010101-752	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Moose Creek - Unnamed cr to Manitou R	04010101-753	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Heartbreak Creek - Cedar Cr to Unnamed cr	04010101-754	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Plouff Creek - T62 R5W S26, north line to Paoli Lk	04010101-755	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Grand Portage Creek) - Headwaters to Unnamed cr	04010101-757	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Grand Portage Creek Tributary) - Headwaters (Dutchman Lk 16-0002-00) to Grand Portage Cr	04010101-758	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Greenwood River Tributary) - Headwaters (Esther Lk 16-0023-00) to Olga Lk (16-0024-00)	04010101-759	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Greenwood River Tributary) - Olga Lk (16-0024-00) to Unnamed cr	04010101-761	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Greenwood River Tributary) - Unnamed cr to Greenwood R	04010101-762	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Greenwood River Tributary) - T63 R2E S1, north line to Unnamed cr	04010101-763	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Greenwood River Tributary) - Headwaters (Section 10 Lk 16-0055-00) to Greenwood R	04010101-764	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Greenwood River Tributary) - Headwaters (Puddle Lk 16-0054-00) to Greenwood R	04010101-765	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Greenwood River Tributary) - Headwaters (Paine Lk 16-0057-00) to Greenwood R	04010101-766	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Greenwood River Tributary) - Headwaters to Greenwood R	04010101-767	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Heartbreak Creek - Headwaters to Unnamed cr	04010101-768	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Heartbreak Creek - Unnamed cr to Cedar Cr	04010101-769	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Heartbreak Creek Tributary) - Headwaters to Heartbreak Cr	04010101-770	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Heartbreak Creek Tributary) - T59 R5W S2, west line to Heartbreak Cr	04010101-771	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Heffelfinger Creek - Headwaters (Fry Lk 38-0411-00) to Hockamin Cr	04010101-772	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Hockamin Creek Tributary) - T57 R8W S23, north line to Hockamin Cr	04010101-773	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Hockamin Creek Tributary) - T57 R8W S13, west line to Hockamin Cr	04010101-774	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Hollow Rock Creek - Headwaters to Unnamed cr	04010101-775	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Hollow Rock Creek - Unnamed cr to Unnamed cr	04010101-776	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Hollow Rock Creek - Unnamed cr to Lk Superior	04010101-777	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Hollow Rock Creek Tributary) - Headwaters to Hollow Rock Cr	04010101-778	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Hollow Rock Creek Tributary) - Headwaters to Hollow Rock Cr	04010101-779	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Red Rock Creek - Headwaters to Lk Superior	04010101-780	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Honeymoon Creek - Headwaters to Temperance R	04010101-781	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

WL TALU Comment Exhibit 3

Reach Name and Description#	AUID	Uses	V#	ORVW
Horn Creek - Headwaters (Horn Lk 16-0485-00) to Baker Lk	04010101-782	1B, 2Bd, 3C, 4A, 4B, 5, 6	*	
Wanless Creek - Headwaters (Dam Five Lk 38-0053-00) to Houghtaling Cr	04010101-783	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Houghtaling Creek Tributary) - Artlip Lk to Houghtaling Cr	04010101-784	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Irish Creek Tributary) - Headwaters to Irish Cr	04010101-785	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Jonvick Creek - Headwaters to Lk Superior	04010101-786	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Junco Creek Tributary) - Headwaters (Pine Lk 16-0194-00) to Unnamed lk (16-0860-00)	04010101-787	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Junco Creek Tributary) - Headwaters (Olson Lk 16-0158-00) to Junco Cr	04010101-788	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Junco Creek Tributary) - Headwaters to Circle Lk	04010101-789	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Junco Creek Tributary) - Headwaters to Circle Lk	04010101-790	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Junco Creek Tributary) - Headwaters (Eggers Lk 16-0144-00) to Junco Cr	04010101-792	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kadunce Creek Tributary) - Headwaters (Marsh Lk 16-0048-00) to Trout Lk (16-0049)	04010101-793	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kadunce Creek Tributary) - Trout Lk (16-0049-00) to Kadunce Cr	04010101-795	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kadunce Creek Tributary) - Headwaters (Section Fifteen Lk 16-0051-00) to Kadunce Cr	04010101-796	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kadunce Creek Tributary) - Headwaters (Bogus Lk 16-0050-00) to Kadunce Cr	04010101-797	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kadunce Creek Tributary) - Headwaters to Kadunce Cr	04010101-798	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kimball Creek Tributary) - Headwaters to Kimball Cr	04010101-799	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kimball Creek Tributary) - Headwaters to Kimball Cr	04010101-800	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kimball Creek Tributary) - Headwaters (Kimball Lk 16-0045-00) to Kimball Cr	04010101-801	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kimball Creek Tributary) - Headwaters (Benson Lk 16-0052-00) to Unnamed cr	04010101-802	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kimball Creek Tributary) - Headwaters to Unnamed cr	04010101-803	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kimball Creek Tributary) - Unnamed cr to Kimball Cr	04010101-804	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Koski Creek - Headwaters to Swanson Cr	04010101-805	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Swanson Creek - Headwaters to Koski Cr	04010101-806	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Swanson Creek - Koski Cr to Temperance R	04010101-807	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Leskinen Creek - Headwaters to Leskinen Lk	04010101-808	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Leskinen Creek - Leskinen Lk (38-0240-00)	04010101-809	2B, 3C, 4A, 4B, 5, 6	*	
Leskinen Creek - Leskinen Lk to Baptism R	04010101-810	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Lindstrom Creek) - Headwaters to Unnamed cr	04010101-811	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Lindstrom Creek) - Unnamed cr to Baptism R	04010101-812	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Lindstrom Creek Tributary) - Headwaters to Unnamed cr (Lindstrom Cr)	04010101-813	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Lullaby Creek - Headwaters (Lullaby Lk 16-0100-00) to Brule R	04010101-814	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Mark Creek - Headwaters to T61 R2W S5, south line	04010101-815	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Mark Creek - T61 R2W S8, north line to Mark Lk	04010101-816	2B, 3C, 4A, 4B, 5, 6	*	
Mark Creek - Mark Lk to Cascade R	04010101-818	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Manitou River (North Branch Manitou River) - T59 R7W S19, north line to S Br Manitou R	04010101-819	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Manitou River Tributary) - Headwaters (Bensen Lk 38-0018-00) to Manitou R	04010101-820	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Manitou River Tributary) - Headwaters (Kowalski Lk 38-0016-00) to Manitou R	04010101-821	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Little Manitou River - Headwaters to Lk Superior	04010101-822	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

WL TALU Comment Exhibit 3

Reach Name and Description#	AUID	Uses	v#	ORVW
Unnamed creek (Manitou River Tributary) - Headwaters to Manitou R	04010101-823	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Manitou River Tributary) - Headwaters to Manitou R	04010101-824	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Manitou River Tributary) - Headwaters to Manitou R	04010101-825	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Balsam Creek - T59 R7W S34, south line to Manitou R	04010101-826	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Manitou River, South Branch - Junction Cr to Mantiou R	04010101-827	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Manitou River, South Branch - Unnamed cr to Junction Cr	04010101-828	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Manitou River, South Branch - Unnamed cr to Unnamed cr	04010101-829	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Manitou River, South Branch - Headwaters to Unnamed cr	04010101-830	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Junction Creek - Headwaters to Unnamed cr	04010101-831	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (South Branch Manitou River Tributary) - Headwaters to Junction Cr	04010101-832	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Junction Creek - Unnamed cr to Unnamed cr	04010101-833	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Junction Creek - Unnamed cr to S Br Manitou R	04010101-835	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (South Branch Manitou River Tributary) - Headwaters to Junction Cr	04010101-836	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (South Branch Manitou River Tributary) - Headwaters to S Br Manitou R	04010101-837	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (South Branch Manitou River Tributary) - Headwaters to S Br Manitou R	04010101-838	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Mississippi Creek - Unnamed cr to Cascade R	04010101-839	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Mississippi Creek - Little Mississippi Cr to Unnamed cr	04010101-840	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Mississippi Creek - Unnamed cr to Little Mississippi Cr	04010101-841	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Mississippi Creek - Unnamed cr to Unnamed cr	04010101-842	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Mississippi Creek - Headwaters to Unnamed cr	04010101-843	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Mississippi Creek Tributary) - Headwaters to Mississippi Cr	04010101-844	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Mississippi Creek Tributary) - Headwaters to Mississippi Cr	04010101-845	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Mississippi Creek Tributary) - Headwaters (Unnamed lk 16-0249-00) to Mississippi Cr	04010101-846	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Mistletoe Creek - Mistletoe Lk to Unnamed cr	04010101-848	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Mistletoe Creek - Unnamed cr to Unnamed cr	04010101-849	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Mistletoe Creek - Unnamed cr to Halls Pond	04010101-850	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Mistletoe Creek Tributary) - Headwaters to Mistletoe Cr	04010101-851	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Mistletoe Creek Tributary) - Headwaters (Roast Lk 16-0367-00) to Mistletoe Cr	04010101-852	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Mons Creek - Headwaters (Unnamed lk 38-0262-00) to Brule R	04010101-853	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Ninemile Creek Tributary) - Moose Cr to Ninemile Cr	04010101-854	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Murmur Creek - Headwaters (Pike Lk 16-0252-00) to Unnamed cr	04010101-855	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Murmur Creek - Unnamed cr to Bigsby Lk	04010101-856	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Murmur Creek Tributary) - T61 R2W S15, east line to Murmur Cr	04010101-857	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Myhr Creek - Headwaters to Lk Superior	04010101-859	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Ninemile Creek - Headwaters (Ninemile Lk 38-0033-00) to Unnamed cr	04010101-860	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Ninemile Creek - Unnamed cr to Unnamed cr	04010101-861	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Ninemile Creek - Unnamed cr to Cramer Lk	04010101-862	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Ninemile Creek - Cramer Lk to Unnamed lk (38-0015-00)	04010101-864	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Ninemile Creek - Unnamed lk to Manitou R	04010101-866	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

WL TALU Comment Exhibit 3

Reach Name and Description#	AUID	Uses	v#	ORVW
Unnamed creek (Ninemile Creek Tributary) - Headwaters (Paccini Lk 38-0037-00) to Ninemile Cr	04010101-867	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Plouff Creek) - Sunhigh Lk to Wonder Lk	04010101-868	1B, 2A, 3B, 4A, 4B, 5, 6	*	[11/05/84P]
Unnamed creek (Oliver Creek) - Doyle Lk to Unnamed cr	04010101-869	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Oliver Creek) - Unnamed cr to Unnamed cr	04010101-870	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Oliver Creek) - Unnamed cr to Baptism R	04010101-871	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Onion River, West Branch - Headwaters to Onion R	04010101-872	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Onion River Tributary) - Headwaters to Onion R	04010101-873	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Pancake Creek - Pancake Lk to Temperance R	04010101-875	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Pecore Creek - Headwaters to Temperance R	04010101-876	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Pine Mountain Creek - Mush Lk to Unnamed cr	04010101-877	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Pine Mountain Creek - Unnamed cr to Falls Cr	04010101-878	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Falls Creek - Pine Mountain Lk to Pine Mountain Cr	04010101-879	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Falls Creek - Pine Mountain Cr to Brule R	04010101-880	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Pine Mountain Creek Tributary) - Headwaters to Pine Mountain Cr	04010101-881	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Plouff Creek - Wonder Lk to T62 R5W S23, south line	04010101-882	1B, 2A, 3B, 4A, 4B, 5, 6	*	[11/05/84P]
Missouri Creek - Headwaters (Missouri Lk 16-0474-00) to Poplar R	04010101-883	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Poplar River Tributary) - T60 R3W S6, west line to Poplar R	04010101-884	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Caribou Creek Tributary) - Lk Agnes (16-0359-00) to Caribou Cr	04010101-886	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Poplar River Tributary) - Headwaters to Poplar R	04010101-887	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Portage Brook - Headwaters (Devilfish Lk 16-0029-00) to Unnamed cr	04010101-888	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Portage Brook Tributary) - Unnamed cr to Unnamed cr	04010101-889	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Portage Brook Tributary) - Headwaters to Unnamed cr (Chester Lk outlet)	04010101-890	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Chester Lake Outlet) - Headwaters (Chester Lk 16-0033-00) to Unnamed cr	04010101-891	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Portage Brook - Unnamed cr to Unnamed lk (16-0864-00)	04010101-892	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Reservation River - T63 R5E S18, north line to Unnamed cr	04010101-894	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Reservation River - Unnamed cr to Unnamed cr	04010101-895	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Reservation River - Unnamed cr to Lk Superior	04010101-896	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Reservation River Tributary) - Headwaters (Taylor Lk 16-0007-00) to Unnamed cr	04010101-897	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Reservation River Tributary) - Headwaters to Unnamed cr	04010101-898	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unidentified streams - In the BWCA	04010101-899	1B, 2Bd, 3B, 3C, 4A, 4B, 5, 6	*	[11/05/84P]
Unnamed creek (East Branch Baptism River Tributary) - Headwaters to Unnamed cr	04010101-900	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (East Branch Baptism River Tributary) - Headwaters to Unnamed cr	04010101-901	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (East Branch Baptism River Tributary) - Headwaters to Unnamed cr	04010101-902	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Tower Creek) - Headwaters to E Br Baptism R	04010101-903	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Baptism River Tributary) - Headwaters to Baptism R	04010101-904	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Baptism River Tributary) - Headwaters to Baptism R	04010101-905	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (West Branch Baptism River Tributary) - Headwaters to W Br Baptism R	04010101-906	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (West Branch Baptism River Tributary) - Headwaters to W Br Baptism R	04010101-907	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (West Branch Baptism River Tributary) - T58 R8W S34, north line to W Br Baptism R	04010101-908	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

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Reach Name and Description#	AUID	Uses	v#	ORVW
Unnamed creek (West Branch Baptism River Tributary) - Unnamed cr to W Br Baptism R	04010101-909	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (West Branch Baptism River Tributary) - Headwaters to Unnamed cr	04010101-910	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (West Branch Baptism River Tributary) - T58 R8W S35, north line to Unnamed cr	04010101-911	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (West Branch Baptism River Tributary) - Headwaters to Unnamed cr	04010101-912	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (West Branch Baptism River Tributary) - Unnamed cr to Unnamed cr	04010101-913	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (West Branch Baptism River Tributary) - Headwaters to W Br Baptism R	04010101-914	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (West Branch Baptism River Tributary) - Headwaters to W Br Baptism R	04010101-915	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (West Branch Baptism River Tributary) - Headwaters to W Br Baptism R	04010101-916	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Barker Creek) - Headwaters to Barker Cr	04010101-917	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Barker Creek) - Headwaters to Barker Cr	04010101-918	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Blesner Creek) - Headwaters to Blesner Cr	04010101-919	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Brule River Tributary) - Headwaters to Brule R	04010101-920	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Brule River Tributary) - Headwaters to Brule R	04010101-921	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Brule River Tributary) - Headwaters to Brule R	04010101-922	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Brule River Tributary) - Headwaters to Unnamed cr	04010101-923	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Brule River Tributary) - Headwaters to Unnamed cr	04010101-924	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Burnt Creek Tributary) - Headwaters to Burnt Cr	04010101-925	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Burnt Creek Tributary) - Headwaters to Unnamed cr	04010101-926	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Burnt Creek Tributary) - Headwaters to Burnt Lk	04010101-927	1B, 2A, 3B, 4A, 4B, 5, 6	*	[11/05/84P]
Unnamed creek (Caribou Creek Tributary) - Headwaters to Caribou Cr	04010101-928	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Caribou River Tributary) - Headwaters to Caribou R	04010101-929	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Caribou River Tributary) - Headwaters to Caribou R	04010101-930	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Caribou River Tributary) - Headwaters to Unnamed cr	04010101-931	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Caribou River Tributary) - Headwaters to Unnamed cr	04010101-932	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Caribou River Tributary) - Headwaters to Caribou R	04010101-933	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Caribou River Tributary) - Headwaters to Caribou R	04010101-934	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Caribou River Tributary) - Headwaters to Caribou R	04010101-935	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Martin Creek - Headwaters to Caribou R	04010101-936	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - Headwaters to Unnamed cr	04010101-937	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - Headwaters to Unnamed cr	04010101-938	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Thompson Creek Tributary) - Headwaters to Unnamed cr	04010101-939	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - Headwaters to Cascade R	04010101-940	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - Headwaters to Cascade R	04010101-941	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - Headwaters to Cascade R	04010101-942	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - T61 R2W S12, west line to Cascade R	04010101-943	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - Headwaters to Cascade R	04010101-944	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - Headwaters to Cascade R	04010101-945	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - T61 R2W S26, west line to Cascade R	04010101-946	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Thompson Creek Tributary) - Headwaters to Thompson Cr	04010101-947	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

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Reach Name and Description#	AUID	Uses	V#	ORVW
Unnamed creek (Thompson Creek Tributary) - Headwaters to Thompson Cr	04010101-948	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (North Branch Cascade River Tributary) - T62 R2W S3, west line to N Br Cascade R	04010101-949	1B, 2A, 3B, 4A, 4B, 5, 6	*	[11/05/84P]
Unnamed creek (Nester Creek) - Headwaters to Nester Cr	04010101-950	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Nester Creek) - T62 R1W S33, east line to Nester Cr	04010101-951	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Nester Creek) - Headwaters to Nester Cr	04010101-952	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Nester Creek) - Headwaters to Nester Cr	04010101-953	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Nester Creek) - Headwaters to Unnamed cr	04010101-954	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Nester Creek) - Headwaters to Unnamed cr	04010101-955	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Nester Creek) - Headwaters to Unnamed cr	04010101-956	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cedar Creek) - Headwaters to Unnamed cr	04010101-957	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cliff Creek Tributary) - Headwaters to Cliff Cr	04010101-958	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cliff Creek Tributary) - Headwaters to Cliff Cr	04010101-959	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cliff Creek Tributary) - Headwaters to Cliff Cr	04010101-960	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Unnamed creek Tributary) - Headwaters to Unnamed cr	04010101-961	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cross River Tributary) - T59 R5W S15, north line to Cross R	04010101-962	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cross River Tributary) - Headwaters to Cross R	04010101-963	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cross River Tributary) - T59 R5W S23, north line to Cross R	04010101-964	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Stumble Creek) - Headwaters to Stumble Cr	04010101-965	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Fry Creek (Crown Creek Tributary) - T57 R8W S9, west line to Unnamed cr	04010101-966	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Crown Creek Tributary) - Headwaters to Unnamed cr	04010101-967	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Crown Creek Tributary) - Headwaters to Unnamed cr	04010101-968	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Crown Creek Tributary) - Headwaters to Unnamed cr	04010101-969	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cut Face Creek Tributary) - T61 R1W S29, north line to Cut Face Cr	04010101-970	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Woods Creek Tributary) - Headwaters to Woods Cr	04010101-971	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Devil Track River Tributary) - Headwaters to Devil Track R	04010101-972	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Devil Track River Tributary) - Headwaters to Devil Track R	04010101-973	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Devil Track River Tributary) - Headwaters to Devil Track R	04010101-974	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Little Devil Track River Tributary) - Headwaters to Little Devil Track R	04010101-975	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Little Devil Track River Tributary) - Headwaters to Little Devil Track R	04010101-976	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Monker Creek Tributary) - T62 R1E S31, east line to Monker Lk	04010101-977	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Dragon Creek Tributary) - Headwaters to Unnamed cr (Dragon Cr)	04010101-978	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Durfee Creek Tributary) - Headwaters to Durfee Cr	04010101-979	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Durfee Creek Tributary) - Headwaters to Unnamed cr	04010101-980	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Elbow Creek Tributary) - Headwaters to Elbow Cr	04010101-981	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Elbow Creek Tributary) - T62 R1E S27, west line to Elbow Cr	04010101-982	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Farquhar Creek Tributary) - Headwaters to Unnamed cr (Farquhar Cr)	04010101-983	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fiddle Creek Tributary) - Headwaters to Unnamed cr	04010101-984	1B, 2A, 3B, 4A, 4B, 5, 6	*	[11/05/84P]
Unnamed creek (Fiddle Creek Tributary) - T63 R1W S3, west line to Dislocation Lk	04010101-985	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fiddle Creek Tributary) - Headwaters to Fiddle Cr	04010101-986	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

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Reach Name and Description#	AUID	Uses	√#	ORVW
Unnamed creek (Fiddle Creek Tributary) - Headwaters to Fiddle Cr	04010101-987	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fiddle Creek Tributary) - Headwaters to Fiddle Cr	04010101-988	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fiddle Creek Tributary) - Headwaters to Fiddle Lk	04010101-989	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fiddle Creek Tributary) - Headwaters to Fiddle Cr	04010101-990	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Flute Reed River Tributary) - Headwaters to Flute Reed R	04010101-991	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Flute Reed River Tributary) - Headwaters to Flute Reed R	04010101-992	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fox Farm Creek) - Headwaters to Devil Track Lk	04010101-993	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fox Farm Creek Tributary) - Headwaters to Unnamed cr	04010101-994	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fox Farm Creek Tributary) - Headwaters to Unnamed cr	04010101-995	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Gauthier Creek Tributary) - Headwaters to Gauthier Cr	04010101-996	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Gauthier Creek Tributary) - Headwaters to Gauthier Cr	04010101-997	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Grand Portage Creek Tributary) - Headwaters to Unnamed cr	04010101-998	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Grand Portage Creek Tributary) - Headwaters to Unnamed cr	04010101-A00	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Greenwood River Tributary) - Headwaters (Redcoat Lk 16-0058-00) to Greenwood R	04010101-A01	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Heartbreak Creek Tributary) - Headwaters to Heartbreak Cr	04010101-A02	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Heartbreak Creek Tributary) - Headwaters to Heartbreak Cr	04010101-A03	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Hockamin Creek Tributary) - Headwaters to Hockamin Cr	04010101-A04	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Hockamin Creek Tributary) - Headwaters to Hockamin Cr	04010101-A05	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Hockamin Creek Tributary) - Headwaters to Hockamin Cr	04010101-A06	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Hockamin Creek Tributary) - Headwaters to Hockamin Cr	04010101-A07	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Hollow Rock Creek Tributary) - Headwaters to Hollow Rock Cr	04010101-A08	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Hollow Rock Creek Tributary) - Headwaters to Unnamed cr	04010101-A09	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Hollow Rock Creek Tributary) - Headwaters to Unnamed cr	04010101-A10	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Hollow Rock Creek Tributary) - Headwaters to Hollow Rock Cr	04010101-A11	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Red Rock Creek Tributary) - Headwaters to Red Rock Cr	04010101-A12	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Red Rock Creek Tributary) - Headwaters to Red Rock Cr	04010101-A13	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Wanless Creek Tributary) - Headwaters to Wanless Cr	04010101-A14	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Houghtaling Creek Tributary) - Headwaters to Houghtaling Cr	04010101-A15	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Houghtaling Creek Tributary) - Headwaters to Houghtaling Cr	04010101-A16	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Indian Camp Creek Tributary) - Headwaters to Indian Camp Cr	04010101-A17	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Indian Camp Creek Tributary) - Headwaters to Indian Camp Cr	04010101-A18	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Indian Camp Creek Tributary) - Headwaters to Unnamed cr	04010101-A19	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Grand Portage Creek Tributary) - Headwaters to Unnamed cr	04010101-A20	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Irish Creek Tributary) - Headwaters to Irish Cr	04010101-A21	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Jonvick Creek Tributary) - Headwaters to Jonvick Cr	04010101-A22	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Jonvick Creek Tributary) - Headwaters to Jonvick Cr	04010101-A23	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Junco Creek Tributary) - Headwaters to Junco Cr	04010101-A24	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Junco Creek Tributary) - Headwaters to Junco Cr	04010101-A25	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Junco Creek Tributary) - Headwaters to Junco Lk	04010101-A26	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

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Reach Name and Description#	AUID	Uses	v#	ORVW
Unnamed creek (Junco Creek Tributary) - Track Lk to Unnamed cr	04010101-A27	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Junco Creek Tributary) - Headwaters to Unnamed cr	04010101-A28	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Junco Creek Tributary) - Headwaters to Unnamed lk (16-0860-00)	04010101-A29	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Junco Creek Tributary) - T62 R1W S2, west line to Unnamed lk (16-0860-00)	04010101-A31	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Junco Creek Tributary) - Headwaters to Junco Cr	04010101-A32	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Junco Creek Tributary) - Headwaters to Junco Cr	04010101-A33	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Junco Creek Tributary) - Headwaters to Junco Cr	04010101-A34	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kadunce Creek Tributary) - Headwaters to Unnamed cr	04010101-A35	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kadunce Creek Tributary) - Headwaters to Unnamed cr	04010101-A36	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kadunce Creek Tributary) - Headwaters to Kadunce Cr	04010101-A37	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kadunce Creek Tributary) - Headwaters to Kadunce Cr	04010101-A38	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kadunce Creek Tributary) - Headwaters to Kadunce Cr	04010101-A39	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kadunce Creek Tributary) - Headwaters to Kadunce Cr	04010101-A40	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kadunce Creek Tributary) - Headwaters to Kadunce Cr	04010101-A41	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kimball Creek Tributary) - Headwaters to Kimball Cr	04010101-A42	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kimball Creek Tributary) - Headwaters to Unnamed cr	04010101-A43	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kimball Creek Tributary) - Headwaters to Kimball Cr	04010101-A44	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kimball Creek Tributary) - Headwaters to Kimball Cr	04010101-A45	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kimball Creek Tributary) - Headwaters to Kimball Cr	04010101-A46	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kimball Creek Tributary) - Headwaters to Kimball Cr	04010101-A47	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kimball Creek Tributary) - Headwaters to Unnamed cr	04010101-A48	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kimball Creek Tributary) - Headwaters to Unnamed cr	04010101-A49	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Swanson Creek Tributary) - Headwaters to Swanson Cr	04010101-A50	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Leskinen Creek Tributary) - Headwaters to Leskinen Cr	04010101-A51	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Lindstrom Creek Tributary) - Headwaters to Unnamed cr (Lindstrom Cr)	04010101-A52	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Lindstrom Creek Tributary) - Headwaters to Unnamed cr (Lindstrom Cr)	04010101-A53	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Lindstrom Creek Tributary) - Headwaters to Unnamed cr	04010101-A54	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Mark Creek Tributary) - Headwaters to Mark Cr	04010101-A55	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Rock Cut Creek - Headwaters to Manitou R	04010101-A56	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Rock Cut Creek Tributary) - Headwaters to Rock Cut Cr	04010101-A57	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Manitou River Tributary) - Headwaters to Manitou R	04010101-A58	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Manitou River Tributary) - Headwaters to Manitou R	04010101-A59	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Manitou River Tributary) - Headwaters to Manitou R	04010101-A60	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Manitou River Tributary) - Headwaters to Manitou R	04010101-A61	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Manitou River Tributary) - Headwaters to Unnamed cr	04010101-A62	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Manitou River (North Branch Manitou River) - Headwaters (Delay Lk 38-0415-00) to Round Island Lk	04010101-A63	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Manitou River (North Branch Manitou River) - Round Island Lk	04010101-A64	2B, 3C, 4A, 4B, 5, 6	*	
Unnamed creek (Manitou River Tributary) - Headwaters to Balsam Cr	04010101-A65	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Manitou River Tributary) - Headwaters to Manitou R	04010101-A66	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

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Reach Name and Description#	AUID	Uses	√#	ORVW
Unnamed creek (Manitou River Tributary) - Headwaters to Unnamed cr	04010101-A67	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Manitou River Tributary) - Headwaters to Unnamed cr	04010101-A68	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Manitou River Tributary) - Headwaters to Balsam Cr	04010101-A69	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (South Branch Manitou River Tributary) - T58 R8W S1, south line to S Br Manitou R	04010101-A70	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (South Branch Manitou River Tributary) - Headwaters (Unnamed lk 38-0262-00) to Junction Cr	04010101-A71	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (South Branch Manitou River Tributary) - Headwaters to Junction Cr	04010101-A72	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Mississippi Creek Tributary) - T61 R3W S1, west line to Mississippi Cr	04010101-A73	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Little Mississippi Creek Tributary) - Headwaters to Little Mississippi Cr	04010101-A74	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Mistletoe Creek Tributary) - Headwaters to Mistletoe Cr	04010101-A75	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Mistletoe Creek Tributary) - Headwaters to Mistletoe Cr	04010101-A76	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Mistletoe Creek Tributary) - Headwaters to Unnamed cr	04010101-A77	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Mistletoe Creek Tributary) - Headwaters to Mistletoe Cr	04010101-A78	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Mons Creek Tributary) - Headwaters to Mons Cr	04010101-A79	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Mons Creek Tributary) - Headwaters to Mons Cr	04010101-A80	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Ninemile Creek Tributary) - Headwaters to Ninemile Cr	04010101-A81	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Oliver Creek) - Headwaters to Unnamed cr	04010101-A82	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Onion River Tributary) - Headwaters to Onion R	04010101-A83	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Onion River Tributary) - Headwaters to Onion R	04010101-A84	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Pecore Creek Tributary) - Headwaters to Pecore Cr	04010101-A85	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Pecore Creek Tributary) - Headwaters to Unnamed cr	04010101-A86	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Pike Lake Creek) - Headwaters to Pike Lk	04010101-A87	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Poplar River Tributary) - T61 R4W S10, west line to Poplar R	04010101-A88	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Poplar River Tributary) - Headwaters to Poplar R	04010101-A89	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Poplar River Tributary) - Headwaters to Poplar R	04010101-A90	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Poplar River Tributary) - Headwaters to Poplar R	04010101-A91	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Poplar River Tributary) - Headwaters to Poplar R	04010101-A92	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Poplar River Tributary) - Headwaters to Poplar R	04010101-A93	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Poplar River Tributary) - Headwaters to Poplar R	04010101-A94	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Poplar River Tributary) - Headwaters to Unnamed cr	04010101-A95	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Portage Brook Tributary) - Headwaters to Unnamed lk (16-0864-00)	04010101-A96	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Portage Brook Tributary) - Headwaters to Portage Bk	04010101-A97	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Portage Brook Tributary) - Headwaters to Portage Bk	04010101-A98	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Portage Brook Tributary) - Headwaters to Portage Bk	04010101-A99	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Portage Brook Tributary) - Headwaters to Portage Bk	04010101-B00	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Reservation River Tributary) - Unnamed cr to Reservation R	04010101-B01	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Reservation River Tributary) - Headwaters to Unnamed cr	04010101-B02	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Reservation River Tributary) - Headwaters to Unnamed cr	04010101-B03	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Reservation River Tributary) - T63 R4E S25, north line to Unnamed cr	04010101-B04	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

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Reach Name and Description#	AUID	Uses	V#	ORVW
Unnamed creek (Reservation River Tributary) - Unnamed cr to Unnamed cr	04010101-B05	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Reservation River Tributary) - Headwaters to Unnamed cr	04010101-B06	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Reservation River Tributary) - Unnamed cr to Reservation R	04010101-B07	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Reservation River Tributary) - T63 R5E S18, north line to Reservation R	04010101-B08	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Rollins Creek - Headwaters to Unnamed cr	04010101-B09	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Rollins Creek - Unnamed cr to Lk Superior	04010101-B10	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Rollins Creek Tributary) - Headwaters (Oberg Lk 16-0466-00) to Rollins Cr	04010101-B11	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Rollins Creek Tributary) - Headwaters to Unnamed cr	04010101-B12	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Rollins Creek Tributary) - Headwaters to Unnamed cr	04010101-B13	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Fall River (Rosebush Creek) - Headwaters to Unnamed cr	04010101-B14	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Fall River (Rosebush Creek) - Unnamed cr to Lk Superior	04010101-B15	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fall River Tributary) - Headwaters to Fall R	04010101-B16	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fall River Tributary) - Headwaters to Unnamed cr	04010101-B17	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fall River Tributary) - Headwaters to Unnamed cr	04010101-B18	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fall River Tributary) - Headwaters to Fall R	04010101-B19	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fall River Tributary) - Headwaters to Fall R	04010101-B20	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Sawbill Creek Tributary) - Headwaters to Sawbill Cr	04010101-B21	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Sawmill Creek - Unnamed lk (38-0238-00) to Unnamed cr	04010101-B22	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Sawmill Creek - Unnamed cr to Unnamed cr	04010101-B23	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Sawmill Creek - Unnamed cr to Baptism R	04010101-B24	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Sawmill Creek Tributary) - Headwaters to Sawmill Cr	04010101-B25	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Sawmill Creek Tributary) - Headwaters (Unnamed lk 38-0241-00) to Sawmill Cr	04010101-B26	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Sawmill Creek Tributary) - Headwaters to Sawmill Cr	04010101-B27	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Sawmill Creek Tributary) - Headwaters to Sawmill Cr	04010101-B28	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Sawmill Creek - Headwaters to Unnamed lk (38-0238-00)	04010101-B29	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Schoolhouse Creek Tributary) - Headwaters to Schoolhouse Cr	04010101-B31	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Section 16 Creek) - T58 R5W S16, west line to Lk Superior	04010101-B32	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Section 16 Creek Tributary) - Headwaters to Unnamed cr	04010101-B33	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Sixmile Creek - Headwaters to Unnamed cr	04010101-B34	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Sixmile Creek - Unnamed cr to Temperance R	04010101-B35	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Sixmile Creek Tributary) - Headwaters to Sixmile Cr	04010101-B36	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Sixmile Creek Tributary) - Headwaters to Sixmile Cr	04010101-B37	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Sixmile Creek Tributary) - Headwaters to Sixmile Cr	04010101-B38	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Stickle Creek - Headwaters to Unnamed cr	04010101-B39	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Stickle Creek - Unnamed cr to South Brule R	04010101-B40	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Stickle Creek Tributary) - Headwaters to Stickle Cr	04010101-B41	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Stone Creek) - Headwaters to Unnamed cr	04010101-B42	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Stone Creek) - Unnamed cr to Lk Superior	04010101-B43	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Unnamed creek Tributary) - Headwaters to Unnamed cr	04010101-B44	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

WL TALU Comment Exhibit 3

Reach Name and Description#	AUID	Uses	V#	ORVW
Unnamed creek (Unnamed creek Tributary) - Headwaters to Unnamed cr	04010101-B45	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Unnamed creek Tributary) - Headwaters to Unnamed cr	04010101-B46	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Unnamed creek Tributary) - Headwaters to Unnamed cr	04010101-B47	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Little Stony Creek - Headwaters to Unnamed cr	04010101-B48	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Little Stony Creek - Unnamed cr to T63 R2E S9, south line	04010101-B49	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Little Stony Creek - T63 R2E S16, north line to Assinika Cr	04010101-B50	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Little Stony Creek Tributary) - Headwaters (Sparks Lk 16-0082-00) to Little Stony Cr	04010101-B51	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Stump River Tributary) - T64 R3E S8, west line to Stump R	04010101-B52	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Lower Stump River - T64 R3E S8, west line to Unnamed cr	04010101-B53	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Stump River Tributary) - Headwaters (Loft Lk 16-0031-00) to Lower Stump R	04010101-B54	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Lower Stump River - Unnamed cr to Stump R	04010101-B55	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Stump River Tributary) - T64 R3E S14, north line to Stump R	04010101-B56	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Stump River Tributary) - Headwaters to Stump R	04010101-B57	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Stump River Tributary) - Headwaters to Stump R	04010101-B58	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Stump River Tributary) - Headwaters to Stump R	04010101-B59	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Stump River Tributary) - Headwaters to Stump R	04010101-B60	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Stump River Tributary) - T64 R3E S17, west line to Lower Stump R	04010101-B61	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Sugar Loaf Creek) - T58 R5W S20, west line to Lk Superior	04010101-B62	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Sugar Loaf Creek Tributary) - Headwaters to Unnamed cr	04010101-B63	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Sundling Creek - Headwaters to Cascade R	04010101-B64	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Swamp River - Stevens Lk to T63 R4E S20, east line	04010101-B66	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Swamp River Tributary) - Headwaters to Stevens Lk	04010101-B67	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Swamp River Tributary) - Headwaters to Swamp R	04010101-B68	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Swamper Creek - T64 R1E S20, west line to Unnamed cr	04010101-B69	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Swamper Creek - Unnamed cr to Unnamed cr	04010101-B70	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Swamper Creek - Unnamed cr to Brule R	04010101-B71	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Swamper Creek Tributary) - T64 R1E S29, east line to Swamper Cr	04010101-B72	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Swamper Creek Tributary) - T64 R1E S29, east line to Swamper Cr	04010101-B73	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Tait River Tributary) - Headwaters to Tait R	04010101-B74	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - Headwaters to Temperance R	04010101-B75	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - Headwaters to Temperance R	04010101-B76	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Torgenson Creek - Headwaters to Unnamed cr	04010101-B77	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Torgenson Creek - Unnamed cr to Temperance R	04010101-B78	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Torgenson Creek Tributary) - Headwaters to Torgenson Cr	04010101-B79	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - Headwaters to Temperance R	04010101-B80	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - Headwaters to Temperance R	04010101-B81	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - Headwaters to Temperance R	04010101-B82	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - T60 R4W S17, east line to Temperance R	04010101-B83	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - Unnamed pond in T60 R4W S32 to Temperance R	04010101-B84	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

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Reach Name and Description#	AUID	Uses	V#	ORVW
Unnamed creek (Temperance River Tributary) - Headwaters to Temperance R	04010101-B85	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - Headwaters to Temperance R	04010101-B86	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - Headwaters to Temperance R	04010101-B87	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - T59 R4W S8, east line to Temperance R	04010101-B88	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - Headwaters to Temperance R	04010101-B89	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - Headwaters to Temperance R	04010101-B90	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - Headwaters to Unnamed cr	04010101-B91	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - Headwaters to Temperance R	04010101-B92	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - T59 R4W S19, west line to Temperance R	04010101-B93	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - T59 R4W S19, west line to Temperance R	04010101-B94	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - T59 R4W S19, west line to Temperance R	04010101-B95	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - T59 R4W S19, west line to Unnamed cr	04010101-B96	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Temperance River Tributary) - T59 R4W S19, west line to Unnamed cr	04010101-B97	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Tikkanen Creek) - Headwaters to Unnamed lk (38-0235-00)	04010101-B98	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Tikkanen Creek) - Unnamed lk (38-0235-00) to E Br Baptism R	04010101-C00	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Tikkanen Creek Tributary) - Headwaters to Unnamed cr	04010101-C01	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Timber Creek Tributary) - Headwaters to Timber Cr	04010101-C02	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Two Island River Tributary) - Headwaters (Dogwood Lk 16-0635-00) to Two Island R	04010101-C03	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Two Island River Tributary) - Headwaters (Morris Lk 16-0609-00) to Two Island R	04010101-C04	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Two Island River Tributary) - T59 R5W S7, north line to Two Island R	04010101-C05	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Two Island River Tributary) - Headwaters to Two Island R	04010101-C06	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Two Island River Tributary) - Headwaters to Two Island R	04010101-C07	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Two Island River Tributary) - Headwaters to Unnamed cr	04010101-C08	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Two Island River Tributary) - Headwaters to Unnamed cr	04010101-C09	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Two Island River Tributary) - Unnamed cr to Two Island R	04010101-C10	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Two Island River Tributary) - T59 R6W S12, north line to Two Island R	04010101-C11	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Two Island River Tributary) - Headwaters to Two Island R	04010101-C12	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Two Island River Tributary) - Headwaters (Dyers Lk 16-0634-00) to Two Island R	04010101-C13	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Two Island River Tributary) - Headwaters to Unnamed cr	04010101-C14	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Two Island River Tributary) - Headwaters to Unnamed cr	04010101-C15	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Fredneberg Creek - T59 R5W S27, east line to Two Island R	04010101-C16	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Temperance River - Baker Lk to Marsh Lk	04010101-C21	1B, 2Bd, 3C, 4A, 4B, 5, 6	*	
Unnamed creek - Unnamed wetland to Gaskin Lk	04010101-C24	1B, 2Bd, 3B, 3C, 4A, 4B, 5, 6	*	[11/05/84P]
Unnamed creek - Headwaters to Pigeon R	04010101-C25	2B, 3C, 4A, 4B, 5, 6	*	
Unnamed creek - Kemo Lk to Pine Lk	04010101-C26	2B, 3C, 4A, 4B, 5, 6	*	
Ada Creek - Ada Lk to Sawbill Lk	04010101-C28	1B, 2Bd, 3B, 3C, 4A, 4B, 5, 6	*	[11/05/84P]
Unnamed creek (Junco Creek Tributary) - Headwaters to Track Lk	04010101-C30	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Junco Creek Tributary) - Unnamed lk to Junco Cr	04010101-C32	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Junco Creek Tributary) - Headwaters to Junco Cr	04010101-C33	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

WL TALU Comment Exhibit 3

Reach Name and Description#	AUID	Uses	v#	ORVW
Unnamed creek (Junco Creek Tributary) - Headwaters to Junco Cr	04010101-C34	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Manitou River (North Branch Manitou River) - Round Island Lk to Unnamed lk	04010101-C36	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Temperance River - Headwaters (South Temperance Lk 16-0457-00) to Weird Lk	04010101-C39	1B, 2Bd, 3B, 3C, 4A, 4B, 5, 6	*	[11/05/84P]
Temperance River - Jack Lk to Kelly Lk	04010101-C41	1B, 2Bd, 3C, 4A, 4B, 5, 6	*	[11/05/84P]
Temperance River - Kelly Lk to Peterson Lk	04010101-C43	1B, 2Bd, 3C, 4A, 4B, 5, 6	*	[11/05/84P]
Temperance River - Peterson Lk to Baker Lk	04010101-C45	1B, 2Bd, 3C, 4A, 4B, 5, 6	*	[11/05/84P]
Unnamed creek - Gaskin Lk to Allen Lk	04010101-C47	1B, 2Bd, 3B, 3C, 4A, 4B, 5, 6	*	[11/05/84P]
Unnamed creek - Allen Lk to Horseshoe Lk	04010101-C49	1B, 2Bd, 3B, 3C, 4A, 4B, 5, 6	*	[11/05/84P]
Unnamed creek (Cut Face Creek Tributary) - Headwaters to Cut Face Cr	04010101-C51	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cut Face Creek Tributary) - Headwaters to Unnamed cr	04010101-C52	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cut Face Creek Tributary) - Headwaters to Unnamed cr	04010101-C53	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cut Face Creek Tributary) - Headwaters to Unnamed cr	04010101-C54	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cut Face Creek Tributary) - Unnamed cr to Cut Face Cr	04010101-C55	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - Headwaters to Cascade R	04010101-C56	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - Headwaters to Cascade R	04010101-C57	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - Headwaters to Cascade R	04010101-C58	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Mistletoe Creek Tributary) - Headwaters (Vat Lk 16-0372-00) to Mistletoe Cr	04010101-C59	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Baptism River Tributary) - Headwaters to Unnamed cr	04010101-C60	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Crown Creek Tributary) - Headwaters to Crown Cr	04010101-C61	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Bally Creek Tributary) - Headwaters to Bally Cr	04010101-C62	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Portage Brook Tributary) - Headwaters to Portage Bk	04010101-C63	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Irish Creek Tributary) - Headwaters to Irish Cr	04010101-C64	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Irish Creek Tributary) - Headwaters to Irish Cr	04010101-C65	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Assinika Creek Tributary) - Headwaters to Assinika Cr	04010101-C66	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Assinika Creek Tributary) - Headwaters to Assinika Cr	04010101-C67	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Assinika Creek Tributary) - Headwaters to Assinika Cr	04010101-C68	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Assinika Creek Tributary) - Headwaters to Assinika Cr	04010101-C69	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Assinika Creek Tributary) - Headwaters to Unnamed cr	04010101-C70	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Assinika Creek Tributary) - T63 R2E S7, north line to Assinika Cr	04010101-C71	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Brule River Tributary) - Headwaters to Brule R	04010101-C72	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Brule River Tributary) - Headwaters to Brule R	04010101-C73	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Brule River Tributary) - Headwaters to Brule R	04010101-C74	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Brule River Tributary) - Headwaters to Brule R	04010101-C75	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Brule River Tributary) - Headwaters to Brule R	04010101-C76	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Little Brule River Tributary) - Headwaters to Unnamed cr	04010101-C77	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kadunce Creek Tributary) - Headwaters to Kadunce Cr	04010101-C78	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kadunce Creek Tributary) - Headwaters to Kadunce Cr	04010101-C79	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Kimball Creek Tributary) - Headwaters to Kimball Cr	04010101-C80	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fiddle Creek Tributary) - T63 R1W S3, west line to Unnamed cr	04010101-C81	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

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Reach Name and Description#	AUID	Uses	v#	ORVW
Unnamed creek (Caribou River Tributary) - Headwaters to Caribou R	04010101-C82	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Caribou River Tributary) - Headwaters to Caribou R	04010101-C83	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Caribou River Tributary) - Headwaters to Unnamed cr	04010101-C84	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Amenda Creek Tributary) - Headwaters to Amenda Cr	04010101-C85	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cabin Creek Tributary) - Headwaters to Cabin Cr	04010101-C86	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (East Branch Baptism River Tributary) - Headwaters to E Br Baptism R	04010101-C87	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (East Branch Baptism River Tributary) - Headwaters to E Br Baptism R	04010101-C88	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Poplar River Tributary) - Headwaters to Poplar R	04010101-C89	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Poplar River Tributary) - Headwaters to Poplar R	04010101-C90	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Devil Track River Tributary) - Headwaters to Unnamed cr	04010101-C91	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Carlson Creek Tributary) - Headwaters to Carlson Cr	04010101-C92	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Carlson Creek Tributary) - Headwaters to Carlson Cr	04010101-C93	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Carlson Creek Tributary) - Headwaters to Carlson Cr	04010101-C94	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Mississippi Creek Tributary) - Headwaters to Unnamed cr	04010101-C95	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - Unnamed cr to Swamp Lk	04010101-C97	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - T62 R2W S16, north line to Unnamed cr	04010101-C98	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - Headwaters to Unnamed cr	04010101-C99	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Cascade River Tributary) - T62 R2W S16, west line to Unnamed cr	04010101-D00	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Spruce Creek Tributary) - Headwaters to Spruce Cr	04010101-D01	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Spruce Creek Tributary) - Headwaters to Spruce Cr	04010101-D02	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Spruce Creek Tributary) - Headwaters to Spruce Cr	04010101-D03	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Spruce Creek Tributary) - Headwaters to Spruce Cr	04010101-D04	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Devil Track River Tributary) - Headwaters to Devil Track R	04010101-D05	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Devil Track River Tributary) - Headwaters to Devil Track R	04010101-D06	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Devil Track River Tributary) - Headwaters to Devil Track R	04010101-D07	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Devil Track River Tributary) - Headwaters to Devil Track R	04010101-D08	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Devil Track River Tributary) - Headwaters to Devil Track R	04010101-D09	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Devil Track River Tributary) - Headwaters to Devil Track R	04010101-D10	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Fiddle Creek Tributary) - Headwaters to Fiddle Cr	04010101-D11	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Indian Camp Creek Tributary) - Headwaters to Indian Camp Cr	04010101-D12	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Onion River Tributary) - Headwaters to Onion R	04010101-D13	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Plouff Creek Tributary) - Headwaters to Plouff Cr	04010101-D14	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Plouff Creek Tributary) - Headwaters to Plouff Cr	04010101-D16	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Plouff Creek Tributary) - T61 R5W S15, south line to Plouff Cr	04010101-D17	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Unnamed creek (Poplar River Tributary) - Headwaters to Poplar R	04010101-D18	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Brule River - Northern Lights Lk to T63 R2E S32, east line	04010101-D19	1B, 2Bd, 3C, 4A, 4B, 5, 6	*	
Unnamed creek (Junco Creek Tributary) - Headwaters to Junco Cr	04010101-D20	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Manitou River (North Branch Manitou River) - T59 R7W S18, north line to T59 R7W S18, south line	04010101-D21	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Manitou River (North Branch Manitou River) - Unnamed lk to T59 R7W S18, north line	04010101-D22	1B, 2A, 3B, 4A, 4B, 5, 6	*	

Exhibit I.9.

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Reach Name and Description#	AUID	Uses	v#	ORVW
Manitou River (North Branch Manitou River) - T59 R7W S7, south line loop	04010101-D23	2B, 3C, 4A, 4B, 5, 6	*	
Cascade River - T62 R2W S10, west line to N Br Cascade R	04010101-D24	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Swamp River - T63 R4E S21, west line to Swamp R Reservoir	04010101-D25	2B, 3C, 4A, 4B, 5, 6	*	
Little Mississippi Creek - T62 R2W S26, west line to Mississippi Cr	04010101-D26	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Little Mississippi Creek - T62 R2W S27, south line to east line	04010101-D27	2B, 3C, 4A, 4B, 5, 6	*	
Little Mississippi Creek - Headwaters to T62 R2W S34, north line	04010101-D28	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Brule River - Headwaters (Horseshoe Lk 16-0241-00) to BWCA boundary	04010101-D29	1B, 2Bd, 3B, 3C, 4A, 4B, 5, 6	*	[11/05/84P]
Brule River - BWCA boundary to South Brule R	04010101-D30	1B, 2Bd, 3C, 4A, 4B, 5, 6	*	
Flute Reed River - Headwaters (Moosehorn Lk 16-0015-00) to Unnamed cr	04010101-D31	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Flute Reed River - Unnamed cr to Lk Superior	04010101-D32	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Cross River - Finger Lk to South Wigwam Lk	04010101-D33	2B, 3C, 4A, 4B, 5, 6	*	
Cross River - South Wigwam Lk to Cross River Lk	04010101-D35	2B, 3C, 4A, 4B, 5, 6	*	
Baptism River, West Branch - Crown Cr to E Br Baptism R	04010101-D49	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Baptism River, West Branch - -91.3381 47.4702 to Crown Cr	04010101-D50	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Baptism River, West Branch - Headwaters to -91.3381 47.4702	04010101-D51	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Kadunce River (Kadunce Creek) - Headwaters (Scabbard Lk 16-0047-00) to -90.1484 47.8261	04010101-D52	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Kadunce River (Kadunce Creek) - -90.1484 47.8261 to Lk Superior	04010101-D53	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Portage Brook - Headwaters (Unnamed lk 16-0864-00) to CSAH 16	04010101-D54	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Portage Brook - CSAH 16 to Pigeon R	04010101-D55	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Temperance River - T61 R4W S4, north line to Sixmile Cr	04010101-D56	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Temperance River - Sixmile Cr to Lk Superior	04010101-D57	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Baptism River, East Branch - Lk Twenty-three to Blesner Cr	04010101-D58	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Baptism River, East Branch - Blesner Cr to Baptism R	04010101-D59	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Woods Creek - Headwaters to -90.2650 47.7964	04010101-D60	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Woods Creek - -90.2650 47.7964 to Devil Track R	04010101-D61	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Royal River - Royal Lk to N Fowl Lk	04010101-D75	1B, 2Bd, 3B, 3C, 4A, 4B, 5, 6	*	[11/05/84P]
Devil Track River - Devil Track Lk to Unnamed cr	04010101-D79	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Devil Track River - Unnamed cr to Lk Superior	04010101-D80	1B, 2A, 3B, 4A, 4B, 5, 6	*	
Hoist Creek - Hoist Lk outlet to Cabin Lk	04010101-D81	2B, 3C, 4A, 4B, 5, 6	*	

Exhibit I.10.

Molloy, Kevin (MPCA)

From: Eric Williams <ewilliams@uss.com>
Sent: Thursday, February 02, 2017 12:47 PM
To: Bouchard, Will (MPCA); *MPCA_TALU Rulemaking
Cc: Molloy, Kevin (MPCA); David L Smiga; Christopher J Masciantonio; Todd D Young; Tishie Woodwell; Chrissy L Bartovich; Tom A Moe
Subject: TALU Comments - United States Steel Corporation
Attachments: USS TALU Comments.pdf

Mr. Bouchard,

Please find attached, United States Steel Corporation's comments regarding Minnesota's proposed Tiered Aquatic Life Uses (TALU) rule amendment (Revisor's identification code RD42374). If you have any questions or concerns, please do not hesitate to call.

Regards,

Eric Williams
Environmental Affairs
412-433-5918 - office
412-302-3624 - cell

Exhibit I.10.

United States Steel Corporation
Law Department
600 Grant Street, Room 1500
Pittsburgh, PA 15219-2800
Phone: 412-433-2851
Fax: 412-433-2964
dlsmiga@uss.com

David L. Smiga
Assistant General Counsel –
Environmental

February 2, 2017

Mr. Will Bouchard
Minnesota Pollution Control Agency
Environmental Analysis and Outcomes Division
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

Re: Comments on Planned Amendments to Water Quality Standards and Tiered Aquatic Life Uses – Revisor's Identification Number RD42374

Dear Mr. Bouchard:

United States Steel Corporation – Minnesota Ore Operations (U. S. Steel) operates both the Minntac and Keetac taconite mines which are located in northeastern Minnesota and may be impacted by the proposed rule amendments. U. S. Steel appreciates the opportunity to provide comments on Minnesota Pollution Control Agency's (MPCA) proposed rule amendments to establish tiered aquatic life uses (TALU) within the existing Class 2 water quality standards based on biological potential. U. S. Steel is also a member of the Minnesota Chamber of Commerce and supports their comments in regards to the proposed rule. At this time, it is U. S. Steel's position that the MPCA should immediately cease the rule revisions because the proposed rule package contains insufficient information to substantiate, and therefore; effectively comment on, the proposed TALU rule amendments.

The MPCA has provided insufficient information in the following areas:

- The index of biotic integrity (IBI) calculation mechanism is an essential piece of the proposed rule that the MPCA should make available to the public for review and comment[1]. The scientific and regulated communities must be able to review, comment on, and hopefully verify this mechanism before this rule is adopted. All other numeric water quality standards in Minnesota Rules can be evaluated through sampling and analysis by reliable and qualified third-parties. Third party evaluation of the IBI calculation mechanism can be used to verify the state's results, which helps provide the transparency needed for such standards. For these reasons, proceeding with rule-making at this time is not reasonable.

- The MPCA must provide an assessment of the year-over-year variability in the computed IBI due only to annual variability of a given water body's hydrology. The MPCA has not demonstrated that IBI values will not vary significantly due to normal wet-year to dry-year[2] fluctuations. Such consistency is needed to

[1] Generally any adequately trained biologist can collect fish and macroinvertebrates at a site using standard methods and count the number of fish and macroinvertebrate taxa and individuals. Currently, only MPCA staff can convert this data into an IBI score. Thus MPCA has not provided the public with the IBI calculation mechanism.

[2] The fluctuations envisioned in this comment would not include "drought" years, or extreme wet years, but the more normal fluctuations expected between the 10% wettest and the 10% driest years, for example.

prevent "luck-of-the-draw" in determining whether a stream would or would not meet its IBI water quality standard (WQS).

- The MPCA did not incorporate information regarding implementation measures within the proposed language. This oversight does not allow the regulated community to review and understand the potential implications prior to providing comments.

U. S. Steel has concerns with reclassification of streams without adequate consideration of whether the actual attainable use for the stream segment is and/or should be Limited Resource Value Waters (Class 7). For example, Appendix A lists specific use changes proposed as a part of this rule making following the steps described in "Draft technical guidance for designating aquatic life uses in Minnesota streams and rivers". However, those steps do not include the consideration of determining when a stream is appropriately classified as a Class 7 water, not a Class 2 water. It would seem logical that some of the stream segments in the area assessed would be ephemeral, especially the smaller county ditches listed in Table A-1 of the SONAR, and thus would not have sufficient flow to conduct biological assessments, IBI-based WQS should not be applied to those streams[3]. However, MPCA is proposing that all of these ditches fit into the Class 2, not Class 7, use classification. It is U. S. Steel's position that the MPCA should change its procedures for proposing TALU designation changes to include a proper and full assessment of streams in each evaluation area, including whether some stream segments would be appropriately designated as Class 7 waters[4].

U. S. Steel has concerns that the MPCA's proposed rules will have the unintended consequence of applying IBI-based WQS to unlisted lakes and ephemeral streams (waters of the state for which IBI procedures are not applicable). Unlisted waters in the state of Minnesota are by default Class 2B (Minn. R. 7050.0430). Some of those streams are being re-classified as Class 2Bm waters as the MPCA works through the TALU designation process (perhaps a decades-long process) and the remainder will be classified as 2Bg as a default assumption, without a Use Attainability Analysis (UAA) determination (proposed amendment to Minn. R. 7050.0430 Subp. 1). How will the MPCA address the headwaters of the "default" 2Bg waters, where ephemeral conditions do not allow an IBI determination, but the rule requires the stream to meet these new numeric IBI-based WQS? The default 2Bg classification applies to all waters of the state that are not listed in rule, but how can the attainment with the IBI-based WQS be determined if IBI protocols are not applicable to all streams, especially ephemeral streams? How can attainment with the IBI-based WQS be determined when IBI protocol are not technically applicable to lakes, but yet the IBI-based WQS would be applicable to unlisted lakes via this proposed rule? It appears that the MPCA has not really figured out how this rule will or should be applied to all waters of the state and, as a result, this rule needs to be more thoroughly vetted and reviewed before it is re-proposed, let

---

[3] Neither Class 7 streams nor ephemeral streams are addressed deeply in the rule or SONAR. Footnote 19 on page 41 of the SONAR states "Biological monitoring of fish and macroinvertebrates in streams has been limited to perennial and intermittent streams with sufficient flow to allow for colonization of fish and macroinvertebrates. As a result, the biological tools (i.e., IBIs) developed using these data are applicable to similar streams and not to ephemeral systems. The use of biological tools in ephemeral systems would require the collection of additional data and the development of new tools that can account for natural differences in biological assemblages related to their flow regimes."

[4] Minn. R. 7050.0140 Subp. 8: **Class 7 waters, limited resource value waters.** Limited resource value waters include surface waters of the state that have been subject to a use attainability analysis and have been found to have limited value as a water resource. Water quantities in these waters are intermittent or less than one cubic foot per second at the 7Q10 flow as defined in part 7050.0130, subpart 3.

alone before it is adopted. The state's definition of waters of the state is so broad that the default application of a 2Bg use classification to unlisted waters, including waters where IBI WQS are not applicable (lakes, ephemeral streams, and/or waters that would be designated as Class 7 if properly evaluated), makes this proposed rule unreasonable[5].

U. S. Steel is concerned that the MPCA is replacing one version of a "one-size-fits-all" WQS rule with another. As discussed above, the MPCA has not thought through how this rule fits with Class 7 uses or with ephemeral Class 2 waters (Class 2A or Class 2B). The proposed rule will presume that such waters are capable of meeting these new IBI-based WQS and will assign a Class 2Bg use presumptively to many waters of the state, some of it inappropriately. In order to assign the Class 2Bg use classification to only those waters to which it should be applied, the MPCA could use its UAA process to make these assignments, truly eliminating the "one-size-fits all" approach. It is U. S. Steel's position that the MPCA should change its procedures for proposing TALU designation changes to include a proper and full UAA assessment of streams in each evaluation area, including whether the IBI protocol can be appropriately applied. Then, through this UAA process, all Class 2 subcategories (2Bg, 2Be, and/or 2Bm) would be assigned through rule-making for each water body.

U. S. Steel appreciates your consideration of our concerns regarding the proposed rule amendments. If you have any questions regarding our concerns, please feel free to contact me.

Sincerely

David L. Smiga

DLS:nms

(499546)

[5] This would provide the MPCA with a great opportunity to identify those waters that can and cannot support Class 3 industrial use, which is another rule-making issue that the MPCA is evaluating.

Exhibit I.11.

Molloy, Kevin (MPCA)

From: Tiedeken, Nicklas (DOT)
Sent: Thursday, February 02, 2017 12:49 PM
To: Bouchard, Will (MPCA)
Cc: Schmitt, Mark (MPCA)
Subject: MnDOT comments on TALU Rules
Attachments: TALU MnDOT comments.pdf

Will
Please find attached comments from MnDOT on the proposed TALU rules. I will drop of the original this afternoon. Mark I assume you do NOT need more paper so I will not make a copy for you. Please let me know if you have any questions.
Thanks
Nick

DEPARTMENT OF TRANSPORTATION

Office of Environmental Stewardship
395 John Ireland Blvd.
St. Paul, MN 55155

Exhibit I.11

February 2, 2017

Will Bouchard
MPCA, Environmental Analysis and Outcomes Division
520 Lafayette Road North
Saint Paul, MN 55155-4194

RE: Comments on Proposed Amendments to Minnesota Rules Chapter 7050 and 7052, relating to Tiered Aquatic Life Uses (TALU) and Modification of Class 2 Beneficial Use Designations

Dear Mr. Bouchard,

Thank you for allowing the Minnesota Department of Transportation (MnDOT) the opportunity to review and comment on the proposed TALU rules. MnDOT activities and facilities are subject to various water program requirements and permits such as the National Pollutant Discharge Elimination System Permit (NPDES) Construction Stormwater Permit and the Municipal Separate Storm Sewer (MS4) Permit for discharge of pollutants under section 402 Clean Water Act (CWA), and for discharges of dredge or fill material under section 404 CWA and associated Section 401 Certifications. MPCA rules and standards are implemented and enforced through these permits and certifications. As such, the addition, or modification of existing, rules and standards can have a substantial effect on how we plan, build and operate the transportation system.

MnDOT has participated in numerous discussions with MPCA over the past few years relating to the TALU approach. We also thank you for meeting with us on June 30, 2016 to further discuss the proposed changes to the water quality standards. You and your staff have been very helpful in answering our questions and resolving many of our concerns. However, we request clarification for a topic that has been partially addressed in the SONAR, but not directly in the rule. Specifically this is the applicability of the TALU standards to water related features such as roadside ditches that typically do not support aquatic life in a manner that would be expected of natural streams or rivers.

MnDOT has over the years, expressed to MPCA the problem of application of water quality standards to roadside ditches and conveyance systems. These features typically are built systems designed to convey water away from the roadway, but are generally not designed or intended to support aquatic life or aquatic recreation. MPCA has, through the NPDES permits, provided some leeway for stormwater discharges of pollutants to these systems. The proposed TALU provisions do not set pollutant limits as are found in other parts of Chapters 7050 and 7052. Rather the proposed rule presupposes that all streams and rivers should support healthy levels of aquatic life. While the SONAR describes the types of streams that were used to establish the classification system (SONAR 5.A.i footnote 19, page 41), the proposed rule language does not differentiate a stream from a roadside ditch, swale or other drainage feature that does not carry a permanent flow of water. The proposed rule declares unlisted waters (7050.0430) as 2Bg waters. The proposed rule (e.g. 7050.0222 Subp. 4c.C) describes Class 2Bg as "a beneficial use that means waters capable of supporting and maintaining a balanced, integrated, adaptive community of warm or cool water aquatic organisms having a species composition, diversity, and functional organization comparable to the median of biological condition gradient level 4 as established in Calibration of the Biological Condition Gradient for Streams of Minnesota, Gerritsen et al. (2012)."

As such the same presumption of healthy aquatic life in a stream could inappropriately be applied to a roadside ditch or drainage system. It would be unreasonable for MPCA to apply TALU to typical roadside ditches, swales of other drainage features that were never intended or built to support aquatic life. To clarify the applicability of the rule to such drainage features a definition of "streams" to which TALU would be applied should be included in the rule. Such a definition could reference the tables of streams for each watershed entitled "Beneficial Use Designations for Stream Reaches". The SONAR states that these tables list ALL streams in each watershed (SONAR 5.A.v.1 – page 50). An alternative definition could refer to streams as those features which have a relatively permanent flow of water. Without such a definition of streams, the applicability of the rule is ambiguous as applied to roadside ditches, swales or other drainage features that were not intended or built to support aquatic life.

We have a few additional comments and suggestions that are attached separately.

Please feel free to contact me should you have any questions or concerns.

Sincerely,

Lynn Clarkowski, P.E.
Chief Environmental Officer
Office of Environmental Stewardship

Enclosure
-TALU, MnDOT Additional Comments

CC: Mark Schmitt, Director, MPCA Municipal Division
Nancy Daubenberger, Assistant Commissioner, MnDOT Engineering Services
Mike Barnes, Assistant Commissioner, MnDOT Operations
Scott Peterson, MnDOT Government Affairs
Beth Neuendorf, MnDOT Metro Water Resources

TALU – MnDOT Additional Comments

7050.0220 Subpart 1 A, B and C The replacement of Class 2A with 2Ae or 2Ag; Class 2Bd with 2Bde, 2Bdg, or 2Bdm; and Class 2B with 2Be, 2Bg, 2Bm raises the question of whether the standards established for Class 2A, 2Bd and 2B would still apply. Class 2Ae and 2Ag appear to be subclasses of 2A. Class 2Bde, 2Bdg, and 2Bdm appear to be subclasses of 2Bd. Class 2Be, 2Bg, and 2Bm appear to be subclasses of Class 2B.

7050.0220 Subpart 1C The proposed rule suggests that 2Be, 2Bg, 2Bm classification apply to all cool and warm water habitats and wetlands. The SONAR states that the proposed TALU system is intended for streams and rivers and not lentic systems (SONAR 1.A – page 14). The rule should be clear that the proposed TALU system and numeric criteria applies to streams and rivers and not lakes, wetlands or other waters. Similar arguments can be made for 7050.0220 Subpart 1 A and B.

7050.0220 Subpart 1C It is unclear if the 2Be, 2Bg and 2Bm classifications apply to wetlands. The SONAR states that the proposed TALU system is intended for streams and rivers and not lentic systems (SONAR 1.A – page 14). It would be appropriate to clearly link wetlands with class 2D consistent with the current rule (7050.0425).

7050.0222 Subp. 3d and Subp. 4d The tables do not provide modified tier scores for certain classes of waters (e.g. Northern Forest Rivers). The SONAR (SONAR 5.A.iii –page 48) states that the lack of scores for large rivers, cold water streams and high gradient streams is because channelizations or alterations are uncommon, or due to the ability of some streams to attain general use goals. While this may be the case for many waters, it is possible that some waters are altered to the point of justifying examination of a modified standard. It would be appropriate to provide some mechanism for this examination and development of an alternate criteria.

Exhibit I.12.

Molloy, Kevin (MPCA)

From: Daniel M Marx <DMMarx@flaherty-hood.com>
Sent: Thursday, February 02, 2017 3:08 PM
To: *MPCA_TALU Rulemaking
Subject: MESERB Comments on Proposed TALU Framework
Attachments: MESERB.2017 TALU Comments.pdf

Mr. Bouchard:

Attached please find comments from the Minnesota Environmental Science and Economic Review Board (MESERB) on MPCA's proposed amendments to Minnesota Rules, Chapters 7050 and 7052, relating to Tiered Aquatic Life Uses (TALU) and Modification of Class 2 Beneficial Use Designations.

If you have any questions regarding the attached comments please contact me.

Thank you.

Sincerely,

Daniel

Daniel Marx, Associate Attorney
Flaherty & Hood, P.A.
525 Park Street, Suite 470
St. Paul, MN 55103
Direct Dial: 651-259-1907
Office: 651-225-8840
dmmarx@flaherty-hood.com

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Exhibit I.12.

MESERB
Minnesota Environmental Science and Economic Review Board

Using science and economics to improve environmental regulations

February 2, 2017

BY E-MAIL ONLY

Will Bouchard
Environmental Analysis and Outcomes Division
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194
talurulemaking.pca@state.mn.us

Re: Proposed Amendments to Minn. Rules Chapters 7050, 7052, relating to Tiered Aquatic Life Uses and Modification of Class 2 Beneficial Use Designations

Dear Mr. Bouchard:

Thank you for the opportunity to comment on the above-referenced proposed amendments. The following comments are offered on behalf of the Minnesota Environmental Science and Economic Review Board (MESERB), a joint powers organization of 45 Greater Minnesota cities, public utilities commissions and sanitary sewer districts. MESERB has worked since 1997 to ensure that regulations affecting wastewater treatment are reasonable and based on sound science.

MESERB supports the general concept and purpose of the TALU framework as we believe that if appropriately designed and implemented, TALU can lead to the more efficient use of limited clean water infrastructure resources to effectively protect aquatic life in Minnesota's waters. That being said, we have the following comments and concerns regarding the MPCA's proposal:

(1) MESERB is concerned that Agency failed to perform an independent external peer review of its proposed TALU framework.

MESERB strongly encourages the MPCA to use independent external peer review in the development of all technical Agency rules and water quality standards. MESERB's principal concern with the proposed TALU framework is that Agency failed to convene an independent external peer review examining the MPCA's overarching proposal, the technical components thereof (e.g., the development of the IBI's BCG models and the habitat assessment tool) and the underlying data and statistical relationships that inform the key biological criteria at issue in this rulemaking.

As the Agency acknowledges, the proposed TALU framework is a highly technical and novel (as compared to other states with biocriteria) approach to addressing water quality that has significant

and long-lasting import for the state of Minnesota and its clean water regulatory framework. To our knowledge, there is only one state in the country that presently uses a TALU framework (Ohio) with two others in the development stage (Minnesota and Wisconsin). In the SONAR the Agency states that "the technical underpinnings of the rule and the rule itself were in fact the subject of multiple external peer reviews" (SONAR at 74). However, the principal external peer review referenced by the Agency, a journal article published in *Environmental Monitoring and Assessment,* entitled, "A novel approach for the development of tiered use biological criteria for rivers and streams in an ecologically diverse landscape" is not included the SONAR, was not made available to the public for review and comment and is only accessible via purchase online (*see* Exhibit 85). When adopting a novel framework such as TALU, it is essential for the Agency to convene an independent external peer review that involves the public as contemplated by Minn. Stat. § 115.035—not only to ensure that the Agency's science is sound, but also to improve the public's confidence in its efforts. Therefore, MESERB requests that the Agency convene an external peer review pursuant to Minn. Stat. § 115.035.

(2) MESERB is concerned that the Agency will amend guidance documents referenced in rule without going through notice and public comment rulemaking.

The TALU proposal seeks to incorporate by reference Agency guidance documents into administrative rule such as the Guidance Manual for Assessing the Quality of Minnesota Surface Waters for Determination of Impairment: CWA §305(b) Report and CWA § 303(d) List ("Guidance Manual") (*see* proposed rule 7050.0150, subp.3a). In the past the Agency has substantively amended the Guidance Manual (and others) changing the Agency's interpretation and implementation of rules without following the public notice and comment procedures required by the Minnesota Administrative Procedures Act (*compare* August 2016 version to December 2016 version of the above referenced Guidance Manual). MESERB requests that prior to making changes to the Guidance Manual (and others) that the Agency initiate a notice a public comment process.

(3) MESERB is concerned that data presented in the administrative record and data analysis performed by the Agency in development of the TALU framework is insufficient.

The TALU framework as developed by MPCA theoretically results in attainable and appropriate goals for aquatic life beneficial uses in streams (SONAR at 16) by redefining Class 2 aquatic life beneficial uses into Exceptional, General, and Modified TALU tiers. Draft biological criteria for these tiers are provided in Table 5-1 of the SONAR (at 43).

Table 5-1. Draft biological criteria for Exceptional, General, and Modified Uses for fish and macroinvertebrates (Abbreviations: RR = high gradient, GP = low gradient).

Type #	Type Name	Exceptional Use	General Use	Modified Use
Fish				
1	Southern Rivers	71	49	NA
2	Southern Streams	66	50	35
3	Southern Headwaters	74	55	33
4	Northern Rivers	67	38	NA
5	Northern Streams	61	47	35
6	Northern Headwaters	68	42	23
7	Low Gradient Streams	70	42	15
10	Southern Coldwater Streams	82	50	NA
11	Northern Coldwater Streams	60	35	NA
Macroinvertebrates				
1	Northern Forest Rivers	77	49	NA
2	Prairie and Southern Forest Rivers	63	31	NA
3	Northern Forest Streams RR	82	53	NA
4	Northern Forest Streams GP	76	51	37
5	Southern Streams RR	62	37	24
6	Southern Forest Streams GP	66	43	30
7	Prairie Streams GP	69	41	22
8	Northern Coldwater Streams	52	32	NA
9	Southern Coldwater Streams	72	43	NA

These draft biological criteria were developed through consideration of biological condition gradient (BCG) models, which describe how aquatic communities change in response to increasing levels of stressors (See, Figure 5-1, SONAR at 44).

As illustrated in Figure 5-1 below, the BCG looks at structural, functional, and taxonomic integrity of the fish and macroinvertebrate communities in a stream to estimate the presumed level of stress, which ranges from natural (watershed, habitat, flow regime, water chemistry) to severely altered. The biological criteria are based on relative positions within the presumed continuum of response as the presumed level of stress increases. Therefore, the biological community is measured and the results of this measurement are used to assign the stress condition without an independent measurement of the actual stress.

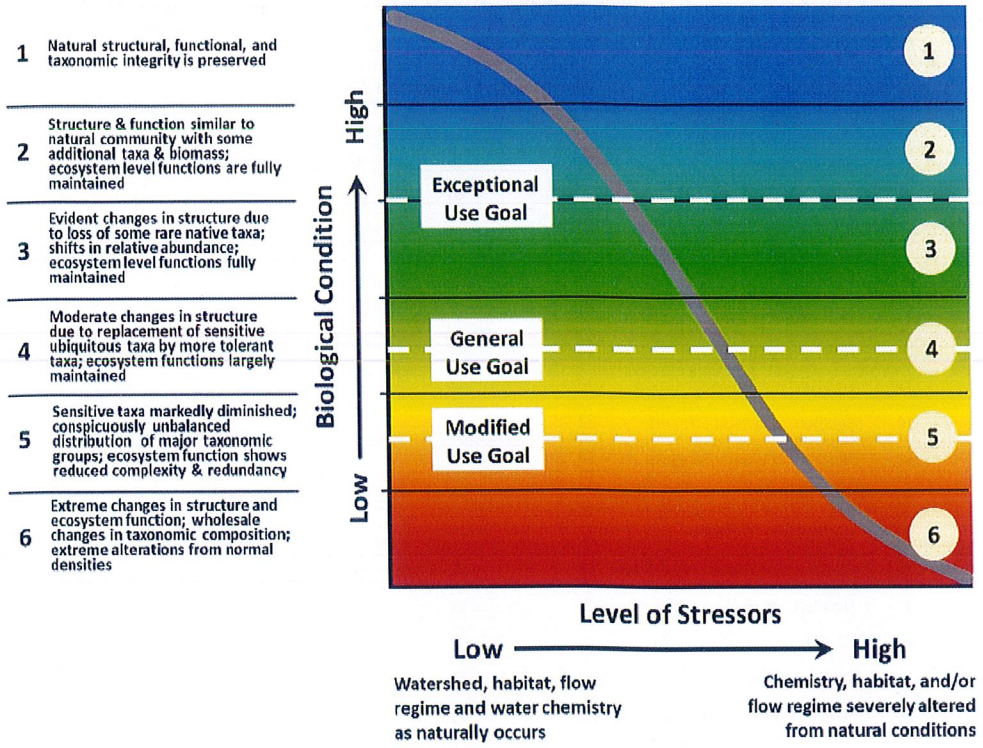

Figure 5-1. BCG illustrating the location of draft biocriteria for protection of Minnesota's tiered aquatic life use goals.

As a theory, the BCG model looks reasonable – changes in the biological community from some natural condition must be associated with the amount of stressors present in the environment. It is also appropriate to redefine Class 2 in consideration for stream alterations. However, the use of this model to develop biological criteria is problematic because variability in biological response does not appear to be addressed and the level of stress is not independently evaluated.

As a consequence, if a biological criterion is not achieved, the stream will be identified as impaired whether or not the observed response is within a reasonable amount of variation around the biological response threshold. Examples of this variability are contained in "Identification of Predictive Habitat Attributes for Minnesota Streams to Support Tiered Aquatic Life Uses". (June 15, 2016. Midwest Biodiversity Institute; wq-s6-39). Figures 5 from the MBI Report (MBI at 14), for example, show macroinvertebrate IBI scores in comparison with overall habitat scores. The variability in these relationships is high (R^2 less than 0.2), indicating a large amount of variability in IBI score for the same habitat score. Where is this variability addressed in development of the proposed biological criteria? Are these "not to exceed" thresholds? Is there an averaging period for looking at multiple years of record? What return frequency of

exceedances would be considered acceptable for attaining designated uses? These questions need to be answered and presented to the public before any biological criteria can be adopted.

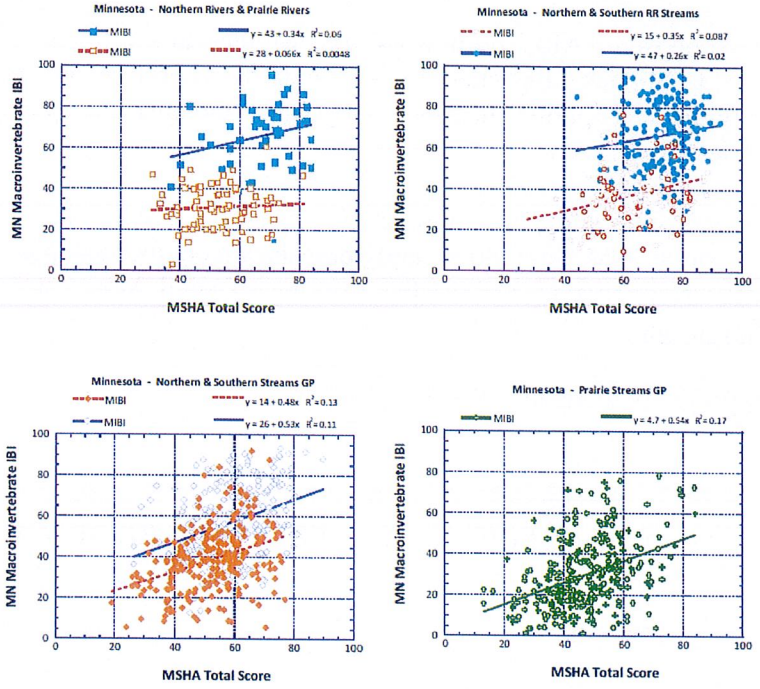

Figure 5. Plots of MIBI versus Total MSHA score separately for Minnesota Northern Forest and Prairie rivers (top left), Northern and Southern Riffle/Run streams (top right), Northern and Southern Glide/Pool streams (bottom left) and Prairie Glide/Pool streams(bottom right).

In addition, the draft biological criteria are presented without providing any data to show how the various criteria were developed. The SONAR indicates that detailed descriptions of the IBIs and biological criteria can be found in several references (S-63, S-64, S-78, and S-79), but these are not available to the public without charge. Federal and state law requires that that Agency provide the necessary background data used to develop water quality criteria and/or standards for review by the public during the administrative rulemaking process. Based on the review of the rulemaking record and technical support documents referenced by MPCA, MESERB was not able to readily identify the comprehensive background data used by the MPCA to develop the relevant IBI scores. Can MPCA please identify where this data can be found?

Moreover, once identified as impaired, it will be difficult to identify the stressors that must be controlled to achieve the biological response threshold. As noted in Figure 5-1 (SONAR at 44), there are multiple potential stressors but the standard approach will be to target effluent parameters that can be controlled whether or not those parameters contribute materially to the impaired biological condition. Since the stressor gradient is composed of multiple stressors, the SONAR should explain how these stressors will be evaluated to determine what controls are necessary and what improvement in IBI score can be expected if other "non-pollutant" stressors are not addressed.

(4) The Agency's intent to adopt the TALU framework without a public hearing may violate the public participating requirements of the CWA.

The adoption of the proposed TALU framework into Minnesota's rules clearly constitutes a revision or amendment to Minnesota's water quality standards. Therefore, adopting the proposed TALU framework without a public hearing potentially violates the public participation requirements of the Clean Water Act.

Thank you again for the opportunity to comment. Responses to any of the foregoing may be provided to my attention at 218-299-5386 or andy.bradshaw@ci.moorhead.mn.us. Please also copy any such written responses to MESERB's attorney, Daniel Marx, at 651-225-8840 or dmmarx@flaherty-hood.com.

Thank you for the opportunity to provide these comments.

Yours truly,

MINNESOTA ENVIRONMENTAL SCIENCE AND ECONOMIC REVIEW BOARD

Andy Bradshaw, Operations Manager
City of Moorhead Wastewater Services Division
MESERB President

cc: MESERB members

Exhibit I.13.

Molloy, Kevin (MPCA)

From: Maureen Johnson <mjsciled@earthlink.net>
Sent: Thursday, February 02, 2017 3:26 PM
To: *MPCA_TALU Rulemaking
Subject: Comments on TALU proposed rules

Dear Mr. Bouchard,

Here are my comments on the Proposed Rules for TALU.
I have listed some references that I will send to you when my internet is back up to high speed to accommodate their size.
If you have any questions, please feel free to call or email me.

Final TALU Comments

February 2, 2017

Proposed Amendments to Minnesota Rules, Chapters 7050 (Water Quality Standards for Protection of Waters of the State) and 7052 (Lake Superior Basin Water Standards), relating to Tiered Aquatic Life Uses and Modification of Class 2 Beneficial Use Designations.

My name is Maureen Johnson. I am a biologist with 30 years of experience, managing cleanups of hazardous waste sites for the Minnesota Pollution Control Agency, and water quality analysis, water quality data verification, and implementation of cooperative agreements for both U.S. Environmental Protection Agency and U.S. Forest Service. National precedent was set when I implemented the first Federal Facility Agreement to protect not only people but also ecological resources at Twin Cities Army Ammunition Plant contamination. Other examples of my cleanups included Perham Arsenic that actually poisoned people and Reserve Mining hazardous waste threatening Lake Superior. I am a co-author with Bruce L. Johnson of An Evaluation of a Field-Based Aquatic Life Benchmark For Specific Conductance In Northeast Minnesota , Nov. 2015.

With my professional experience I am familiar with interpreting and implementing the intent of numerous Federal and State environmental regulations.

I have developed the following comments regarding the proposed rules. The 170 pages of proposed rules incorporate multiple documents of 352 pages, and and each of these incorporated documents of thousands pages in references that are important support for the conclusions. The MPCA developed these documents over 15 years, and we have 45 days including the Christmas season. so the time allotted is insufficient to review the rules and each incorporated document -

-*and* its supporting references. My inability to comment on the remainder of the proposed rule changes does not indicate that I agree to its contents. **Exhibit I 13.**

In these comments the underlining is mine for emphasis.

P. Rules is the Proposed Rules.

Human Disturbance Score in Indices of Biological Integrity

Table 2. Human Disturbance Score metrics, in *Development of a Macroinvertebrate-Based Index of Biological Integrity for Minnesota's Rivers and Streams,* has a metric for Per cent agricultural land use, but does not have a Per cent mining use. The lack of these metrics makes the northeastern IBIs look much better than they are where mining is a major effect. The lack of specific conductance metric makes southern streams also appear better than they are, and the per cent mining sands in the south east may also be essential to an accurate IBI locally.

Any Minnesota index of biological integrity should include specific conductance as a metric. Specific conductance has been used since the MPCA began in 1965 as a parameter that indicates anthropologic change after natural changes have been accounted for. Cormier, Susan M., Ph.D., *REVIEW: "An Evaluation of a Field-Based Aquatic Benchmark for Specific Conductance in Northeast Minnesota" (November 2015). Prepared by B. L. Johnson and M. K. Johnson for WaterLegacy*, Feb. 4, 2016, wrote, speaking of specific conductance (SC):

> 1. Independent data sets from different decades confirm Johnson and Johnson's conclusion that the background SC in Ecoregion 50 in Minnesota is less than the background of the data set used to develop the SC benchmark for Ecoregions 69 and 70 in Central Appalachia. Hence, a benchmark value for SC in Ecoregion 50 is not expected to be greater than the benchmark for central Appalachia, i.e. 300 µS/cm.
>
> 2. Likewise, the inference that 5% extirpation of benthic invertebrates would occur at similar conductivity levels in central Appalachia and Ecoregion 50 in Minnesota was supported by analysis of an independent data set of paired benthic invertebrate and SC data from Ecoregion 50 in Minnesota. We estimated that more than 5% of genera would be extirpated in streams greater than 320 µS/cm. However, additional analyses are needed to evaluate the effect of seasonal collection. [320 uS/cm would be the maximum specific conductance benchmark, and further spring sampling could lower this number.]
>
> 3. Johnson and Johnson evaluated biological effects where SC was greater than background at several mine sites and streams draining in or near the mines. SC associated with discharges and mine pits exceeded 300 µS/cm. For some sites, dilution may reduce the SC below 300 µS/cm in the waterbody, but the data are not shown and may not be available for all sites. In other cases, SC is very high (>1,000 µS/cm) and biological effects have been reported by MPCA. The severity of the effects are consistent with effects expected for increased level of SC.
>
> 4. Metal contamination, habitat alteration, temperature, and nutrient enrichment may contribute to biological effects at some of the mine sites. These stressors may exacerbate the effect, but the extirpation due to SC would still occur if these stressors were removed based on removal of other stressors and persistent effects observed in Appalachia when only conductivity was high and other stressors were low or absent (U.S. EPA, 2011; Timpano et al., 2015; Cook et al., 2015)

Designations of Exceptional (e), General (g), and Modified (m)

Unlisted waters

The P. Rules state:

> 7050.0430 UNLISTED W A TERS. 78.26
>
> Subpart 1. Statewide surface waters. Except as provided in subparts 2 and 3, all 78.27
>
> surface waters of the state that are not listed in part 7050.0470 and that are not wetlands 78.28
>
> as defined in part 7050.0186, subpart 1a, are hereby classified as Class 2B 2Bg, 3C, 4A, 78.29
>
> 4B, 5, and 6 waters. 78.30
>
> Subp. 2. Boundary Waters Canoe Area Wilderness. 78.31
>
> A. All streams in the Boundary Waters Canoe Area Wilderness [1 1/5/84P] not 79.1
>
> listed in part 7050.0470 are classified as Class 1B, 2Bdg, 3B

In the tables, such as *Beneficial Use Designations for Stream Reaches: Little Fork River Watershed (09030005),* a statement identifies a symbol used in the tables: ‡

> Some stream miles within the watershed have not been assigned their own water body id. These water bodies are not included in the use table, but they are labeled xxxxxxxx-999 in the Minnesota Pollution Control's databases. The default uses (2Bg, 3C, 4A, 4B, 5, 6) apply to these waters.

All of these types of unlisted waters including the BWCAW are biologically designated g for General, which according to the definitions beginning on line definitions beginning on line 41.18 indicates a capability to meet a lower capability gradient level than that of e for Exceptional. All unlisted or unassessed waters should be designated exceptional and having potential for high quality in its type, including waters with legal physical limitations (prior to modified designation), until shown to be otherwise via an actual assessment or a Use attainability analysis under 7050.0405. This is not the case in these P. Rules. These g waters, some of which are actually e BCG 3 - 75th percentile, will only be expected to attain or maintain a BCG level 4, enabling pollution to occur until these waters actually are lowered to BCG level 4. This is not consistent with the Clean Water Act goal to maintain and restore integrity of the waters.

The Dual Notice states:

> The TALU framework represents a significant change to the existing water quality standards that protect aquatic life by more precisely classifying streams based on the biological condition that is possible for a particular stream.

Those headwaters that originate in the BWCAW are as near to the biological condition that is possible while unimpacted by man, except possibly for air impacts originating outside the BWCAW. However, in this case, those streams should still

be designated as exceptional because that is the level that the streams should be and therefore the goal of monitoring, regulation and enforcement should be set to restore the BWCAW streams to their natural condition. These headwaters may have been affected by man's logging or dams in the past; the US Forest Service is gradually removing the dams and no logging is allowed within the BWCAW, so efforts are being made to restore these streams to their exceptional condition, whether storm-ravaged new growth or old growth habitat.

Some of the BWCAW streams that originate outside of the BWCAW may have anthropological stress, and unless they are physically modified, should also be designated exceptional because their "biological condition that is possible" is likely the same as those that originate within the BWCAW; a goal of these streams should be to protect the BWCAW portion of the stream, though it will take more work to restore them.

Similarly the proposed rules for unlisted statewide surface waters do not protect those waters that are actually potentially restorable or even those that do not need restoration

7050.0430 UNLISTED W ATERS. 78.26

Subpart 1. Statewide surface waters. Except as provided in subparts 2 and 3, all 78.27

surface waters of the state that are not listed in part 7050.0470 and that are not wetlands 78.28

as defined in part 7050.0186, subpart 1a, are hereby classified as Class 2B 2Bg, 3C, 4A, 78.29

4B, 5, and 6 waters. 78.30

All waters should be protected for their potential restorability rather than their existing condition. If someone or an entity wishes, they may contest the listing at any time since the evaluation has not been done. The proposed rules still state "or may support":

7050.0140 USE CLASSIFICATIONS FOR WATERS OF THE STATE. 1.4

[For text of subps 1 and 2, see M.R.] 1.5

Subp. 3. Class 2 waters, aquatic life and recreation. Aquatic life and recreation 1.6

includes all waters of the state that support or may support fish, other aquatic life aquatic 1.7

biota, bathing, boating, or other recreational purposes.

MPCA will be reclassifying waters according to the new rules in the future without public notice. This is not acceptable. Reclassification should require notice in the applicable local newspapers and to all Minnesotans who should be considered to be interested. Before any water is downgraded in uses in any way, a public comment period and a public hearing shall be conducted on that specific water, so that those who use the water have sufficient notice and opportunity to defend the use and quality of the water since 1975. Before any downgrading may occur, a stressor analysis should be conducted that includes evaluation of all past uses of the water, including industrial uses, to identify

past and existing pollution and its source(s) since November 1975; when such pollution is found, and responsible party(ies) is (are) identified, natural resource damages should be assessed in such measure as to repair the damage to the water or to repair those who are harmed by the loss of the use.

A water with legal physical limitations may be noted as such, but it also should be designated exceptional use modified or general use modified, since both are possible. For example a few waters in the BWCAW have dams, and these are gradually being removed by the USFS. These waters with dams would be Modified, but they still have potential to gain quality by removal of the dams, are in the BWCAW, so their designation should be exceptional, reflecting the potential of the waters to gain quality

Biological Condition Gradient

The Biological Condition Gradients are used to describe exception versus general, for example:

> B. "Exceptional cold water aquatic life and habitat" or "Class 2Ae" is a 41.15
>
> beneficial use that means waters capable of supporting and maintaining an exceptional 41.16
>
> and balanced, integrated, adaptive community of cold water aquatic organisms having 41.17
>
> a species composition, diversity , and functional organization comparable to the 75th 41.18
>
> percentile of biological condition gradient level 3 as established in Calibration of the 41.19
>
> Biological Condition Gradient for Streams of Minnesota, Gerritsen et al. (2012). 41.20
>
> C. "General cold water aquatic life and habitat" or "Class 2Ag" is a beneficial 41.21
>
> use that means waters capable of supporting and maintaining a balanced, integrated, 41.22
>
> adaptive community of cold water aquatic organisms having a species composition, 41.23
>
> diversity , and functional organization comparable to the median of biological condition 41.24
>
> gradient level 4 as established in Calibration of the Biological Condition Gradient for 41.25
>
> Streams of Minnesota, Gerritsen et al. (2012). 41.26

The definition of "Exceptional cold water aquatic life and habitat" use the word exceptional to define exceptional without defining what "exceptional" means. The word exceptional is used with "and... 75th percentile... level 3", but the rule does not explain what exceptional means. With any MPCA staff can designate a water as exceptional --or not exceptional -- according to what he feels the water is without any definitional guidance.

The word "comparable" has little meaning in science. One can compare anything to anything. It is the relationship that matters.

The definitions above use "capable of supporting" a certain functional organization listed in the specified reference. To designate an unevaluated stream as a lower quality functional organization than that which it might be capable is inappropriate.

Note underlining of the difference between the exceptional and general Class 2A above. The definition does not define what 2A waters are designated if the water is scored below the 75th percentile(in the range of 1 percentile to 70th percentile) of biological condition gradient level 3. It is not "general" because that is the "median of biological condition gradient level 4". A water is neither "g" nor "e" if it is at the 75th or 25th percentile of biological condition gradient level 4.

The discussion of the Biological Gradient that most reflects Minnesota Rules concludes that BCG 4 is reflective of MN Rules.

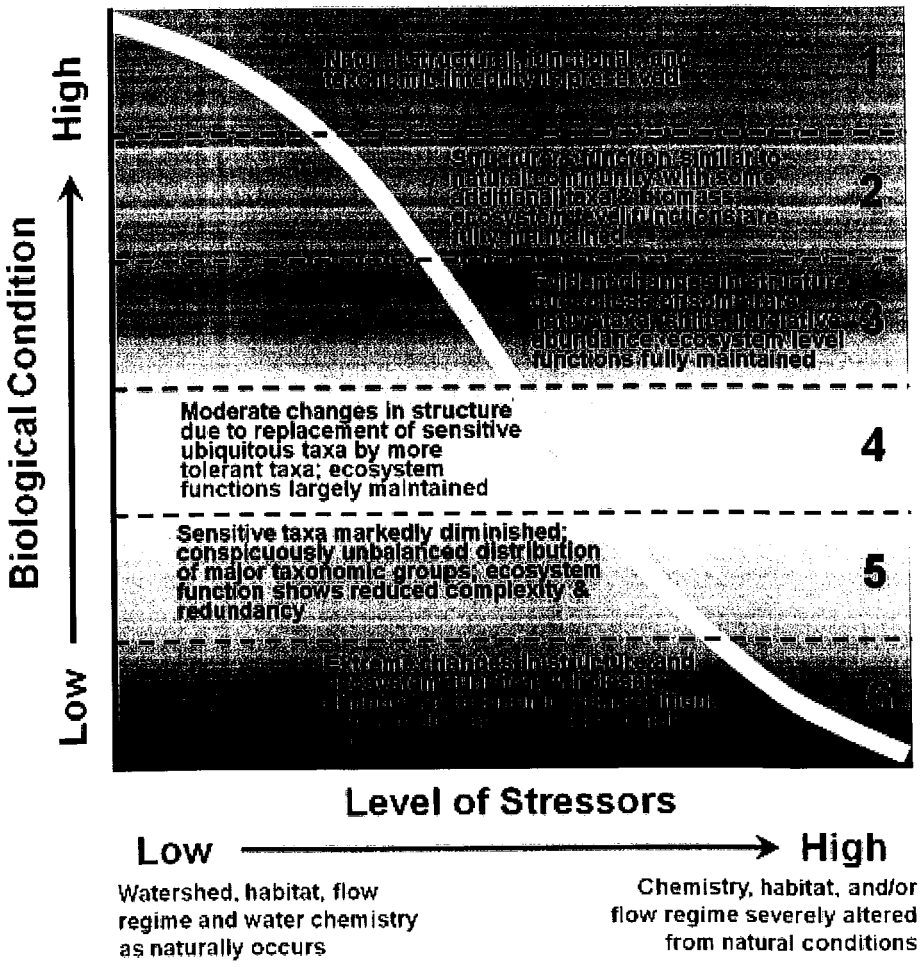

Figure 8. Conceptual model of the biological condition gradient (modified from Davies and Jackson [2006]).

MPCA [Bouchard, William, Jr.] (2014) Development of biological criteria for tiered aquatic life uses: fish and macroinvertebrate thresholds for attainment of aquatic life use goals in Minnesota streams and rivers. Minnesota Pollution Control Agency, Environmental Analysis and Outcomes Division, St. Paul, MN,(Biological Criteria for TALU, 2014) p. 26.

Exhibit J.13.

> The use of the median of BCG Level 4 will produce consistently protective biocriteria for streams across Minnesota that will not result in regions with heavy overall disturbance to be held to a lower standard. Most importantly, the BCG permits Minnesota to set criteria that will be at least protective of the Minnesota's aquatic life use goals in regions were too few minimally or least disturbed reference sites are available. By using the median of BCG Level 4 as a threshold we are recognizing the fact that the biologists involved with BCG development have placed the goal between Levels 3 and 4. (p. 33)

The decision to designate Minnesota's aquatic life goals as "the median of BCG Level 4" or "between Levels 3 and 4" is arbitrary and subject to this Proposed Rules' comments solicitation. According to this, those waters designated General Use have no hope for restoration to their natural state.

Minnesota must comply with the Clean Water Act. The CWA Section 101 (a) objective is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 100% integrity would be achieving the natural state of a water, which is equivalent to the Biological Condition Gradient 1, above. All waters at one time in the past were once in natural condition. Any water with a BCG designation less than 1 means it requires improvement.

It is understandable that the waters with the worst legal physical changes would not be able to achieve the natural condition. However, the degrees of severity of the physical changes will govern achievement of a range of BCGs including BCG 2 level for the Modified designation.

To state that waters have a goal designated General with BCG 3 (loss of rare native taxa) to 4 (sensitive taxa replaced by more tolerant taxa) being the highest level that the state will make any effort to achieve does not comply with the CWA nor with the Minn. Rules description of what is pollution.

A **new description of a type of reach**

In Minn. Rules, Colby Lake is described, but Partridge River and Wyman Creek are unlisted:

> 7050.0470, Subpart 1. Lake Superior basin, B. Lakes: (30) Colby Lake, 69-0249-00, (T .58, R.14): 1B, 2Bd, 3C;
>
> (271) Wyman Creek, (T .58, R.14, S.3, 4; T .59, R.14, S.11, 13, 14, 23, 24, 26, 27, 34, 35):
>
> 1B, 2A, 3B; a

Table *Beneficial Use Designations for Stream Reaches: St. Louis River Watershed (04010201)*:

"Within Colby Lake"? There is always mixing occurring in a lake especially at spring and fall turnovers. Colby Lake is a drinking water, so any water "within Colby Lake" should not have a lesser designation. Wyman Creek discharges, not to Colby L, but to Partridge River, where it mixes with the Partridge R. due to turbulence, then Partridge R. flows into Colby Lake and out again, according to my US Forest Service Superior National Forest Map.

Incorporation of documents into the rules

The rules incorporate six documents inappropriately.

Biological Criteria for TALU, 2014, p. 39 refers to "draft criteria" and Table 11 is "Draft".

Draft criteria do not belong in proposed rules.

The writers of the *Guidance Manual for Assessing the Quality of Minnesota Surface Waters for Determination of Impairment: 305(b) Report and 303(d) List* did not intend that the Guidance be part of any water quality rule, see p. 5:

> The Guidance is not part of any water quality rule – it does not have the force of law. It serves to guide the interpretation and application of current water quality standards that are in water quality rules.

So it appears that the rule writers included it inappropriately, and probably the rest of the documents are also inappropriately included, since they are only reports that document the development of the various methods to support the existing narrative rules and do not contain directions on how to use the items developed *per se* in water quality standards.

The documents incorporated by the P. Rules, and there for the P. Rules, all assume that permits issued by the MPCA both 1) contain appropriate effluent limits, and 2) are enforced by MPCA staff. Neither is true, at least for mining in the Northeast. The USEPA has required MPCA to reissue old mining NPDES permits but MPCA has refused to do so, so the permits, not having appropriate effluent limits or enforcement, allow pollution to continue unabated with resulting aquatic life impairment (Johnson and Johnson, 2015). MPCA staff are able to say unabashedly that the permittees are in compliance with the permits. However, the permits are not written to include effluent limits that reflect all the applicable water quality standards.

An example is on p. 66 of the impairment guidance manual: care must be taken to avoid sampling in the mixing zone of permitted facility, however, the permits do not include the exact location of the mixing zone, nor does MPCA require

sampling at the end of the mixing zone to confirm compliance with the rules. As they are, the mixing zone is apparently as far down as the permittee's pollution can be detected and there is no sampling of the receiving water downstream of the mixing zone; this is not the intent of the rules, actual or proposed.

The Proposed Rules p. 81 lines 5-6 state "The tables are incorporated by reference and are not subject

to frequent change." However, these tables do not have any biological designations at all. They appear to be a reformatting of 7050.0470 as it is now. The only biological designations are in text for unlisted bodies of water. The rules have no procedure for amending these tables.

The proposed rule is not properly written to reflect the intention of protecting all waters, and a hearing is definitely in order, which I have duly requested.

REFERENCES in comments

Johnson, Bruce L., and Maureen K. Johnson, Evaluation Of A Field-Based Aquatic Life Benchmark For Specific Conductance In Northeast Minnesota, unpublished, November 2015

U.S. EPA, *Improving EPA Review of Appalachian Surface Coal Mining Operations Under the Clean Water Act, National Environmental Policy Act, and the Environmental Justice Executive Order*, Memorandum, Stoner, Nancy K., acting Assistant Administrator for Water, and Cynthia Giles, Assistant administrator for Compliance Assurance, to Shawn Garvin, Regional Administrator, EPA Region 3, Gwendolyn Keyes Fleming, Regional Administrator, EPA Region 4, Susan Hedman, Regional Administrator, EPA Region 5, July 21, 2011. Available at http://water.epa.gov/lawsregs/guidance/wetlands/mining.cfm. On July 31, 2012, a federal district court for the District of Columbia set aside this EPA Final Guidance, but this district court decision was overturned on appeal in National Mining Association v. McCarthy, 758 F.3d 243 (D.C. Cir. 2014).

U.S. EPA, Field-Based Methods for Developing Aquatic Life Criteria for Specific Conductivity Public Review Draft, Office of Water, Office of Science and Technology, Washington, DC, December 2016.

US EPA, Office of the Administrator, Science Advisory Board, Review of Field-Based Aquatic Life Benchmark for Conductivity in Central Appalachian Streams, Letter to The Honorable Lisa P. Jackson Administrator, EPA, EPA-SAB-11-006, March 25, 2011.

Sincerely,

Exhibit I.13.

Maureen K. Johnson
Stacy, Minnesota
763-444-4579

Exhibit I.14.

Molloy, Kevin (MPCA)

From: Larson, Maria <MLarson@mnchamber.com>
Sent: Thursday, February 02, 2017 3:35 PM
To: Bouchard, Will (MPCA)
Subject: Comments on Planned Amendments to Water Quality Standards and Tiered Aquatic Life – Revisor's Identification Number RD42374.
Attachments: TALU_TK.pdf

Dear Mr. Will Bouchard,

Please find the attached letter regarding comments on Planned Amendments to Water Quality Standards and Tiered Aquatic Life – Revisor's Identification Number RD42374.

Sincerely,
Maria Larson

MARIA LARSON
Public Policy Assistant

Minnesota Chamber of Commerce
400 Robert Street North
Suite 1500
St. Paul, MN 55101
P: 651.292.4695
F: 651.292.4656
mlarson@mnchamber.com
www.mnchamber.com

We are so very thankful for you!
Ensure you are receiving our member-only communications. View instructions on including us on your safe-senders list.
Read this helpful article on how to add recipients if you use Microsoft Outlook as your email client.

If you print this email, please recycle it. Only a few other materials are as renewable, sustainable and recyclable as paper.

Exhibit I.14.

MINNESOTA CHAMBER of COMMERCE

February 2, 2017

Mr. Will Bouchard
Minnesota Pollution Control Agency
Environmental Analysis and Outcomes Division
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

RE: Comments on Planned Amendments to Water Quality Standards and Tiered Aquatic Life – Revisor's Identification Number RD42374

Dear Mr. Bouchard,

The Minnesota Chamber of Commerce (Chamber) is a statewide business organization representing approximately 2,300 businesses that this proposed rule has the potential to impact. The Chamber appreciates the opportunity to provide comments on Minnesota Pollution Control Agency's (MPCA) proposed rule amendments to establish tiered aquatic life uses (TALU) within the existing Class 2 water quality standards based on biological potential. At this time, it is the Chamber's overall comment that the MPCA should immediately cease the rule revisions because the proposed rule package contains insufficient information to substantiate and therefore, effectively comment. If the MPCA does not suspend the rulemaking, the Chamber opposes the entire proposed rule revisions and requests a public hearing following the procedures set forth in Minnesota Rules, parts 1400.2300 to 1400.2310, and Minnesota Statutes, sections 14.22 to 14.28.

The MPCA has provided insufficient information in the following areas:

- The index of biotic integrity (IBI) calculation mechanism is an essential piece of the proposed rule. However, the MPCA did not provide information on the calculation mechanism[1] with or prior to publication of the proposed rule[2]. There has not been sufficient time to review and comment on the proposed mechanism. The scientific and regulated communities must be able to review, comment on, and hopefully verify this mechanism before this rule is adopted. Furthermore, all other numeric water quality standards in Minnesota Rules can be sampled, analyzed and verified by reliable and qualified third-parties; all of which helps provide the transparency needed for such standards. For these reasons, proceeding with rule-making at this time is not reasonable.

- The MPCA must provide an assessment of the year-over-year variability in the computed IBI due only to annual hydrology variability. The MPCA has yet to demonstrate that IBI values will not vary

[1] Generally any adequately trained biologist can collect fish and macroinvertebrates at a site using standard methods and count the number of fish and macroinvertebrate taxa and individuals. Currently, only MPCA staff can convert this data into an IBI score.
[2] Last week, MPCA published part of the IBI calculation mechanism as a "draft".

significantly due to normal wet-year to dry-year[3] fluctuations. Such consistency is needed to prevent the "luck-of-the-draw" in determining whether a stream would meet or not meet its IBI water quality standard (WQS).

- The MPCA did not incorporate information regarding implementation measures within the proposed language. This oversight does not allow the regulated community to review and understand the potential implications prior to providing comments.

The Chamber has concerns with reclassification of streams without the adequate consideration of whether the actual attainable use for the stream segment is and should be Limited Resource Value Waters (Class 7). For example, Appendix A lists specific use changes proposed as a part of this rule making following the steps described in "Draft technical guidance for designating aquatic life uses in Minnesota streams and rivers". However, those steps do not include the consideration of determining when a stream is appropriately classified as a Class 7 water, not a Class 2 water. It would seem logical that some of the stream segments in the area assessed would be ephemeral, especially the smaller county ditches listed in Table A-1 of the SONAR, and thus would not have sufficient flow to conduct biological assessments and therefore IBI-based WQS should not be applied to those streams[4]. However, MPCA is proposing that all of these ditches fit into the Class 2, not Class 7, use classification. The MPCA should change its procedures for proposing TALU designation changes to include a proper and full assessment of streams in each evaluation area, including whether some stream segments would be appropriately designated as Class 7 waters[5].

The Chamber has concerns that the MPCA's proposed rules will have the unintended consequence of applying IBI-based WQS to unlisted lakes and ephemeral streams (waters of the state for which IBI procedures are not applicable). Unlisted waters in the state of Minnesota are by default Class 2B (Minn. R. 7050.0430). Some of those streams are being re-classified as Class 2Bm waters as the MPCA works through the TALU designation process (perhaps a decade-long process) and the remainder will be classified as 2Bg as a default assumption, without a use attainability analysis (UAA) determination (proposed amendment to Minn. R. 7050.0430 Subp. 1). How will the MPCA address the headwaters of the "default" 2Bg waters, where ephemeral conditions do not allow an IBI determination, but the rule requires the stream to meet these new numeric IBI-based WQS? The default 2Bg classification applies to all waters of the state that are not listed in rule, but how can the attainment with the IBI-based WQS be determined if IBI protocols are not applicable to all streams, especially ephemeral streams? How can attainment with the IBI-based WQS be determined when IBI protocol are not technically applicable to lakes, but yet the IBI-based WQS would be applicable to unlisted lakes via this proposed rule? It appears that the MPCA has not really assessed how this rule will or should be applied to the state's waters and as a result, this rule needs to be more thoroughly vetted and reviewed before it is re-proposed; let alone before it is adopted. The state's definition of waters of the state

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[3] The fluctuations envisioned in this comment would not include "drought" years, or extreme wet years, but the more normal fluctuations expected between the 10% wettest and the 10% driest years, for example.

[4] Neither Class 7 streams nor ephemeral streams are addressed deeply in the rule or SONAR. Footnote 19 on page 41 of the SONAR states "Biological monitoring of fish and macroinvertebrates in streams has been limited to perennial and intermittent streams with sufficient flow to allow for colonization of fish and macroinvertebrates. As a result, the biological tools (i.e., IBIs) developed using these data are applicable to similar streams and not to ephemeral systems. The use of biological tools in ephemeral systems would require the collection of additional data and the development of new tools that can account for natural differences in biological assemblages related to their flow regimes."

[5] Minn. R. 7050.0140 Subp. 8: **Class 7 waters, limited resource value waters.** Limited resource value waters include surface waters of the state that have been subject to a use attainability analysis and have been found to have limited value as a water resource. Water quantities in these waters are intermittent or less than one cubic foot per second at the 7Q10 flow as defined in part 7050.0130, subpart 3.

is so broad that the default application of a 2Bg use classification to unlisted waters, waters where IBI WQS are not applicable (lakes, ephemeral streams, waters that would be Class 7 if properly evaluated), makes this proposed rule unreasonable.

The Chamber is concerned that the MPCA is replacing one version of "one-size-fits-all" WQS rule with another. As discussed above, the MPCA has not thought through how this rule fits with Class 7 uses or with ephemeral Class 2 waters (Class 2A or Class 2B). The proposed rule will presume that such waters are capable of meeting these new IBI-based WQS and will assign a Class 2Bg use presumptively to many waters of the state, some of it inappropriately. In order to assign the Class 2Bg only to appropriate waters, the MPCA could use its UAA process to make these assignments, truly eliminating the one-size-fits all approach. The MPCA should change its procedures for proposing TALU designation changes to include a proper and full assessment of streams in each evaluation area, including whether the IBI protocol can be appropriately applied—then through this UAA process all Class 2 subcategories (e.g., 2Bg, 2Be, and/or 2Bm), or Class 7 use, would be assigned through rule-making for each water body[6].

The Chamber has concerns with the strikethroughs of 2A, 2Bd, and 2B classifications in 7050.0220 Subp. 1. The proposed strikethrough of "2A" and replacement with "2Ae or 2Ag", strikethrough of "2Bd" and replacement with "2Bde, 2Bdg, or 2Bdm", and strikethrough of "2B" and replacement with "2Be, 2Bg, 2Bm" in 7050.0220 Subp.1 is incorrect. How can a lake, wetland, or other non-flowing water have a Class 2 designation ending in e, g, or m (exceptional, general, or modified) given that IBI-based WQS and IBI protocols are not applicable to such waters? Those e, g, and m designations refer to the new TALU framework and associated IBIs specifically developed for flowing streams and rivers. The earlier sections of the rule revisions should avoid strikethrough/deletion of Class 2A, 2Bd, and 2B. For example, 7050.0220 Subpart 1.C:

- Agency's proposed rule language: *"C. cool and warm water sport fish, indigenous aquatic life, and wetlands aquatic life and habitat and wetlands: Classes ~~2B, 2C,~~ 2Be, 2Bg, 2Bm, or 2D; 3A, 3B, 3C, or 3D; 4A and 4B or 4C; and 5 (subpart 5a); and"*
- Chamber's suggested language rule to address this comment: *"C. cool and warm water sport fish, indigenous aquatic life, and wetlands aquatic life and habitat and wetlands: Classes 2B, ~~2C,~~ 2Be, 2Bg, 2Bm, or 2D; 3A, 3B, 3C, or 3D; 4A and 4B or 4C; and 5 (subpart 5a); and"*

The MPCA should review and modify the proposed rule to allow the existing 2A,2Bd, and 2B use classifications to remain—for example, cool and warm water lakes, ephemeral streams, and unlisted waters could (and should) remain Class 2B waters.

The Chamber appreciates your consideration of our concerns regarding the proposed rule amendments. If you have any questions regarding our concerns, please feel free to contact me at (612) 292.4668

Sincerely,

Tony Kwilas
Director, Environmental Policy

[6] This would provide the MPCA with a great opportunity to identify waters that can and cannot support Class 3 industrial use, which is another rule-making issue that the MPCA is currently evaluating.

Exhibit I.15.

Molloy, Kevin (MPCA)

From: John Lenczewski <jlenczewski@comcast.net>
Sent: Thursday, February 02, 2017 4:33 PM
To: Bouchard, Will (MPCA); *MPCA_TALU Rulemaking
Subject: Comments of MNTU re TALU
Attachments: Letter to WB re TALU.pdf

Please see attached.

Exhibit I.15.

John P. Lenczewski, Executive Director
Minnesota Trout Unlimited
PO Box 845
Chanhassen, MN 55317
612.670.1629
jlenczewski@comcast.net

February 2, 2017

Will Bouchard
MPCA, Environmental Analysis and Outcomes Division
520 Lafayette Road North, Saint Paul, MN 55155-4194
talurulemaking.pca@state.mn.us

Via electronic mail

Re: Proposed Amendments to Minnesota Rules, chapters 7050 and 7052, relating to Tiered Aquatic Life Uses (TALU) and modification of Class 2 beneficial use designations.

Dear Mr. Bouchard:

Thank you for the opportunity to comment upon the planned amendments to Minnesota Rules Chapter 7050 and 7052 referenced above. Minnesota Trout Unlimited ("MNTU") is a non-profit organization made up of several thousand members organized into seven chapters across the state. We work to conserve, protect, and restore Minnesota coldwater fisheries and their watersheds. We believe that the protection of our waters and watersheds which support trout fisheries should be based upon sound science.

We applaud the effort to develop a Tiered Aquatic Life Uses framework in order to better protect Minnesota waters. We strongly support the creation of the Exceptional Use category for coldwater (2A) streams and urge that many more 2A streams be given the heightened protections of this category.

Many of our members and partners have raised points which MNTU agrees with, but since time is short I will highlight a few that many not have been covered by others.

Need to consider entire life cycle needs of coldwater fish species.

MNTU believes that the MPCA has the best of intentions and desires to protect all coldwater streams. However, we are concerned that the criteria, procedures and assumptions contained in the guidance document referenced in the proposed rule and SONAR might unwittingly lead to the removal of Class 2A protections from many waters or sections of waters which supported coldwater communities in November 1975 or for a time thereafter, but which have been degraded since that time. Over the past year or two we have had discussions with MPCA staff concerning some preliminary use designation changes proposed following application of the new approaches. In some instances one or more

segments of an interconnected stream system which trout utilize seasonally or for one portion of their life cycle were proposed to be downgraded to 2B waters. This result is unacceptable, since to maintain a robust self-sustaining trout population over time requires trout to be able to move to different areas at different times in their life cycle. Limit the habitat needed for one phase and the overall population is limited and long term viability threatened. For this reason headwater reaches, tributaries and reaches downstream of the core population area are important and need 2A protections even if they appear to be "marginal" habitat at certain times of the year. Unfortunately, it is difficult to pinpoint where in the proposed rule and guidance document are found the assumptions and procedures contributing to such objectionable results. We request that the MPCA indicate where in the proposed rules and guidance documents this concern might be addressed.

Thank you for the opportunity to comment upon the planned amendments to Minnesota Rules Chapter 7050 and 7052 referenced above. Minnesota Trout Unlimited ("MNTU") is a non-profit organization made up of several thousand members organized into seven chapters across the state. We work to conserve, protect, and restore Minnesota coldwater fisheries and their watersheds. We believe that the protection of our waters and watersheds which support trout fisheries should be based upon sound science.

Impermissible shifting of burden of proof away from agency.

Discussions with staff about individual streams also raised concerns the MPCA may be discounting past classifications of 2A waters and shifting the burden of proof concerning existing beneficial uses. Past agency determinations (DNR, MPCA) can be important for those coldwater streams which supported trout in 1975 and afterwards, but which have since been degraded and no longer provide the full suite of coldwater fishes and invertebrates. MPCA appears willing to assume some currently degraded waters were not coldwater fisheries in November 1975 or any time since, and place the burden upon the MNDNR and trout anglers to document that these currently degraded streams in fact held trout or other coldwater species in 1975 or later. This is unjustified and unreasonable.

The SONAR states that UAA process for the TALU framework is driven primarily by biological conditions as measured through analytical tools and cites the states relatively recent biological monitoring program. It then indicates, "The UAA will assign the highest beneficial use that has been demonstrated *by the available monitoring data.* In cases where the recommended TALU is Exceptional or Modified, a rulemaking will be required to adopt the new use." (emphasis added)(SONAR page 19). This is concerning since it suggests that reclassifications using TALU will be made based only upon "available monitoring data", even where the only data available is all quite recent. Our concern is for situations where there is a gap in historical data and existing uses are not presently being attained (but were in November 1975, or thereafter but when data was not yet being collected) might be placed in a subcategory with less stringent water quality standards. The SONAR promises shifts to a Modified Use will go through rulemaking, but there is no mention of changes from 2A general to 2B general. If the same process and assumptions suggested on page 29 for General Use non-attainment is intended to be used for 2A waters, we strongly object.

In the late 1970s and 1980s the State deliberately chose to classify a small subset of streams as 2A waters. This was a deliberate step designed to protect existing uses, namely coldwater fisheries. Our concern is that the proposed rules and criteria being adopted by reference contain an implicit and legally impermissible shifting of the burden of proof with respect to these waters. The State's classification of these waters as 2A could only have been justified if they were protecting existing uses, not merely creating designated uses where no existing uses actually existed. It would have been unreasonable for the State to go out of its way to designate uses which were not also existing uses at that time, rather than using the default 2B classification. While some skepticism about 2B waters may be justified since it has been the default classification, this is not true for 2A waters which were deliberately selected based upon a higher existing use.

A key step in the process described on page 29 is unreasonable and legally impermissible if applied to 2A waters. The narrative describes reaching a point in the process where it is determined human-caused conditions or modifications preclude the attainment of the beneficial (designated) use. When this happens, ". . . a review is required *to determine if the General Use was attained on or after November 28, 1975*. If the General Use was attained on or after this date, it is an existing use that must be maintained." (emphasis added). What is troubling is that a review can reach this point based only upon recent data collection. In many cases there is very little data from November 1975 to 1990 or so. If this were a 2A stream being reviewed, note that there is no presumption that it ever was an existing use. If historical data is absent, there is no way to demonstrate today, forty years after the fact, that the use existed. The MPCA is obliged to assume that there was a reasonable basis for its earlier 2A classifications, namely, that coldwater fishery uses were existing uses at the time.

The assumptions used in the evaluation process are not spelled out in the proposed rule. However, since the only sound reason for earlier 2A classifications was that those uses existed at the time, the MPCA must begin its reviews of 2A waters with the presumption that 2A water designations were made to protect existing 2A uses at the time. Where the MPCA proposes a lower use for a 2A water, it must affirmatively demonstrate that in fact the stream did not support an existing use on November 28, 1975 or at any time since then. To the extent the proposed rule and reference guidance document propose to reduce or shift MPCA burden of affirmatively demonstrating that a 2A use was never an existing use before it may designated a lower use, we object to those provisions.

Other comments.

1. The tables proposed in the place of listing streams in the rules and/or statutes are not a good enough substitute. At a minimum the tables should add a column or columns that list the township, range and section through which each Stream flows. Adding a column showing the counties would also be very useful. The data/map tool on the MPCA website does not work well and the public will find it of limited use as is.

2. The process used to break up streams into smaller sections needs work. Many coldwater systems are broken up into too many segments, especially considering the natural movements of trout over seasons and years. This needs work.

3. We support changing 2C classifications to 2B.

4. We oppose the lowering of uses for any 2B stream which flows into a 2A segment, as well as any immediately downstream of a 2A segment.

5. The process for reexamining and changing classifications must be changed to include stakeholders early on. Currently there is no guarantee of stakeholder participation until after the determination is made. Stakeholders and counties are not equivalent.

6. The implications for planning efforts by others based on MPCA classifications cannot be ignored. More and better BMPs to address non-point source pollutants will likely be developed and more resources focused on areas that are not categorized as modified use.

Please note that we plan to participate in the hearing held on these rules .

Thank you for your thoughtful consideration of our comments.

Sincerely,

John P. Lenczewski

Exhibit I.16.

Molloy, Kevin (MPCA)

From: John Lenczewski <jlenczewski@comcast.net>
Sent: Thursday, February 02, 2017 4:41 PM
To: Bouchard, Will (MPCA); *MPCA_TALU Rulemaking
Subject: RE: Comments of MNTU re TALU
Attachments: Letter to WB re TALU.proofed.pdf

Hi Will,

I saw and corrected a couple typos. No substantive changes. Thanks.

From: John Lenczewski [mailto:jlenczewski@comcast.net]
Sent: Thursday, February 02, 2017 4:33 PM
To: Bouchard, Will (MPCA) (will.bouchard@state.mn.us); 'talurulemaking.pca@state.mn.us'
Subject: Comments of MNTU re TALU

Please see attached.

Exhibit I.16.

John P. Lenczewski, Executive Director
Minnesota Trout Unlimited
PO Box 845
Chanhassen, MN 55317
612.670.1629
jlenczewski@comcast.net

February 2, 2017

Will Bouchard
MPCA, Environmental Analysis and Outcomes Division
520 Lafayette Road North, Saint Paul, MN 55155-4194
talurulemaking.pca@state.mn.us

Via electronic mail

Re: Proposed Amendments to Minnesota Rules, chapters 7050 and 7052, relating to Tiered Aquatic Life Uses (TALU) and modification of Class 2 beneficial use designations.

Dear Mr. Bouchard:

Thank you for the opportunity to comment upon the planned amendments to Minnesota Rules Chapter 7050 and 7052 referenced above. Minnesota Trout Unlimited ("MNTU") is a non-profit organization made up of several thousand members organized into seven chapters across the state. We work to conserve, protect, and restore Minnesota coldwater fisheries and their watersheds. We believe that the protection of our waters and watersheds which support trout fisheries should be based upon sound science.

We applaud the effort to develop a Tiered Aquatic Life Uses framework in order to better protect Minnesota waters. We strongly support the creation of the Exceptional Use category for coldwater (2A) streams and urge that many more 2A streams be given the heightened protections of this category.

Many of our members and partners have raised points which MNTU agrees with, but since time is short I will highlight a few that many not have been covered by others.

Need to consider entire life cycle needs of coldwater fish species.

MNTU believes that the MPCA has the best of intentions and desires to protect all coldwater streams. However, we are concerned that the criteria, procedures and assumptions contained in the guidance document referenced in the proposed rule and SONAR might unwittingly lead to the removal of Class 2A protections from many waters or sections of waters which supported coldwater communities in November 1975 or for a time thereafter, but which have been degraded since that time. Over the past year or two we have had discussions with MPCA staff concerning some preliminary use designation changes proposed following application of the new approaches. In some instances one or more

segments of an interconnected stream system which trout utilize seasonally or for one portion of their life cycle were proposed to be downgraded to 2B waters. This result is unacceptable, since to maintain a robust self-sustaining trout population over time requires trout to be able to move to different areas at different times in their life cycle. Limit the habitat needed for one phase and the overall population is limited and long term viability threatened. For this reason headwater reaches, tributaries and reaches downstream of the core population area are important and need 2A protections even if they appear to be "marginal" habitat at certain times of the year. Unfortunately, it is difficult to pinpoint where in the proposed rule and guidance document are found the assumptions and procedures contributing to such objectionable results. We request that the MPCA indicate where in the proposed rules and guidance documents this concern might be addressed.

Impermissible shifting of burden of proof away from agency.

Discussions with staff about individual streams also raised concerns the MPCA may be discounting past classifications of 2A waters and shifting the burden of proof concerning existing beneficial uses. Past agency determinations (DNR, MPCA) can be important for those coldwater streams which supported trout in 1975 and afterwards, but which have since been degraded and no longer provide the full suite of coldwater fishes and invertebrates. MPCA appears willing to assume some currently degraded waters were not coldwater fisheries in November 1975 or any time since, and place the burden upon the MNDNR and trout anglers to document that these currently degraded streams in fact held trout or other coldwater species in 1975 or later. This is unjustified and unreasonable.

The SONAR states that UAA process for the TALU framework is driven primarily by biological conditions as measured through analytical tools and cites the states relatively recent biological monitoring program. It then indicates, "The UAA will assign the highest beneficial use that has been demonstrated *by the available monitoring data.* In cases where the recommended TALU is Exceptional or Modified, a rulemaking will be required to adopt the new use." (emphasis added)(SONAR page 19). This is concerning since it suggests that reclassifications using TALU will be made based only upon "available monitoring data", even where the only data available is all quite recent. Our concern is for situations where there is a gap in historical data and existing uses are not presently being attained (but were in November 1975, or thereafter but when data was not yet being collected) might be placed in a subcategory with less stringent water quality standards. The SONAR promises shifts to a Modified Use will go through rulemaking, but there is no mention of changes from 2A general to 2B general. If the same process and assumptions suggested on page 29 for General Use non-attainment is intended to be used for 2A waters, we strongly object.

In the late 1970s and 1980s the State deliberately chose to classify a small subset of streams as 2A waters. This was a deliberate step designed to protect existing uses, namely coldwater fisheries. Our concern is that the proposed rules and criteria being adopted by reference contain an implicit and legally impermissible shifting of the burden of proof with respect to these waters. The State's classification of these waters as 2A could only have been justified if they were protecting existing uses, not merely creating designated uses where no existing uses actually existed. It would have been unreasonable for the State to go out of its way to designate uses which were not also existing uses at

that time, rather than using the default 2B classification. While some skepticism about 2B waters may be justified since it has been the default classification, this is not true for 2A waters which were deliberately selected based upon a higher existing use.

A key step in the process described on page 29 is unreasonable and legally impermissible if applied to 2A waters. The narrative describes reaching a point in the process where it is determined human-caused conditions or modifications preclude the attainment of the beneficial (designated) use. When this happens, ". . . a review is required *to determine if the General Use was attained on or after November 28, 1975.* If the General Use was attained on or after this date, it is an existing use that must be maintained." (emphasis added). What is troubling is that a review can reach this point based only upon recent data collection. In many cases there is very little data from November 1975 to 1990 or so. If this were a 2A stream being reviewed, note that there is no presumption that it ever was an existing use. If historical data is absent, there is no way to demonstrate today, forty years after the fact, that the use existed. The MPCA is obliged to assume that there was a reasonable basis for its earlier 2A classifications, namely, that coldwater fishery uses were existing uses at the time.

The assumptions used in the evaluation process are not spelled out in the proposed rule. However, since the only sound reason for earlier 2A classifications was that those uses existed at the time, the MPCA must begin its reviews of 2A waters with the presumption that 2A water designations were made to protect existing 2A uses at the time. Where the MPCA proposes a lower use for a 2A water, it must affirmatively demonstrate that in fact the stream did not support an existing use on November 28, 1975 or at any time since then. To the extent the proposed rule and reference guidance document propose to reduce or shift MPCA burden of affirmatively demonstrating that a 2A use was never an existing use before it may designated a lower use, we object to those provisions.

Other comments.

1. The tables proposed in the place of listing streams in the rules and/or statutes are not a good enough substitute. At a minimum the tables should add a column or columns that list the township, range and section through which each stream flows. Adding a column showing the counties would also be very useful. The data/map tool on the MPCA website does not work well and the public will find it of limited use as is.

2. The process used to break up streams into smaller sections needs work. Many coldwater systems are broken up into too many segments, especially considering the natural movements of trout over seasons and years. This needs work.

3. We support changing 2C classifications to 2B.

4. We oppose the lowering of uses for any 2B stream which flows into a 2A segment, as well as any immediately downstream of a 2A segment.

5. The process for reexamining and changing classifications must be changed to include stakeholders early on. Currently there is no guarantee of stakeholder participation until after the determination is made. Stakeholders and counties are not equivalent.

6. The implications for planning efforts by others based on MPCA classifications cannot be ignored. More and better BMPs to address non-point source pollutants will likely be developed and more resources focused on areas that are not categorized as modified use.

Please note that we plan to participate in the hearing held on these rules.

Thank you for your thoughtful consideration of our comments.

Sincerely,

John P. Lenczewski

Exhibit I.17.

Molloy, Kevin (MPCA)

From: Molloy, Kevin (MPCA)
Sent: Thursday, February 02, 2017 5:35 PM
To: *MPCA_TALU Rulemaking; Bouchard, Will (MPCA)
Subject: FW: TALU rulemaking comments
Attachments: RRWMB_comment_020217.pdf

FYI

From: Corey Hanson [mailto:coreyh@wiktel.com]
Sent: Thursday, February 02, 2017 5:27 PM
To: carol.nankinel@state.mn.us
Cc: Van Offelen, Henry (DNR) <Henry.Van.Offelen@state.mn.us>; coreyh@wiktel.com; tammya@wiktel.com; jesme@wiktel.com; Molloy, Kevin (MPCA) <kevin.molloy@state.mn.us>
Subject: TALU rulemaking comments

Dear Ms. Nakivel:

Please accept this letter as comments from the Red River Watershed Management Board's (RRWMB) on proposed rule changes to incorporate a classification system based on tiered aquatic life uses (TALU) in Minn. Rules 7050, 7052, and 7053. This letter is the product of a cooperative effort among staff from multiple agencies that are part of the RRWMB. The paragraphs at the beginning are cooperatively developed, general thoughts on the TALU proposal and future implementation of the standards. Following those paragraphs are specific observations comments, mostly from individual staff, regarding the rules and the SONAR document that were provided on the MPCA TALU Framework website.

Thank you for the opportunity to provide these comments.

Sincerely,

Corey Hanson
Water Quality Coordinator
Red Lake Watershed District
1000 Pennington Ave S
Thief River Falls, MN 56701
coreyh@wiktel.com
Office: 218-681-5800
Cell: 218-686-9691

February 2, 2017

Carol Nankivel
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

RE: Comments on planned amendments to water quality standards to incorporate a classification system based on tiered aquatic life uses Minn. Rules 7050, 7052, and 7053

Dear Ms. Nakivel:

Please accept this letter as comments from the Red River Watershed Management Board's (RRWMB) on proposed rule changes to incorporate a classification system based on tiered aquatic life uses (TALU) in Minn. Rules 7050, 7052, and 7053. The RRWMB is a joint powers board for eight watershed districts in the Red River basin. The member watershed districts are responsible for management and maintenance of many hundreds of miles of drainage systems under drainage and watershed laws (M.S. 103D and 103E). The RRWMB and its member watershed districts have significant concerns about these state rules that may affect our future authority to properly manage watercourses within our watersheds under the law.

Watershed districts in the Red River basin have worked with the MPCA and local and regional partners to implement a comprehensive water quality monitoring program throughout the Red River Basin. We understand and support the intent of the proposed rules to move away from a one-size-fits-all approach to designating biological standards; however, the recent experiences of our member districts suggests that the process used to monitor waters and designate uses have inadequate opportunities for public input and that provisions should be made in these rules to designate all Class 2 waters which are defined in Minnesota Statutes as artificial watercourses (M.S. 103G.005) as modified use waters. Our specific concerns with these general issues as well as specific comments on the rule language and statement of need and reasonableness is provided below.

Comment on process used to assess waters and designate their use.
M.R. 7050.0150 Subp 3a defers to the Guidance Manual for Assessing the Quality of Minnesota Waters. The steps outlined in this guidance document include data compilation, expert review, desktop assessment, Watershed Assessment Team, and Professional Judgement group. As described in this manual and as implemented in practice, the assessment process does not provide for adequate formal engagement of local resource professionals early in the process or at the end of the process and there is no provisions for appealing designation decisions. Local input is "encouraged" in the guidance. However, in practice, little effort has been made to engage local professionals to provide input in biological sampling locations or in final use designations. The entire process has been crafted with heavy-handed state agency control with little ability for local professionals to influence where monitoring sites are located or on final designations. In addition, there is no formal process provided in rule to appeal final use-support determinations made after the Professional Judgement Group (PJG) meeting. We encourage the MPCA to establish provisions in rule that requires establishment of a local technical panel in those HUC8 watersheds where local governments request formal

input into the monitoring and use designation process. The technical panel would provide a formal channel to communicate and engage with local resource professionals and could provide a mechanism that could also be designated to evaluate appeals of final-use support designations.

Comment on process for use designation decisions.

As it stands now, all "artificial watercourses" defined in statute (M.S 103G.005) are designated as Class 2 - General Use waters. This designation is unreasonable and not in the public interest given that most of these watercourses are also the part of public drainage systems authorized under M.S. 103E and 103D. The statement of need and reasonableness includes a diagram of the process which will be used to make use determinations (Figure 2-3). We recommend this process be modified to incorporate information related to the type of watercourse as defined by statute. Specifically, at step 1, if biological data is not available, we suggest adding the question "Is the watercourse an artificial watercourse? An answer of 'Yes" to this question would lead directly to designation as "modified use". This would put these waters into the correct use category while still allowing for the designation of artificial watercourses as general use where biological monitoring supports this designation.

Specific comments on proposed rule language.

- 7050.0150
  - Subp. 3a Assessment Criteria
    - How often is the Guidance Manual is updated? The MPCA has been changing the rules and methods during each assessment in recent years (most changes are improvements). Going into an important process like a water quality assessment, however, the methods should be made known at the beginning of the process so that everyone is "on the same page." One problem with the Guidance Manual is that updated versions have been published after assessment processes instead of before assessments. The 2016 Draft List of Impaired Waters and the Guidance Manual with the methods used for that assessment cycle were released on the same day: July 13, 2016.
  - Subp.4. Definitions
    - Please specify the months that are used to compute summer average concentrations (June through September).
  - Subp. 6. E.
    - No single person should be unilaterally qualified to make a decision about the appropriate standard or classification of a waterbody. Local resource managers, regional state staff, and other experts should be consulted and those staff should cooperate to ensure that assignments of water quality standards are based upon a well-informed evaluation of the waterbody.
  - Subp. 3c. A. (3)
    - Waterbody types for streams and rivers are not adequately documented within the documents that are referenced in Subitem (2). Standards for individual waterways are not listed or shown in maps. Tables/matrices and detailed maps (include updated layers

on the SWDA interactive map) should be created for each 6 or 8 digit HUC. The "Beneficial Use Designations of Streams" document provides insufficient information. An overwhelming quantity of informational documents have been presented for this review process, yet it is still not possible for reviewers to clearly understand how and where the standards will be applied within their areas.

- 7050.0227
  - There should be provisions for applying standards for pollutants in Limited Resource Value channels that contribute to downstream impairments. In a vacuum, lowered expectations are appropriate. Lowered expectations are also very appropriate for biology in these channels in most cases. However, these channels should not be allowed to contribute substantially to pollutant loading downstream in higher value streams due to lax standards (E. coli and TSS in particular). Monitoring should focus upon identifying the contributions of these channels to receiving waters. If a pollution problem exists, then it should be identified and addressed in a restoration plan (TMDL).

- 7050.0470 Subpart 3.
  - More priority needs to be given to keeping the EDA (Surface Water Data Access) web page updated. Reach layers have been out-of-date for a long time. They neither show splits that factor into the 2016 Draft List of Impaired Waters streams, nor new stream reaches/splits that were assessed in 2016. Assessment results are not updated in a timely manner (include impairments from draft lists and identify them as "draft" impairments).

- 7050.0222
  - The classification of streams is strongly influenced by sampling results rather than relying upon the physical characteristics of a stream (gradient, morphology, etc), history, and local input. The supporting documentation alludes to the current level of attainment as a primary factor in classification decisions. Comments from MPCA staff at Professional Judgement Group meetings have also contributed to this impression. Some MPCA staff erroneously assume that one biological sample in a ten year period is sufficient to contradict 10 years of regular water chemistry measurements. This is not the view of all MPCA staff, but it does occur during assessment processes.

Specific comments on Statement of Need and Reasonableness Document

- Figure 2-3 (flow chart)
  - There is too much reliance on a single sampling event. Local input is not mentioned once. There is no pathway for identifying Limited Resource Value waters. Additional ideas for improving this figure were detailed in the second page of this letter.

- Pre-proposal comments received:
  - The results/answers to comments and questions are not provided in the rule change's supporting documentation. A summary of ways in which public comments changed aspects of the proposal would have been helpful. This section could also have been used to address any misconceptions that were expressed in comments.
- Page 45
  - The description of the Exceptional Use category doesn't provide confidence that high quality waters (trout streams) that have been degraded will be adequately restored. The language gives the impression that the goal is anti-degradation, not restoration. The trout stream reach of the Clearwater River is not classified as an Exceptional Use stream. Trout streams should be included in this category by default. Local input should be given more weight than a one-time sampling of biological communities.
- Page 46
  - A distinction needs to be made between modified natural watercourses and artificial watercourse ditch systems (like road ditches). Accurate "restoration" of many artificial watercourses to a pre-settlement condition would entail abandonment, and filling-in of the channel.
    - Channelized/altered streams should have higher expectations than ditches due to a realistic potential for restoration (commenter approves of that provision in the standards).
    - Ditches that were never streams (artificial watercourses) should have limited expectations and should also be seriously considered for the Limited Use category with exceptions as follows:
    - There are some artificial watercourses with decent habitat, including coarse substrates, stable channels, and adequate buffers. Proper application of the TALU system and local input will help protect those channels from degradation (e.g. Marshall County Ditch 20).
    - The MPCA uses the Modified Streams category to encompass ditches with perceived poor potential and natural waterways that have been channelized and would have greater potential. Add a statement to make it clear that some modified channels qualify for the General Use category and provide a list of reasons, such as:
      - Stable channel with high quality substrate and perennial flow.
      - Channelized reach of a significant perennial stream with restoration potential.
  - It is good to see that restoration potential is part of the decision process. Local input on the feasibility of such an endeavor should be an essential part of that decision making process.
  - Because of the methodology (snapshot sampling results over morphology), some artificial watercourses have been assigned to the General Use category without consultation with local resource managers and experts.

- MPCA assessment staff (during PJG meetings) have expressed a lack of understanding about the difference between a stream that has been channelized and an artificial watercourse. Some of the misconceptions held by St. Paul MPCA staff about modified channels vs. constructed ditches may have something to do with the different topography in SE MN compared to NW MN. Example photos in the documents show ditch channels that actually are streams that have been channelized. A glance at the SWDA interactive map reveals that there doesn't seem to be as many straight blue lines on the map in SE MN as there are in NW MN. Ditch systems seem, at a glance, to follow topography (perhaps as a necessity) where former stream channels likely existed. In NW MN, ditches were constructed to drain flat prairies, poorly drained soils, and swamplands. The construction of some of the ditch channels assessed by the MPCA may not even be legal if it were done today. Some ditches drain wetlands and restoration efforts may be more beneficial if they involve restoration of the wetland pools instead of "restoration" of the ditch channel.
- Scheduled updates to the Guidance Manual should occur prior to assessments that will involve the application of new standards or methods. Otherwise, the process gives the impression (fair, or not) that the MPCA is not operating under a set of standard operating procedures for assessing streams and assessment staff are "making things up as they go along."
- Costs are a part of the SONAR document. Cost savings or efficiencies could be obtained by not sampling in ditches that are 100% man-made (for the purpose of assessments, anyway). It would still be scientifically valuable to sample ephemeral tributaries of perennial streams to identify sources of pollutants.
- Table 6-1
    - The public understanding of TALU standards has not been adequately enhanced, as evidenced by recent discussion among Red River Watershed Management Board members. Specific information about the application of the standards might have caught people's attention, as it has now there is concern about the assessment of certain ditches. This is a "hindsight is 20/20" sort of comment, but hopefully, lessons can be learned and applied to future work. The current application of TALU standards under-protects some streams and over-protects some ditches.
- Page 78 Meaningful Involvement
    - This section is somewhat misleading. The 2009 meetings were a general introduction to the idea of TALU. They were a good start, but more detailed, active connections with LGU staff, regional staff, and experts should have been made. The 2009 meeting in Detroit Lakes was just a general presentation about biological sampling and the basic concept of TALU that was part of a larger meeting that included other topics of discussion (a Red River Basin Water Quality Team meeting).
- Figure 8-1
    - This figure implies that intensive sampling has not occurred in many HUC8 watersheds. This belittles the efforts of long-term, local monitoring programs and other intensive studies that have been accomplished in these watersheds. That is most likely not the intent of the map, but it is the effect. The caption should be re-worded so that it is clear that the map

is specifically referring to the MPCA's 10-Year IWM process and the MPCA's biological sampling. The shaded areas are those in which the first 10-Year IWM Cycle of sampling and biological monitoring has been completed. If you aren't specific here, you are providing a false impression about the amount of data that has been collected throughout the state

- Appendix B
    - Maps only show G/M designations, not standards. No roads, cities, or streams are labeled for spatial reference. The maps are poorly done. Only a limited number of watersheds are shown (those with completed IWM and application of TALU). It would be more appropriate to seek public input prior to IWM assessments or sometime between the biological sampling and assessments.

Thanks again for the opportunity to comment on these proposed rule changes. We understand that a hearing on these rules will be scheduled for later in February and look forward to providing additional comments.

Sincerely,

John N. Finney
President