MINNESOTA
OFFICE OF
ADMINISTRATIVE
HEARINGS

PO Box 64620
Saint Paul, MN 55164-0620
mn.gov/oah

PH (651) 361-7900
TTY (651) 361-7878
FAX (651) 539-0310

Attachment 3

April 24, 2017

VIA E-FILING ONLY
Kevin Molloy
Minnesota Pollution Control Agency
520 Lafayette Rd N
Saint Paul, MN 55155
kevin.molloy@state.mn.us

Re: In the Matter of the Proposed Amendments to MPCA Water Quality Standards Relating to Tiered Aquatic Life Uses and Modification of Class 2 Beneficial U
OAH 5-9003-33998; Revisor R-4237

Dear Mr. Molloy:

Enclosed herewith and served upon you is the **REPORT OF THE ADMINISTRATIVE LAW JUDGE** in the above-entitled matter. The Administrative Law Judge has determined there are no negative findings in these rules.

The Office of Administrative Hearings has closed this file and will return the rule record under separate cover so that the Minnesota Pollution Control Agency can maintain the official rulemaking record in this matter as required by Minn. Stat. § 14.365. Please ensure that the agency's signed order adopting the rules is filed with our office. The Office of Administrative Hearings will request copies of the finalized rules from the Revisor's office following receipt of that order. Our office will then file four copies of the adopted rules with the Secretary of State, who will forward one copy to the Revisor of Statutes, one copy to the Governor, and one to the agency for its rulemaking record. The Agency will then receive from the Revisor's office three copies of the Notice of Adoption of the rules.

The Agency's next step is to arrange for publication of the Notice of Adoption in the State Register. Two copies of the Notice of Adoption provided by the Revisor's office should be submitted to the State Register for publication. A permanent rule with a hearing does not become effective until five working days after a Notice of Adoption is published in the State Register in accordance with Minn. Stat. § 14.27.

If you have any questions regarding this matter, please contact Katie Lin at (651) 361-7911 or katie.lin@state.mn.us.

Sincerely,

JIM MORTENSON
Administrative Law Judge

Enclosure
cc: Office of the Governor
Legislative Coordinating Commission
Revisor of Statutes

OAH 5-9003-33998
Revisor RD4237

STATE OF MINNESOTA
OFFICE OF ADMINISTRATIVE HEARINGS

In the Matter of the Proposed Amendments to Minnesota Pollution Control Agency Rules, Chapters 7050 and 7052, Relating to Water Quality Standards and Tiered Aquatic Life Uses

REPORT OF THE ADMINISTRATIVE LAW JUDGE

This matter came before Administrative Law Judge Jim Mortenson for a rulemaking hearing on February 16, 2017. The public hearing was based at the Minnesota Pollution Control Agency (MPCA or Agency), 520 Lafayette Road North, Saint Paul, Minnesota, and connected via interactive television to the MPCA offices at: 525 Lake Avenue South, Duluth; 714 Lake Avenue, Detroit Lakes; and 504 Fairground Road, Marshall, Minnesota.

The MPCA proposes to amend its rules relating to water quality standards and tiered aquatic life uses. The intent of the proposed changes is to modernize the water quality standards for Class 2, lotic waters in the state in order to provide better management and protection of the state's rivers, streams, and other moving waters.

The hearing and this Report are part of a larger rulemaking process conducted under the authority of the Minnesota Administrative Procedure Act[1]. The Minnesota Legislature designed this process to ensure that state agencies and regulatory boards have met all of the established requirements for adopting administrative rules.

The hearing was conducted to permit the MPCA to give a public summary of its proposed changes and to facilitate public comment regarding the impact of the proposed rules and any changes to the proposal that might be appropriate. The hearing process provides the general public an opportunity to review, discuss, and critique the proposed rules with the MPCA.

The MPCA must establish that the proposed rules are necessary and reasonable; the rules are within the agency's statutory authority; and any modifications that the agency may have made after the proposed rules were initially published in the *State Register* are within the scope of the matter that was originally announced.[2]

During the prehearing public comment period, 17 unique written comments or requests for hearing were received.[3] In addition, two sets of comments and requests for

[1] Minn. Stat. ch. 14 (2016).
[2] *See,* Minn. Stat. §§ 14.05 and 14.50 (2016).
[3] Exhibits (Exs.) I.1 through I.17. I.16 is a corrected version of I.15 submitted by the commenter.

hearing were received which contained identical content.[4] Exhibit I.18 consists of identical letters from 147 individuals. Exhibit I.19 consists of identical letters from 181 individuals.

On February 16, 2017, the MPCA panel at the public hearing included: R. William Bouchard, Ph.D., Research Scientist; Jean Coleman, Staff Attorney; and Kevin Malloy, Rulemaking Coordinator. At least 32 people attended the hearing and signed the hearing register. Following a presentation by Dr. Bouchard, the proceedings continued until all interested persons, groups, or associations had an opportunity to be heard concerning the proposed rules. Nine individuals had questions or comments on the proposed rules, several of which also submitted written comments during or before the hearing. The four written comments submitted at the hearing are labeled Exhibits L.9 through L.12.[5]

After the hearing, the rulemaking record remained open for another 20 working days, until March 17, 2017, to permit interested persons and the MPCA to submit written comments. Four written comments were received during this period.[6] Following the initial comment period, the hearing record was open an additional five business days to permit interested parties and the MPCA an opportunity to reply to earlier-submitted comments. One organization filed reply comments.[7] The hearing record closed on March 24, 2017.

SUMMARY OF CONCLUSIONS

The MPCA has established that it has the statutory authority to adopt the proposed rules, that it complied with applicable procedural requirements, and that the proposed rules are necessary and reasonable.

Based upon all the testimony, exhibits, and written comments, the Administrative Law Judge makes the following:

FINDINGS OF FACT

I. Regulatory Background to the Proposed Rules

1. Water quality standards (WQS) are a fundamental tool of the federal Clean Water Act (CWA).[8] WQS are required to be adopted and implemented by all states.[9]

[4] Exs. I.18 and I.19.

[5] Ex. L.9 is Letter from Lenczewski to Bouchard (Feb. 16, 2017); Ex. L.10 is Letter from Johnson to Administrative Law Judge and Bouchard (Feb. 16, 2017); Ex. L.11 is Comments Regarding MPCA's Draft TALU Regulation, Bruce Johnson (Dec. 23, 2017); and Ex. L.12 is Letter from Callahan to Bouchard (Feb. 2, 2017).

[6] These comments are labeled: Ex. M.1, from White Iron Chain of Lakes Association (Mar. 15, 2017); Ex. M.2, from Minnesota Conservation and Civic Groups (Mar. 16, 2017); Ex. M.3, from Minnesota Cities Stormwater Coalition (Mar. 17, 2017); and M.4, from Howard Markus, Woodbury, MN (Mar. 17, 2017).

[7] Ex. N.1, from the Minnesota Chamber of Commerce (Mar. 24, 2017).

[8] Transcript (Tr.) 20; 33 U.S.C. § 1313 (2012).

[9] *Id.*; Tr. 23.

2. States are responsible for classifying water bodies within their territory by beneficial uses.[10] Minnesota has 80 major watersheds.[11] The waters in these watersheds are classified into seven beneficial use categories.[12] The seven beneficial uses are:

- Class 1: Drinking water
- Class 2: Aquatic life and recreation
- Class 3: Industrial use and cooling
- Class 4: Agricultural and wildlife use
- Class 5: Aesthetics and navigation
- Class 6: Other uses
- Class 7: Limited resource value[13]

3. WQS are used as benchmarks to help measure whether a particular area of water is improving or degrading, and what changes need to be made to further protect the water or be more liberal in its use.[14]

4. The proposed amendments to Minnesota Rules chapters 7050 and 7052 relate to adding Tiered Aquatic Life Uses (TALU) as a means of evaluating the biologic health of lotic waters (streams and other moving waters), in order to better classify and protect such waters. The result of adding TALU, which are based on new, additional WQS, referred to as Indexes of Biological Integrity (IBIs), leads to more specific Class 2 (aquatic life and recreation) use designations.[15]

5. Outreach to the public for developing the rules proposal began in January 2009.[16] At that time, five informational meetings were held around the state to let stakeholders know that the MPCA was interested in pursuing using TALU and obtaining feedback.[17] In February and March 2009 additional meetings were held with different sectors that would be potentially impacted by the TALU framework.[18] In June 2013 the MPCA held a webcast informational meeting concerning a document that described an implementation framework for the TALU rule.[19] In December 2015 draft rule language was made available and in June 2016 a presentation was made at the MPCA Advisory Committee meeting concerning the draft.[20] Since 2009 MPCA staff have taken other opportunities to present and discuss TALU.[21]

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[10] Tr. 20-21; 33 U.S.C. § 1313(c)(2)(A).
[11] Tr. 34.
[12] Tr. 21; Ex. L.4.
[13] Ex. L.4
[14] Tr. 22.
[15] Ex. D at 13.
[16] Tr. 39-40.
[17] Tr. 40.
[18] *Id.*
[19] *Id.*
[20] Tr. 40-41.
[21] Tr. 41.

6. Minn. R. ch. 7050 contains the WQS for protection of waters of the state.[22]

7. Minn. R. ch. 7052 contains the WQS for protection of the Lake Superior Basin.[23]

II. Rulemaking Authority

8. Minn. Stat. §§ 115.03, subd. 5, .44, subd. 4 (2016) provide the MPCA the authority to promulgate rules as necessary to carry out and make effective the provisions and purposes of Minn. Stat. §§ 115.41-.53 (2016). This authority also enables the state to comply with the CWA.[24]

III. Procedural Requirements of Chapter 14

A. Publications and Filings

9. On August 25, 2014, the MPCA published its Request for Comments (RFC) in the State Register.[25]

10. On August 25, 2014, the MPCA also notified interested parties who are subscribed to the TALU Rulemaking GovDelivery list of the RFC.[26] As of December 15, 2016, there were nearly 2,100 subscribers to that list.[27]

11. On August 25, 2014, the MPCA posted the RFC on its Public Notices webpage at https://www.pca.state.mn.us/public-notices.[28]

12. On August 25, 2014, the MPCA posted and published a "plain language" version of the RFC, together with an explanatory "TALU Concept Plan," on the MPCA's TALU webpage at https://www.pca.state.mn.us/water/tiered-aquatic-life-use-talu-framework.[29]

13. On October 14, 2016, the MPCA provided the Commissioner of Agriculture and Department of Agriculture staff a copy of the proposed rule amendments and a draft Statement of Need and Reasonableness (SONAR).[30]

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[22] Ex. D at 18; Minn. R. 7050.0110 (2015).
[23] Ex. D at 18; Minn. R. 7052.0005 (2015).
[24] 33 U.S.C. § 1313.
[25] Ex. A; Ex. D. at 79; Ex. S-71.
[26] Ex. D at 79.
[27] *Id.*
[28] *Id.*
[29] *Id.*
[30] Ex. K.1. The MPCA maintains that these rules do not directly affect farming operations, but that it took steps to comply with Minn. Stat. § 14.111 (2016) because the rules will impact drainage ditches that are used in farm management. The Administrative Law Judge finds that the relationship between the proposed rules and drainage ditches used in farm operations demonstrates the rules do have an effect on farming operations and thus, pursuant to Minn. Stat. § 14.111, the notification provided to the Commissioner of Agriculture was required.

14. On October 14, 2016, the Commissioner of the MPCA sent a letter to the Commissioner of Minnesota Management and Budget (MMB), together with the proposed rule amendments and SONAR.[31] The MPCA soon learned that the MMB staff person who routinely conducts the consultation required by Minn. Stat. § 14.131 (2016) no longer worked at MMB.[32] MPCA staff followed up with MMB on December 7-8, 2016, to ascertain the new MMB staff person who would be handling the consultation.[33] As of February 8, 2017, the MPCA had received no additional communication from MMB on the proposed rule amendments.[34] This failure did not deprive any person or entity an opportunity to participate meaningfully in the rulemaking process. MMB serves as a level of oversight, pursuant to Minn. Stat. § 14.131, and never took a substantive interest in these rules.

15. On December 19, 2016, the MPCA published the SONAR, its approved Dual Notice, and the proposed rules in the *State Register*.[35]

16. On December 19, 2016, the MPCA e-mailed the SONAR, its approved Dual Notice, and the proposed rules to all persons subscribed to the GovDelivery TALU rulemaking list, tribal authorities and designated contact persons of Minnesota's tribal communities, Minnesota Soil and Water Conservation Districts, and Minnesota Watershed Districts.[36]

17. As of December 19, 2016, there were no persons registered to receive MPCA rulemaking notices via U.S. Mail.[37]

18. On December 19, 2016, the MPCA mailed a copy of the Dual Notice, the SONAR, and the proposed rule amendments to legislators who are chairs and ranking minority party members of the legislative policy and budget committees with jurisdiction over the subject matter in the proposed rule amendments, and the Legislative Coordinating Commission.[38]

19. On December 19, 2016, the MPCA sent an e-mail to each Minnesota city mayor and county chairperson whose information was obtained from lists purchased from the League of Minnesota Cities and the Association of Minnesota Counties.[39] The e-mails included a hyperlink to the MPCA's Dual Notice, the SONAR, and the proposed rule amendments.[40] A mailing list purchased from the Association of Minnesota Townships was used to send the same information to each township clerk.[41]

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[31] K.4.
[32] *Id.*
[33] *Id*.
[34] *Id.*
[35] Ex. F.2. Administrative Law Judge Jim Mortenson approved the MPCA's Additional Notice Plan and Dual Notice by Order dated November 29, 2016.
[36] Exs. G, H.
[37] Ex. G.
[38] Ex. K.2.
[39] Ex. K.3.
[40] *Id.*
[41] *Id.*

20. In its December 19, 2016 notifications, the MPCA requested comments on the proposed rules be submitted by 4:30 p.m. on February 2, 2017, 45 days later.[42]

21. By February 3, 2017, the MPCA had received individual comments from 16 people or organizations.[43] The MPCA also received two sets of letters from individuals, each set with identical content.[44]

22. More than 25 people requested a hearing.[45] On February 3, 2017, a Notice of Hearing was sent to all persons who had requested a hearing.[46]

B. The Notice

23. The Dual Notice (Notice) states the MPCA intends to adopt rules without a public hearing unless 25 or more people request a hearing.[47] The Notice identified the rules to be amended and the parts of Minnesota Statutes chapter 14 (Minn. Stat. §§ 14.22 to .28) and Minnesota Rules chapter 1400 (Minn. R. 1400.2300 to .2310) that it must follow.[48]

24. The Notice includes a citation to Minn. Stat. §§ 115.03 and .44 as the authority for the proposed rules.[49]

25. The Notice includes descriptions of the various locations and means of viewing the proposed rules, and a description of the nature and effect of the proposed rules.[50]

26. The Notice states that the SONAR is available to the public and describes how to obtain or view it; that the SONAR contains a summary of the justification for the proposed rule amendments, including who will be affected by the proposed rules; and that it includes an estimate of the probable cost of the proposed rule amendments.[51]

27. The Notice states that the proposed rule amendments may be modified if the modifications are supported by the information and comments submitted to the MPCA or presented at the hearing and do not make the proposed rules substantially different from what the agency originally proposed.[52]

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[42] Exs. H, F.1., F.2., K.3.
[43] Exs. I.1 through I.17.
[44] Exs. 1.18 (147 letters), I.19 (181 letters).
[45] Ex. K.5.
[46] *Id.*
[47] Exs. F.1, F.2.
[48] *Id.*
[49] *Id.*
[50] *Id.*
[51] *Id.*
[52] *Id.*

28. The Notice states that persons may register with the MPCA to receive notice of future rule proceedings.[53]

29. The Commissioner of the MPCA, John Linc Stine, signed the Notice on December 5, 2016.[54]

30. The Notice states that the public may comment in support of or in opposition to the proposed rule amendments, or specific parts thereof, and that comments are encouraged.[55] The Notice also advises that comments should identify the portion of the rules being addressed, any changes proposed, and the reason for the comment or proposed changes.[56] The Notice states that comments on the legality of the rules must be submitted during the initial comment period prior to the possible public hearing.[57]

31. The Notice states that if 25 or more persons submit a written request for a hearing during the comment period, a public hearing will be held on February 16, 2017, at 3:30 p.m.[58]

32. The Notice states that requests for hearing must include identification of the portion of the proposed rules the person objects to, or that the person may object to the entire proposal, and that a request lacking this information is invalid and will not count toward determining whether a hearing will be held.[59] The Notice also states that the reasons for the request and proposed changes are encouraged.[60]

33. The Notice includes instructions on how comments and requests for hearing are to be submitted and to whom at the MPCA they are to be sent, including an e-mail address.[61]

34. The Notice states that if a public hearing is held, the MPCA will proceed under Minn. Stat. §§ 14.131 to 14.20.[62]

35. The Notice states that if no hearing is required, the MPCA may adopt the proposed rules after the comment period, and then submit them, and all evidence, to the Office of Administrative Hearings for review of legality.[63] The Notice also states that persons may request to be notified of the date the proposed rule amendments are submitted to the Office of Administrative Hearings and how to make that request.[64]

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[53] *Id.*
[54] Exs. F.1, F.2.
[55] *Id.*
[56] *Id.*
[57] *Id.*
[58] *Id.*
[59] *Id.*
[60] *Id.*
[61] *Id.*
[62] *Id.*
[63] *Id.*
[64] *Id.*

36. The Notice identifies the date, time and location of the hearing in this matter.[65] The Notice also informs that all interested persons will have an opportunity to participate and that the hearing will be held, simultaneously, at four locations around the state, including in St. Paul, Duluth, Detroit Lakes, and Marshall.[66] The Notice states that hearing attendees will be able to hear, see, and speak at the hearing.[67] The notice also includes the name of the Judge and the address and phone number for the Judge's legal assistant.[68]

37. The Notice states that persons will have the opportunity to submit written comments and reply comments after the hearing, pursuant to Minn. R. 1400.2230 (2015).[69]

38. The Notice states that anyone may request to be notified of the date on which the Judge's report will become available and that the request can be made at the hearing or in writing.[70]

39. The Notice states that people may ask to be notified when the MPCA adopts the rules and files them with the Secretary of State, and how to do so.[71]

40. The Notice states that lobbyists must register with the State Campaign Finance and Public Disclosure Board (Board) and that questions should be referred to the Board, and the Board's address and telephone number.[72]

41. The Notice includes an order that the rulemaking hearing will be held at the stated time, date, and locations.[73]

C. The SONAR

42. The SONAR, published December 19, 2016, includes a description of the classes of persons who probably will be affected by the proposed rules, including classes that will bear the costs of the proposed rules and classes that will benefit from the proposed rules. The SONAR states that all citizens of the state will benefit from the proposed rule amendments, there will be a general cost savings for governments and those who pay for water treatment, and additional revenues for individuals, businesses and government will be generated by higher property values, recreational spending, and

[65] Exs. F.1, F.2.
[66] *Id.*
[67] *Id.*
[68] *Id.*
[69] *Id.*
[70] *Id.*
[71] *Id*.
[72] *Id.*
[73] *Id.*

increased numbers of jobs. The SONAR states additional costs are not expected to result for any class of persons.[74]

43. The SONAR states the probable costs of enforcement of the proposed rules to the MPCA and to any other agency will be reduced overall. If a discharge permittee on an Exceptional Use designated stream is well below its permitted effluent limit, the MPCA may need to determine if increasing pollutant loads to the permit limit could threaten the Exceptional Use designation. This situation could result in an increased cost of $3,106 per review to the MPCA. However, according to the SONAR, the MPCA is unaware of any permitted discharger who will pose such a risk to an Exceptional Use designation.[75]

44. The SONAR states there are no less costly methods or less intrusive methods for achieving the purpose of the proposed rules.[76]

45. The SONAR includes two descriptions of alternative methods for achieving the purpose of the proposed rules that were seriously considered by the MPCA and the reasons why they were rejected in favor of the proposed rules.[77]

46. The SONAR includes a detailed analysis and explanation of the probable costs of complying with the proposed rules, including the portion of the total costs that will be borne by identifiable categories of affected parties, such as governmental units and discharge permittees. The impact varies based on the classification of the stream involved: general use, exceptional use, or modified use.[78]

47. The SONAR describes, in general, the probable costs or consequences of not adopting the proposed rules, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals, and which are addressed in description of classes of people affected by the proposed rule amendments.[79]

48. The SONAR includes a detailed assessment of how the proposed rules implement existing federal regulations, how it improves the current WQS, and a specific analysis of the need for and reasonableness of each proposal.[80]

49. The SONAR includes an assessment of the cumulative effect of the rules with other federal and state regulations related to the specific purpose of the rules and reasonableness of each difference.[81] The SONAR also explains how the regulatory program (the TALU framework) emphasizes superior achievement of the MPCA's

[74] Ex. D at 62-63.
[75] Ex. D at 63-64.
[76] Ex. D at 64.
[77] *Id.* at 64-65.
[78] *Id.* at 82-90.
[79] *Id.* at 62-63, 66.
[80] Ex. D.
[81] *Id.* at 67-68.

objectives in protecting the water quality of Minnesota's lotic waters and adding flexibility for regulated parties in meeting those goals by removing a "one-size-fits-all" framework.[82]

50. The SONAR includes an assessment of the differences between the proposed rules, existing federal standards adopted under the relevant provisions of the CWA, similar standards in states bordering Minnesota, and similar standards in states within the Environmental Protection Agency Region 5.[83]

51. The SONAR describes the MPCA's Environmental Justice Policy, which is designed to ensure the agency provides "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[84]

D. Documents Required for Hearing Record

52. At the hearing on February 16, 2017, the MPCA filed copies of the following documents, as required by Minn. R. 1400.2220 (2015):

(a) the MPCA's Request for Comments published in the *State Register* on August 25, 2014;[85]
(b) the proposed rules dated September 26, 2016, including the Revisor's approval;[86]
(c) the SONAR;[87]
(d) the Certificate of Furnishing the SONAR to the Legislative Reference Library on December 19, 2016;[88]
(e) the Dual Notice as mailed, posted on MPCA webpages, and as published in the *State Register* on December 19, 2016;[89]
(f) the Certificate of Mailing the Dual Notice to the rulemaking mailing list on December 19, 2016;[90]
(g) the Certificate of Giving Additional Notice Pursuant to the Additional Notice Plan on December 19, 2016;[91]
(h) the written comments on the proposed rules that the MPCA received during the comment period that followed the Dual Notice;[92]
(i) the Certificate of Compliance with Minnesota Statutes, Section 14.111, Regarding Farming Operations on October 14, 2016;[93]

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[82] *Id.* at 15-18, 68.
[83] Ex. D at 66-67, 69-71.
[84] *Id.* at 74-79.
[85] Ex. A.
[86] Ex. C.
[87] Ex. D.
[88] Ex. E.
[89] Exs. F.1, F.2.
[90] Ex. G.
[91] Ex. H.
[92] Exs. I.1 – I.19.
[93] Ex. K.1.

(j) the Certificate of Sending the Dual Notice and the Statement of Need and Reasonableness to Legislators and the Legislative Coordinating Commission on December 19, 2016;[94]

(k) the Certificate of Mailing the Dual Notice to Municipalities on December 19, 2016;[95]

(l) the Certificate of Compliance with Minnesota Statutes, Section 14.131, Regarding Consultation with Minnesota Management and Budget;[96] and

(m) the Certificate of Mailing a Notice of Hearing to Those Who Requested a Hearing on February 6, 2017.[97]

E. Cost to Small Businesses and Cities under Minn. Stat. § 14.127 (2016)

53. The MPCA determined that no costs will be associated with compliance of the proposed rules for any small business or small city.[98]

F. Adoption or Amendment of Local Ordinances

54. The MPCA has determined that the proposed amendments will not have any effect on local ordinances or regulations.[99]

G. External Peer Review of WQS

55. The MPCA's technical tools, procedures for determining and incorporating TALUs into current biological framework, assessment work, and implementation plan for TALUs were nearly complete before Minn. Stat. § 115.035 went into effect August 1, 2015. Thus, an external peer review panel was not convened in this matter.[100]

V. Rule by Rule Analysis

A. Minn. R. 7050.0140, subp. 3 – Class 2 waters, aquatic life and recreation

56. The MPCA proposes to change Minn. R. 7050.0140, subp. 3 – Class 2 waters, aquatic life and recreation. The differences are noted with underlining (additions) and strikeouts (deletions) below:

> Aquatic life and recreation includes all waters of the state that support or may support ~~fish, other aquatic life~~ aquatic biota, bathing, boating, or other recreational purposes and for which quality control

[94] Ex. K.2.
[95] Ex. K.3.
[96] Ex. K.4.
[97] Ex. K.5.
[98] Ex. D at 83-89.
[99] *Id.* at 73.
[100] *Id.*; *See* Minn. Stat. § 115.035(a) (2016).

is or may be necessary to protect aquatic or terrestrial life or their habitats or the public health, safety, or welfare.[101]

57. The MPCA seeks this amendment because, while it does not change the meaning of the terms used, the language change uses a phrase that will be consistent with other parts of the rules and the CWA, and will be clearer.[102]

B. Minn. R. 7050.0150, subp. 3 – Narrative Standards

58. The MPCA proposes to change Minn. R. 7050.0150, subp. 3 – Narrative Standards, as follows:

> For all class 2 waters, the aquatic habitat, which includes the waters of the state and stream bed, shall not be degraded in any material manner, there shall be no material increase in undesirable slime growths or aquatic plants, including algae, nor shall there be any significant increase in harmful pesticide or other residues in the waters, sediments, and aquatic flora and fauna; the normal ~~fishery and lower~~ aquatic biota ~~upon which it is dependent~~ and the use thereof shall not be seriously impaired or endangered, the species composition shall not be altered materially, and the propagation or migration of ~~the fish and other~~ aquatic biota normally present shall not be prevented or hindered by the discharge of any sewage, industrial waste, or other wastes to the waters.[103]

59. The MPCA seeks this amendment because it does not change the meaning of the terms used, and it believes the language change is a reasonable clarification and uses a phrase that will be consistent with other parts of the rules and the CWA.[104]

C. Minn. R. 7050.0150, subp. 3a – Assessment Criteria

60. The MPCA proposed to add Minn. R. 7050.0150, subp. 3a – Assessment Criteria to provide clarification.[105] Based on comments stating that the proposed amendment did not provide clarification, the MPCA has withdrawn the amendment.[106]

D. Minn. R. 7050.0150, subp. 4 – Definitions

61. The MPCA had proposed to add seven definitions to Minn. R. 7050.0150, subp. 4, delete one definition, and make minor modifications to three other definitions.[107] The additions, as well as the basis for each, are as follows:

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[101] Ex. C at 1.
[102] Ex. D at 52.
[103] Ex. C at 1.
[104] Ex. D at 52.
[105] Ex. C at 1-2; Ex. D at 53.
[106] MPCA Post-Hr'g Response to Comments Mem. at 3 (Mar. 17, 2017).
[107] Ex. C. at 2-9

C. "Aquatic biota" 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.[108]

This definition was added to more accurately reflect Minnesota and federal goals for the protection of aquatic life and create more consistency throughout Minn. R. ch. 7050.[109]

D. "Assemblage" means a taxonomic subset of a biological community such as fish in a stream community.[110]

This definition was added to provide clarity in the rule.[111]

E. "Biological condition gradient" means a concept describing how aquatic communities change in response to increasing levels of stressors. In application, the biological condition gradient is an empirical, descriptive model that rates biological communities on a scale from natural to highly degraded.[112]

This definition was added because it is a phrase used in the application of the TALU framework. The definition is based on accepted understanding of the phrase among water resource professionals.[113]

F. "Biological criteria, narrative" or "biocriteria, narrative" means written statements describing the attributes of the structure and function of aquatic assemblages in a water body necessary to protect the designated aquatic life beneficial use. The singular form "biological criterion, narrative" or "biocriterion, narrative" may also be used.[114]

This definition was added because these phrases are commonly used to describe statements defining goals for designated aquatic life uses. The definition is based on accepted understanding of the phrases among water resource professionals.[115]

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[108] Ex. C. at 2.
[109] Ex. D. at 53.
[110] Ex. C. at 2.
[111] Ex. D at 53.
[112] Ex. C. at 2-3.
[113] Ex. D. at 54.
[114] Ex. C at 3.
[115] Ex. D. at 54.

> G. "Biological criteria, numeric" or "biocriteria, numeric" means specific quantitative measures of the attributes of the structure and function of aquatic communities in a water body necessary to protect the designated aquatic life beneficial use. The singular form "biological criterion, numeric" or "biocriterion, numeric" may also be used.[116]

This definition was added because these phrases are commonly used to describe quantitative measures defining goals for designated aquatic life uses. The definition is based on accepted understanding of the phrases among water resource professionals.[117]

> LL. "Use attainability analysis" means a structured scientific assessment of the physical, chemical, biological, and economic factors affecting attainment of the uses of water bodies. 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).[118]

This definition was added because the TALU framework establishes a system for the reclassification of waters, and the basis for reclassification is the use attainability analysis (UAA). The definition is based on the general understanding of the phrase by water resource professionals and the regulatory expectations of the United States Environmental Protection Agency (EPA).[119]

> NN. "Water body type" means a group of water bodies with similar natural physical, chemical, and biological attributes, where the characteristics are similar among water bodies within each type and distinct from water bodies of other types.[120]

This definition was added because the rule amendments establishing the biological criteria that are the basis for the TALU framework use the term "water body type" to define groups of water bodies with similar natural attributes. This definition is based on the general understanding of the phrase as it is applied in the scientific literature and TALU programs in other states.[121]

62. The deleted definition was at Minn. R. 7050.0150, subp. 4 (I) – "Fish and other biota" and "lower aquatic biota."[122] This definition was deleted as a result of the addition of the phrase "aquatic biota" which more accurately reflects state and federal

[116] Ex. C at 3.
[117] Ex. D at 54.
[118] Ex. C at 8-9.
[119] Ex. D at 55.
[120] Ex. C at 9.
[121] Ex. D at 55.
[122] Ex. C at 4.

goals for the protection of aquatic life, and creates consistency throughout Minn. R. ch. 7050.[123]

63. The modifications to Minn. R. 7050.0150, subp. 4, were proposed as follows:

> ~~L.~~P. "Index of biotic integrity," "index of biological integrity," or "IBI" means…
> ~~R.~~V. "Normal ~~fishery~~ aquatic biota" and "normally present" mean ~~the fishery and other~~ a healthy aquatic ~~biota~~ community expected to be present in the water body….
> ~~V.~~Z. "Reference water body" means a water body minimally or least impacted by point or nonpoint sources of pollution that is representative of water bodies ~~in the same ecoregion or watershed~~. [124]

These definitions were modified to add clarity and consistency, and to broaden the defined phrases used throughout the amended Minn. R. ch. 7050.[125]

64. Based on comments to the proposed changes to Minn. R. 7050.0150, subp. 4, the MPCA proposes to add an additional definition:

> S. "Lotic water" means a flowing or moving water body such as a stream, river, or ditch.

This definition was added to support other modifications which clarify the original intent of the rules that the TALU framework is applicable only to lotic (flowing) waters.[126]

E. Minn. R. 7050.0150, subp. 6 – Impairment of biological community and aquatic habitat

65. The MPCA proposes the following changes to Minn. R. 7050.0150, subp. 6, in order to update terms, make them consistent throughout the rules, and provide clarity for the process used to develop biological criteria:

> In evaluating whether the narrative standards in subpart 3, which prohibit serious impairment of the normal ~~fisheries and lower~~ aquatic biota ~~upon which they are dependent~~ and the use thereof, material alteration of the species composition, material degradation of stream beds, and the prevention or hindrance of the propagation and migration of ~~fish and other~~ aquatic biota normally present, are being

[123] Ex. D at 54.
[124] Ex. C at 4-6.
[125] Ex. D. at 54-55.
[126] MPCA Post-Hr'g Response to Comments Mem. at 4.

met, the commissioner will consider all readily available and reliable data and information for the following factors of use impairment:…

E. any other scientifically objective, credible, and supportable factors. A finding of an impaired condition must be supported by data for the factors listed in at least one of items A to C. The biological quality of any given surface water body will be assessed by comparison to the biological conditions determined ~~for~~ by the commissioner using a biological condition gradient model or a set of reference water bodies which best represents the most natural condition for that surface water body type within a geographic region.[127]

F. Minn. R. 7050.0155 – Protection of Downstream Uses

66. Based on comments received following the hearing and the MPCA's intent to comply with federal requirements to protect downstream waters, the agency added the following amendment to the rules, which is accompanied by other revisions to explicitly include downstream use protection language:

> Minn. R. 7050.0155 – Protection of Downstream Uses. All waters must maintain a level of water quality that provides for the attainment and maintenance of the water quality standards of downstream waters, including waters of another state.[128]

G. Minn. R. 7050.0217, subp. 1 – Objectives for Protection of Surface Waters from Toxic Pollutants

67. The MPCA proposed amending Minn. R. 7050.0217, subp. 1, to use terms consistent with other changes to Minn. R. ch. 7050.[129] The proposal changes the phrase "fish and aquatic life" to "aquatic biota."[130]

H. Minn. R. 7050.0218, subp. 3 – Definitions

68. The MPCA proposed deleting the definition of "cold water fisheries" because the term will no longer be used in the rules and so does not require a definition.[131]

I. Minn. R. 7050.0218, subp. 4 – Adoption of USEPA national criteria

69. The MPCA proposed changing the language of this rule to remove references to Class 2C waters, a class being reassigned, and changing the term

[127] Ex. C at 9; Ex. D at 55-56.
[128] MPCA Post-Hr'g Response to Comments Mem. at 4.
[129] Ex. D at 56.
[130] Ex. C at 10.
[131] *Id.*; Ex. D at 56.

"fisheries" to "habitats.[132] These language changes are the result of substantive changes made to the rules elsewhere, thereby resulting in a consistent rule.[133]

J. Minn. R. 7050.0218, subp. 9 – Wildlife-based criteria

70. The MPCA proposed changing the language of this rule to remove references to Class 2C waters.[134]

K. Minn. R. 7050.0218, subp. 10 – Applicable criteria or human health-based standard

71. The MPCA proposed changing the language of this rule to remove references to Class 2C waters.[135]

L. Minn. R. 7050.0219, subp. 11 – Final baseline BAF by trophic level

72. The MPCA proposed removing the phrase "for cold water aquatic communities" from Minn. R. 7050.0219, subp. 11, paragraph A.[136] The MPCA made this proposal to eliminate a phrase no longer used, ensure consistency in the rules as a whole, and remove a redundancy.[137]

M. Minn. R. 7050.0220, subp. 1 – Purpose and scope

73. The MPCA proposed changing some of the language in the four categories of surface waters, and made further proposals based on the comments received following the hearing.[138] The final proposed changes are as follows:

> A. cold water ~~sport fish (trout waters)~~ aquatic life and habitat, also protected for drinking water: Classes 1B~~,~~; 2A, 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, 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, ~~2C,~~ 2Be, 2Bg, 2Bm, or 2D; 3A, 3B, 3C, or 3D; 4A and 4B or 4C; and 5 (subpart 5a); and
> D. limited resource value waters: Classes 3C~~,~~; 4A and 4B~~,~~; 5~~,~~; and 7 (subpart 6a).[139]

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[132] Ex. C at 18.
[133] Ex. D at 56.
[134] Ex. C at 19.
[135] *Id.*
[136] *Id.* at 20.
[137] Ex. D at 56.
[138] *Id.* at 20-21; MPCA Post-Hr'g Response to Comments Mem. at 5.
[139] Ex. C at 20-21.

74. These changes were proposed to ensure that the rule applies to all aquatic life, not only sport fish, to reflect federal goals, and to add tiered aquatic life use identifiers to reflect the proposed changes to beneficial uses in Minn. R. 7050.0222, subps. 2, 3, and 4.[140] Further, the changes to the proposal following comments, to revert back to inclusion of all Class 2A, 2Bd, and 2B water quality standards, was made to ensure clarity because the intent was not to remove these classes from the applicable water quality standards.[141]

N. Minn. R. 7050.0220, subp. 2 – Explanation of tables

75. The MPCA proposed to correct a typographical error under paragraph D of this subpart by changing "carcinoge" to "carcinogen."[142]

O. Minn. R. 7050.0220, subp. 3a – Cold water ~~sport fish~~ aquatic life and habitat, drinking water, and associated use classes.

76. The MPCA proposed making the change above to the subpart title[143] and, in response to comments following the hearing, added:

> The water quality standards in 7050.0222, subpart 2, that apply to Class 2A also apply to Classes 2Ae and 2Ag. In addition to the water quality standards in 7050.0222, subpart 2, the biological criteria defined in 7050.0222, subpart 2d, apply to Classes 2Ae and 2Ag.[144]

77. These changes were proposed to ensure that the rule applies to all aquatic life, not only sport fish, and to ensure clarity that the water quality standards that apply to Classes 2A, 2Bd, and 2B also apply to Classes 2Ae, 2Ag, 2Bde, 2Bdg, 2Bdm, 2Be, 2Bg, and 2Bm, with the only addition being an indication that the biological criteria for different TALU also apply.[145]

P. Minn. R. 7050.0220, subp. 4a – Cool and warm water ~~sport fish~~ aquatic life and habitat, drinking water, and associated use classes.

78. The MPCA proposed making the change above to the subpart title[146] and, in response to comments following the hearing, added:

> The water quality standards in 7050.0222, subpart 3, that apply to Class 2Bd also apply to Classes 2Bde, 2Bdg, and 2Bdm. In addition to the water quality standards in 7050.0222, subpart 3, the biological

[140] Ex. D at 57.
[141] MPCA Post-Hr'g Response to Comments Mem. at 5.
[142] Ex. C at 21.
[143] *Id.* at 22.
[144] MPCA Post-Hr'g Response to Comments Mem. at 5.
[145] *Id.*; Ex. C at 22; Ex. D at 57.
[146] Ex. C at 22.

criteria defined in 7050.0222, subpart 3d, apply to Classes 2Bde, 2Bdg, and 2Bdm.[147]

79. These changes were proposed to ensure that the rule applies to all aquatic life, not only sport fish, and to ensure clarity that the water quality standards that apply to Classes 2A, 2Bd, and 2B also apply to Classes 2Ae, 2Ag, 2Bde, 2Bdg, 2Bdm, 2Be, 2Bg, and 2Bm, with the only addition being an indication that the biological criteria for different TALUs also apply.[148]

Q. Minn. R. 7050.0220, subp. 5a – Cool and warm water ~~sport fish~~ aquatic life and habitat and associated use classes.

80. The MPCA proposed making the change above to the subpart title,[149] adding identifiers for the subclasses of TALUs ("e," "g," and "m") to all references to Class 2, and deleting the temperature standard relating to the Class 2C use.[150] In response to comments following the hearing, the MPCA added:

> The water quality standards in 7050.0222, subpart 4, that apply to Class 2B also apply to Classes 2Be, 2Bg, and 2Bm. In addition to the water quality standards in 7050.0222, subpart 4, the biological criteria defined in 7050.0222, subpart 4d, apply to Classes 2Be, 2Bg, and 2Bm.[151]

81. These changes were proposed to ensure that the rule applies to all aquatic life, not only sport fish, and to ensure clarity that the water quality standards that apply to Classes 2A, 2Bd, and 2B also apply to Classes 2Ae, 2Ag, 2Bde, 2Bdg, 2Bdm, 2Be, 2Bg, and 2Bm, with the only addition being an indication that the biological criteria for different TALUs also apply.[152]

R. Minn. R. 7050.0220, subp. 6a – Limited resource value waters and associated use classes

82. The MPCA proposed the following changes to Minn. R. 7050.0220, subp. 6a:

> C. The level of dissolved oxygen ~~shall~~ must be maintained at concentrations:
> (1) that will avoid odors or putrid conditions in the receiving water;
> (2) ~~or at concentrations~~ at not less than one milligram per liter (daily average); and

[147] MPCA Post-Hr'g Response to Comments Mem. at 5.
[148] Ex. C at 22; Ex. D at 57; MPCA Post-Hr'g Response to Comments Mem. at 5.
[149] Ex. C at 22.
[150] Ex. C. at 22-28; Ex. D at 57.
[151] MPCA Post-Hr'g Response to Comments Mem. at 6.
[152] *Id.*at 5; Ex. C at 22; Ex. D at 57.

(3) ~~provided that measurable concentrations are present~~ above zero milligrams per liter at all times.[153]

83. These changes were proposed to clarify, but not change, the existing dissolved oxygen standard for Class 7 waters.[154]

S. Minn. R. 7050.0222, subps. 2 – Class 2A waters; aquatic life and recreation; 3 – Class 2Bd waters; and 4 – Class 2B waters

84. The MPCA proposed to amend Minn. R. 7050.0222, subparts 2, 3, and 4, to replace "sport and commercial fish and associated aquatic biota" with "aquatic biota" in order to ensure consistency with the CWA which protects more than only sport and commercial fish.[155] The MPCA also proposed to add a reference to the new subpart 2c, which describes how the aquatic life use is defined and measured, which adds clarity to the rule.[156]

85. The MPCA also proposes language to maintain the exception to the standards for Class 2B for the reach of the Minnesota River from the outlet of the Blue Lake wastewater treatment works to the mouth at Fort Snelling, because that exception was part of subpart 5 which the MPCA proposes to repeal due to the overall elimination of Class 2C as a category.[157]

T. Minn. R. 7050.0222, subps. 2c – Beneficial use definitions for lotic cold water aquatic life and habitat (Class 2A); 3c – Beneficial use definitions for lotic warm or cool water aquatic life and habitat (Class 2Bd); and 4c – Beneficial use definitions for lotic warm or cool water aquatic life and habitat (Class 2B)

86. The MPCA proposed adding subparts 2c, 3c, and 4c to Minn. R. 7050.0222 in order to provide narratives for each TALU tier under Classes 2A, 2Bd, and 2B.[158] These narratives describe the aquatic assemblage protected by each TALU, and provide references detailing how aquatic assemblage condition is measured and how the biological criteria were developed.[159] The proposed language describes the expectations for each tiered aquatic life use and provides the documentation necessary to justify each use, including the requirement that a use attainability analysis be completed followed by rulemaking to list any water as a Modified use.[160] The proposed language establishes, by reference, water quality standards based on the TALU framework for lotic waters.[161]

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[153] Ex. C at 28.
[154] Ex. D at 58.
[155] Ex. C at 28, 42, and 59; Ex. D at 59.
[156] *Id.*
[157] Ex. C at 69, 77; Ex. D at 59-60
[158] Ex. C at 40-41, 55-57, 73-76; Ex. D at 59.
[159] *Id*.
[160] Ex. D at 59.
[161] Ex. C. at 40-41, 55-57, 73-76.

87. Based on public comments, the MPCA proposed, following the hearing, to modify the headings for the subparts 2c, 3c, and 4c to use the terms "lotic" and "aquatic life" in place of "stream and river."[162] This was proposed to clarify that the TALU framework is applicable only to lotic, or flowing, waters.[163]

88. Based on public comments, the MPCA proposed, following the hearing, to add and modify several subitems to subparts 2c, 3c, and 4c in the following findings.[164]

89. Subparts 2c, item A, subitem 2; 3c, item A, subitem 2; and 4c, item A, subitem 2, are all proposed to be modified with the following wording:[165]

> (2) 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)~~ Fish data collection protocols for lotic waters in Minnesota (2017); or
> (b) the macroinvertebrates IBI as defined in ~~Development of a Macroinvertebrate based Index of Biological Integrity for Minnesota's Rivers and Streams, Minnesota Pollution Control Agency (2014)~~ Macroinvertebrate data collection protocols for lotic waters in Minnesota (2017).[166]

These proposed modifications provide for a more recent and accessible reference which describes the requirements for collecting data that can be used in use attainability analyses and assessments of lotic waters in Minnesota. The information in the new reference documents is not substantially different from the original.[167]

90. Subparts 2c, item A, subitem 4; 3c, item A, subitem 4; and 4c, item A, subitem 4, are all proposed to be modified as follows:[168]

> (4) The following documents are incorporated by reference and are not subject to frequent change:
> (a) Calibration of the Biological Condition Gradient for Streams of Minnesota, Gerritsen et al. (2012). The document is available on the agency's Web site at www.pca.state.mn.us;
> (b) ~~Development of a Fish based Index of Biological Integrity for Minnesota's Rivers and Streams, Minnesota Pollution Control~~

[162] MPCA Post-Hr'g Response to Comments Mem. at 6.
[163] *Id.*
[164] *Id*. at 6-12.
[165] Because these subitems were initially all proposed additions to the rule, this version is both underlined and includes strikeouts and double-underlining of proposed modifications of the original proposed additions. Further, the language under each subpart here is identical, and is only set forth once.
[166] Ex. C at 40, 55, 74; MPCA Post-Hr'g Response to Comments Mem. at 7, 9, 11.
[167] MPCA Post-Hr'g Response to Comments Mem. at 7, 9, 11.
[168] The language under each subpart here is identical and is only set forth once.

~~Agency (2014)~~ Fish data collection protocols for lotic waters in Minnesota (2017). The document is available on the agency's Web site at www.pca.state.mn.us;
(c) ~~Development of a Macroinvertebrate based Index of Biological Integrity for Minnesota's Rivers and Streams, Minnesota Pollution Control Agency (2014)~~ Macroinvertebrate data collection protocols for lotic waters in Minnesota (2017). The document is available on the agency's Web site at www.pca.state.mn.us; and
(d) Development of Biological Criterial for Tiered Aquatic Life Uses, Minnesota Pollution Control Agency (2016). The document is available on the agency's Web site at www.pca.state.mn.us.[169]

These proposed modifications provide for a more recent and accessible reference which describes the requirements for collecting data that can be used in use attainability analyses and assessments of lotic waters in Minnesota. The information in the new reference documents is not substantially different from the original.[170]

91. Subparts 2c, item A, subitem 5; 3c, item A, subitem 5; and 4c, item A, subitem 5, are all proposed to be added to the original proposed changes to these subparts. These proposed changes are as follows:

Minn. R. 7050.0222, Subp. 2c (A)
(5) The beneficial use subclass designators "e" and "g" are added to the Class 2A designator as specific additional designators. The additional subclass designators do not replace the Class 2A designator. All requirements for Class 2A cold water stream and river habitats in 7050.0222 and 7052.0100 continue to apply in addition to requirements for Class 2Ae or Class 2Ag cold water stream and river habitats in 7050.0222. These subclass designators are only applied to lotic waters.[171]

Minn. R. 7050.0222, Subp. 3c (A)
(5) The beneficial use subclass designators "e," "g," and "m" are added to the Class 2Bd designator as specific additional designators. The additional subclass designators do not replace the Class 2Bd designator. All requirements for Class 2Bd warm or cool water stream and river habitats in 7050.0222 and 7052.0100 continue to apply in addition to requirements for Class 2Bde, Class 2Bdg, or Class 2Bdm warm or cool water stream and river habitats in 7050.0222. These subclass designators are only applied to lotic waters.[172]

[169] MPCA Post-Hr'g Response to Comments Mem. at 7, 9, 12.
[170] *Id.*
[171] *Id*. at 6.
[172] *Id.* at 8.

Minn. R. 7050.0222, Subp. 4c (A)
(5) The beneficial use subclass designators "e," "g," and "m" are added to the Class 2B designator as specific additional designators. The additional subclass designators do not replace the Class 2B designator. All requirements for Class 2B warm or cool water stream and river habitats in 7050.0222 and 7052.0100 continue to apply in addition to requirements for Class 2Be, Class 2Bg, or Class 2Bm warm or cool water stream and river habitats in 7050.0222. These subclass designators are only applied to lotic waters.[173]

The MPCA proposed these modifications to the proposed additions in response to comments indicating that people were confused about the need and intent to continue to apply Class 2A WQS to waters with TALU classifications. All WQS that apply to Classes 2A, 2Bd, and 2B would also apply to Classes 2Ae, 2Ag, 2Bde, 2Bdg, 2Bdm, 2Be, 2Bg, and 2Bm, with the only addition being an indication that the biological criteria for different TALU also apply. Thus, the proposed modification provides additional clarity to the rule.[174]

92. Subparts 3c, item D, subitem 1 and 4c, item D, subitem 1, are proposed to be further modified as follows:

Minn. R. 7050.0222, Subp. 3c (D)
(1) To meet the definition in this item, waters must have been the subject of a use attainability analysis where it is determined that attainment of ~~and must have been found to be incapable of supporting and maintaining~~ the Class 2Bdg beneficial use is not feasible because of human-induced modifications of the physical habitat ~~that preclude the potential for recovery of the fauna~~. These modifications must be the result of direct alteration to the channel, such as drainageway maintenance, bank stabilization, and impoundments.[175]

Minn. R. 7050.0222, Subp. 4c (D)
(1) To meet the definition in this item, waters must have been the subject of a use attainability analysis where it is determined that attainment of ~~and must have been found to be incapable of supporting and maintaining~~ the Class 2Bg beneficial use is not feasible because of human-induced modifications of the physical habitat ~~that preclude the potential for recovery of the fauna~~. These modifications must be the result of direct alteration to the channel, such as drainageway maintenance, bank stabilization, and impoundments.[176]

[173] MPCA Post-Hr'g Response to Comments Mem. at 11.
[174] *Id.* at 6, 8, 11.
[175] *Id.* at 10.
[176] *Id*. at 12.

The MPCA proposed these modifications in response to comments in order to more clearly convey the purpose of the provision. The modifications more closely follow the phrases in the CWA at 40 C.F.R. § 131.10(g).[177]

U. Minn. R. 7050.0222, subps. 2d – Biological criteria for lotic cold water aquatic life and habitat (Class 2A); 3d - Biological criteria for lotic warm or cool water aquatic life and habitat (Class 2Bd); and 4d Biological criteria for lotic warm or cool water aquatic life and habitat (Class 2B).

93. The MPCA proposed adding subparts 2d, 3d, and 4d to Minn. R. 7050.0222 in order to establish the biological criteria and relevant assemblage for Classes 2A, 2Bd, and 2B, as well as identify the water-body type and TALU.[178] These additions provide transparency and consistency regarding the process used to assess aquatic life use goals.[179]

94. Based on public comments, the MPCA proposed, following the hearing, to modify the headings for Subparts 2d, 3d, and 4d to use the terms "lotic" and "aquatic life" in place of "stream and river."[180] This was proposed to clarify that the TALU framework is applicable only to lotic, or flowing, waters.[181]

95. Based on public comments, the MPCA proposed, following the hearing, to add to and modify proposed Minn. R. 7050.0222, subp. 2d, by adding the following:

> A. The biological criteria for lotic cold water aquatic life and habitats (Class 2A) are applicable to perennial and intermittent waters that allow for colonization of fish and macroinvertebrates.[182]

96. Based on public comments, the MPCA proposed, following the hearing, to add to and modify proposed Minn. R. 7050.0222, subp. 3d, by adding the following:

> A. The biological criteria for lotic warm or cool water aquatic life and habitats (Class 2Bd) are applicable to perennial and intermittent waters that allow for colonization of fish and macroinvertebrates.[183]

97. Based on public comments, the MPCA proposed, following the hearing, to add to and modify proposed Minn. R. 7050.0222, subp. 4d, by adding the following:

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[177] MPCA Post-Hr'g Response to Comments Mem. at 10, 12.
[178] Ex. C at 42, 57-58, 76-77; Ex. D at 59.
[179] Ex. D. at 59.
[180] MPCA Post-Hr'g Response to Comments Mem. at 8, 10, 13.
[181] *Id.*
[182] *Id.* at 8.
[183] *Id.* at 10.

A. The biological criteria for lotic warm or cool water aquatic life and habitats (Class 2B) are applicable to perennial and intermittent waters that allow for colonization of fish and macroinvertebrates.[184]

98. The MPCA proposed the modifications to the proposed Minn. R. 7050.0222, subps. 2d, 3d, and 4d, because the MPCA does not routinely sample ephemeral, lotic waters for fish and macroinvertebrates because the IBIs and biological criteria are not developed for use in that type of habitat, and the additions clarify the applicability of the IBIs.[185]

V. Minn. R. 7050.0222, subp. 5 – Class 2C waters

99. The MPCA proposed to repeal Minn. R. 7050.0222, subp. 5, which sets the standards for Class 2C designated waters.[186] Under the TALU framework, Class 2C is outdated because the new proposed standards more accurately describe the standards for waters with the characteristics of current Class 2C.[187]

W. Minn. R. 7050.0227, subp. 2 – Class 7 waters; limited resource waters

100. The MPCA proposed to clarify, but not substantively change, Minn. R. 7050.0227, subp. 2, regarding the dissolved oxygen standard for Class 7 waters.[188]

X. Minn. R. 7050.0430 - UNLISTED WATERS

101. The MPCA proposed amending Minn. R. 7050.0430, including by proposed modifications following the hearing to clarify the intent of the rule that the TALU framework is applicable only to lotic waters, as follows:[189]

Subpart 1. **Statewide surface waters.** Except as provided in subparts 2 and 3, all surface waters of the state that are not listed in part 7050.0470 and that are not wetlands as defined in part 7050.0186, subpart 1a, are hereby classified as Class 2B, ~~2Bg,~~ 3C, 4A, 4B, 5, and 6 waters. Unlisted lotic waters are also assigned the beneficial use subclass designator "g" to the Class 2B designator.

Subp. 2. **Boundary Waters Canoe Area Wilderness**.
A. All streams in the Boundary Waters Canoe Area Wilderness [11/5/84P] not listed in part 7050.0470 are classified as Class 1B, 2Bdg, 3B.

[184] MPCA Post-Hr'g Response to Comments Mem. at 13.
[185] *Id*.
[186] Ex. C at 170; Ex. D at 60.
[187] Ex. D at 60.
[188] Ex. C at 78; Ex. D at 60.
[189] Ex. C at 78-79; Ex. D at 60; MPCA Post-Hr'g Response to Comments Mem. at 13.

B. All lakes in the Boundary Waters Canoe Area Wilderness [11/5/84P] not listed in part 7050.0470 are classified as Class 1B, 2Bdg, 3B.
C. All wetlands in the Boundary Waters Canoe Area Wilderness [11/5/84P] not listed in part 7050.0470 are classified as Class 2D.

Subp. 3. **Voyageurs National Park.**
A. All streams in Voyageurs National Park [11/5/84P] not listed in part 7050.0470 are classified as Class 2Bdg, 3B.
B. All lakes in Voyageurs National Park [11/5/84P] not listed in part 7050.0470 are classified as Class 2B, 3B.
C. All wetlands in Voyageurs National Park [11/5/84P] are classified as Class 2D.[190]

102. The MPCA proposed these changes to update the provisions consistent with the new classifications in the TALU framework, to move the provisions of Minn. R. 7050.0470 regarding the Boundary Waters Canoe Area Wilderness (BWCAW) and Voyageurs National Park to Minn. R. 7050.0430, and to incorporate the lists of waters in the BWCAW and Voyageurs National Park by reference.[191]

Y. Minn. R. 7050.0460 – WATERS SPECIFICALLY CLASSIFIED; EXPLANATION OF LISTINGS IN PART 7050.0470.

103. The MPCA proposed amending Minn. R. 7050.0460, subpart 1, Explanation of Listings, to clarify the method for describing the extent of stream reaches and to describe the new approach for incorporating the beneficial use list by reference.[192] The changes are as follows:

Subpart 1. **Explanation of listings.** The waters of the state listed in part 7050.0470 are classified as specified. The ~~specific stretch of watercourse of the~~ location of ~~a water body is~~ lakes, wetlands, calcareous fens, and scientific and natural areas are described by township, range, and section. Specific stream stretches are described by township, range, and section; stream confluence; geographic coordinates; road crossing; some other recognizable landmark; or a combination of these descriptors. Streams and rivers are listed by the eight-digit hydrologic unit code (HUC) of the major watersheds in part 7050.0469 in which the streams and rivers are located. The tables that specify the applicable beneficial uses for the stream and river reaches are incorporated by reference in part 7050.0470. Any community listed in part 7050.0470 is the community nearest the water classified, and is included solely to assist in identifying the water. Most waters of the state are not specifically

[190] Ex. C at 78-79; Ex. D at 60; MPCA Post-Hr'g Response to Comments Mem. at 13.
[191] Ex. D at 60.
[192] *Id*.

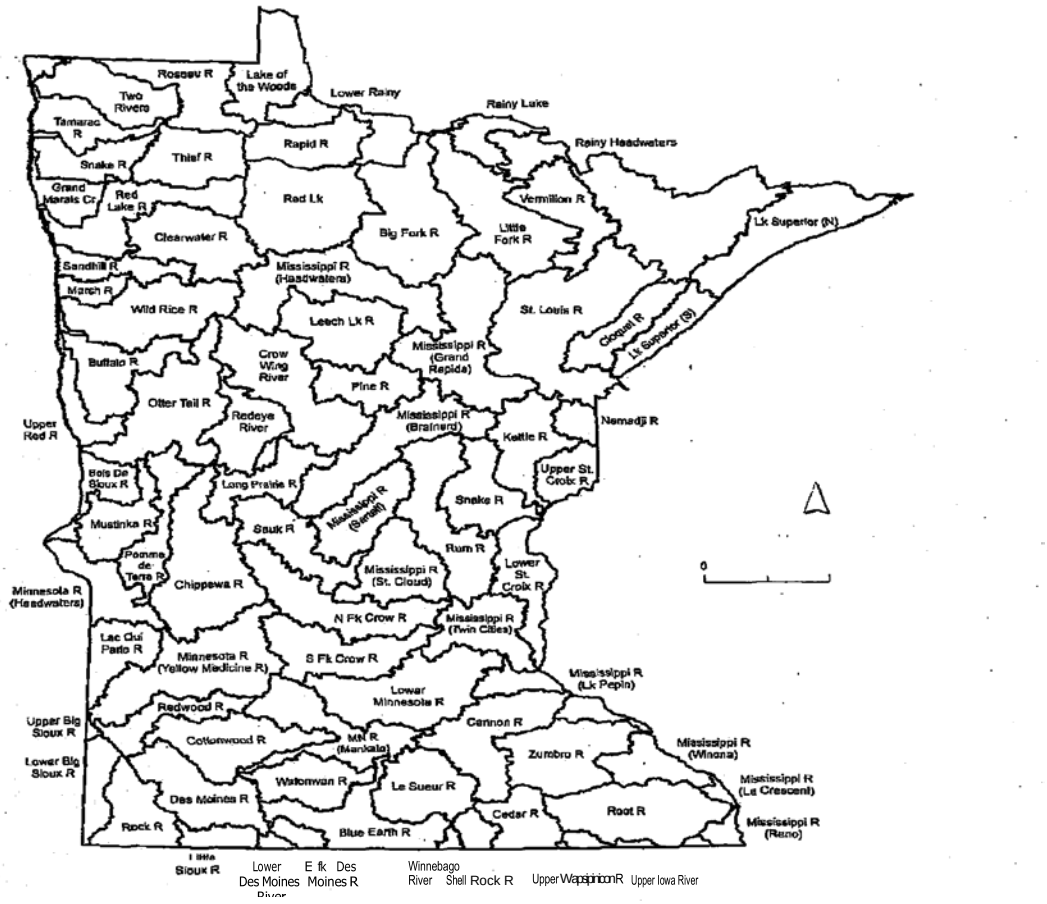
listed in part 7050.0470. See parts 7050.0425 and 7050.0430 for the classifications of waters not listed.[193]

104. This information is necessary because of the proposed changes to the format of water listings provided in Minn. R. 7050.0470.[194]

Z. Minn. R. 7050.0469 – MAP: MINNESOTA'S MAJOR WATERSHEDS

105. The MPCA proposed adding a map of Minnesota's major watersheds in order to provide a reference to assist with locating the correct use table.[195] The use tables are proposed to be incorporated by reference at Minn. R. 7050.0470.[196] The map is as follows:[197]

Major Watersheds in Minnesota



[193] Ex. C at 79-80.
[194] Ex. D at 60.
[195] Ex. C at 80; Ex. D at 61.
[196] Ex. C at 81; Ex. D at 61.
[197] Ex. C at 80.

AA. 7050.0470 – CLASSIFICATIONS FOR SURFACE WATERS IN MAJOR DRAINAGE BASINS

106. The MPCA proposed to change how classifications for surface waters in the nine major drainage basins in the state are listed and organized.[198] The proposal organizes the beneficial uses for stream reaches by major watersheds, identified by their eight-digit hydrologic unit code (HUC).[199] The MPCA used the same language to incorporate the water use classifications for each of the following watershed basins: Lake Superior Basin; Lake of the Woods Basin; Red River of the North Basin; Upper Mississippi River Basin; Minnesota River Basin; Saint Croix River Basin; Lower Mississippi River Basin; Cedar-Des Moines River Basin; and Missouri River Basin.[200] The language is as follows:

> The water use classification for the stream reaches within each of the major watersheds in the [Name] Basin listed in item A are found in tables entitled "Beneficial Use Designations for Stream Reaches" published on the Web site of the Minnesota Pollution Control Agency at www.pca.state.mn.us. The tables are incorporated by reference and are not subject to frequent change. The date after each watershed listed in item A is the publication date of the applicable table. The water use classifications for the other listed waters in the [Name] Basin are as identified in items ~~A~~ B to D. See parts 7050.0425 and 7050.0430 for the classifications of waters not listed. Designated use information for water bodies can also be accessed through the agency's Environmental Data Access (http://www.pca.state.mn.us/quick-links/eda-surface-water-data).[201]

Stream reaches are no longer specifically stated in the proposed Minn. R. 7050.0470, but rather are incorporated by reference to a listed published table of streams within a specific watershed.[202]

107. The MPCA proposes to change the classifications of 141 stream reaches from Class 2 under the current rule to the more specific Class 2 designations under the proposed TALU regulations.[203] Stream reaches in current Class 2B are being changed to Class 2Bm or 2Be.[204] Stream reaches in current Class 2A are being changed to Class 2Ae.[205] Stream reaches in current Class 2C are being changed to Class 2Bm.[206]

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[198] Ex. C at 81-167; Ex. D at 61.
[199] *Id.*
[200] Ex. C at 81, 102, 108-09, 115, 130-32, 144-45, 148-49, 162-63, and 165-66.
[201] *Id.*
[202] Ex. C at 81–167.
[203] *Id.*; Ex. D at 61.
[204] Ex. D at 61. (Letter "m" designates modified or poor. Letter "e" designates exceptional or very good.)
[205] *Id.*
[206] *Id.* (Letter "g" designates general use.)

108. The MPCA is proposing the classification changes above based on the results of UAAs for aquatic life use for these 141 stream reaches.[207] The changes to the modified use are proposed because those stream reaches have been legally modified and maintained for drainage, resulting in habitat loss and a loss in biological integrity.[208] The changes to exceptional use are proposed because those stream reaches have biological assemblages with the ability to meet a higher use tier.[209]

109. The MPCA is proposing that all remaining Class 2C stream reaches be classified as Class 2Bg.[210] This change results from the similarities of Class 2C, which is proposed to be eliminated, and the new proposed Class 2Bg.[211]

BB. 7052.0100 – WATER QUALITY STANDARDS

110. The MPCA proposes to remove references to Class 2C in Minn. R. 7052.0100, because the classification will no longer exist as a result of proposed changes to Minn. R. 7050.0222, subp. 5.[212]

CC. 7052.0110, subp. 3(C) – Bioaccumulation Factors

111. The MPCA proposes to remove references to Class 2C in Minn. R. 7052.0110, subp. 3 (C), because the classification will no longer exist as a result of proposed changes to Minn. R. 7050.0222, subp. 5.[213]

VI. Summary of Comments to Proposed Changes and MPCA Responses

A. Comments Supporting Proposals and MPCA Response

112. Multiple commenters expressed general support for the proposed amendments as an improvement to the existing water quality standards framework, with some concerns and requested modifications or clarifications. This includes commenters who expressed support for the whole rule and others who expressed support for the concept followed by comments regarding the implementation of the amendments. Other comments of support were focused on the use of biological tools to better monitor and assess the condition of Minnesota's streams. One commenter expressed support for the removal of Class 2C.[214]

113. The MPCA states the primary goal of this rulemaking is to improve protection of Minnesota's water quality and the aquatic life (e.g., fish, insects, mussels, plants) that depend on healthy streams. This goal is consistent with the Clean Water Act's

[207] Ex. D at 61.
[208] *Id.*
[209] *Id.*
[210] *Id*. (The letter "g" designates general use.)
[211] *Id.*
[212] Ex. C at 167, 169; Ex. D at 62.
[213] Ex. C at 170; Ex. D at 62.
[214] Exs. I.1, I.3, I.5, I.9, I.12, I.16, I 17, L.12; M.2; Transcript (Tr.) at 77-78.

objective to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[215] The TALU framework builds upon existing water quality standards with a goal of improving how water resources are monitored and managed. Because of improvements in biological, habitat, and water quality monitoring tools, amending Minnesota's water quality rules to include the TALU framework will lead to better outcomes for assessing and ensuring the protection of aquatic life, and better restoration efforts to reach water quality goals. The TALU framework is a reasonable mechanism to address issues that arise from the current "one-size-fits-all" framework for protecting aquatic life and reasonably sets standards for protecting and restoring aquatic life based on attainable biology.[216]

B. Comments Regarding Designated Use List and Format and MPCA Response

114. Several commenters felt the lists of designated uses are not user friendly or that they could not determine which specific reaches have proposed TALU beneficial use designations. Commenters indicated that additional information should be included in the tables, including: the date the beneficial use was adopted; public land survey (PLS) sections; county; and adjacent stream reaches and tributaries. It was also suggested that having the information in 80 separate documents (i.e., one for each major watershed) makes them unsearchable and that they should all be in one text-searchable document.[217]

115. To enhance accessibility and respond to comments, the MPCA intends to include information suggested by the commenters either in the beneficial use tables or through an interactive map tool.[218]

116. The proposed reformatting of the designated beneficial use tables does not in any way impact how water bodies are designated.[219] The proposed reformatting merely creates a framework that provides more information in a more readily accessible format.[220] The proposed table reformatting, while not ideal, is sufficient and it is an improvement over the current format in Minn. R. 7050.0470 (e.g., Exhibit D, SONAR Appendix C). It is similar to the format used by the Ohio Environmental Protection Agency (Ohio EPA) for listing their beneficial uses.[221]

117. The requested PLS information is included in the current Minn. R. 7050.0470, but only for the small fraction of Minnesota stream reaches that are listed in rule. The majority of stream reaches (>10,000) are not currently listed in Minn. R. 7050.0470 and the PLS information has not been compiled for each of these reaches, which is why the MPCA did not include PLS information in the proposed reformatted

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[215] 33 U.S.C. § 1251(a) (2012).
[216] Ex. D at 13-18, 39-51; MPCA Post-Hr'g Response to Comments Mem, Attachment 2 at 2.
[217] Exs. I.3, I.9, I.16, I.17.
[218] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 3.
[219] Ex. D at 61.
[220] *Id.* at 50.
[221] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 3, Attachment 9.

tables. To make the reformatted tables more comprehensive and include all stream WIDs, it was not technically feasible at the time of the rulemaking to include the PLS information and ensure its accuracy. However, the MPCA intends to include the PLS information in revisions to the tables or through a map-based tool. The revisions to include the PLS information are estimated to be made within the next year or two, depending on the technical difficulty and how difficult it is to ensure this information is accurate.[222]

118. According to the MPCA, the tables are proposed to be incorporated by reference as permitted by Minn. Stat. § 14.07, subd. 4. The term in the proposed rule stating the reference tables are "not subject to frequent change," means the tables may be changed no more than once per year according to the Minnesota Revisor of Statutes.[223] Any changes to a document that is incorporated by reference must be available to the public in the same manner as the original document. The MPCA will note any changes to the tables at the same website location as the original tables.[224]

119. The MPCA intends to develop a searchable map-based interface tool that can be used to access the information contained in the rules. This tool will make the tables text-searchable and display adjacent stream reaches and tributaries as requested by commenters.[225]

120. The MPCA believes that the proposed designated beneficial use lists are an improvement over the existing list of streams in Minn. R. 7050.0470 for a number of reasons (Exhibit D at 18, 50):

> 1) They align the list to the existing water body cataloging system used by most programs at the MPCA involved with protecting and restoring designated beneficial uses. This system assigns a number (Waterbody ID or WID; also called an Assessment Unit ID or AUID) to discrete stream reaches which are used to structure the use designations. By providing use designation information catalogued by WID number in Minn. R. 7050.0470, users can identify designated uses that are relevant to MPCA activities. Currently, Minn. R. 7050.0470 does not provide WID information and in many cases streams listed in Minn. R. 7050.0470 consist of multiple WIDs.
>
> 2) The revised tables provide more information. These enhancements include:
> a. WID number: as discussed above.
> b. Information regarding whether or not the use is default or confirmed: The information in Column 4 of the designated use tables contains this information (e.g., Ex. D, Appendix C). It permits not only the documentation

[222] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 3-4.
[223] However, if a reference table is changed and its title or publication date changes, the rule will have to be changed pursuant to the Minnesota Administrative Procedures Act (MAPA) in order to rely on the new publication. (*See* Minn. Stat. § 14.07, subd. 4(a) (2016).)
[224] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 4.
[225] *Id*.

of Classes 1, 2A, 2Bd, and 7, it also documents the confirmation of General Use waters (Class 2B). In doing so this documents that a stream reach has been reviewed and thereby identifies the existing use. This is important for tracking existing use to ensure that a use is not downgraded.

c. All stream WIDs are included in the new tables. Currently only a small subset of the stream reaches in the state are included in Minn. R. 7050.0470 (e.g., Classes 1, 2A, and 7). The vast majority of streams are designated by default as Class 2B (see Minn. R. 7050.0430) and are not included in this table.

3) The new format is more easily updated. Although any change to designated beneficial uses require a formal rulemaking regardless of the format of the use list (Ex. D at 18), the updated list format can be updated more easily following rulemaking. The current process for tracking and making changes to the list in Minn. R. 7050.0470 is cumbersome and requires considerable staff time both from the MPCA and the Revisor's office. The new format does not change the public participation requirements for making a use designation, but facilitates the logistics of documenting that change in rule.[226]

C. Comments Regarding Documentation of Science Supporting Proposed Amendments and MPCA Responses

121. The MPCA received several comments related to the sufficiency and documentation of the science undertaken to support the proposed amendments. These comments ranged from general to the specific. One commenter questioned the data presented in the administrative record and the data analysis performed by the MPCA in development of the TALU framework as generally insufficient based on the example of a low R2 value.[227] Other commenters asked the MPCA to address year-to-year variability in the IBI scores, and stated that the IBI calculation mechanism needs to be available for public review and comment.[228] Finally, one commenter stated that they felt peer review of the science supporting the rule was not sufficient.[229]

122. According to the MPCA, the scientific supporting documentation for the TALU rule amendments is extensive and sufficient. Extensive documentation was necessary because it is important to the MPCA that it provide thorough documentation and transparency regarding the science it relied upon. A commenter extracted a small part of the science supporting the rule as evidence that the data and analyses are not sufficient. This takes the science out of context and is misleading. The science supporting the TALU rule amendment is constructed of many elements, and the analysis noted by the commenter is only one part of the foundation of the science. The commenter noted that the R2 (a statistical measure that indicates how much of the variance in the

[226] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 4; Ex. D at 18, 50.
[227] Ex. I.12.
[228] Exs. I.10, I.14.
[229] Ex. I.12.

dependent variable can be explained by the independent variable) for one of these analyses was low. In the example provided by the commenter, the IBI scores are the dependent variable and the habitat score (i.e., MSHA) is the independent variable. The purpose of the R2 analysis was not to develop a predictive model, but rather was an exploratory exercise to identify relationships between biological scores from different stream types and habitat scores. The habitat models actually used as part of the UAAs are several steps removed from this preliminary analysis and are described in more detail in Exhibits S-66 and S-63.[230]

123. In general, the use of biological data has the advantage of providing an integrated assessment of stressors over time due to the fact that many of these organisms are relatively long lived.[231] However, there is still variability in these assemblages that needs to be understood. As part of Minnesota's biological monitoring framework, the MPCA estimates the variability in sampling. Therefore, it is possible to determine IBI score variability associated with sampling the same sites across years (i.e., year-to-year variability). This is estimated by calculating 90% confidence limits for IBI scores using the residual error term from an analysis of variance (ANOVA).[232] The datasets used to estimate confidence limits included replicate samples collected from sites across years (including 1210 macroinvertebrate sample and 1531 fish samples). This variability is 4 points for macroinvertebrates and three points for fish samples. This variability is manageable and can be used as part of assessments and UAAs when scores are near thresholds. It should be noted that these values likely overestimate the variability that can be assigned to annual differences alone because it includes samples that were collected more than ten years apart and because variability that is the result of changes caused by anthropogenic stressors (i.e., the changes in biological communities that the IBIs are designed to detect) cannot be partitioned out.[233]

124. The documentation for the IBIs has been available on the MPCA's website for this rulemaking for public review for approximately three years. This was sufficient time for those interested in these tools to review them and provide feedback. As part of TALU outreach with Barr Engineering (August 2016), the MPCA was asked to provide additional details on the mechanisms behind calculating the IBI model scores. The MPCA indicated that it would compile this information and it made the information available publically on January 26, 2017, and February 8, 2017.[234] The information contained in these documents is also largely contained within Exhibits S-64 and S-65 and was made available through correspondence with Barr Engineering staff. Although the MPCA does not view these new documents as necessary for reviewing the merit of TALU rule amendments, the MPCA believes it has provided sufficient time for stakeholders to review the small amount of additional information in these new documents. In addition, the MPCA has provided Attachments 3 and 4 to the MPCA Response to Comments Memorandum

[230] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 5.
[231] Ex. D at 40.
[232] Ex. S-85.
[233] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 5-6.
[234] Exs. L.7, L.8.

that further clarify methods by incorporating several existing protocols into two documents.[235]

125. The MPCA disagrees that the science used to support the TALU rule amendments was not sufficiently peer reviewed. Furthermore the Agency asserts it fully complied with Minn. Stat. § 115.035, which, in instances where the MPCA Commissioner does not convene an external peer review panel during the amendment of water quality standards, requires the MPCA Commissioner to state in the SONAR the reason an external peer review panel was not convened. The SONAR (Ex. D) includes this statement on pages 73-74. In addition, the following supplemental information on peer review during the development of the rule is provided in support of the Commissioner's decision.[236]

126. According to the MPCA, the development of the technical tools supporting the proposed rule amendments span nearly a decade. These technical tools have undergone peer review both through formal independent peer reviews and through implementation of many of these tools. The development of the technical tools followed peer-reviewed scientific methods. For example, the IBIs were developed following the methods described in Exhibit S-86. For research that advanced the science of biological monitoring and assessment, the MPCA underwent a formal, external review to ensure that the science behind this research was sound. This includes the development of the biological criteria (Exhibit S-85) and the Biological Condition Gradient (BCG) models that underlie the biological criteria. The independent peer-review of the BCG models has also been completed and the resulting article is being readied for publication. The scientific journal publishing this article has approved the inclusion of a pre-publication version of the article as Attachment 5 to the MPCA's post-hearing response to comments.[237] In addition, the research is fully documented in Gerritsen et al. (2013), which is Exhibit L.6.[238]

127. In addition to formal peer review, the IBIs, biological criteria, and BCG models have been in use by the MPCA for more than four years for assessing Class 2A, 2Bd, 2B, and 2C waters (equivalent to the proposed General Use). They are used as numeric translators for narrative standards (see Exhibit D at 41, 44; and Minn. R. 7050.0150, subp. 6) and are an update to the tools used in biological assessment extending back to 2002 (see Exhibit D at 23). The MPCA states it is important to note that the proposed TALU rule amendments do not implement a new or wholly untested framework, as they are a refinement to the existing framework. As a result, stakeholders have seen these tools or earlier versions of these tools since 2002.[239]

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[235] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 6.
[236] *Id*.
[237] Gerritsen, et al, *Calibration of the biological condition gradient in Minnesota streams: a quantitative expert-based decision system*, Freshwater Science, (forthcoming 2017).
[238] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 6.
[239] *Id.*, Attachment 2 at 7.

128. The MPCA also received comments regarding the difficulty of accessing a peer-reviewed article published in an international journal. It is not always possible to get open access for copyrighted peer-reviewed articles. The MPCA cannot "republish" these articles on the Agency website unless permission has been purchased from the copyright holder. However, these articles are available for purchase online or they can be accessed through some libraries. In addition, the MPCA ensured that this research is readily available so the material in the peer-reviewed article (Exhibit S-85) is also available in a MPCA report (Exhibit S-84). The peer review did not change the substance of the research because the independent reviewers were supportive of the approach. Therefore, stakeholders interested understanding and reviewing the technical basis for the biological criteria and the tiered use goals can review Exhibit S-84.[240]

D. Comments Recommending Clarifications and MPCA Responses

129. Several commenters requested specific clarifying changes to the proposed rule. Most of these comments did not criticize the intent of the proposed rule language, but rather sought clarification and shoring up of the rule amendments to ensure that the intended language was not ambiguous.[241]

130. First, two commenters requested that the MPCA clarify in rule that the TALU framework applies to only streams and other flowing waters. It is unclear if the TALU framework applies to wetlands.[242] The MPCA made changes to Minn. R. 7050.0150, subp. 4, and Minn. R. 7050.0222 to address these requests for clarification.[243]

131. Second, one commenter asked the MPCA to define or clarify the intended use of the terms "incapable" and "maintaining" as used in the phrase "incapable of supporting and maintaining the … beneficial use," and use of the word "potential" in proposed Minn. R. 7050.0222, subp. 3c.D.(1) and 4c.D.(1).[244] The MPCA made modifications to these two rule proposals to address these requests for clarification.[245]

132. Third, two commenters asked whether the standards that apply to 2A, 2Bd, and 2B also apply to classes 2Ae, 2Ag, 2Bde, etc.[246] The MPCA responded that all water quality standards that apply to Classes 2A, 2Bd, and 2B would also apply to Classes 2Ae, 2Ag, 2Bde, 2Bdg, 2Bdm, 2Be, 2Bg, and 2Bm, with the only addition being an indication that the biological criteria for different TALUs also apply.[247] The MPCA made modifications to the rule amendments for Minn. R. 7050.0220, subps. 1, 3a, 4a, 5a, and Minn. R. 7050.0222, subps. 2c, 3c, 4c, in order to provide clarity to the rules.[248]

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[240] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 7.
[241] *Id.*, Attachment 2 at 8.
[242] Exs. I.11, 1.14.
[243] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 8-9; *See also* findings 49 and 76-90, *supra*.
[244] Ex. I.3.
[245] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 9-10; *See also* findings 78-82, *supra*.
[246] Exs. I.9, I.11.
[247] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 11.
[248] *Id.*, Attachment 2 at 11-12; *See also* findings 63, 64, 66-71, 78-82, *supra*.

133. Fourth, one commenter asserted that water quality standards would cease to apply to waters designated as Class 2C in Minn. R. 7050.0470 when the Class 2C is eliminated.[249] According to the MPCA, each water body currently classified as Class 2C will fall into one of two categories under the TALU rule: Class 2Bm or default Class 2Bg.[250] A total of 7 Class 2C waters are proposed to be reclassified as Class 2Bm as part of this rule amendment, as listed in Appendix A of Exhibit D. The remaining Class 2C waters will be designated as default Class 2Bg as specified in proposed rule amendment Minn. R. 7050.0430.[251] The MPCA modified the proposed amendments to Minn. R. 7050.0430, subp. 1, to address these concerns.[252]

134. Fifth, one commenter suggested that consumption of aquatic biota should be included in the new definition of "aquatic biota."[253]

135. According to the MPCA, protecting fish and other edible aquatic life for consumption by people or wildlife is an important and long-standing foundation of the Class 2 water quality standards. Comprehensive methods and numeric standards have been in place for the objective of protecting fish and aquatic life for consumption by people and wildlife since 1990. The addition of the term "aquatic biota" in the proposed rule is meant to consolidate and clarify different terminology used in the rule that relate to the depth and breadth of many types of living organisms that need protection from adverse effects under our water quality standards, and has no bearing on the many aspects of the narrative standards that address consumption of aquatic life (*see* Minn. R. 7050.0150, subp. 7, Minn. R. 7050.0217 to Minn. R. 7050.0220, Minn. R. 7050.0222). The narrative standards in the rules related to aquatic life consumption for humans and wildlife are maintained and would not benefit by stating "aquatic life" has the same definition as "aquatic biota." Based on the use of "aquatic life" in Minn. R. 7050.0140, subp. 3, it has an overarching definition consistent with MPCA and EPA expectations that include consumption of fish and other edible aquatic organisms and protection of the aquatic biota itself. Further, the objectives to protect consumption of aquatic biota by humans and wildlife is addressed in Minn. R. 7050.0217. While the CWA and Minnesota rule include both the protection of aquatic consumption and the protection of aquatic biota, they are not the same. One protects the health of humans who consume fish and other edible aquatic life and the consumption of aquatic organisms by wildlife. The other protects the aquatic plants and animals in and of themselves. The chemical standards for the protection of consumption of aquatic biota by humans and wildlife are in Minn. R. 7050.0222. Thus, the proposed biological water quality standards are reasonable because they do not replace the chemical standards that protect consumption of aquatic biota by humans and wildlife, and there is no need to further modify the proposal.[254]

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[249] Ex. I.9.
[250] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 12.
[251] *Id*.
[252] *Id.*; *See also* finding 93, *supra*.
[253] Ex. I.9.
[254] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 13.

E. Comments Regarding Adoption of Documents by Reference and MPCA Response

136. Several commenters were concerned that the adoption of documents (i.e., assessment guidance manual, BCG and IBI background documents, and the designation of beneficial use tables) by reference gives the MPCA an ability to change rules without going through rulemaking, or to change documents too frequently. One commenter requested clarification for the term "frequent" in the proposed rule language "…are incorporated by reference and are not subject to frequent change."[255] In response, the MPCA refers to Minn. Stat. § 14.07, subd. 4(a), which permits and specifies how a document is incorporated into a rule.[256]

137. With regard to the adoption of the assessment guidance manual by reference in proposed section Minn. R. 7050.0150, subp. 3a, the MPCA's intent for adding this reference into rule was to improve clarity and convenience in regards to how beneficial uses are assessed. The MPCA was not proposing to change the public process by which the Guidance Manual for Assessing the Quality of Minnesota Surface Waters for Determination of Impairment: CWA §305(b) Report and CWA § 303(d) List is revised. The document is revised once every two years as part of the impaired waters listing process. As part of the impaired waters listing process, the assessment guidance manual is published for review and comment with a formal public notice. The intent was not to adopt these methods into rule or to change the process by which the documents are modified. Due to apparent confusion, the MPCA has eliminated the proposed addition of Minn. R. 7050.0150, subp. 3a.[257]

138. Regarding the guidance documents in proposed sections Minn. R. 7050.0222, subps. 2c, 3c, and 4c, they are proposed for incorporation by reference due to their size which makes incorporation of their text into rule infeasible. The assessment criteria are made conveniently available to the public on the MPCA's website.[258]

139. Regarding the proposed beneficial use tables described in proposed sections Minn. R. 7050.0460 and Minn. R. § 7050.0470, subps. 1-9, they are proposed for incorporation by reference in order to improve comprehensiveness and accessibility.[259]

140. According to the MPCA, all of the documents that the Agency is proposing to include in the rule by reference are currently in use. Incorporating them by reference will make them more accessible and actually less subject to change.[260]

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[255] Exs. I.3, I.9, I.13, Tr. at 96.
[256] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 14.
[257] *Id.*, Attachment 2 at 15; *See* finding of fact 52.
[258] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 15.
[259] *Id.*
[260] *Id.*

141. Whether a referenced and incorporated document is "subject to frequent change" must be stated in the rule, pursuant to Minn. Stat. § 14.07, subd. 4(a). According to the MPCA, the Minnesota Revisor of Statutes interprets "…not subject to frequent change" to mean less than once a year. The TALU proposed rule language was reviewed and approved by the Revisor. Any changes to a document that is incorporated by reference must be available to the public in the same manner as the original document. MPCA will note any changes to the documents at the same website location as the original documents.[261] However, before a changed document becomes the new referenced document, the rule itself must be changed to refer to the new or changed document if the title, author, publisher, or date of publication of the document changed.[262]

142. The process followed to make changes to documents incorporated by reference are specific to the document. As part of the TALU rule amendments, the MPCA can group these into two types: 1) documents describing scientific methodologies/protocols; and 2) lists of beneficial use designations in Minn. R. 7050.0470. In the case of the documents describing scientific methodologies/protocols in proposed section Minn. R. 7050.0222, subps. 2c., 3c, and 4c, these can be updated without following the Minnesota Administrative Procedures Act (APA) although depending on the document some form of public participation is involved. These include the documents that describe the biological sampling methods (Attachments 3 and 4), the biological criteria (Exhibit S-84), and biological condition gradient (Exhibit L.6). These documents are inherently tied to the proposed TALU biological criteria. As such, materially changing the methods or models described by these documents would alter the biological criteria. Since the biological criteria cannot be changed without a formal rulemaking process following the APA, materially changing these documents is not possible without this formal process. However, more minor changes could be made to these documents. For example, if a stakeholder asks for language which clarifies the methods in these documents, then the MPCA could update these documents without a formal rulemaking, but not more than once a year.[263]

143. For the proposed lists which document the beneficial use designations for streams and rivers in proposed section Minn. R. 7050.0470, these could not be changed without following the APA. This is described or noted in numerous locations in the SONAR (see Exhibit D at 15, 17-18, 29, 48, 51, 61, 64, 72-73, 83, 85-86). The MPCA is not proposing to change the process by which designated uses are changed, only how they are listed in rule. Changes to designated uses, including TALUs and beneficial use classes (e.g., Classes 1, 2, 3, etc.), will require the same formal rulemaking process that is currently required. Therefore, reformatting the beneficial use list in these documents does not change the process by which beneficial uses are designated. The MPCA is simply altering the formatting to include more information and make the actual updating

[261] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 15.
[262] Minn. Stat. § 14.07, subd. 4(a). ("If the rule incorporates by reference other publications and documents, the rule must contain a statement of incorporation. The statement of incorporation must include the words 'incorporated by reference'; must identify by title, author, publisher, and date of publication the standard or material to be incorporated[.]")
[263] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 15-16.

of these lists logistically simpler. The beneficial use tables provided do in fact reflect the current rule because the agency has not yet adopted the TALU framework or any specific TALUs. Changes to these tables require rulemaking. Following adoption of the TALU rule amendments, the 141 stream WIDs that are proposed for designation will be updated in these tables.[264]

F. Comments Regarding Use Attainability Analysis Implementation and MPCA Responses

144. Several comments were related to UAA implementation. Several commenters wanted to know who is responsible for determining water body type, possible WID splits, and beneficial use designations; and what entity will bear the cost of performing UAAs.[265] Others asked if there will there be future revisions to the "Technical Guidance for Reviewing and Designating Tiered Aquatic Life Uses in Minnesota Streams and Rivers" document; and whether more than one IBI score should be required for designating TALUs.[266]

145. According to the MPCA, the UAA process would be unchanged from the current process for a UAA, with the exception that determination of TALUs would also be part of this process. The MPCA is responsible for determining water body type, possible WID splits, and beneficial use designations with input from public stakeholders.[267]

146. There are a number of pathways that could result in a change to a designated use. Changes to use destinations can be initiated by the MPCA as the result of the collection of data that demonstrates the current use is not appropriate. Any person may also petition the MPCA to consider a change to a use designation.[268] For the most part, the cost of performing UAAs is largely borne by the MPCA, although the MPCA also encourages public input through stakeholder engagement (e.g., Intensive Watershed Monitoring (IWM) planning meetings, professional judgement group meetings (PJG)) and rulemaking since a change to a beneficial use designation requires a rule change.[269]

147. Water body type determinations are made by the MPCA following protocols for fish[270] and macroinvertebrates.[271] The information included in these documents also allows other parties to make these determinations.[272]

148. WID splits related to TALUs are determined by the MPCA as part of the use review process that occurs before water quality assessments. Stakeholders have input in the location of these splits as part of the various stakeholder engagement activities (e.g.,

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[264] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 16.
[265] Exs. I.3, I.7.
[266] Exs. I.5, I.17.
[267] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 17.
[268] Minn. R. 7050.0405.
[269] Ex. D at 64; MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 17.
[270] Exs. L.8, S-64; MPCA Post-Hr'g Response to Comments Mem., Attachment 3.
[271] Exs. L.7, S-65; MPCA Post-Hr'g Response to Comments Mem., Attachment 4.
[272] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 17.

IWM planning meetings, PJG meetings). In addition, when the WID split is driven by the designation of an Exceptional or Modified Use, there will be opportunity for public participation as part of rulemaking to designate those uses.[273]

149. The Agency will update the "Technical Guidance for Reviewing and Designating Tiered Aquatic Life Uses in Minnesota Streams and Rivers" as needed based on internal and external stakeholder input. This could include revisions to provide more information or clarifications or changes to the process for UAAs to incorporate changing restoration technologies. For example, as best management practices are improved or developed, they can be included as proven restoration techniques that may be required in altered waters.[274]

150. In most cases there are both macroinvertebrate and fish IBI scores used in the UAA determinations and often there are multiple visits either from the same or multiple stations on a stream reach. In addition, the UAA review is not performed in a vacuum using only biological information. This is important in all reviews, but it is especially important for reaches with one or two biological samples. This includes reviewing chemical, habitat, and land use information and data from adjacent or nearby stations. This process is described in Exhibit S-63.[275]

G. Comments Regarding Application of IBI models, biological criteria, and UAA tools and MPCA Responses.

151. Several commenters suggested that the MPCA should better clarify the methods used as part of the TALU framework, including clearly describing the methodology for performing biological assessments and designation of uses.[276]

152. In order to clarify the methods for the fish and macroinvertebrate IBI methods, the MPCA modified the references to two of the documents referenced in proposed section Minn. R. 7050.0222. Specifically, the two IBI documents for fish and macroinvertebrates that were originally referenced in several places (Development of a Fish-based Index of Biological Integrity for Minnesota's Rivers and Streams, Minnesota Pollution Control Agency (2014) and Development of a Macroinvertebrate-based Index of Biological Integrity for Minnesota's Rivers and Streams, Minnesota Pollution Control Agency (2014)) will be replaced by references incorporating documents that describe in detail the protocols for sampling, sample processing, and IBI calculation (Fish data collection protocols for lotic waters in Minnesota (2017) and Macroinvertebrate data collection protocols for lotic waters in Minnesota (2017)). These documents describe the requirements for collecting data that can be used in UAAs and assessments of lotic waters in Minnesota.[277]

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[273] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 17.
[274] *Id.,* Attachment 2 at 17-18.
[275] *Id.,* Attachment 2 at 18.
[276] Exs. I.9, I.17, M.2.
[277] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 19, Attachments 3 and 4.

153. One commenter suggested the Class 2A narrative water quality standards should be more specific to native taxa to make it consistent with the IBI models; or, the IBIs should be altered to consider non-native trout; or, the Minnesota Department of Natural Resources should stock only native trout in Class 2A streams. The commenter also asked how new IBI models or site-specific standards would be implemented in cases where natural habitat conditions are limiting biological assemblages.[278]

154. According to the MPCA, in developing biological assessment tools and biological criteria for cold water streams, the MPCA considered and accounted for cold water streams where native cold water fish species are naturally absent. As a result, the presence of native cold water species are not required for a stream to meet the goals for General Use cold water streams. Specifically, the development of the cold water fish IBIs and biological criteria included numerous streams were brook trout and other cold water obligate species may not have been historically present. First, these streams were part of the dataset used to develop the fish IBIs (Exhibit S-64). Second, this type of stream was considered as part of the Biological Condition Gradient (BCG) models (Exhibit L.6 and MPCA Response to Comments Memorandum, Attachment 5). This is best illustrated by the metrics used in the models (see Exhibit L.6 at 37, Table 8). There are two important points to make from Table 8. First, for BCG Levels 1-3, the metrics include alternate metrics for both streams with and without native brook trout populations. Second, BCG Levels 3 and 4 do not require the presence of native cold water taxa. BCG Levels 3 and 4 are important as most fish communities that attain this level of condition meet the General Use aquatic life use goals (Exhibit D at 42; see also Exhibits S-84 and S-85). Therefore, the biological criteria assigned to General Use cold water streams do not require the presence of native cold water taxa.[279]

155. Minnesota Rules also provide mechanisms for modifying standards in cases where a water body is atypical or unusual. Specifically, it may be appropriate to apply a site-specific modification to the standard (Minn. R. 7050.0220, subp. 7). The IBI models developed for assessing aquatic life were developed to apply to most streams, rivers, and ditches in the state, however, local conditions may result in the standards not being appropriate leading to the need to set a site-specific standard. UAAs are also a mechanism that can be used if certain criteria can be meet (e.g., natural habitat conditions are limiting biological communities). Further, site specific standards are currently authorized under the CWA and Minnesota law and will continue to be available under the TALU framework. The MPCA states that it will work with the commenter on the possibility of using this option.[280]

156. Several commenters expressed concern that the TALU standards and IBIs might be applied to ephemeral waters.[281] In response to rule language modifications proposed to Minn. R. 7050.0222, subps. 2d, 3d, and 4d, at the hearing on February 16, 2017 (Exhibit L.5), the Agency received a comment that the modified language should be

[278] Ex. I.7.
[279] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 21.
[280] *Id.*, Attachment 2 at 21-22.
[281] Exs. I.10, I.11, 1.14.

changed to say "fish and/or macroinvertebrates" instead of "fish and macroinvertebrates.[282]

157. According to the MPCA, it does not routinely sample ephemeral, lotic waters for fish and macroinvertebrates because the IBIs are not developed for use in this type of habitat. The IBIs and the associated biological criteria are only applicable to waters where the IBI models can be appropriately applied. Specifically, the water needs to be suitable to allow for the colonization of fish or macroinvertebrates (Exhibit D at 41, footnote 19; Exhibit S-85 at 3). The second comment regarding the commenter's proposed modification is based on the idea that the modification should not require both fish and macroinvertebrates to be able to colonize before the biological criteria are applied; but, rather, that the colonization of either fish or macroinvertebrates, or both, must be allowed before the biological criteria are applied. The intent was not to require both. Thus, the MPCA has modified the language in Minn. R. 7050.0222, subps. 2d, 3d, and 4d, from "and" to "or" to better convey the intent that the stream should be suitable for the colonization of either fish or macroinvertebrates, or both, for the application of the biological criteria to be appropriate.[283]

158. Two commenters stated that waters need to be first reviewed to determine if the IBIs can be appropriately applied.[284] Others commented that streamflow at the time of sampling should be considered.[285]

159. According to the MPCA, the review of waters to determine if the IBIs can be appropriately applied is already part of the UAA and assessment process. Specifically, the first phase of this determination is the site reconnaissance (MPCA Response to Comments Memorandum, Attachment 6) where it is determined if the station is appropriate for biological sampling. Reasons for rejecting a site include: no definable channel; insufficient wetted area for sampling; and wetland characteristics. A major reason for performing site reconnaissance is to determine if a water body is sufficient to allow for colonization of fish or macroinvertebrates. This is accomplished by both fall and spring reconnaissance visits to ascertain these conditions and provides the MPCA with multiple data points to make the determination. During the sampling event, no sample may be collected if conditions are not suitable (e.g., insufficient wetted area) or the sample may be flagged as not reportable if a sufficient sample could not be collected (e.g., electrofishing equipment not functioning properly). Following sample collection, but before UAA analysis and assessment, the data are reviewed to determine if the data are assessable. For example, samples may be flagged as not assessable if it is determined that flow conditions were atypical. The UAA and use designation steps are also important to determine the assessability of the data and the attainability of the use (MPCA Response to Comments Memorandum, Attachment 7 at 12). The assessability is also

[282] Tr. at 98.
[283] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 22-23.
[284] Exs. I.10, I.14.
[285] Exs. I.5, I.17.

considered through the assessment steps as well as during other steps such as the IWM planning meetings, PJG meetings, and stressor identification studies.[286]

160. One commenter felt that because the Human Disturbance Score (HDS) used in the development of the biological criteria does not include percent mining, that, therefore the IBI scores in streams impacted by mining are inflated.[287]

161. According to the MPCA, the HDS is a generalized disturbance score that is used to "train" the IBI models (Exhibits S-64 and S-65). Specifically, it is used to select biological metrics that respond to a generalized disturbance gradient. Even though the HDS score that is used to develop the IBI models is not stressor or impact specific, biological communities have fundamental and predictable responses to stress. This means that although the HDS scores did not explicitly include mining land use, the impacts from these activities will still be reflected in the IBI scores. As a result, the IBIs are robust measures of biological health for a range of stressor types. In addition to the HDS not requiring a percent mining metric, the metrics within the HDS already directly and indirectly capture the potential impacts of mining on aquatic communities. The HDS includes a metric for the number of point sources per km2 and a proximity correction factor for point sources which directly capture mining activity. In addition, there are other activities that are associated with mining that that are captured by the HDS score. These include: percent impervious surface, percent channelized stream per stream km2, degree channelized at site, percent disturbed riparian habitat, condition of riparian zone, number of road crossings per km2, and urban land use adjacent to site. It is reasonable to use HDS scores that incorporate mining through multiple metrics that directly or indirectly capture the impacts of mining.[288]

162. One commenter stressed that the index of biological integrity should include specific conductance as a metric in order to assist in measuring human disturbance to the water.[289]

163. According to the MPCA, the inclusion of specific conductance as a metric in the IBIs is not logical. The metrics in the IBIs are biological metrics that measure different aspects of the biological community. As part of a stressor identification review, the IBI scores, biological metric scores, and raw biological data can be used to determine if specific conductance (or the constituents which are causing elevated specific conductance) are a stressor, but specific conductance cannot be part of the IBI itself.[290]

164. Federal statute states the objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[291] One commenter felt that achieving the CWA objective means achieving the natural state of a water, which

[286] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 23.
[287] Tr. at 101-02.
[288] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 23-24.
[289] Tr. at 103-105.
[290] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 24.
[291] 33 U.S.C. § 1251(a).

is equivalent to the Biological Condition Gradient Level 1, and therefore any water with a BCG designation less than Level 1 has room for improvement. This means, according to the commenter, waters that have the potential to meet the Exceptional Use should be designated as such.[292]

165. According to the MPCA, this is not an appropriate interpretation of the CWA and its objective. The CWA is clear that the 33 U.S.C. § 1251(a)(2) goal of the Act is consistent with the objective. It is an interim goal that provides for the protection and propagation of fish, shellfish and other wildlife.[293] This goal is sometimes called by the shorthand "fishable/swimmable". This goal is not equivalent to the natural condition or BCG Level 1. The practice of managing water quality is tied to the 33 U.S.C. § 1251(a)(2) goal and the CWA's definition of an existing use. The CWA protects beneficial uses that are "existing uses" (i.e., uses actually attained in a surface water on or after November 28, 1975).[294] Because the "restore and maintain" objective of the CWA is tied to existing uses that were actually attained in a surface water on or after November 28, 1975, and some surface waters have not actually attained "natural" conditions on or after that date, the CWA does not require that "natural" conditions be attained for all surface waters. There must exist some evidence that water quality has been sufficient to support a given use at some point in time since November 28, 1975, for that use to be defined as an "existing use" for a water body. In addition, the CWA interim goal explicitly says that it is consistent with the Act's objective.[295] Thus, the proposed TALU amendments do not require all waters to be classified as Exceptional Use. It should be noted that a General Use designation does not preclude efforts to improve the condition of a stream to the Exceptional Use.[296]

166. One commenter felt that the TALU approach, including the IBIs, must be informed by data on constructed and highly modified open channels, which are components of many public drainage systems.[297]

167. According to the MPCA, the commenter is incorrect that the IBIs were not informed by data on constructed and highly modified open channels. Channelized systems were explicitly considered as part of the IBI and biological criteria development process. Approximately one-third of samples collected by the MPCA and used in IBI and biological criteria development were from stream reaches determined to be channelized

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[292] Tr. at 106-109.
[293] 33 U.S.C. § 1251(a)(2) ("[I]t is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water.")
[294] 40 C.F.R. § 131.3(e) (2016).
[295] 33 U.S.C. § 1251(a) ("The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. In order to achieve this objective it is hereby declared that, consistent with the provisions of this Act… (2) it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983.")
[296] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 24.
[297] Ex. I.4.

(e.g., Exhibits S-84 at 32-36, S-64 and S-65.)[298] The MPCA has explicitly considered where the biological tools are applicable and designed these tools for assessing both natural and altered water bodies.[299]

168. One commenter asked that the MPCA standardize the location of biological monitoring stations as part of the TALU approach.[300]

169. The MPCA is not clear about exactly what the commenter means by standardizing the location of stream sites. If it means that the Agency should use a protocol to select the location of sampling stations, then this is already the case. For example, site reconnaissance is performed to determine if the water can be sampled at the station (described above in finding of fact 149). In addition, consideration is given to locating stations on stream reaches that are representative of the WID. For example, if a WID channel is largely natural then the goal is to locate the sampling station on a natural reach.[301]

170. There are also broader strategies used by the MPCA for locating biological monitoring stations. These include:

• **IWM Cycle 1:** Selection of biological monitoring sites for the Intensive Watershed Monitoring (IWM) program follows a systematic approach. The first cycle of IWM used a framework of subwatersheds within each major watershed as the basis for selecting the location of sites near the outlet of each minor (~ 5 mi2) and major (~40 mi2) watershed. Sites were established in close proximity to these outlet unless there were unique circumstances (e.g., lake or large wetland) that made it impossible. Sites were also selected irrespective of their channel condition (natural stream or channelized/ditch) at the road crossing closest to the watershed outlet.

• **IWM Cycle 2:** Site selection for Cycle 2 of IWM also represents a systematic approach, though one that is slightly different than IWM Cycle 1. In Cycle 2 a shift in the watershed framework (to ~20-30 mi2) and changes to the guidelines for selecting sites within each watershed occurred. Rather than selecting sites that were close to the watershed outlet of these subwatersheds, IWM Cycle 2 guidelines emphasize the selection of sites that best represent the watershed. For example, if watercourses in the watershed are predominantly channelized, then a representative stream sampling location should be located on a channelized section as well. Often times, sites selected in IWM Cycle 1 meet this new criteria and will be retained in IWM Cycle 2, though on occasion new site locations will need to be selected to replace IWM Cycle 1 sites that do not satisfy the new guidelines.

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[298] The MPCA also pointed out that these SONAR exhibits do not explicitly mention channelized stream reaches because such waters were included in the analysis. In other words, if they were to be discussed in these documents it would have been to note that channelized streams were excluded from analyses.
[299] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 25.
[300] Ex. I.5.
[301] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 25.

• In addition to being representative of the predominant stream type in the watershed, IWM Cycle 2 site selection also considers the following:

- Site access - sites should be reasonable to access and for which landowner permission is either not needed (e.g., public land or public right-of-way) or for which landowner permission has been granted previously.
- Proximity to watershed outlet – sites that are closer to the outlet better reflect the condition of the watershed by "capturing" more of its area compared to a site that is closer to the headwaters of a watershed.
- Co-location of sites – if a previously monitored station meets the IWM Cycle 2 guidelines, then it has preference over a new location, because there is less uncertainty regarding access to the site and the ability to effectively sample the biological communities there. It is also beneficial to co-locate biological monitoring and water quality (i.e., chemistry) monitoring sites as these combined data sets will provide a more comprehensive evaluation of watershed condition.[302]

171. One commenter asserted that the IBI dataset was not sufficiently large because a larger dataset of chemical measurements was determined to be a "modest" number of samples. The commenter felt this would result in under protective biological criteria values.[303]

172. According to the MPCA, the commenter appears to be mixing the data needs of biological samples with chemical samples. Fewer biological samples are needed because these samples integrate multiple stressors over time as compared to one-time chemical grab samples.[304] A small or insufficient dataset would not necessarily result in under protective biological criteria, but rather would increase the risk of setting inaccurate thresholds (i.e., either too high or too low). This was a concern for the Agency so several different analyses were performed to determine the dataset size necessary to set accurate and protective biological criteria (see Exhibits S-84 at Appendix and S-85 at 8-9). As a result, the datasets used to set the proposed biological criteria thresholds were sufficient in size to set accurate and protective goals.[305]

173. One commenter thought that because the macroinvertebrate data is collected in the fall it misses the sensitive organisms which occur in the spring.[306]

174. The MPCA uses a fixed index period (late-July through October) to reduce the variability in the biological communities.[307] This is important because macroinvertebrate communities change seasonally and by sampling these communities

[302] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 25-26.
[303] Tr. 119-120.
[304] Ex. D at 40.
[305] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 26.
[306] Tr. 120-121.
[307] MPCA Post-Hr'g Response to Comments Mem., Attachment 4 at 6.

within a fixed season reduces this variability. This means that the sampling of these organisms needs to be limited to defined time period. The selection of the late summer through fall index period was selected to sample macroinvertebrate communities during the period of greatest stress (i.e., lower water levels, higher temperatures, etc.). In doing so, these measurements are more likely to identify negative anthropogenic impacts than a spring sample where conditions (e.g., cooler temperatures, higher dissolved oxygen) might mask these impacts. There is also a practical reason to not use spring samples and that is avoiding high spring flows. These flows can make it impractical or dangerous to sample these waters. Sampling during high flows can also introduce unwanted sample variability as the IBI models were develop from streams sampled under normal flow conditions.[308]

175. One commenter felt that the taxonomic resolution used by the MPCA for fish and macroinvertebrates is not sufficient or at least not clear.[309]

176. The MPCA has well-defined taxonomic resolution goals which takes most macroinvertebrate taxa to the genus level and fish to the species level.[310] These are described in Exhibits L.7 and L.8 and in the MPCA Response to Comments Memorandum, Attachments 3 and 4. This is a standard taxonomic resolution used by advanced biological monitoring programs.[311] Although the macroinvertebrate IBI models and biological criteria are based on genus-level data, the MPCA currently identifies some groups to the species level (e.g., Odonata (dragonflies and damselflies), Plecoptera (Stoneflies), Ephemeroptera (mayflies), and Trichoptera (caddisflies)). This finer taxonomic resolution can be used now as part of standards development, stressor identification, and beneficial use reviews or in future refinements of the biological monitoring tools.[312]

177. One commenter stated that the MPCA's watershed approach fails to follow the ecoregion approach in EPA guidance for developing biological tools.[313]

178. According to the MPCA, the use of ecoregions in biological tool development (e.g., IBIs) addresses natural variability in biological communities in order to maximize the ecological signal from anthropogenic impacts. For example, large rivers in southern Minnesota have naturally different biological communities than cold water streams in northern Minnesota. To address these dissimilarities, different models are developed so that comparisons are made between water bodies with similar natural characteristics. As mentioned by the commenter, ecoregions are one stream typology framework that can be used. However, this is not the only organizing framework that can used and other frameworks can be used if appropriate and if they are demonstrated to be effective. The ecoregion approach is *a priori* prediction of type, quality, and quantity of

[308] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 26.
[309] Tr. 121-123.
[310] Ex. D at 13, fn. 4.
[311] *See* Ex. S-21.
[312] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 27.
[313] Tr. 123-124.

environmental resources. Ecoregions are classified based on similar geology, landforms, soils, vegetation, climate, land use, wildlife, and hydrology. Although ecoregions are useful, the MPCA relied on a more empirical approach to classifying streams using cluster analysis (the details of this are described in Exhibits S- 64 at 7-9 and S-65 at 8-10). As part of this analysis, ecoregions were evaluated as a possible classification framework, however it was determined that a different framework using geographic location, thermal regime, gradient, and stream size was more effective for grouping naturally similar streams (see proposed rule item Minn. R. 7050.0150 Subp. 4. (NN)). As a result, the typology framework used in Minnesota was developed and determined to be more robust and effective than the ecoregion framework. This framework is also better tailored to Minnesota's lotic resources and the biological monitoring program. Because the Minnesota framework was determined to be effective for Minnesota streams, it is a reasonable approach to address natural variability.[314]

179. One commenter suggested that draft criteria do not belong in proposed rules. Specifically, the Biological Criteria for TALU, 2014 at 39 refers to "draft criteria" and Table 11 is "Draft."[315]

180. According to the MPCA, the biological criteria remained draft because until recently they had not been proposed and the Agency had been seeking feedback from stakeholders on these documents during the previous 2+ years that they have been available. Once the TALU rule amendment is adopted, this document can be updated to reflect that they are no longer draft, but rather adopted biological criteria. In Exhibit D at 43, the biological criteria are also referred to as "draft" and should be "proposed."[316]

H. Comments Regarding Modified Use Provisions and MPCA Responses

181. The development and implementation of a Modified Use in the proposed TALU rule elicited concerns from many commenters displaying divergent perspectives. These perspectives ranged from the view that all "artificial" watercourses should automatically be designated as Modified Use, to the view that the Modified Use creates a framework for unlawfully "downgrading" streams through a "mass reclassification." Several comments were received related specifically to the process for designating Modified Uses. This process includes both: the requirement in proposed section Minn. R. 7050.0222, subps. 3c and 4c, that a UAA be conducted supporting the designation; and that a rulemaking be undertaken to change the stream's classification in Minn. R. 7050.0470. Because the comments were varied on this topic, specific comments or groups of related comments are listed below followed by MPCA's response. Several comments were explicitly concerned with the protection of Class 2A waters. It should be noted that the proposed rule amendments do not propose to change any waters from Class 2A to Class 2B or *vice versa*. Nor do the rules propose to change how Class 2A or

[314] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 27.
[315] Ex. I.13.
[316] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 27-28.

2B designated uses are determined or changed.[317] The specific comments and responses follow.

182. There were several comments that were concerned that either the TALU rule amendments would result in broad reclassifications of waters or that the amendments need to include provisions to allow for broad reclassifications of waters. Some commenters were concerned that the Modified Use designation would create a framework for unlawfully "downgrading" streams through a "mass reclassification."[318] Contrasting with this comment, another commenter suggested that "artificial" watercourses should automatically be designated as Modified Use.[319]

183. According to the MPCA, the TALU rule amendments and supporting documentation create a framework for performing individualized determinations. Therefore, mass reclassifications do not occur for any group/class of streams such as drainage ditches. These individualized determinations are done through the CWA-required UAA process (40 C.F.R. § 131.10(j)) as that process is defined in proposed rule section Minn. R. 7050.0150, subp. 4. (LL), and as that process is required by proposed rule sections Minn. R. 7050.0222, subp. 3c. D(1) and subp. 4c. D(1). The UAA process is detailed on pages 28 through 31 of the SONAR (Ex. D) and explained in more detail in Exhibit S-63. Each of the 112 stream reaches proposed for designation to the Modified Use have been subjected to a UAA that demonstrates the General Use designation is not attainable. In Appendix A of Exhibit D (SONAR), data that were used in this evaluation along with narrative statements that describe the outcome of the data review are provided. It is reasonable to use a UAA process to make individualized determinations for the classification of Modified Use streams.[320]

184. If a UAA results in a classification that a stream is a Modified Use, it is not a downgrading of a stream from the current classification (i.e., default General Use); rather, it is a recognition that the current classification is not accurate. These are stream reaches where the use has not been assessed before, and therefore, the General Use is not an existing use. The UAA process does not result in a Modified Use (or Exceptional Use) classification without due consideration. The UAA process is rigorous as required by 40 C.F.R. § 131.10, and must demonstrate that the existing use is not attainable because of natural conditions or human-induced changes that have been in place since the date on which the CWA established existing uses (i.e., November 28, 1975). The result of a UAA is an appropriate classification of a stream. A UAA cannot result in the loss of an existing use because a UAA cannot violate the antidegradation provisions of the CWA and state law, which prohibit the loss of an existing use. It is reasonable to use the CWA-authorized UAA process to assign appropriate classifications to streams.[321]

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[317] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 28-29.
[318] Exs. I.3, I.4, I.7, I.8, I.9., I.10, I.13, I.14, I.16, I.17, I.18, I.19, M.1, M.2.
[319] Ex. I.17.
[320] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 29.
[321] *Id.*

185. There is evidence from other states which have adopted a TALU framework into rule that it does not result in a mass reclassification of waters to uses below the 33 U.S.C. § 1251(a)(2) goal. Both Ohio and Maine have documented improvements in water quality since adoption of these rules.[322] For example, both Ohio and Maine have documented an increase in the number of stream reaches where the designated use is upgraded.[323]

186. Several comments were received regarding how the Agency interprets the available data when performing UAAs. Some commenters disagreed with the bar for data sufficiency in determining what is attainable in waters maintained for drainage and indicated that these waters may be restorable now or in the future and should be protected for their potential restorability.[324] Related to this, a commenter expressed concern that UAAs would be based on the condition at the time of sampling meaning that a ditch might have recovered and been cleaned out sometime between November 28, 1975, and the time of sampling, thereby missing the existing General Use.[325] The commenter further suggested that the five-year natural restoration threshold be reconsidered because it is arbitrary.[326] One commenter suggested that the monitoring framework is not sufficient because stream reaches that are several miles long are being designated based on only 1-2 monitoring stations.[327] One commenter was concerned that the process for designating waters does not require the agency to demonstrate existing use and shifts that burden to a party opposing the designation.[328]

187. According to the MPCA, as part of the UAA, the MPCA is making a reasonable determination of the restorability of waters proposed for Modified Use designation. This includes a review of available data (i.e., biological, chemical, and physical data) whether current or historical, a determination of whether or not the modification predates the existing use date, and an assessment of the status of the drainageway (i.e., whether or not it will recover on its own in the near term, if it is restorable, or if drainage maintenance is likely to continue). As part of this review, the five-year recovery period is intended as a guideline to determine if the modification to the channel is temporary and will recover in a relatively short period of time or if the intent is to retain the channelized state through routine maintenance.[329]

188. Regarding the spatial extent of the monitoring framework, it is not feasible to sample every mile of stream in the state. However, the MPCA does use guidelines that limit extrapolation of a designated use beyond what is reasonable. For both the Modified and Exceptional Uses, the designation is typically only extrapolated 5 miles from the sampling station (see Exhibit S-63 [pp. 16-17]). This may vary and it is more likely that the extrapolated use will extend less than 5 miles from the biological station. The objective

[322] Ex. D at 26.
[323] *Id.*; MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 29-30, Attachment 7.
[324] Tr. 94-95, 108-112; Exs. I.8, I.9.
[325] Tr. 84-87.
[326] Tr. 79-80.
[327] Exs. I.16, L.12.
[328] *Id.*
[329] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 30.

is to identify relatively homogenous stream sections with similar natural characteristics and anthropogenic influences. As a result, land use changes, major tributary confluences, channel condition, and other landscape changes are considered as part of the UAA to determine the reasonable extent of the beneficial use between the monitored and unmonitored reaches.[330]

189. It is unreasonable to require the UAA to prove that the condition existed at every point in time after November 28, 1975.[331] The use of available data to make a determination of the existing use is consistent with guidance provided by the EPA:

> EPA recognizes, however, that all the necessary data may not be available to determine whether the use actually occurred or the water quality to support the use has been attained. When determining an existing use, EPA provides substantial flexibility to states and authorized tribes to evaluate the strength of the available data and information where data may be limited, inconclusive, or insufficient regarding whether the use has occurred and the water quality necessary to support the use has been attained. In this instance, states and authorized tribes may decide that based on such information, the use is indeed existing.[332]

190. In making UAA determinations, the MPCA considers all available information – not only recent information. In Exhibit S-63 this is summarized as: "This approach seeks to bring in all available current and historical information from a water body unit (identified as a WID) in order to build supporting evidence for the attainability of a beneficial use." In performing UAAs, the Agency considers historical information. For example, historical aerial imagery is important for determining the date when a stream was channelized to ensure the channelization is an existing use (i.e., a use existing on or before November 28, 1975). In cases where limited historical information is available, the Agency must make a reasonable determination using available data. Although not necessarily germane to the current proposed rule amendments, any proposal to change a Class 2A to Class 2B or *vice versa* would include historical information if available to determine the existing use. Due to the interest in many Class 2A waters (i.e., trout waters), there is often considerable historical data that can be used to determine the existing use. It is reasonable to base UAA studies on a comprehensive review of all available data to make a determination of the appropriate beneficial use, which protects the existing use.[333]

191. The burden of demonstrating the existing use for a stream does fall to the Agency.[334] The definition of a UAA in proposed section Minn. R. 7050.0150, subp. 4(LL) states: "A use attainability analysis is required to remove a designated use specified in 33 U.S.C. § 1251(a)(2) that is not an existing use." This statement indicates that a

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[330] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 30.
[331] *Id.*
[332] Water Quality Standards Regulatory Revisions, 80 Fed. Reg. 51027 (2015).
[333] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 31.
[334] Ex. D at 63-64.

designated use cannot be removed if it is an existing use. If a designated use is not an existing use then a UAA is required before the designated use may be removed. In application, a Modified Use designation is below the General Use designation (i.e., the 33 U.S.C. § 1251(a)(2) goal), which is why a UAA is required. The General Use designation cannot be removed if the General Use is an existing use. It is reasonable to require a UAA before removing a designated use that is not an existing use.[335]

192. A commenter suggested that the Modified Use designations should sunset after five years.[336]

193. The Modified Use designation does not create a permanent use without periodic review. Federal regulations require that, "The State shall also re-examine any waterbody segment with water quality standards that do not include the uses specified in section 101(a)(2) of the Act [33 U.S.C. § 1251(a)(2)] every 3 years to determine if any new information has become available."[337] 33 U.S.C. § 1251(a)(2) states "the protection and propagation of fish, shellfish, and wildlife and…recreation in and on the water" as goals, which are equivalent to the proposed General Use designation. This means that as new data is available, it will be considered to determine if the Modified Use designation is still appropriate. This process to consider new data will occur within the well-established "triennial review" that MPCA undertakes to comply with the CWA. Because of this required periodic review, it is unreasonable to automatically sunset Modified Use designations every five years as one commenter suggested. It is reasonable to rely on the triennial review process for periodic review of Modified Uses.[338]

194. Commenters suggested potential modifications to the Modified Use process in the rule as proposed. Commenters suggested that a Modified Use should only be designated when the nonattainment of the General Use biological criteria is solely caused by a nonpollutant, not when the stream is impacted by any chemical pollutant.[339] A commenter further suggested there was a need to perform a stressor identification study as part of the UAA process for designating a Modified Use.[340] Commenters also expressed concerns that chemical pollutants for which there are no promulgated standards would receive less scrutiny in water bodies designated as a Modified Use,[341] and that wastewater treatment permits for discharges to Modified Use streams would be designed to only protect the lower biological goals.[342] One commenter suggested that water quality standards cannot be set to balance important socioeconomic needs.[343]

195. According to the MPCA, the TALU framework, and its tiered biological uses, are just one part of the larger structure of Minnesota's water regulations that are designed

[335] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 31.
[336] Ex. I.9.
[337] 40 C.F.R. § 131.20(a).
[338] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 31-32.
[339] Ex. I.9.
[340] Ex. I.13.
[341] Exs. I.9, I.13.
[342] Tr. 81-82.
[343] Ex. I.9.

to reach the CWA objective of restoring and maintaining the chemical, physical, and biological integrity of our nation's waters. The larger structure of water regulations includes distinct chemical water quality standards, as well as implementation of chemical and biological standards through Total Maximum Daily Loads (TMDL), Watershed Restoration and Protection Strategies (WRAPS), and permits. It is not reasonable to demand that TALU incorporate aspects of water regulation that already exist in other portions of statute and rule.[344] The proposed rule does not change any of the existing chemical water quality standards in Minn. R. ch. 7050. All existing water quality standards (e.g., chemical pollutant standards, antidegradation standards) continue to exist parallel to the proposed biological water quality standards in the TALU rule. The MPCA will continue to implement water quality standards for chemicals. In addition, as stated in the SONAR: "Designation to Modified Use will not change the standards that apply to Class 2 water bodies or affect existing permit conditions."[345] Therefore, a Modified Use would not result in permits that are designed to protect a lower use. It is unreasonable for the TALU rule to be expected to somehow contain and convey all previously adopted water quality standards.[346]

196. The MPCA will continue to implement chemical standards even in stream reaches that are determined to have a biological impairment, as it has been doing using existing chemical standards and the narrative biological standard. During 2012-2013, the Agency assessed stream reaches to determine if they were impaired under the applicable chemical water quality standards and the narrative biological standard. If a stream reach was determined to be impaired for a chemical pollutant, the Agency included it on the 2016 impaired waters list. If the stream reach was determined to be impaired for aquatic life under the currently applicable narrative standard equivalent of the General Use, the agency included it on the 2016 impaired waters list. Of the 112 stream reaches proposed for Modified Use designation, 67 (61%) were included on the 2016 impaired waters list for aquatic life use impairments. Aquatic life use impairments are biological impairments. In the future, under a TALU framework, the Agency will assess streams for both chemical impairments and for biological impairments relative to the stream's TALU tier. The difference from the past is only that the biological impairment assessments are more precise and appropriate for the stream.[347]

197. The proposed rule requires that a Modified Use designation must be based on the demonstration that habitat is limiting one or both of the biological assemblages. This means that regardless of the chemical conditions, good or bad, the water body would still not meet the General Use biological criteria based on habitat conditions.[348] This is stated in the WQS handbook:

> In some instances, physical factors may preclude the attainment of uses regardless of improvements in the chemistry of the receiving

[344] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 32.
[345] Ex. D at 90.
[346] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 32.
[347] *Id.*, Attachment 2 at 32-33.
[348] *Id.*, Attachment at 33.

> water. This is particularly true for fish and wildlife protection uses where the lack of a proper substrate may preclude certain forms of aquatic life from using the stream for propagation, or the lack of cover, depth, flow, pools, riffles, or impacts from channelization, dams, or diversions may preclude particular forms of aquatic life from the stream altogether.[349]

198. According to the MPCA, it is reasonable to base biological water quality standards on an assessment that biological habitat is the limiting factor; and rely on water chemistry when assessing for separately authorized chemical water quality standards.[350]

199. The CWA does have provisions for setting goals below the 33 U.S.C. § 1251(a)(2) goal using socioeconomic reasons outside of antidegradation regulations. Pursuant to 40 CFR § 131.10(g)(6) "[c]ontrols more stringent than those required by sections 301(b) and 306 of the Act [33 U.S.C. §§ 1311, 1316] would result in substantial and widespread economic and social impact."[351] However, the MPCA is not basing the Modified Use determinations on this reason.[352] Rather:

> Adopting the TALU framework in rule:
>
> - "Will better balance the requirement and need to protect and restore aquatic resources while recognizing that legacy, physical conditions may preclude the attainment of the CWA 101(a)(2) goal[.]"[353]

200. According to the MPCA, after considering the comments it was determined that in Appendix A of Exhibit D, the reason stated for designating the Modified Use was incorrect. In Exhibit D, 40 C.F.R. § 131.10(g)(3) is used: "Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place[.]" However, because these assessments are based on habitat limitation it is more appropriate to use 40 C.F.R. § 131.10(g)(4): "Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and 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[.]" As a result the Agency has modified the citation in Appendix A of the SONAR.[354]

201. Several commenters expressed concerns about the protection of downstream waters when a Modified Use is designated upstream.[355] Related to this, a

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[349] Ex. S-113.
[350] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 33.
[351] 40 CFR § 131.10(g)(6).
[352] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 33.
[353] Ex. D at 14.
[354] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 34, Attachment 10.
[355] Tr. 82-83, 97-98; Ex. I.9.

commenter suggested that it should not be possible to assign Modified Uses upstream of waters impaired for chemical pollutants.[356] In some cases these concerns were specific to how Modified Uses might affect designated trout waters (2A streams) through downstream impacts or because trout may move from designated Class 2A streams to other waters (Class 2B) during certain periods of the year.[357]

202. The process of designating uses must protect downstream uses as required by 40 C.F.R. § 131.10(b), which states:

> In designating uses of a water body and the appropriate criteria for those uses, the State shall take into consideration the water quality standards of downstream waters and shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters.

This provision requires the MPCA to consider and to ensure the attainment and maintenance of downstream water quality standards during the establishment of designated uses. Therefore, a downstream Class 2A cold water stream is considered during the assessment to reclassify a stream to a Modified Use. It is reasonable to comply with federal requirements to protect downstream waters as part of the use designation process. To clarify this, the Agency has modified the TALU amendments by including a new part to explicitly include downstream use protection language that follows federal regulations at Minn. R. 7050.0155.[358] Although this modification is an improvement to the rules, the proposed Modified Uses already comply with this requirement. The designation of Modified Uses is based on legacy modifications to local, physical habitat conditions, which are limiting the biological assemblages. As such, the TALU framework does not ignore chemical pollutants that can increase loading of these pollutants downstream and cause downstream impairments.[359]

203. In their comments on the Modified Use process, commenters suggested potential modifications that would impact the entirety of the rule as proposed. One commenter suggested that the TALU rules should somehow prohibit future hydrological alterations in a watershed that could have an impact on stream biology.[360] Taking an opposite perspective, another commenter suggested that waters impacted by unregulated activities that cause hydrological alterations (such as tiling, private ditching) should be eligible for a Modified Use designation. [361] In addition, this commenter and another noted that since cold water streams (Class 2A) can be impacted by legal, physical habitat alterations, the Modified Use designation and biological criteria should be applicable to these streams.[362]

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[356] Tr. 97-98.
[357] Exs. I.16, L.12.
[358] *See* finding 56, *supra*.
[359] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 34.
[360] Ex. I.9.
[361] Ex. I.7.
[362] Exs. I.7, I.11.

204. There are existing mechanisms in the CWA and state regulations that govern practices that impact hydrology in Minnesota watersheds and streams. These include: protection of existing uses (40 C.F.R. § 131.3); TMDL load allocations for non-point pollutant sources and related implementation strategies in WRAPS (33 U.S.C. § 1313(d); Minn. Stat. ch. 114D); stormwater management requirements under MS4 permits (Minn. R. ch. 7090); water withdrawal permits (Minn. Stat. ch. 103H); and drainage law (Minn. Stat. ch. 103E). The proposed TALU rule amendments do not alter these existing laws, which manage hydrological impacts. Rather, the TALU rule amendments create a framework within which these existing laws can be more precisely implemented using the best methods for each biological tier. The SONAR, as well as the CWA, are clear on how the concept of existing use is important for protecting beneficial uses and preventing hydrological alterations that impact attainment of beneficial uses. It is reasonable to rely on existing laws for the management of hydrological impacts and rely on water quality standards for establishing biological criteria to protect existing uses.[363]

205. According to the MPCA, the TALU framework is a proposed refinement of the Class 2 aquatic life beneficial use classification and related biological criteria. The proposed rule is not intended to substantively amend the narrative water quality standard in Minn. R. 7050.0150, subp. 3. The only amendment proposed in this rulemaking to the narrative water quality standard is to standardize the use of terms related to the TALU framework. The addition to the narrative standard language proposed by the commenter relates to regulating water flow. The need for an amendment of the narrative standard to control flow has not been established in this rulemaking.[364]

206. A Modified Use for cold water (Class 2A) streams (i.e., "coldwater Modified Use") was considered during the development of the tiered biological criteria. This was determined not to be a feasible classification to develop and employ. There are a relatively small number of channelized cold water streams with biological monitoring data in the state.[365] It is possible with the collection of additional data that a subset of legally altered cold water streams could support the development of a coldwater Modified Use. Regardless, the implementation of a TALU framework does not preclude use of a UAA to change the goals for a cold water stream if it can be demonstrated that the use is not feasibly attainable due to one of the six reasons stated in 40 C.F.R. § 131.10(g).[366]

207. The MPCA received a comment that the TALU UAA process should consider designation of Limited Use waters.[367]

208. According to the MPCA, Limited Resource Value waters (Class 7) are for the most part waters that are not appropriate (e.g., ephemeral) for application of the current biological tools (i.e., IBIs, biological criteria). As such, ephemeral stream reaches

[363] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 35.
[364] *Id.*
[365] Exs. D at 48; S-84; S-85 at 14.
[366] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 35.
[367] Exs. I.4, I.10, I.14.

are avoided as part of biological monitoring (Exhibit D at 41, fn. 19), and therefore are reasonably not part of the UAA process for TALUs.[368]

I. Comments Regarding Specific Proposed Use Designations or Beneficial Use Tables and MPCA Responses

209. Concerns with the proposed Modified Use designations of 07020007-688, 07020007-525, 07020007-664, and 07040004-585 were raised because these stream reaches are proposed to be designated as Modified Use.[369]

210. There are three reaches proposed for Modified Use designation upstream of the reach (Fort Ridgely Creek - 07020007-689) noted by the commenters. As noted by one commenter, the reach 07020007-689 is managed as a seasonal, put-and-take trout (rainbow and brown trout) fishery. However, due to habitat and temperature limitations there is no reproduction or year-to-year carryover of trout (meaning they do not survive through the summer months). This reach is not a designated trout water (Minn. R. 6264.0050) or coldwater stream (Class 2A; Minn. R. 7050.0470). There are currently no plans to change the designation of this water to a cold water reach due to the conditions which limit survival of trout.[370]

211. Another commenter noted that the Minnesota River - Mankato Watershed Monitoring and Assessment Report (October 2016) listed some of the proposed Modified Use reaches upstream of 07020007-689 as supporting aquatic communities that meet the General Use (Class 2Bg) goals for aquatic life.[371] However, this is not the case. The determination of support in this report is based on the Modified Use (Class 2Bm) goals, meaning that these reaches meet the Modified Use biological criteria, but not the General Use biological criteria. The MPCA cannot propose a Modified Use for reaches that meet the General Use for both fish and macroinvertebrates. As mentioned previously, Modified Use designations are supported by limitations to the biological communities are the result of habitat limitation and not other stressors. A review of chemical data collected from these stream reaches indicated that there was an occurrence of low dissolved oxygen in one reach. This corresponded with an impairment of the macroinvertebrate community (i.e., the macroinvertebrate community did not meet the Modified Use goals and was listed as impaired). This triggers a more in-depth stressor identification study and a report that will describe restoration recommendations (i.e., WRAPS). As a result, the Modified Use designations for these reaches are not expected to negatively impact the beneficial uses of the downstream reach (i.e., 07020007-689).[372]

[368] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 36.
[369] Exs. I.16; L.12.
[370] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 37.
[371] Ex. L.12.
[372] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 37.

212. A commenter noted Fort Ridgely Creek was misspelled in several locations (as “Ridgley”). The MPCA will correct this in the SONAR (Attachment 10) and in the MPCA waterbody databases.[373]

213. Reach 07040004-585 on Trout Brook is proposed for designation as a Modified Use based on poor habitat which is limiting the fish communities. A detailed stressor identification study has been completed and concluded that habitat was limiting the fish community and did not identify any other stressors. The stream reach upstream from 07040004-585 has been confirmed as General Use, but is currently designated a Class 2B. Trout (brook trout) have been collected in this reach, but there are currently no plans to change the designation of this reach to cold-water. Regardless this is outside the scope of this rulemaking. Since the proposed Modified Use is downstream of the designated trout waters and the reach is limited by habitat, it is not expected to negatively impact these waters.[374]

214. Two commenters stated that queries from the MPCA’s database indicate that there is not adequate information for assessment, and therefore there is not enough information to perform UAAs.[375]

215. According to the MPCA, the online database referenced by the commenters does not display the most up-to-date data. This information is based on the latest Impaired Waters List approved by the EPA. The last list approved by the EPA is the 2012 list, so these data are more than four years out of date. Recognizing this as an issue the MPCA has begun a policy change that will update this database more regularly. This will make this information available to stakeholders in a timely manner. However, for the reaches proposed for TALU designations as part of the TALU rule amendments, this information is contained in Appendix A of Exhibit D. All of these reaches have sufficient data to perform the UAA and assessments.[376]

216. One commenter stated “Colby Lake is a drinking water, so any water” "within Colby Lake “should not have a lesser designation."[377]

217. According to the MPCA, the listing of this WID in the St. Louis beneficial use table (https://www.pca.state.mn.us/sites/default/files/wq-s6-46c.pdf) is an error. This WID is an “Artificial Flow Through Path” and it has no bearing on the designated uses for the lake. These artificial segments are needed to create continuity for the streams as they move other bodies of water. These “Artificial Flow Through Path” WIDs are intended to be eliminated and the use tables and this WID will be removed.[378]

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[373] Ex. L.12; MPCA Post-Hr’g Response to Comments Mem., Attachment 2 at 37.
[374] MPCA Post-Hr’g Response to Comments Mem., Attachment 2 at 37-38.
[375] Exs. I.8, L.12.
[376] MPCA Post-Hr’g Response to Comments Mem., Attachment 2 at 38.
[377] Ex. I.13.
[378] MPCA Post-Hr’g Response to Comments Mem., Attachment 2 at 38-39.

J. Comments Regarding Proposed UAA Process for Designating Exceptional Uses and MPCA Responses

218. Some commenters suggested that the TALU rules create an improper presumption that streams not found to be "Exceptional" in a current assessment are not "Exceptional" existing uses. As a result, waters that attained the Exceptional Use on or after November 28, 1975, but which have been degraded below that goal before sampling would not be protected.[379]

219. The proposed rule amendments are fully consistent with the CWA. There is a presumption that waters be protected to the interim goal of the CWA at 33 U.S.C. § 1251(a)(2) ("provides for the protection and propagation of fish, shellfish, and wildlife"). However, the CWA does not provide a presumption for an Exceptional Use, and therefore, according to the MPCA, this use must be reasonably demonstrated. Currently, these determinations are made using fish and macroinvertebrate data along with supplemental information such as habitat, water chemistry, and land use data. However, at a minimum this currently requires sampling of both fish and macroinvertebrates using standard protocols (see MPCA Response to Comments Memorandum, Attachments 3 and 4) and a demonstration that they meet or did meet these goals on or after November 28, 1975. Hypothetically, it is not unreasonable to designate an Exceptional Use using different information than is currently required and the proposed rule language does not preclude that. However, the MPCA has not encountered a case where such information was available and sufficient for an Exceptional Use designation.[380]

220. Several commenters suggested that some broad categories of waters should be designated as Exceptional Use including waters in the BWCA, Lake Superior, waters in Voyageurs National Park, scientific and natural areas, wilderness areas, wild river segments, and trout streams.[381] Related to this were comments seeking clarification regarding the need to perform a UAA to designate Exceptional Use streams.[382]

221. According to the MPCA, the designation of an Exceptional Use requires sufficient data to demonstrate that it is an existing use (i.e., the data must demonstrate attainment of the biocriteria by both fish and macroinvertebrates). Although a UAA is not required by the CWA, a UAA-like process is needed.[383] The resumption of Exceptional Uses for these other broad categories of waters cannot on its own fulfill the demonstration of Exceptional attainment and to automatically designate them as such would result in assessment errors. In Ohio in the 1970s and 1980s, Exceptional Uses were originally classified on a cultural basis and without a confirmation of biological status as Exceptional.[384] This resulted in a correction process as biological data has become available via routine biological assessments. Other regulations and programs provide

[379] Exs. I.9, I.13, I.19, M.1, M.2.
[380] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 39-40. *See* findings 177-181, *supra*.
[381] Exs. I.9, I.13, I.17.
[382] Exs. I.9, I.13, M.3.
[383] MPCA Post-Hr'g Response to Comments Mem., Attachment 7 at 5; Ex. S-63.
[384] *Id*., Attachment 11.

additional protection to these waters (antidegradation, general stormwater permits, etc.). However, conflating all ORVWs or natural scenic waters, for example, with the Exceptional Use does not recognize the differences in the programs.[385]

222. One commenter asked for more guidance to define what Exceptional Use means in order to standardize its application. The commenter also felt the word "comparable" has little meaning in science.[386]

223. According to the MPCA, the term Exceptional Use is well defined in both rule and in the supporting documents.[387] In Exhibit L.6, Tables 5-13 transparently describe the rules for determining BCG levels. For example, to be considered a BCG Level 3, a fish sample in a Prairie River needs to have 11-16 species, 15-25% of the species need to be sensitive species (i.e., attribute 1, 2, and 3 species), individuals of the most numerous tolerant species (i.e., attribute 5a or 6a species) need to comprise less than 7-13% of the sample, etc. As described in the rule language, the biological criterion or threshold is based on the 75th percentile of IBI scores from a population of samples that score as BCG Level 3. As a result, Exceptional Use communities are represented by the 25% best sites in BCG Level 3 and most samples in BCG Levels 2 and 1. Although this can be somewhat confusing without a background in aquatic science and biological monitoring, the explicit details of what the Exceptional Use means and how it is measured is contained in the TALU reference documents.[388]

224. The use of the term "comparable" mirrors the language accepted and used to define biological integrity: "supporting and maintaining a balanced, integrated, adaptive community of organisms having a composition and diversity comparable to that of the natural habitats of the region."[389] It is also similar to the language used in Ohio's rule for establishing TALUs.[390]

225. One commenter stated there should be an effort to determine TALUs for trout waters and waters adjacent to Exceptional Use waters.[391]

226. The MPCA does not disagree that efforts are needed to identify additional Exceptional Uses and that the classes of waters indicated by the commenter are a good suggestion. However, the monitoring efforts of the Agency are not unlimited and fulfill many roles so efforts to identify Exceptional Use waters will need to be balanced with these other goals.[392]

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[385] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 40.
[386] Ex. I.13.
[387] *See, e.g.,* Ex. L.6.
[388] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 40.
[389] Ex. S-11.
[390] Ex. S-87.
[391] Ex. I.9.
[392] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 41.

K. Comments Regarding Economic Analysis, Cost of Compliance, and Cost of Implementation and MPCA Responses

227. One commenter expressed concern that the rules could hinder agricultural production.[393]

228. According to the MPCA, as discussed in Hearing Exhibit D (SONAR) sections 6 and 8, it determined that the proposed TALU rule amendments should not result in new costs to agricultural producers.[394] The proposed amendments provides more certainty for agricultural producers by setting appropriate goals for some waters maintained for drainage.[395]

229. One commenter was concerned that considerable expense will be incurred to complete use attainability analyses.[396]

230. According to the MPCA, the cost of performing UAAs is largely borne by the MPCA, although the MPCA also encourages public input through stakeholder engagement (e.g., IWM planning meetings, PJG meetings) and rulemaking.[397] The cost of conducting UAA's can be reasonably borne by the MPCA as evidenced by the 141 UAA's completed by the MPCA as part of this rulemaking effort.[398]

231. One commenter suggested that cost savings or efficiencies could be obtained by not sampling ditches that are 100% man-made for the purpose of assessments.[399]

232. Artificial or constructed ditches are waters of the state under Minn. Stat. § 115.01, subd. 22, and they are part of the framework of aquatic systems in Minnesota.[400] According to the MPCA, it is important and reasonable to manage manmade ditches to protect the aquatic life that utilize these habitats, as well as the beneficial uses downstream. The analysis of costs to be incurred by the MPCA, included in Exhibit D on pages 63 through 64, assumes that sampling of waters of the state include both natural and man-made waters.[401]

233. One commenter asked how might an Exceptional Use designation affect a city with an MS4 permit (concerning storm water management); and whether it is possible to develop and urbanize a land area and still maintain an Exceptional Use?[402]

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[393] Ex. I.2.
[394] Ex. D. at 62-79, 82-90.
[395] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 42.
[396] Ex. I.4.
[397] Ex. D at 64.
[398] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 42.
[399] Ex. I.17.
[400] Minn. Stat. § 115.01, subd. 22 (2015); See also Exs. D and S-27.
[401] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 42.
[402] Tr. 54; Ex. M.3.

234. In preparing its response to this comment, the MPCA discovered an error in the economic analyses provided in Hearing Exhibit D at 85. The analysis is characterized as being for MS4 cities. The analysis inadvertently pulled database information on individual stormwater NPDES permits, and did not pull information on MS4 cities. The analysis was accurate for individual stormwater NPDES permits (i.e., no expected impact because most permittees do not have offsite discharge under normal runoff events; and any current discharge is supporting the Exceptional Use) and will be corrected in the SONAR. (See MPCA Response to Comments Memorandum, Attachment 10.) During the post-hearing comment period, the MPCA conducted additional analysis using the MS4 city database. The additional analysis did not identify any MS4 permits within a mile of any waters being proposed as Exceptional Uses as part of this rule. The additional analysis did identify four MS4 permits that are within a mile of waters that have the potential to be designated as Exceptional Uses in future rulemakings, but which are not being proposed for designation in the current rulemaking. The intent of both analyses was to use all available data to identify potential long-term economic effects of the TALU framework. The result of both analyses is consistent with the conclusion noted in Exhibit D at 85; that no permits are expected to be impacted by the reaches being designated as Exceptional Use as part of this rule amendment.[403]

235. Because the MPCA has not identified any MS4s that would be impacted by proposed Exceptional Use designation in the current rulemaking, the commenter's question is only forward looking and the answer, by necessity, is speculative. According to the MPCA, the question becomes how might a city with an MS4 permit be affected if a stream reach within one mile of an MS4 permit is designated through a future rulemaking as Exceptional Use? The process to protect an Exceptional Use in a situation where an MS4 city may impact the use would be similar to that described for NPDES permits.[404] This involves determining if the activity will increase pollution to the Exceptional Use and determine if those levels would result in the loss of the use. If there is a risk to the beneficial use based on this analysis, the result would be to develop plans to avoid impact or to implement BMPs that prevent the loss of the Exceptional Use. In cases where the loss of the Exceptional Use occurs, restoration of the stream would be the first option, although stream mitigation could also be considered as an option. It is very important to note that the four potential Exceptional Use streams that are within one mile of an MS4 city are all Class 1B (i.e., drinking water) and Class 2A (i.e., cold-water) streams. That means the potential future Exceptional Use streams already receive increased protection under these classifications, regardless of a future potential TALU classification. So, the nearby cities should already be aware of these classifications and be planning for protection of these streams if urban expansion is anticipated.[405]

236. One commenter expressed concern about the sufficiency and accuracy of the MPCA's economic and cost analysis related to municipal separate storm sewer

[403] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 42-43.
[404] Ex. D at 87-88.
[405] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 43.

systems (MS4). It also sought identification of MS4s related to potential Exceptional Use streams.[406]

237. There will not be the need for MS4 cities to adopt additional ordinances or regulations. Therefore, there is no inaccuracy related to this topic on page 73 of the SONAR.[407]

238. The four MS4s and the three related potential Exceptional Use streams are:

- Duluth Township MS4 - Captain Jacobson Creek (04010102-584)
- Duluth City MS4 - Amity Creek (04010102-541)
- St Louis County MS4 - Amity Creek (04010102-541)
- Rice Lake Township MS4 - Unnamed creek (Lester River Tributary) (04010102-539)

The three potential Exceptional Use streams are all Class 2A (i.e., cold-water/trout water) streams. This means that they already have existing additional protections that are likely to be sufficient to protect an Exceptional Use. Although a future proposal to designate these three streams as Exceptional Use is unlikely to impact MS4s, the MPCA provided an overview of the process for determining and preventing the loss of a threatened Exceptional Use within the boundaries of a hypothetical MS4 municipality in Attachment 2 of the March 17, 2017, MPCA Responses to Public Comments on pages 42 through 43.[408]

L. Comments Regarding Public Participation and MPCA Responses

239. Several commenters felt that stakeholders did not have sufficient time or access to review the technical support documents, the proposed rule, or the proposed use designations. Several commenters suggested improvement to the process for reviewing and changing classifications, asking that stakeholders be included before the formal rulemaking, and that proposals for Modified Uses be noticed more widely.[409]

240. The MPCA provided information throughout an extended public outreach period with stakeholders starting back in 2009.[410] The goal of these interactions was to not only make stakeholders aware of the TALU framework and to receive feedback on the rule as it was being developed, but also to receive feedback on technical support documents. As a result, these supporting documents were available years (1-3 years depending on the document) before the rules were proposed. During stakeholder meetings, the MPCA routinely directed stakeholders to the TALU webpage, and the documentation contained on that page in addition to requesting feedback from

[406] Ex. M.3.
[407] MPCA Rebuttal Response to Comments at 5 (Mar. 27, 2017).
[408] *Id.* at 6.
[409] Exs. I.8, I.13, I.16, L.12.
[410] Ex. D at 31-37; Tr. 39-40.

stakeholders on these materials. The public participation process met and exceeded the APA requirements.[411]

241. Some commenters suggested ways to improve the documentation for the UAAs (e.g., providing raw IBI scores and biological criteria in tables) and the MPCA will consider these to improve communication with stakeholders.[412]

242. Use designations are required to be listed in rule by Minn. R. 7050.0470, and any use designation requires a rulemaking to change the classification in Minn. R. 7050.0470. The MPCA followed all required steps under the APA for designating uses and exceeded them in some cases. The MPCA made the draft list of proposed use designations contained in this rule amendment available to the public on the Agency's website in June 2016 and actively encouraged review and comment. Future use designation proposals will also undergo formal rulemaking along with the required public participation.[413]

243. One commenter suggested that the MPCA consider how the TALU classifications will be used by other entities in their planning efforts. For example, other entities may develop more and improved best management practices (BMPs) to address non-point source pollutants. The commenter also expressed concern that resources from these other entities are likely to be focused on areas that are not categorized as Modified Use.[414]

244. The MPCA expects the TALU framework will provide benefits and prove to be useful for entities beyond the MPCA. The outcome of the TALU framework and biological monitoring in Minnesota will result in better BMPs. However, the Agency does not agree that the Modified Use designation necessarily means that these systems will be ignored, nor that resources will be directed elsewhere. By setting appropriate and attainable goals, the work that is needed to restore or protect Modified Use waters can be better targeted and is more likely to succeed. Over time as protection and restoration methods improve, the goals for Modified Use waters can shift to match available technologies.[415]

245. One commenter felt the process used to assess waters and designate their use does not involve sufficient public input, especially from local partners.[416]

246. According to the MPCA, one of the first steps in the monitoring of watersheds involves engagement with local partners in IWM planning meetings to determine the sampling framework (i.e., where will sampling station be located and what parameters will be sampled). Local partners are also involved in the use designation and

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[411] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 44.
[412] *Id.*
[413] *Id.*
[414] Ex. I.16.
[415] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 45.
[416] Ex. I.17.

assessment of waters (e.g., PJG meetings, impaired water list comment period, and use designation rulemaking). The Agency is also interested in receiving feedback from stakeholders on rulemakings, including use designation rulemakings, and reasonably involves public stakeholders in these efforts.[417]

247. One commenter asserted that the TALU rulemaking process may violate the public participation requirements of the CWA.[418]

248. Revised regulations governing state adoption of water quality standards (WQS) took effect on October 20, 2015, including changes to 40 C.F.R. § 131.20 defining the state process for adoption of WQS. Many of the federal requirements are similar to requirements of the APA. The federal law includes requirements that exceed the APA hearing process in several ways, including: a 45-day public notice in advance of a hearing; and a record of the hearing made available to requesters at cost. The MPCA was aware of, and has satisfied, these additional federal requirements. The notice of hearing for this rulemaking included a 45-day notice period and all documents and data were made available throughout the notice period. A public hearing was held on February 16, 2017, and a transcript was made of the hearing and posted for free download by any person on the Agency's website within 10 days after the hearing. Paper copies of the transcript will be made available to any requester at cost.[419]

249. Multiple commenters made the identical claim that the proposed use designations were not properly noticed because the public notice for the proposed TALU rules did not say that any water bodies would be downgraded if the rules were approved, let alone more than 100 waters.[420]

250. The proposed use designations were properly noticed and met all APA requirements for rulemaking. The dual notice published in the *State Register* on December 19, 2016, contained the following information on page 662 (the third full page of the notice):

> **1. 141 stream reaches will be reclassified based on 2012 and 2013 Intensive Watershed Monitoring (IWM) efforts in 14 watersheds.** The MPCA is proposing to reclassify specific streams using the TALU framework, where existing intensive monitoring data have demonstrated the need for a more accurate use designation. Based on monitoring data from fourteen (8-digit Hydrological Unit Code) watersheds representing the 2012 and 2013 IWM efforts, the MPCA is proposing to reclassify 141 stream reaches from the existing General Use to either Exceptional or Modified Use. The

[417] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 45.
[418] Ex. I.12.
[419] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 45.
[420] Exs. I.9, I.13, I.19.

> MPCA anticipates that future TALU reclassifications will occur annually following the IWM schedule.[421]

In support of the published notice, the SONAR was made available on the same date and the published notice directed interested persons to the SONAR for more comprehensive information. The SONAR contains detailed information on the reclassifications.[422]

251. One commenter suggested that while the SONAR described the MPCA's efforts to address environmental justice issues, it did not seek the advice of the MPCA's Environmental Justice Advisory Committee, which was formed in mid-2016.[423]

252. According to the MPCA, the Environmental Justice Advisory Committee did not meet for the first time until October 28, 2016. By this point, the analyses in the SONAR were significantly complete so there was no opportunity to involve the Environmental Justice Advisory Committee in these analyses.[424]

VII. Summary

253. The Administrative Law Judge finds the MPCA gave notice to interested persons in this matter. The Dual Notice, the proposed rules, and the SONAR complied with Minn. R. 1400.2080, subp. 5 (2015).

254. The Administrative Law Judge finds that the MPCA has provided a rational explanation for the proposed rules and the grounds on which it is relying. While some groups and individuals disagree with some of the MPCA's proposals, the MPCA is allowed to make rational choices between possible approaches and the Administrative Law Judge cannot properly interfere with its policy-making discretion.

255. The Administrative Law Judge finds that the MPCA has demonstrated, by an affirmative presentation of facts, the need for and reasonableness of the proposed amendments and modifications to the rules under consideration.[425]

256. The Administrative Law Judge finds that all the MPCA's proposed rule changes addressed in this Report are authorized by statute and that there are no other defects that would bar the adoption of those rules.[426]

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[421] Ex. F.2 at 662.
[422] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 46.
[423] Tr. 105.
[424] MPCA Post-Hr'g Response to Comments Mem., Attachment 2 at 46.
[425] *See* Minn. Stat. § 14.50.
[426] *Id*.

Based on the foregoing Findings of Fact, the Administrative Law Judge makes the following:

CONCLUSIONS OF LAW

1. The Administrative Law Judge must make the following inquiries: Did the agency have statutory authority to adopt the rule; is the rule unconstitutional or otherwise illegal; has the agency complied with the rule adoption procedures; is the rule rationally related to the agency's objective and does the record demonstrate the need for the rule; is the rule substantially different than the proposed rule; is the rule unconstitutional or illegal; does the proposed rule grant undue discretion to government officials; does the rule improperly delegate the agency's powers to another agency, person, or group; and does the proposed language meet the definition of a rule?[427]

2. Under Minn. Stat. § 14.14, subd. 2, and Minn. R. 1400.2100 (2015), the MPCA must establish the need for, and reasonableness of, the proposed rule amendments by an affirmative presentation of facts. In support of the rules, the MPCA may rely upon materials developed for the hearing record. The MPCA may also rely on "legislative facts" (namely, general and well-established principles that are not related to the specifics of a particular case, but which guide the development of law and policy) and the MPCA's interpretation of related statutes.[428]

3. A proposed rule is reasonable if the agency can "explain on what evidence it is relying and how the evidence connects rationally with the agency's choice of action to be taken."[429] By contrast, a proposed rule will be deemed arbitrary and capricious where the agency's choice is based upon whim, is devoid of articulated reasons or, "represents its will and not its judgment."[430] Consequently, the Administrative Law Judge does not "vote" for a particular policy, or select a policy the Judge considers to be in the best interest of the public or the regulated parties.[431]

4. An important corollary to these standards is that when proposing new rules, an agency is entitled to make choices between different possible regulatory approaches, so long as the alternative that is selected by the agency is a rational one. Thus, while reasonable minds might differ as to whether one or another particular approach represents "the best alternative," the agency's selection will be approved if it is one that a rational person could have made.[432]

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[427] *See* Minn. R. 1400.2100.
[428] *See Mammenga v. Agency of Human Services*, 442 N.W.2d 786, 789-92 (Minn. 1989); *Manufactured Housing Institute v. Pettersen*, 347 N.W.2d 238, 240-44 (Minn. 1984); *Minnesota Chamber of Commerce v. Minnesota Pollution Control Agency*, 469 N.W.2d 100, 103 (Minn. Ct. App. 1991); *see also, United States* v. *Gould,* 536 F.2d 216, 220 (8th Cir. 1976).
[429] *Manufactured Hous. Inst.*, 347 N.W.2d at 244.
[430] *See Mammenga*, 442 N.W.2d at 789; *St. Paul Area Chamber of Commerce v. Minn. Pub. Serv. Comm'n*, 251 N.W.2d 350, 357-58 (Minn. 1977).
[431] *Manufactured Hous. Inst.*, *supra,* at 244-45 ("the agency must explain on what evidence it is relying and how that evidence connects with the agency's choice of action to be taken … We do not substitute our judgment for that of the Department of Health ….").
[432] *Peterson v. Minn. Dep't of Labor & Indus*., 591 N.W.2d 76, 79 (Minn. Ct. App. 1999); *Minnesota Chamber of Commerce*, 469 N.W.2d at 103.

5. The MPCA has demonstrated the need for and reasonableness of the proposed rules by an affirmative presentation of facts in the record within the meaning of Minn. Stat. §§ 14.14 and 14.50. Differences in opinion about the rules demonstrated by multiple commenters have resulted in permissible changes to the proposed rules which do not significantly alter them. Further, any comments about the reasonableness of the rules that did not result in modifications to the proposal did not demonstrate the proposed rules are not needed and reasonable. Further, there is no evidence or indication in the record that the rules are unconstitutional or otherwise illegal.

6. The MPCA has demonstrated its statutory authority to adopt the proposed rules, and has fulfilled all other substantive requirements of law or rule within the meaning of Minn. Stat. §§ 14.05, subd. 1; 14.15, subd. 3; and 14.50 (i) and (ii). The rules meet the definition on "rule" under Minn. Stat. § 14.02, subd. 4.

7. The MPCA has fulfilled the procedural requirements of Minn. Stat. § 14.14 and all other procedural requirements of law or rule. The failure of MMB to substantively respond to the MPCA's request for consultation does not result in a fatal defect in the procedural requirements because there is no resulting prejudice to any party or a demonstrated error.[433] The Administrative Law Judge concludes that the MPCA has fulfilled its additional notice requirements.

8. An agency may incorporate by reference into its rules the text from publications and documents which are determined by the Revisor of Statutes to be conveniently available to the public.[434] "The statement of incorporation by reference must include the words 'incorporated by reference'; must identify by title, author, publisher, and date of publication the standard or material to be incorporated."[435] It must also "state whether the material is subject to frequent change" and include a statement of availability.[436]

9. The MPCA has properly incorporated by reference into the rules: 1) *Calibration of the Biological Condition Gradient for Streams of Minnesota*, Gerritsen et al. (2012); 2) *Fish data collection protocols for lotic waters in Minnesota*, MPCA (2017); 3) *Macroinvertebrate data collection protocols for lotic waters in Minnesota*, MPCA (2017); and 4) *Development of Biological Criterial for Tiered Aquatic Life Uses*, MPCA (2016).

10. Changes to the referenced materials will not necessarily result in changes to the rule or standard, unless the title, author, publisher, or date of the referenced document does not change or the reference in the rule changes accordingly through proper rulemaking.

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[433] Minn. Stat. § 14.15, subd. 5 (2016).
[434] Minn. Stat. § 14.07, subd. 4 (2016).
[435] *Id.*
[436] *Id.*

11. Minn. Stat. § 14.127 requires an agency to "determine if the cost of complying with a proposed rule in the first year after the rule takes effect will exceed $25,000 for: (1) any one business that has less than 50 full-time employees; or (2) any one statutory or home rule charter city that has less than ten full-time employees." The agency must make this determination before the close of the hearing record, and the Administrative Law Judge must review the determination and approve or disapprove it.[437]

12. The MPCA has made the determinations required by Minn. Stat. § 14.127 and the Administrative Law Judge approves those determinations.

13. Under Minn. Stat. § 14.128, an agency must determine if a local government will be required to adopt or amend an ordinance or other regulation to comply with a proposed agency rule. The agency must make this determination before the close of the hearing record, and the Administrative Law Judge must review the determination and approve or disapprove it.[438]

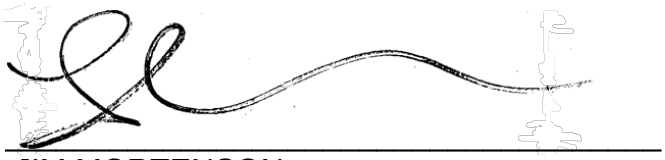
14. The MPCA has made the determination required by Minn. Stat. § 14.128 and that determination is hereby approved.

Based upon the foregoing Conclusions of Law, the Administrative Law Judge makes the following:

RECOMMENDATION

IT IS HEREBY RECOMMENDED that the proposed amended rules be adopted.

Dated: April 24, 2017



JIM MORTENSON
Administrative Law Judge

Reported: Transcript Prepared by
Kirby A. Kennedy & Associates (one volume).

[437] Minn. Stat. § 14.127 (2016).
[438] Minn. Stat. § 14.128, subd. 1 (2016).

NOTICE

This Report must be available for review to all affected individuals upon request for at least five working days before the agency takes any further action on the rules. The agency may then adopt the final rules or modify or withdraw its proposed rules. If the agency makes any changes in the rules, it must submit the rules to the Chief Administrative Law Judge for a review of the changes prior to final adoption. Upon adoption of a final rule, the agency must submit a copy of the Order Adopting Rules to the Chief Administrative Law Judge. After the rule's adoption, the Office of Administrative Hearings will file certified copies of the rules with the Secretary of State. At that time, the agency must give notice to all persons who requested to be informed when the rule is adopted and filed with the Secretary of State.

7050.0155 PROTECTION OF DOWNSTREAM USES.

All waters must maintain a level of water quality that provides for the attainment and maintenance of the water quality standards of downstream waters, including the waters of another state.

Statutory Authority: *MS s 115.03; 115.44*

History: *42 SR 441*
Published Electronically: *November 20, 2017*

Attachment 5 is not publicly posted on the MPCA web page due to copyright protection laws. However, you may request the document through your local library.

Feather, P., D. Hellerstein, and T. Tomasi (1995) A Discrete-Count Model of Recreational Demand. Journal of Environmental Economics and Management, 29:214-227; [Copyrighted].

Attachment 6 is not publicly posted on the MPCA web page due to copyright protection laws. However, the following link is provided for interested parties to access the document in accordance with the respective copyright restrictions. The document may also be available through your local library.

Kauffman, G. J. 2019. Economic benefits of improved water quality in the Delaware River (USA). River Research and Applications; [Copyrighted but available at: http://www.wrc.udel.edu/wp-content/uploads/2019/07/EconomicbenefitsofimprovedwaterqualityintheDelawareRiverUSAMay2019.pdf]

Attachment 7 is not publicly posted on the MPCA web page due to copyright protection laws. However, the following link is provided for interested parties to access the document in accordance with the respective copyright restrictions. The document may also be available through your local library.

Dumas, C.F., P.W. Schuhmann, and J.C. Whitehead (2005) Measuring the economic benefits of water quality improvement with benefit transfer: an introduction for noneconomists. In: Effects of Urbanization on Stream Ecosystems. (eds. Brown, L.R., Gray, R.H., Hughes, R.M., Meador, M.R.) American Fisheries Society, Bethesda, MD, pp. 53-68; [Copyrighted but available at: https://www.uwsp.edu/cnr-ap/UWEXLakes/Documents/people/economics/52_waterQualityBenefitTransfer_dumas_paper.pdf]

United States Environmental Protection Agency

EPA 841-N-12-004

The Economic Benefits of Protecting Healthy Watersheds

April 2012

Did You Know?

Maintaining the integrity of natural biological and physical systems provides economic benefits through ecosystem service provision.

Degradation of riparian ecosystems can cause negative economic impacts far from the altered site.

Protecting healthy watersheds reduces capital costs to supply clean drinking water and to treat waste water.

Healthy Watersheds support healthy economies!

Protecting Healthy Watersheds…

--Lowers drinking water treatment costs

--Avoids expensive restoration activities

--Sustains revenue-generating recreational and tourism opportunities

--Minimizes vulnerability and damage from natural disasters

--Provides critical ecosystem services at a fraction of the cost for engineered services

--Increases property value premiums

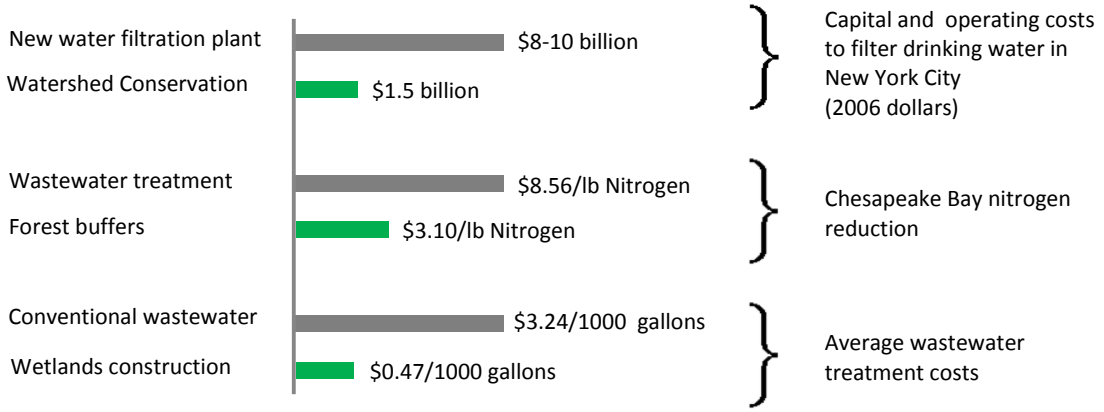
--Supports millions of jobs nationwide

--Ensures we leave a foundation for a vibrant economy for generations to come

Protecting our nation's healthy watersheds makes economic sense

Healthy intact watersheds provide many ecosystem services that are necessary for our social and economic well-being. These services include water filtration and storage, air filtration, carbon storage, nutrient cycling, soil formation, recreation, food and timber. Many of these services have not been monetized and therefore the economic contributions of healthy intact ecosystems are often under-valued when making land use decisions. Ecosystem services provided by healthy watersheds are difficult to replace and most often very expensive to engineer (see chart). An engineered ecosystem service replacement may only provide a fraction of the services provided by highly functioning natural systems.

Preventing impairments in healthy watersheds protects valuable ecosystem services that provide economic benefits to society and prevent expensive replacement and restoration costs. Maintaining riparian connectivity and natural processes in the landscape provide a supporting network for ecological integrity, ensuring the sustainable and cost effective provision of clean water over time.



Watershed protection is less expensive than building new "grey" infrastructure
Hanson, Craig et al. 2011. Forests for water: exploring payments for watershed services in the US south." World Resources Institute Issue Brief, Issue 2, Pp15.

How is monetary value assigned to an ecosystem service?

Environmentalists and economists frequently suggest that there would be a greater incentive for environmental stewardship if ecosystem services were valued in a manner that reflects the large contribution they have to our economy and society. Assigning a monetary value to a particular service can be very complicated due to issues of scale and the complexity of ecological interactions that make isolating the economic effects of one service difficult. Although challenging, valuation is seen as essential for encouraging conservation. Economists have developed innovative methods that attempt to quantify ecosystem services and the economic benefits of conservation.

Instead of developing values for individual landscape features, such as a wetland, a healthy stream reach or headwaters, many economists have found that holistic valuation techniques that monetize a range of services provided by a landscape to be a more effective communication tool. At times, value is measured indirectly through payment for ecosystem services (PES) programs that compensate landowners for conserving land so that others may benefit from the multitude of ecosystem services the land supplies. Value can also be estimated by citizen's willingness to pay (WTP) to use or protect a land area or ecosystem service.

Another common indirect valuation method is the estimation of avoided costs to society due to protection activities. Cost avoidance scenarios are used to communicate the costs associated with losing ecosystem services and replacing them. These scenarios are commonly used to show costs saved from the prevention of flood damage or impairments that would occur if a floodplain was not intact.

Protecting healthy watersheds avoids future costs and benefits communities

Investing in the maintenance of healthy watersheds can significantly lower costs associated with water treatment and flooding. In a study of 27 US water suppliers, researchers found that protecting forested watersheds used for drinking water sources can reduce capital, operational and maintenance costs for drinking water treatment. They found that watersheds with greater percentages of protected forest correlate to fewer water treatment expenditures (see table).

Floods cause an average of $8 billion in damage every year in the United States

Retaining high quality natural green infrastructure minimizes property damage and clean-up costs from flood damage and storm surges. Forested cover prevents runoff from moving rapidly across the landscape and allows it to slowly infiltrate into the soil, reducing erosion and high flows. Intact wetlands store and capture excess water. For example, wetlands surrounding the Boston area have been estimated to prevent $42,111 of flood damage per acre of intact wetland. A healthy watershed will reduce the area and impact of a flood, minimize the economic burden on public infrastructure, reduce erosion and water treatment costs and can restore natural groundwater recharge.

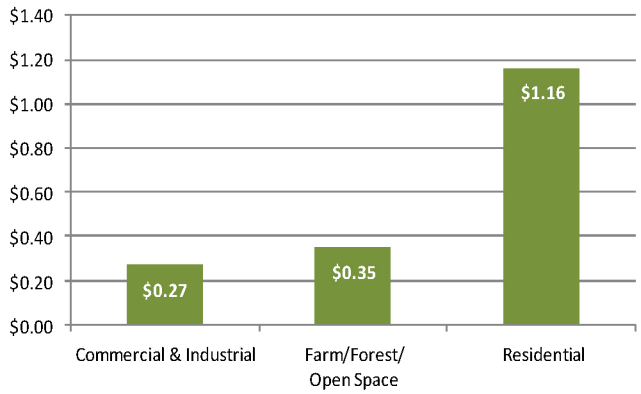
Healthy watersheds that maintain protected riparian corridors are expected to be more resilient to the anticipated effects of climate change. Expenses associated with recovery from extreme weather impacts increased by a factor of six between 1997 and 2007. This rising trend is expected to continue. Floods now cause an average of $8 billion in damage every year in the U.S. The most efficient way to avoid excessive future costs is to increase the flexibility of ecosystems now so that they may function and retain resiliency under a wider range of climatic conditions. Riparian areas that are hydrologically connected to their landscape can maintain their functionality, are more adaptable to change, and better equipped to handle large storm events.

Share of forested watershed	Treatment costs per 3,000 m^3	Average annual treatment costs	Cost increase over 60% forest cover
60%	$29	$297,110	
50%	$36	$369,380	24%
40%	$46	$465,740	57%
30%	$58	$586,190	97%
20%	$74	$746,790	151%
10%	$91	$923,450	211%

Percent forest cover and predicted water treatment costs based on 27 US water supply system, based on treatment of 22 million gallons per day, the average daily production of water suppliers surveyed.
For more information, see *Postel, Sandra L. and Barton H. Thompson. 2005. Watershed protection: capturing the benefits of nature's water supply services. Natural Resources Forum*. Issue 29, Pp 98-108.

Future costs associated with the loss of natural intact systems and the services they provide may include constructing new infrastructure to manage and treat more stormwater and drinking water and greater clean-up costs from natural disasters. Comparing future adaptation costs to current short-term profits from land conversion can accurately reflect the ecological and economic consequences of land use decisions.

Economic and ecological benefits of conservation development

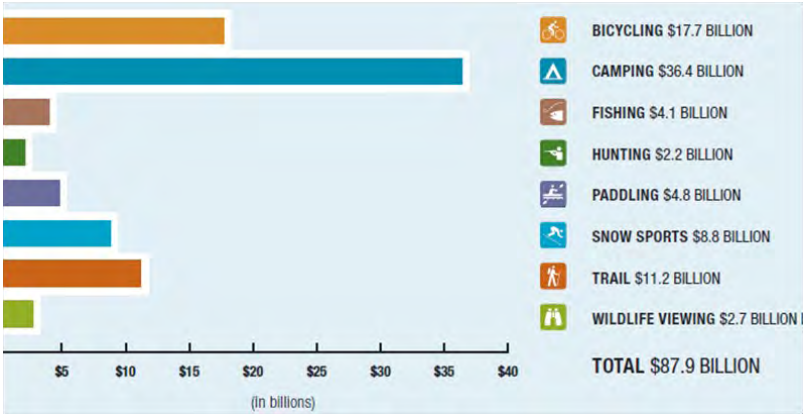


Conservation development preserves open space and maintains landscape connectivity, while clustering development to the least environmentally sensitive areas. Traditional development requires intensive and costly additions of grey infrastructure to connect new neighborhoods to road and utility networks. In a review of 98 communities across 21 states, researchers found that for every dollar received from residential development revenues, a median of $1.16 was spent on providing services to the new community by the local government (see figure). Conservation development provides economic benefits to communities because it consumes less land, needs fewer roads, resources and utility infrastructure. Additionally, many studies have shown that people are willing to pay a premium to live in conservation developments; these premiums provide greater revenues to local communities.

The median cost to provide public services to different land uses per dollar of revenue raised (n=98 communities)
Reprinted with permission from Crompton, John L. 2007."The impact of parks and open spaces on property taxes."The Economic Benefits of Land Conservation. Ed. Constance T.F.de Brun. The Trust for Public Land. Pp1-12.

Recreation and tourism

Recreation and tourism are billion-dollar industries in the United States. According to the American Sportfishing Association, there are over 30 million anglers in the U.S., generating over one million jobs and over $45 billion in retail sales annually. Healthy intact ecosystems are essential to the viability of both commercial and recreational fishing. More people in the U.S. fish (30 million) than play golf (24.2 million) or play tennis (10.2 million).



Federal and state tax revenues generated by recreational activity
Outdoor Industry Foundation 2003

In a 2003 study, the Outdoor Industry Foundation found that the outdoor recreation economy contributed $730 billion annually to the economy, supported 6.5 million jobs and generated $88 billion in state and federal tax revenues. Wildlife watchers in The Chesapeake Bay region spend about $3 billion annually on trip-related expenses and equipment; this estimate does not include job creation and multiplier effects from these activities. Rural areas near forest land and other types of open space often depend on tourist spending to help support their local economies. Outdoor recreation and eco-tourism are large economic forces whose foundation rely on the maintenance of healthy watersheds and the protection of open space.

More people in the United States fish (30 million) than play golf (24.2 million) or play tennis (10.2 million)

Property value premiums

People value living near healthy clean water. Studies from Maine and Minnesota show that home values declined by tens of thousands of dollars with declines in water quality. The aggregate effect of an increase in property values attributed to good water quality on a single lake equates to millions of dollars per lake in these areas. Further, recent studies around the country (e.g., in Colorado, Pennsylvania, Oregon, Maryland, Ohio and Virginia) have shown increased property values and tax revenues from properties near open space, green space, walking/biking trails, or riparian areas. Even in tight economic times, a relatively higher premium is placed on properties with access to nature. For example, a current study of five counties in southeastern Pennsylvania shows that open space is attributed with adding $16.3 billion to the regional housing stock value. Clean and healthy waterfronts boost property values and revenues for adjacent retail and commercial businesses, too. Waterfront business properties are attractive to customers and have greater property value premiums when they are near clean waters. Preserving healthy watersheds and protecting open space while providing access to people has the potential to boost local revenues while providing attractive amenities.

Quality of life and health benefits

The EPA and other public health organizations have long acknowledged the link between water and air quality to human health. When people think of human health and the environment, they often think of the negative health effects from an impacted environment, rather than the positive impacts that a healthy environment can have on human well-being.

There are social and health benefits related to the proximity of people to nature, parks, walking trails and biking trails—both in the form of physical exercise and mental stress relief. Forests outside of urban areas significantly contribute to human health in urban areas. These health benefits have the potential to provide significant cost savings in health expenditures. People who exercise regularly and seek stress relief are generally healthier, have fewer insurance claims and spend less time in hospitals, thus their societal health care costs are lower.

Forests outside of urban areas significantly contribute to human health in urban areas… reducing health expenditures

About Healthy Watersheds

EPA's Healthy Watersheds Initiative (HWI) was developed to protect the nation's remaining healthy watersheds, prevent them from becoming impaired, and accelerate our restoration successes.

The HWI complements existing EPA program efforts by focusing on protection of high quality watersheds. These healthy areas are identified through holistic aquatic ecosystem assessments. Protection and restoration priorities are developed through these assessments to strategically implement protective actions that are both economically and ecologically beneficial.

We can't afford not to protect our nation's remaining healthy watersheds!

If you would like to receive a copy of a white paper on the economic benefits of protecting healthy watersheds or learn more about Healthy Watersheds at EPA,
Contact Laura Gabanski:
Gabanski.Laura@epa.gov
or
Visit our website
www.epa.gov/healthywatersheds

People support protecting our nation's environment—it's good for the economy

Citizens across the United States have overwhelmingly voiced their support of environmental protection: between 1994 and 2004 over 75% of conservation referenda on ballots were passed and a 2011 Gallup poll shows that nearly 80% of people worry about pollution of lakes, rivers, streams and drinking water.

The United States has spent on average $1 billion per year on stream restoration since1990. These numbers are expected to rise as communities work to mitigate environmental problems. Restoration efforts are less successful without a supporting ecological network of healthy watersheds. Protecting highly functioning aquatic ecosystems is a cost-effective way to sustainably provide the multitude of services required to meet society's needs. Studies show that the total economic value of intact systems exceeds that of lands converted for intensive economic uses over time.

Understanding the contribution that healthy watersheds provide to local economies is an important tool for land stewardship. Strengthening protection of high quality waters or diverting new development from these sensitive areas can have a positive economic and social impact and maintain these benefits for generations to come.

Selected Publications and Resources

Ecosystem services provided by conserving forest land

Forests, water and people: Drinking water supply and forest lands in the Northeast and Midwest United States
http://na.fs.fed.us/watershed/fwp_preview.shtm
This analysis by the US Forest Service highlights the connection between forests and the protection of surface drinking water quality.

Investing in protecting healthy watersheds avoids future costs

Forests for water: Exploring payments for watershed services in the U.S. South
http://www.wri.org/publication/forests-for-water
This World Resources Institute study from 2011 explores the use of landowner compensation to protect natural resources and for avoided costs.

Green infrastructure: Smart conservation for the 21st century
Mark A. Benedict and Edward T. McMahon
http://www.greeninfrastructure.net/sites/greeninfrastructure.net/files/GI_RR.pdf
This 2002 publication lays out the natural green infrastructure concept of protecting ecological hubs and corridors and discusses how protecting these areas avoids future costs.

Revenues generated in recreation and tourism sectors from healthy watersheds

American Sportfishing Association
http://www.asafishing.org/
This organization provides links to several studies that explore the economic impact of the hunting and fishing industries, which rely on healthy fish and wildlife habitats.

Outdoor Industry Association
http://www.outdoorindustry.org/national-economic-impact-reports.php
This website provides links to comprehensive economic reports on the impact that outdoor recreational activity has on the economy.

Valuing ecosystem services

The World Conservation Union (IUCN) ***Value: Counting ecosystem services as infrastructure***
http://www.iucn.org/what/tpas/greeneconomy/resources/documents/?1136/Value-counting-ecosystems-as-water-infrastructure
This 2004 IUCN publication is a comprehensive look a how ecosystems provide valuable services and the critical need for investment in protecting natural systems.

DUANE A. SMITH
EXECUTIVE DIRECTOR

BRAD HENRY
GOVERNOR

STATE OF OKLAHOMA
WATER RESOURCES BOARD
www.owrb.ok.gov

August 11, 2008

Ms. Denise Keehner
U.S. EPA Headquarters
Ariel Rios Building
1200 Pennsylvania Ave., N.W.
Mail Code: 4305T
Washington, D.C. 20460

Dear Ms. Keehner:

It has been my pleasure to work with you and your staff over the last several months to clarify many fundamental Water Quality Standards issues we have wrestled with in recent years. Whether these issues arose through ASIWPCA, WQS Managers Meetings, WQS Workgroup Meetings or the WQS Academy, it has been both enlightening and encouraging to explore them with you.

Would it be possible for you to forward to me in writing the results of some of these discussions to share with my staff and state colleagues? As an example, we've framed the question of "existing uses" with the following questions:

What are existing uses?
When determining an existing use, are there situations where a state should describe existing uses more specifically than designated uses?
How should a state determine the existing use for a water body?
What is the difference between an existing use and a designated use?
Can a state adopt the existing use as its designated use?

We have discussed other foundational issues as well and I would be most interested in affirming my understanding of the outcomes of these discussions that reflect our common understanding.

Thanks again for all your time and effort on the critically important work of WQS. As always feel free to call me with any questions at (405) 530-8800.

Sincerely,

Derek Smithee, Chief
Water Quality Programs Division

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
WATER

September 5, 2008

Mr. Derek Smithee
State of Oklahoma
Water Resources Board
3800 N. Classen Blvd.
Oklahoma City, OK 73118

Dear Mr. Smithee:

Thank you for your letter of August 11, 2008. I also appreciate the discussions we have had with states at ASIWPCA meetings, WQS Managers Meetings, WQS Workgroup meetings, and the WQS Academy. You asked if we could forward you in writing the results of these discussions to share with your staff and colleagues. Our office is happy to provide you with answers to your specific questions that reflect common understanding throughout EPA Regional Offices in the enclosed attachment.

If you have any questions please feel free to contact me at 202-566-1566 or Jim Keating at 202-566-0383.

Sincerely,

Denise Keehner 9/23/08

Denise Keehner, Director
Standards and Health Protection Division

Enclosures

Attachment

1) ***What are existing uses?***

EPA's regulations define existing uses as "...those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards."[1,2] Existing uses are relevant to two provisions in the Federal regulation – 40 C.F.R. § 131.10(g), designated uses, and 40 C.F.R. § 131.12(a)(1), antidegradation. Overall, these provisions:

- Prohibit removal of a designated use that would also remove an existing use.[3]
- Require the maintenance and protection of existing instream water uses and the level of water quality necessary to protect existing uses when implementing a state's or tribe's antidegradation policy.[4]

EPA considers the phrase "existing uses are those uses actually attained" to mean the use and water quality necessary to support the use that have been achieved in the waterbody on or after November 28, 1975. Waterbody uses relate to a distinct purpose (e.g., recreation, public water supply) or function (e.g., supporting an aquatic ecosystem). EPA's regulations, relating to the protection of existing uses, require states and tribes to maintain and protect these uses, not specific water quality parameters which may have achieved levels more protective than necessary to support these uses.[5]

In nearly all cases, a waterbody will have achieved some degree of use related to aquatic life, wildlife, and human activity on or after November 28, 1975. States and tribes are not bound by their designated use classification categories when describing existing uses. In some cases, the use(s) and water quality actually achieved may be less protective than the designated use(s) assigned to the waterbody. For example, while the water quality since November 28, 1975 may never have been sufficient to support the diverse aquatic community associated with the waterbody's designated use, it is likely that the water quality in the waterbody supports or has supported some less diverse community of organisms. When such uses have been achieved on or after November 28, 1975, EPA considers the uses reflecting the degree of aquatic life, wildlife, and human activity achieved to be "existing" uses.

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[1] 40 C.F.R. § 131.3(e).

[2] November 28, 1975 is the date EPA promulgated the initial Federal water quality standards regulations related to existing uses. 40 C.F.R. 55334 (Nov. 28, 1975).

[3] 40 C.F.R. § 131.10(g).

[4] 40 C.F.R. § 131.12(a)(1).

[5] In the 1982 preamble to the proposed rule for the current WQS regulations, EPA stated that the first tier of antidegradation applies to uses, not specific parameters. For example, if a stream actually achieved a warm water fishery use and achieved a dissolved oxygen level of 7.0 mg/L, under the existing use regulation the state would only be required to maintain the dissolved oxygen levels sufficient to support the warm water fishery existing use (e.g. 5.0 mg/L if that is sufficient to support the existing warmwater fishery use). 47 Fed. Reg.49,234, 49,238 (col. 3)(Oct. 29, 1982).

A waterbody may have multiple existing uses. When evaluating the uses actually achieved along a continuum, the existing uses of a waterbody are the "highest degree of uses" and water quality necessary to support those uses, that have been achieved since November 28, 1975, independent of the designated use. "Highest degree of uses" generally means the degree of use closest to those supported by minimally impacted conditions, which usually is associated with the highest level of water quality. In the paragraph above, if this less diverse community is the highest degree of aquatic life use that has been achieved since 1975, this would be the existing aquatic life use.

EPA's existing use regulations ensure that the waterbody's highest degree of uses and the necessary levels of water quality actually achieved on or after November 28, 1975 will be maintained and protected consistent with the overall objective of the Clean Water Act (CWA) to restore and maintain the physical, chemical, and biological integrity of the nation's waters.[6] Thus, 40 C.F.R. §§ 131.10(g) and 131.12(a)(1) define the absolute "floor" or minimum use and necessary level of water quality achieved that must be maintained and protected in a waterbody.[7] In the above example, where a state is designating its uses or revising its designated uses, the state or tribe must ensure that the resulting water quality will not jeopardize the less diverse aquatic community (and thus the existing use).

The regulation at 40 C.F.R. § 131.10(g) prohibiting removal of an existing use is not intended to apply to a situation where the state or tribe wishes to remove a use where the removal would result in improving the condition of a waterbody, i.e., facilitates attainment of a use closer to those supported by minimally impacted conditions.[8] The intent of the regulation is to further the objectives of the CWA "to restore and maintain the chemical, physical, and biological integrity" of the nations waters (CWA section 101(a)), not to prevent actions that make the waterbody more like its minimally impacted condition. For example, if a pollution tolerant aquatic community is replaced by a more diverse aquatic community as a result of improving water quality, loss of the pollution tolerant community is a necessary step towards restoring a waterbody to its minimally impacted condition and is not a removal of an existing use. Similarly, if a state or tribe stocks trout (a coldwater species) into a natural warmwater fishery, the existing use provision would not prevent removal of that stocked trout fishery use because a natural warmwater fishery is closer to the minimally impacted condition.

Existing use determinations should be made on a site-specific. If a state or tribe can show that removing a designated use will not remove an existing use and the state or tribe can show that there are factors precluding the attainment of this designated use, the state/tribe must then determine and designate the highest attainable use.

2) ***When determining an existing use, are there situations where a state or tribe should describe existing uses more specifically than designated uses?***

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[6] CWA section 101(a).

[7] See the preamble to EPA's WQS regulations at 48 Fed. Reg. 51,500, 51,403, col. 2 (Nov. 8, 1983).

[8] See 40 C.F.R. § 131.10(h). States or tribes may remove existing uses where the state or tribe is adding a use requiring more stringent criteria..

Yes. While there are some situations where it would be reasonable to describe existing uses of a waterbody using the same broad categories employed for designating uses, a state or tribe should describe existing uses more specifically where necessary to meet the intent of the existing use requirements. It would be consistent with the intent of the regulation for a state or tribe to more specifically describe its existing use, for example, where necessary to maintain and protect unique attributes of a waterbody that are not adequately described using a broadly defined designated use category. Examples 1 (CSO-impacted waters) and 2 (mining-impacted waters) provided in the next question, demonstrate the importance of describing the existing use (and the water quality necessary to support this existing use) in a specific manner so that the uses and the water quality improvements achieved since 1975 can be maintained and protected.

States and tribes must consider existing uses prior to removing or revising a designated use and in the context of its antidegradation requirements.[9] The Federal regulations do not require states and tribes to specify both existing uses and designated uses for each waterbody in their water quality standards; however a state or tribe may do so if it chooses.[10]

3) ***How should a state or tribe determine the existing use for a waterbody?***

A state or tribe should determine existing uses on a site-specific basis to ensure it has identified the highest degree of uses and water quality necessary to support the uses that have been achieved since November 28, 1975. When describing existing uses, states and tribes should articulate not only the use(s) that has been achieved, but also the water quality supporting the specific use(s) that has been achieved. Examples 1 (CSO-impacted) and 2 (mining-impacted) below illustrate this point. For aquatic life, states and tribes should consider the available biological data as an indicator of both water quality and the actual use, in conjunction with any available chemical water quality data.

Although EPA interprets the definition of "existing use" to require consideration of the available data and information on both actual use and water quality, all the necessary data may not be available. In these circumstances, a state or tribe may choose, in implementing its water quality standards program, to determine an existing use based on the strength of evidence that a use has actually been achieved or the strength of evidence that water quality supporting a use has been achieved. In other words, where data may be limited or inconclusive, EPA expects states and tribes to consider the quantity, quality, and reliability of the different types of available data to describe the existing use as accurately and completely as possible and to resolve any apparent discrepancies based upon that evaluation. As an example, a state is considering removing a primary contact recreation use and is therefore evaluating the existing use. While it has information that people are swimming in a waterbody, it does not have any data to determine the level of water quality that has been achieved on or after November 28, 1975. In this case, the state has two

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[9] 40 C.F.R. §§ 131.10(g) and 131.12(a)(1).

[10] EPA notes that 40 C.F.R. § 131.10(i) requires states and tribes to "revise its standards to reflect the uses actually being attained."

choices regarding the existing recreation use. If there is no reason to believe that there has ever been a water quality problem (e.g., no nearby sources of bacteria), then it would be reasonable for the state or tribe to determine that primary contact recreation is the existing use. However, if there is reason to believe a nearby source may have been limiting the water quality since November 28, 1975, the state should conduct a use attainability analysis to determine if primary contact recreation is attainable or not. If primary contact recreation is deemed attainable, the state must retain primary contact recreation use as the designated use, even if it is unclear whether that use is existing. If a primary contact recreation use is not attainable, then the state or tribe must designate the highest attainable recreation use.[11]

In a 1985 Antidegradation Questions and Answers document, EPA said "An existing use can be established by demonstrating that fishing, swimming, or other uses have actually occurred since November 28, 1975 or that the water quality is suitable to allow such uses to occur (unless there are physical problems which prevent the use regardless of water quality.)" While this approach allows states to make an existing use determination where it only has information on one or the other type of information, some have interpreted this statement as obligating states to ignore one set of information where both types are available. EPA has found that, in practice, taking into account all the available information results in a more accurate articulation of the existing uses. In addition, the 1985 policy was stated under the assumption that states and tribes would likely describe existing uses in the same terms or categories employed for designated uses. However, during the time since issuing those Qs and As, EPA has seen increasingly complex issues arise regarding the implementation of the existing use provisions of the Federal water quality standards regulations. It has become apparent that using the same designated use categories to describe existing uses may be insufficiently detailed to accurately describe the existing use.

Under the clarification that states and tribes are not bound to describing their existing uses with the same categories employed for designated uses, the following summarizes how states and tribes should determine existing uses.

1. Where a use (i.e., some degree of use related to aquatic life, wildlife, and human activity) has actually been achieved on or after November 28, 1975, the existing use is the highest degree of use *and* the water quality that has been achieved and is necessary to support the use (see examples 1 and 2); and

2. Where the water quality achieved was sufficient to support a use on or after November 28, 1975, but the use (i.e., some degree of use related to aquatic life, wildlife, and human activity) has not occurred, the federal regulations provide states and tribes the discretion to determining whether or not this is an existing use. In this case, however, it would be reasonable to presume the use is attainable and that a state or tribe would need to explain the factors unrelated to water quality (e.g. human caused conditions that cannot be remedied, hydrologic modifications) that

[11] 40 C.F.R. §§ 131.10(a) – (k).

are limiting the attainment of the use before it can be removed (see examples 3 and 4).

It is appropriate to describe the existing uses of a waterbody in terms of both actual use and water quality because doing so provides the most comprehensive means of describing the baseline conditions that must be protected. In identifying an existing use, it is important to have a high degree of confidence because a state or tribe may not remove an existing use when revising designated uses, regardless of whether the existing use remains attainable. This is also important because EPA's antidegradation provisions require any CWA authorization of a discharge or activity that may result in a discharge to protect the existing use.[12]

A specific example given in the 1985 Antidegradation Qs and As was one of shellfish harvesting. In the example, shellfish are thriving, but it is not clear whether people were actually harvesting the shellfish. In 1985, EPA said that shellfish harvesting is the existing use because to say "otherwise would be to say that the only time an aquatic protection use 'exists' is if someone succeeds in catching fish." (Appendix G Water Quality Standards Handbook). EPA's regulations provide states and tribes the discretion to determine whether or not shellfish harvesting is the existing use in this example. While in the example there was actual evidence of aquatic life (healthy shellfish), there was no evidence of shellfish harvesting. Under EPA's current interpretation, the state or tribe is not *required* to deem shellfish harvesting is an existing use in this situation. A state or tribe may determine that the existing use is an aquatic life use that supports healthy shellfish but that "harvesting" is not part of the "existing use" since there is no evidence of actual harvesting. On the other hand, if shellfish harvesting has not been documented but the evidence shows that the water quality to support harvesting has been achieved and the shellfish present are (or were) suitable for consumption, a state or tribe may determine the existing use is shellfish harvesting or shellfish suitable for consumption. Example 3 below further discusses that if water quality supports harvesting, a shellfish harvesting use is considered attainable (whether or not the state/tribe has determined it is an existing use) and should not be removed, even if no harvesting has actually occurred, unless the state can demonstrate otherwise based on one of the 131.10(g) factors.

For example, if shellfish harvesting has not been documented but the evidence shows that the water quality achieved and presence of shellfish suitable for consumption support harvesting, a state or tribe could determine the existing use is shellfish harvesting or shellfish suitable for consumption. Please see examples 3 (shellfish harvesting) and 4 (public water supply) for further discussion.

Example 1

People occasionally recreate in a waterbody impacted by combined sewer overflows (CSOs). While water quality may be sufficient to support full primary contact recreation most of the time (i.e., the ambient bacterial densities in the waterbody meet the bacteria water quality criteria), the number of indicator bacteria is likely to exceed the water

[12] 40 C.F.R. § 131.12(a)(1).

quality criteria established to support primary contact recreation during heavy rainfall events that trigger CSO events. If the CSOs have existed before November 28, 1975, what is the existing use related to recreation for this scenario?

In this example, water quality data may show that bacteria levels fluctuated above and below the state/tribal criterion for the protection of primary contact recreation and that exceedances correlated with the occurrence of CSO events. In addition, data regarding the type, timing, and frequency of recreation may show that some recreation (swimming or kayaking) occurs regularly in the waterbody even after a CSO discharge when the bacteria levels make it unsafe for primary contact recreation.

Based on the available data for this example, the existing use may be described as a primary contact recreation use at times not affected by CSOs and high risk recreation at times of CSO overflows (because there is a higher risk of getting sick from pathogens than in a water that supports a primary contact recreation use all the time). This existing use describes the absolute "floor" or minimum use and necessary level of water quality achieved for this waterbody that may not be removed when changing designated uses. In addition, the existing use must be protected in the context of antidegradation when authorizing a discharge or activity, under the CWA, that is required to meet water quality standards (WQS). The WQS existing use regulations, therefore, would not allow designated use changes or CWA authorized discharges/activities that would, for example, lower the water quality in a manner that would reduce the level of protection to recreators achieved by the existing use. Once the state/tribe has determined that changing the designated use will not remove an existing use, the state or tribe must conduct a use attainability analysis (UAA) if it wishes to change its currently designated recreational use to one that would require less stringent criteria.

Example 2

Hard rock mining has affected a mountain stream since before November 28, 1975, eliminating trout and other native fish, as well as impairing the benthic invertebrate community, within 20 stream miles of the mining district. Between 1990 and 2000, the State undertook a major remediation effort which resulted in a significant reduction in most metal concentrations. However, concentrations of cadmium and zinc (year round) remain well above the State's acute and chronic numeric criteria adopted to protect the trout stream use classification. The State found that with the significant reduction in most metals, the benthic invertebrate community fully recovered and the trout and other native fish returned to the remediated segment. Yet, the State also found that the number of fish per acre was still less than those at similar reference sites and the length/weight index showed these trout were not in as good of condition as those in the reference streams. Despite the inferior condition of the trout, the lower species numbers, and the fact that the water quality was exceeding some of the criteria adopted to protect a trout fishery use classification, the return of the trout was enough to encourage the public to fish and thus establish a successful trout fishing use.

In this example, the existing use (i.e., highest degree of aquatic life use and water quality necessary to support the use that has been achieved since November 28, 1975) may be described as a trout fishery in waters with high levels of cadmium and zinc concentrations. In this example, it is likely that maintaining the water quality improvements for the most limiting water quality parameters (cadmium and zinc) is especially important to maintain the existing use because changes to these parameters are likely to correlate with changes in the trout population.

Example 3

A waterbody has a healthy shellfish community that is propagating and thriving in a biologically suitable habitat and the water quality is sufficient to support both this healthy shellfish community and shellfish consumption by humans. However, there is not available information indicating that shellfish have been harvested since November 28, 1975. Because the water quality is sufficient to fully support a healthy shellfish community and a shellfish community actually exists, the existing use may be described as "a healthy shellfish community" or, as discussed earlier, the state or tribe may choose to determine shellfish harvesting is the existing use by weighing the evidence on water quality sufficient to support the use and evidence of actual use, and relying on one to a greater extent than the other. If the available data are lacking or inconclusive on whether shellfish are actually being harvested and consumed, a state or tribe may determine the existing use based on a reasonable judgment.

Shellfish harvesting is a CWA 101(a)(2) use. Therefore, if a state or tribe is considering removing a designated shellfish harvesting use, under 40 C.F.R. § 131.10(j)(2), it must conduct a UAA to demonstrate that shellfish harvesting is not feasible to attain due to one of the six factors in 40 C.F.R. § 131.10(g), keeping in mind that it cannot adopt a use that would lower the water quality in such a way that the water would no longer support the existing use. If the water quality is sufficient to support shellfish harvesting, it may be difficult to demonstrate that the use is not feasible to attain, even if no harvesting has or is occurring. However, 40 C.F.R. § 131.10(g) does provide for situations where factors other than water quality affect the attainability of a use. Any proposed use change must go through a public process consistent with state/tribal law and EPA's public participation requirements.[13]

Example 4

Since November 28, 1975, a particular waterbody has met the human health criteria necessary for a waterbody to be used as a source of public water supply. However, there has never been a drinking water intake because the waterbody has never been used as a source of drinking water. Is public water supply an existing use for this scenario?

As stated above, EPA expects states and tribes to look at the available data and information on both water quality and actual use to determine if it is an existing use. If data are clear that the water quality was sufficient to support a public water supply (PWS)

[13] 40 C.F.R. §§ 131.10(e) and 131.20(b).

use, but no PWS use actually occurred since there was no PWS intake, then the Federal regulations do not *require* that the state or tribe find that there is an existing public water supply use. EPA recognizes that when states/tribes initially designated uses they may have designated certain waters or all state/tribal waters for public water supply use even though state, tribal, and local governments have never actually used these waters as public water supply sources since November 28, 1975. However, as discussed earlier, states and tribes may choose, in implementing their water quality standards programs, to determine that a public water supply use is an existing use based on the strength of evidence that a use is actually occurring or the strength of evidence that water quality supports a potential use. For example, if a use has never occurred in or on the waterbody since November 28, 1975, but the water quality at the time of evaluation would support such a use, a state or tribe may determine that this use is an existing use because maintaining the water quality will preserve its use in the future. In addition, where data are unavailable or inconclusive, a state or tribe has the discretion to determine whether or not there is an existing public water supply use based on best professional judgment.

4) ***What is the difference between an existing use and a designated use?***

In 1998, EPA stated that "Designated uses focus on the attainable condition while existing uses focus on the past or present condition."[14]Existing uses are a description of the highest degree of uses and water quality necessary to support the uses that have been achieved at any time since November 28, 1975.[15] The existing use identifies a minimum use and level of water quality that must be maintained to protect uses that have already been attained (*i.e*, the "floor").[16] A designated uses, on the other hand, expresses the state/tribal objectives (i.e., the highest attainable uses) for a waterbody or set of waterbodies. The designated use may or may not have actually been attained in the waterbody.[17] In implementing the regulations, it is important to consider both the distinction and linkage between designated and existing uses. The following is a somewhat simplified example to illustrate how they relate to one another:

Blue Lake is a relatively small, natural lake. It is fed by tributary streams and has an outlet stream that connects it to a larger watershed. Beginning in the 1960s, Blue Lake served as a summer retreat and was surrounded by small summer homes with onsite septic systems. Over time, as popularity for the vacation spot increased, the area became incorporated into a larger urban area. The resulting urban nonpoint source pollution, hydrologic modifications to the watershed (increased impervious surfaces), and failure of onsite septic systems caused high nutrient and sediment loadings, organic enrichment, and low dissolved oxygen (DO) levels in Blue Lake. This led to an increase in nuisance algae blooms and loss of submerged aquatic vegetation. The State conducted a biological assessment in 1974 which documented poor water quality and that the aquatic community

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[14] 1998 Advance Notice of Proposed Rulemaking on the Water Quality Standards Regulation. 63 FR 36,742, 36, 748 (col. 3) (July 8, 1998).
[15] 40 C.F.R. § 131.3(e).
[16] See the preamble to EPA's WQS regulations at 48 Fed. Reg. 51,500, 51,403, (col. 2) (November 8, 1983).
[17] 40 C.F.R. § 131.3(f).

was comprised of low numbers of tolerant invertebrate and fish species. Based on this information, the State designated a limited warmwater aquatic life use for Blue Lake.

During the 1980s and 1990s, the community reduced pollutant loadings to Blue Lake and water quality and biological conditions improved. Although pollutant loadings from urban stormwater remained, connecting the homes to community water and sewer lines significantly reduced the organic enrichment and nutrient loadings to Blue Lake. State monitoring data showed an increase in water clarity, reduced algal turbidity, reduced chlorophyll *a*, and reduced nutrients. Biological assessment data showed a return of expected submerged aquatic vegetation and an improved invertebrate community (rating as a fair quality aquatic community). This information documented the improved condition and helped the State define the existing use (much improved from the limited warmwater aquatic life designated use). However, the fish community still lacked a variety of species expected for this type of lake and water quality still did not meet the criteria for the state's designated warmwater aquatic life use.

In response to the improved conditions, the identified existing use, and the remaining stressors, the State conducted a use attainability analysis (UAA) in 2005 to determine the highest attainable use that should be designated. The UAA demonstrated that implementing a stormwater management program would likely result in attainment of the warmwater aquatic life designated use, although it would take several years. The State expects the projected improved water quality levels to support a good quality aquatic community. Despite the number of years it might take to see improvements, the State determined that a warmwater aquatic life use (and not a limited warmwater aquatic life use) was the appropriate long term objective and revised its water quality standards to adopt the new designated use.

Although it is important to recognize that the regulatory roles and requirements for existing and designated uses differ, decisions about each are not made in isolation. In this example, the aquatic community assessments not only helped to identify improvements in the existing condition but also helped to identify the stressors limiting attainment of a higher use. Information about the limiting stressors, then, was used to evaluate whether or not the expected condition would be attainable. As illustrated here, there is a link between existing and designated uses, and information about the existing condition can be used to inform attainability decisions.

5) ***Can a state or tribe adopt the existing use as its designated use?***

In 1998, EPA stated that "Designated uses focus on the attainable condition while existing uses focus on the past or present condition." EPA's regulations at 40 C.F.R. § 131.10 links these uses in a manner which intends to ensure that States and Tribes designate appropriate water uses, reflecting both the exiting and attainable uses of each waterbody.[18] A state or tribe may adopt an existing use as the designated use where it is the highest attainable use. However, where it is not, states and tribes must consider designating uses based on the

[18] 1998 Advance Notice of Proposed Rulemaking on the Water Quality Standards Regulation. 63 FR 36,742, 36, 748 (col. 3) (July 8, 1998).

potential of a waterbody to attain a use, and not simply base the use designation on what has been attained, (i.e. the existing use).[19]

[19] 40 C.F.R. §§ 131.2 and 131.10.

4/18/1994 SR Adopt. Year

Attachment 10

STATE OF MINNESOTA
POLLUTION CONTROL AGENCY

18 SR 2195

IN THE MATTER OF THE PROPOSED REVISIONS
TO THE RULES GOVERNING THE CLASSIFICATION
AND STANDARDS FOR WATERS OF THE STATE,
MINNESOTA RULES CHAPTER 7050

STATEMENT OF NEED
AND REASONABLENESS

April 27, 1993

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I. INTRODUCTION

A. Minnesota Rules Chapter 7050

Minnesota Rules Chapter 7050 are the rules of the Minnesota Pollution Control Agency (hereinafter "Agency" or "MPCA") that establish water quality standards and the beneficial use classifications for all the waters of the state. These rules define the water quality standards for all water bodies consistent with the goals of the federal Clean Water Act to provide fishable and swimmable waters wherever attainable. The standards in general include narrative requirements such as nondegradation, mixing zone requirements, and general provisions applicable to all dischargers or to all waters of the state. Specific numerical water quality standards* are established to protect aquatic life and recreation, and other beneficial uses as well, such as water for drinking, industrial and agricultural uses. The numerical standards provide a measuring stick against which the Agency can assess the quality of the state's waters, determine the need for treatment or clean-up programs, measure the success of ongoing pollution abatement programs, and help establish priorities when planning for pollution control needs. Also, standards are the basis for effluent limitations in some permits.

Chapter 7050 also defines the levels of wastewater treatment that are applicable to industrial and municipal point source dischargers. Secondary treatment and federal technology-based minimum treatment requirements are generally required, although more advanced water quality based effluent limitations may be required if the technology-based effluent limitations are not adequate to maintain water quality standards.

*The term "standards" is used both in a broad sense to refer to all of Chapter 7050, and in a strict sense to refer to pollutant-specific numerical standards. The words "numerical standards" will be used when standards has the latter meaning, unless the meaning is clear from the context.

B. Scope of the Proposed Revisions

1. The major subjects of this hearing are the proposed revisions of Chapter 7050 as follows:

   a. Add water quality standards specifically for wetlands under parts 7050.0110; 7050.0130, items D and F; 7050.0185, subparts 1 and 9; 7050.0186; 7050.0210, subpart 13a; 7050.0222, subpart 6; 7050.0223, subpart 5; 7050.0224, subpart 4; 7050.0225; 7050.0410; 7050.0425; and 7050.0430. The proposed language will address the unique characteristics of wetlands.

b. Expand biological-criteria narrative and standards under parts 7050.0150; 7050.0200, subparts 3 and 8; and 7050.0222, subparts 2 to 7. The proposed language will be used to develop a biological criteria value from reference conditions that can be used to evaluate biological integrity through assessment.

c. Add an exemption to point source discharge requirements under part 7050.0212, subpart 2a, for return flows from dredge disposal facilities. The proposed exemption will allow return water from short-term dredge projects to be treated through best management practices (BMPs), best practicable technology (BPTs) and special site-specific conditions established under a State Disposal System permit.

d. Add eight new aquatic life standards for toxics under part 7050.0222, subparts 2 to 4. Standards are proposed for Alachlor, Antimony, Atrazine, Cobalt, Iron, Manganese, Naphthalene, and Thallium.

e. Update nine current aquatic life standards for toxics under part 7050.0222, subparts 2 to 4. The toxics standards proposed to be updated are for Arsenic, Benzene, Bromoform, Endosulfan, Fluoranthene, Hexachlorobenzene, Nickel, Pentachlorophenol, and Vinyl Chloride.

2. The minor subjects of this hearing are the proposed revisions of Chapter 7050 as follows:

a. Clarify the language for natural water quality under part 7050.0170.

b. Add one scientific and natural area called Falls Creek, in Washington County, as an Outstanding Resource Value Water under part 7050.0180, subpart 4.

c. Add calcareous fens identified by the Minnesota Department of Natural Resources as Outstanding Resource Value Waters under part 7050.0180, subpart 6b.

d. Revise the fen names under part 7050.0180, subpart 6b, to correspond to the names established by the Minnesota Department of Natural Resources.

e. Add the location information (county, township, range and section) to the fens listed under part 7050.0180, subpart 6b.

f. Add the term "specific pollutants or whole effluent toxicity" under the general standard for "water quality based effluent limitations," part 7050.0210, subpart 9.

g. Change the requirement for discharges from feedlots that are not regulated by federal requirements from a five-day biochemical oxygen demand standard to a feedlot pollution rating under part 7050.0215, subpart 2.

h. Clarify the definition for "acute toxicity" under part 7050.0218, subpart 3, item B.

i. Add the words "or effluent" under the definition for "chronic criterion," part 7050.0218, subpart 3, item H.

j. Add a definition for "percent effluent" under part 7050.0218, subpart 3, item Z.

k. Add a definition for "toxic unit" under part 7050.0218, subpart 3, item EE.

l. Clarify the definition of "whole effluent toxicity test" under part 7050.0218, subpart 3, item HH.

m. Add the words "and narrative" under part 7050.0220, subpart 1.

n. Add tables under part 7050.0220 that summarize how the narrative and numerical standards for associated water use classifications, and provide updated drinking water standards.

o. Update the references to the federal drinking water standards and incorporate certain federal standards by reference to the Code of Federal Regulations under part 7050.0221, subparts 2 to 5.

p. Update reference to the Minnesota Department of Natural Resources Commissioner's Order under part 7050.0420 for trout waters and list all designated trout streams and trout lakes under part 7050.0470.

q. Classify additional waters identified as public drinking water supply sources by the Minnesota Department of Health as Class 1C under part 7050.0470.

r. Include or modify exclusionary references to certain waters listed in part 7050.0470 which are currently or which were designated trout streams identified by Minnesota Department of Natural Resources Commissioner's Order.

s. Make new entries and revise existing entries under part 7050.0470 to correspond with changes proposed under part 7050.0180.

t. Add the county name to the fen entries under part 7050.0470.

u. Change the class designation under part 7050.0470 for waters requested to be reclassified by persons outside the Agency and recommended by staff.

v. Change the class designation for fens listed under part 7050.0470 from Class 2B to Class 2D to correspond to Class 2D proposed under part 7050.0222, subpart 7, item C.

w. Make miscellaneous changes throughout the chapter to correct cross references and spelling, modify the structure of the rule to improve the readability of the language and make subpart and item number and letter changes to accommodate the proposed language.

C. Introduction of Proposed Wetland Water Quality Standards and Biological Criteria

The proposed wetland water quality standards and biological criteria require a more in-depth introduction.

1. Wetland Water Quality Standards.

There are many types of wetlands, just as there are a wide variety of types of lakes and rivers. Names associated with moving water include rivers, streams, creeks, brooks, and rills and those associated with standing water include lakes, ponds, reservoirs, and pools. In the same way, there are numerous names associated with wetlands, including marshes, fens, swamps, bogs, sloughs, and mires. Each of the different water resources has its own set of values, functions, and uses but all have a place in the fabric of the environment. These resources are treated with equal protection for their designated uses under the federal Clean Water Act and the Ch. 7050 Water Quality Standards.

Shallow seasonal wetlands are not more or less valuable in the landscape than deep open water wetlands, but their designated uses are as different as streams are different than rivers or lakes. It is recognized that damming a stream to form a ponded reservoir causes significant changes in the habitat, the hydrology and water quality downstream, and the plants and animals utilizing the resource.

In the same way, wetlands deserve careful consideration before they are converted to other types of wetlands or removed from the landscape altogether. Water resources are not isolated from each other or from the ecosystem. Wetland uses such as nutrient uptake, storm water storage, erosion control, low flow augmentation, wildlife habitat, and ground water recharge, are extremely valuable even in remote wetlands only distantly connected to the other resources in the watershed. And wetland removal will have reverberations throughout the fabric of the landscape. The poor water quality of the Minnesota River can be directly tied to the loss of small, seemingly insignificant, upland and riparian wetlands that cumulatively served the functions noted above. One major component of the restoration of the Minnesota River will be to restore the hydrologic and treatment capabilities lost with the reduction in wetlands. Exhibits W1 and W2.

Wetlands are "waters of the United States" and "waters of the State", just like lakes and rivers. "Waters of the State" are defined under Minnesota Statutes, section 115.01, subdivision 9, to mean:

> "all streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, reservoirs, aquifers, irrigation systems, drainage systems and all other bodies or accumulations of water, surface or underground, natural or artificial, public or private, which are contained within, flow through, or border upon the state or any portion thereof."

The Agency's authority to protect waters of the state from pollution originated in 1967 with the establishment of the Agency. Pollutant and pollution are defined under Minnesota Statutes section 115.01, subdivisions 8, 9, 12, 13, and 17 as follows:

> Subd. 8. "'Industrial waste' means any liquid, gaseous or solid waste substance resulting from any process of industry, manufacturing trade or business or from the development of any natural resource."
>
> Subd. 9. " 'Other wastes' mean garbage, municipal refuse, decayed wood, sawdust, shavings, bark, lime, sand, ashes, offal, oil, tar, chemicals, dredged spoils, solid waste, incinerator residue, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, cellar dirt or municipal or agricultural waste, and all other substances not included within the definitions of sewage and industrial waste set forth in this chapter which may pollute or tend to pollute the waters of the state."
>
> Subd. 12. " 'Pollutant' means any 'sewage', 'industrial waste', or 'other waste', as defined in this chapter, discharged into a disposal system or to waters of the state.
>
> Subd. 13. " 'Pollution of water', 'water pollution', or 'pollute the water' means : (a) the discharge of any pollutant into any waters of the state or the contamination of any waters of the state so as to create a nuisance or render such waters unclean, or noxious, or impure so as to be actually or potentially harmful or detrimental or injurious to public health, safety or welfare, to domestic, agricultural, commercial, industrial, recreational or other legitimate uses, or to livestock, animals, birds, fish or other aquatic life; or (b) the alteration made or induced by human activity of the chemical, physical, biological, or radiological integrity of waters of the state."

> Subd. 17. "'Sewage' means the water-carried waste products from residences, public buildings, institutions or other buildings, or any mobile source, including the excrementitious of other discharge from the bodies of human beings or animals, together with such ground water infiltration and surface water as may be present.

The 1972 amendments to the Federal Water Pollution Control Act (now called the Clean Water Act, CWA) created the National Pollutant Discharge Elimination System (NPDES) program for point source discharges and CWA section 401 Water Quality Certifications. Exhibit W50. The Agency is the designated state agency for administrating these programs and issuing corresponding permits and certifications.

Significant adverse impacts to wetlands result in degraded water quality, both in the wetland and downstream. Exhibits W29 and W19. These impacts to water quality must be replaced to balance the loss of designated uses. Exhibit W30.

The U.S. Fish and Wildlife publication Circular 39 separates freshwater wetlands into eight types. Exhibit W31. These types range widely in characteristics. Some have saturated soils for only a few weeks a year while others are flooded all year. Some wetlands are treeless, containing only grasses and/or shrubs, while others are completely forested. Thus each wetland type provides its own individual set of characteristics, values, and uses, yet all wetlands, to some extent, provide the attributes described below.

To understand why wetlands provide these values, it is important to explain how wetlands enhance water quality. Filtering of pollutants by wetlands is an important function and benefit of wetlands. Exhibits W32, W33, W34 and W35. These pollutants are often buried by newer plant material, isolating them in the sediments.

The trapping of nutrients by wetlands also helps reduce excess plant growth in lakes and rivers. The main nutrients of concern are phosphorus and nitrogen. Exhibit W29. Common sources of nutrients in run-off are urban storm water, cultivated fields, and feedlots. Exhibit W1. If a lake becomes polluted because of excess nutrients or sediments, lake restoration must be undertaken. Most lake restoration methods are very costly, and this cost is usually borne by the public. Thus the value of upland wetlands that capture nutrients can be significant.

Sediments are trapped in wetlands in several ways. Exhibit W36. When the narrow channel of a stream widens into a wetland, water velocity slows. This allows the sediments time to drop out and settle in the wetland. This also occurs along the riparian border of a stream, which capture erosional sediments before they can get to the stream. Exhibit W37. When wetlands decrease stream velocity, downstream bank scouring is also diminished. This further decreases the sediment in the stream and enhances the water quality. These downstream water quality enhancements are an important public benefit provided by wetlands. Exhibits W38 and W39.

Also important are the losses in designated use from the cumulative loss of wetlands. Exhibits W40, W41 and W42. The Code of Federal Regulation 40 CFR 1508.7 defines a cumulative impact as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions...Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." Exhibits W43 and W45. Any one wetland loss may not significantly impair downstream water quality, but the cumulative impact from the loss of many wetlands in a basin may be large. Exhibit W44. The Minnesota River Basin has degraded water quality, partially as a result of the cumulative loss of wetlands in the basin. Exhibits W1 and W2. Also, one consideration before a Clean Water Act Section 401 Water Quality Certification can be issued by the Agency is cumulative impacts. Another type of potential cumulative impact to wetlands is the loss of variety of the natural wetland types that commonly exists in the landscape. Different wetland types provide a range of designated uses. If many of the wetlands in a watershed were to be converted to a single type, such as a shallow water marsh, many of the wide range of uses that were present in the watershed would be lost, even if the net acres remained relatively constant.

The concept of nondegradation of Minnesota's water resources is an integral part of the Water Quality Standards. Two of the major themes of the federal Clean Water Act are: 1) all waters of the nation are to be assigned uses and those uses must be protected (Section 303(c)(2)(A)), and 2) the water resources of the nation must be protected from degradation to either maintain or improve the water quality of the nation (Section 101(a)(2)). The nondegradation language in the water quality standards is designed to protect the existing uses of the waters of the state. Waters are protected from point source discharges by setting effluent limits which are designed to ensure designated uses are maintained.

In a parallel way, the designated uses of the state's wetlands are protected from significant adverse impacts to the designated uses by requiring a mitigative process before wetlands are physically altered. This process of wetlands replacing wetlands to maintain the overall wetland resource is called "no-net-loss". State Executive Order 91-3 orders that "(a)ll responsible departments and agencies of the State of Minnesota shall operate to the fullest extent of their authority under the strict concept of 'NO-NET-LOSS' of wetlands of the state in regard to projects under their jurisdiction." Exhibit W26. The concept of "no-net-loss" of wetlands also fits within the federal goal of nondegradation of the nation's water resources (40 CFR 131.12(a)(1)).

The mitigation sequence has been established in 40 CFR Sec. 1508.20, in the State Executive Order 91-3, and in the State Wetland Conservation Act, Exhibit W53, as the approach to evaluate the potential for reasonable alternatives development. The mitigative sequence, in descending order, is as follows: avoid wetland impacts, minimize unavoidance impacts, and mitigate for the remaining impacts to the wetland designated uses.

2. Biological Criteria.

Historically, the evaluation of water quality has primarily been driven by the need to determine compliance under pollution abatement and regulatory programs. This made regulatory agencies rely heavily on water chemistry to evaluate water quality. Even though water chemistry is an important element of the quality of a water resource, it does not directly measure the health of the plant and animal communities that are part of the resource. Therefore, it is an incomplete measure of quality.

A nationwide effort is beginning, under the guidance of U.S. Environmental Protection Agency (EPA), to improve the accuracy of water quality measurement by establishing and utilizing narrative biological criteria. Narrative biological criteria (biocriteria) are general statements that describe the biological integrity of aquatic communities inhabiting waters of a given aquatic life designated use such as Class 2A and 2B. Biological integrity can be defined as the condition of aquatic communities inhabiting natural, unimpaired waterbodies or habitats of a region as measured by their structure and function. These reference conditions provide the benchmark against which other waterbodies or sites can be judged.

At this time, the Agency is proposing to modify the descriptions of the aquatic life use classes and to include a statement indicating the intention to use reference conditions as the benchmark for evaluating the biological condition. The proposal includes a change in the description of the aquatic life use classes to emphasize biological communities as the focus of protection and biological condition determination. An additional aquatic life classification called Class 2D is proposed to address wetlands as a separate habitat type.

D. Solicitation for Comments

To establish an opportunity for public input about the major revision issues to be aired during the development of rule language, the Agency conducted two periods to solicit opinions and comments from persons outside the Agency.

The first solicitation period began on February 25, 1992, and ended on March 31, 1992. A notice announcing this period was published in the State Register. Exhibit G1. The Agency received seven letters and three comments by phone during this period. Exhibit G2.

Much concern was raised about the plan to establish water quality standards specifically for wetlands. A public meeting was held in May 1992 to explain the federal regulations that require the development of wetland water quality standards, explain staff's ideas for language development and discuss the confusion between the Agency's rule revision plans and the rule development work being completed by the Board of Water and Soil Resources.

The second solicitation period began on September 1, 1992, and ended on September 30, 1992. A notice announcing this period was published in the State Register. Exhibit G3. This notice included a list of the issues that staff planned to address with rule revisions. A fact sheet was produced for each issue. Exhibit G7.

Three Agency letters were also sent out during the September solicitation period. The first letter introduced all the revision issues identified by staff and was sent to persons that submitted a comment during the February solicitation period, members of the Board of Water and Soil Resources rule working committee, and persons that attended the May 1992 wetland issues meeting. Exhibits G4a and G4b. The second letter addressed the plan to propose statewide toxic standards for alachlor, atrazine, antimony, cobalt, iron, manganese, naphthalene, and thallium, and was sent to active members of the Toxics Technical Advisory Committee, which was established during the 1990 triennial review for Minn. Rules ch. 7050. Exhibits G5a and G5b. A third letter addressed the reclassification of drinking water sources, identified by the Minnesota Health Department, to Class 1C and was sent to property owners known to draw drinking water from the listed waters. Exhibits G6a and G6b.

The Agency received 18 letters and nine comments by phone during the September solicitation period.

On January 29, 1993, a preliminary draft of revisions to Chapter 7050 was sent to persons in other state agencies that were used as consultants during the development of draft language. The purpose of this advance review was to ensure that policies and rules from other state agencies would not be violated by MPCA's intended changes.

II. STATEMENT OF AGENCY'S STATUTORY AUTHORITY

The Agency's statutory authority to adopt water quality standards and to classify waters of the state is found in Minn. Stat. sec. 115.03 (1992), particularly subdivisions 1(b) and 1(c). Subdivision 1(b) authorizes the Agency to classify waters, while subdivision 1(c) authorizes the Agency to "establish and alter such reasonable pollution standards for any waters of the state in relation to the public use to which they are or may be put as it shall deem necessary for the purposes of this chapter and, with respect to the pollution of the waters of the state, chapter 116."

Additional authority for adopting standards is established under Minn. Stat. sec. 115.44, subds. 2 and 4 (1992). Subdivision 2 authorizes the Agency to "group the designated waters of the state into classes, and adopt classifications and standards of purity and quality." Subdivision 4 authorizes the Agency to "adopt and design standards of quality and purity for each such classification necessary for the public use or benefit contemplated by such classification. Such standards shall prescribe what qualities and properties of water shall indicate a polluted condition of the waters of the state which is actually or potentially deleterious, harmful, detrimental or injurious to the public health, safety or welfare, to terrestrial or aquatic life or to the growth and propagation thereof, or to

the use of such waters for domestic, commercial and industrial, agricultural, recreational or other reasonable purposes, with respect to the various classes established..."

III. STATEMENT OF NEED

Minn. Stat. ch. 14 (1992) requires the Agency to make an affirmative presentation of facts establishing the need for and reasonableness of the rules as proposed. In general terms, this means that the Agency must set forth the reasons for its proposal, and the reasons must not be arbitrary or capricious. However, to the extent that need and reasonableness are separate, need has come to mean that a problem exists which requires administrative attention, and reasonableness means that the solution proposed by the Agency is appropriate. The need for the rule amendments is discussed below.

Rule revisions are needed at this time to meet requirements of the federal Clean Water Act (CWA). States are obligated by the Clean Water Act under section 303(c)(1) to review and revise their water quality standards at least once every three years. CWA sec. 303(c)(1) states:

> "The Governor of a State or the State water pollution control agency of such State shall from time to time (but at least once every three years period ...) hold public hearings for the purpose of reviewing applicable water quality standards and, as appropriate, modifying and adopting standards. Results of such review shall be made available to the [U.S. Environmental Protection Agency (EPA)] Administrator."

Under section 303(c)(3) of the Clean Water Act, EPA has final approval of proposed standards. CWA sec. 303(c)(3) states:

> "If the Administrator, within sixty days after the date of submission of the revised or new standard, determines that such standard meets the requirements of this Act, such standard shall thereafter be the water quality standard for the applicable waters of the State. If the Administrator determines that any such revised or new standard is not consistent with the applicable requirements of this Act, he shall not later than the ninetieth day after the date of submission of such standard notify the State and specify the changes to meet such requirements. If such changes are not adopted by the State within ninety days after the date of notification, the Administrator shall promulgate such standard pursuant to paragraph (4) of this subsection."

This review and approval process is called the triennial review. The Agency last reviewed its water quality standards in 1990. The current EPA deadline to have standard revisions adopted is September 30, 1993.

The EPA has provided the states with guidance on how to review and amend their water quality standards in the Water Quality Standards Handbook, July, 1990. Exhibit W3. The handbook discusses the states' obligation to review and amend their rules every three years and the federal authority to review and approve the states' standards after they are promulgated. The handbook requires the states to address water quality standards for wetlands and biocriteria during the 1993 review. Additional revisions are needed to address staff concerns that arose from their project work, to include information that has developed since the last revision, to make the rules easier to read by improving the structure and format, and to correct errors. The need for each major rule revision subject is discussed below.

A. Wetland water quality standards.

The EPA has directed that one of the major goals in this triennial review will be to emphasize wetlands protection. To guide the states in revising their Water Quality Standards for this triennium, U.S. EPA supplied National Technical Guidance, Exhibit W3, which require states to include the following:

- Include wetlands in the definition of 'State waters.'
- Designate uses for all wetlands.
- Adopt aesthetic narrative criteria (the 'free froms') and numeric criteria for wetlands.
- Adopt narrative biological criteria for wetlands.
- Apply the State's antidegradation policy* and implementation methods to wetlands."

*"Antidegradation" means the same as "nondegradation". "Nondegradation" in Chapter 7050 was revised during the 1981-1984 triennial review period. The term antidegradation first appeared in Federal regulation on November 8, 1983. The Agency saw no reason to change its terminology.

The Technical Guidance Executive Summary states that "(a)t a minimum, all wetlands must have uses designated that meet the goals of Section 101(a)(2) of the CWA by providing for the protection and propagation of fish, shellfish, and wildlife and for recreation in and on the water, unless a use attainability analysis (UAA) shows that the Clean Water Act Section 101(a)(2) goals cannot be achieved." The guidance goes on to state that "(t)he Water Quality Standards Regulation (40 CFR 131.11(a)(1)) requires States to adopt criteria sufficient to protect designated uses that may include general statements (narrative) and specific numerical values (i.e. concentrations of contaminants and water quality characteristics)." 40 CFR 131.3 defines designated uses as "those uses specified for water quality standards for each water body or segment whether or not they are being attained." 40 CFR 131.3 defines use attainability analysis as "a structured scientific assessment of the use which may include physical, chemical, biological, and economic factors..."

Once the Agency received the Technical Guidance listing the federal requirements, an internal working group was formed to draft the water quality standards wetland revision. Exhibit W4. The proposed draft was written to clarify the role of wetlands in the standards under existing

authority, which is already extensive. The draft document was first presented to a group of state and federal agencies in November, 1991, and then presented to a group of interest groups in May, 1992. Exhibits W6 and W7. There were also two public notice comment periods, in March and September, 1992.

B. Biological criteria.

Narrative biocriteria is needed to make progress toward fulfilling the requirements of the Clean Water Act and to establish a method of measuring water quality by examining biological communities structure and function.

MPCA establishes rules that define the goals for all waterbodies consistent with the federal Clean Water Act. The main objective of the CWA as stated in Section 101(a) is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. To achieve the objective, Section 101(a)(2) sets, wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and provides for recreation in and on the water. In furthering both of these goals, the United States Environmental Protection Agency has directed states to adopt narrative biological criteria in EPA guidance dated April 1990. Exhibit B2. EPA considers the adoption of biocriteria into state water quality standards as an indication of intent to formally consider the status of biological communities in states' water quality management programs.

Sections 303 and 304 of the Clean Water Act give specific directives for the development of biological criteria. Section 303(c)(2)(B) requires development of criteria based on biological assessment methods when numerical criteria are not established for toxic pollutants listed pursuant to Section 307(a)(1). Section 304(a) requires EPA to develop water quality criteria, methods, and information for assessing 1) the effects of pollutants on aquatic community components such as fish, shellfish, wildlife, and plant life, 2) the effects of pollutants on biological community diversity, productivity, and stability and 3) the factors that are necessary to restore and maintain the physical, chemical, and biological integrity of all waters. In addition, biological criteria are seen as an aid to states in meeting requirements of the Clean Water Act under Section 305(b), 303(d), 304(l), 314 and 319.

The need to more explicitly address the biological integrity of waterbodies stems from the inadequacy of protecting and assessing biological condition primarily through a chemical approach. Historically, most pollution control programs have attempted to achieve the Clean Water Act goals by focusing regulatory efforts and assessment on the chemical condition of waters. In large part this has occurred because the initial regulatory thrust was to control chemical discharges from point sources. Standards were developed that set chemical specific criteria which are considered protective of aquatic life uses.

Significant improvements in water quality have been made using this chemical criteria approach. However, there are many factors that affect biological integrity which are not addressed by present numeric chemical criteria and chemical monitoring. Chemical toxicity tests have been completed on only a minority of suspected toxicants and laboratory testing cannot take into account all possible toxicity changes that can occur in the receiving water. Significant nutrient loadings typically associated with nonpoint source pollution can impact biological integrity as well by increasing primary production and altering the energy flow through the system, which can change the aquatic community structure. Biological condition can also be impacted by non-chemical factors such as habitat alteration, sedimentation, and hydrologic modifications.

Biological criteria and biological surveys provide a more direct means of assessing aquatic life use attainment. Chemical monitoring is an indirect method for judging biological integrity and is not always an effective tool to evaluate all impairments. The results of a study conducted by Ohio Environmental Protection Agency illustrate this point. The study compared aquatic life use impairment, as determined by an integrated biologically based assessment and by water column chemistry testing. Exhibit B1. The biological survey showed nonattainment to aquatic life uses in 49.8 percent of the 645 stream segments where water column parameters, that had corresponding criteria, indicated no impairment. In large part the causes of impairment were organic enrichment/low dissolved oxygen, habitat modification, or siltation.

If Agency water quality management programs and water quality rules are to further the goals of the Clean Water Act, then the Agency needs to ensure protection of biological communities by establishing biological criteria and assessing against that criteria. The Agency's proposed amendments do not infer that biological criteria are superior to existing criteria but that integrated chemical, physical, and biological tools are needed to assess attainment of designated uses.

The EPA has provided guidance to the states on how to develop biological criteria. Exhibit B2. The guidance outlines a phased process for implementation. The EPA first requires the adoption of narrative biological criteria. At a future date, the use of biological surveys will be required to derive biological criteria for all types of surface waters (rivers and streams, lakes, reservoirs, and wetlands) and designated aquatic life uses. EPA considers the adoption of narrative biological criteria in Chapter 7050 the legal and programmatic basis for using ambient biological assessments in the Agency's water quality management programs. Procedures on initiating narrative biological criteria have also been provided by EPA. Exhibit B3.

C. Exemption for return waters from dredge disposal facilities.

The Agency is proposing an exemption from the secondary effluent limitations for suspended solids and phosphorus for dredge disposal facilities. This exemption is needed to address the unique treatment problems associated with dredge spoils and the history of State Disposal System permit violations at these treatment facilities.

Minnesota has approximately 20 dredge disposal facilities that discharge excess water from dredge holding ponds into the state's waters and are unable to consistently meet water quality permit limitations for total suspended solids and phosphorous. Establishing permit limitations that are not achievable by the permittee sets up permit noncompliance situations that cause many problems for both the Agency and the regulated community. These problems include but are not limited to: penalties for noncompliance, the permittee's vulnerability to citizens lawsuits, the time and expense spent on enforcement actions, permit issuance backlogs and some loss of the Agency's ability to ensure minimization of water quality impacts.

D. Eight new aquatic life standards for toxics.

In 1990 the Agency adopted aquatic life water quality standards for 53 toxic pollutants. Also, a detailed procedure (Parts 7050.0217 and 7050.0218) was added to replace very general guidance on developing site-specific criteria for other pollutants. Since 1990, Agency staff has developed 17 site-specific criteria. The Agency is proposing to adopt eight of these as statewide standards. The eight proposed standards include alachlor, antimony, atrazine, cobalt, iron, manganese, naphthalene, and thallium.

The 17 criteria were developed in response to requests from staff in the Agency's Ground water and Solid Waste, Hazardous Waste, and Water Quality Divisions to protect surface waters threatened by pollution from a variety of sources, and by pollutants for which no numerical standards were available.

The eight criteria were selected for promulgation based on the quality and quantity of the toxicity data supporting the proposed standard and on the number of times the criterion was requested to be used at different locations. Once promulgated as standards these eight criteria can be applied statewide without the need for a time consuming site-specific review. These eight criteria are the ones most likely to be needed in the foreseeable future to help set goals for remedial actions at ground water contamination sites or to set effluent limitations for point source dischargers.

The following is a more detailed discussion of why each of the eight criteria was developed and selected for promulgation.

1. Alachlor and Atrazine.

Criteria for these herbicides were originally developed for the Huntting Elevator Spill Site near Lansing, Minnesota at the request of the Agency's Ground Water and Solid Waste Division. Atrazine is the most widely used herbicide in the U.S. for corn and sorghum production. Exhibit T10. Atrazine has been found as a contaminant in ground water and surface waters in many locations. Exhibits T32 and T34. With the greater emphasis being place on the control of nonpoint source pollution, including agricultural runoff, standards for atrazine and alachlor are needed to help assess the progress of these programs.

2. Antimony, Cobalt, Iron, Manganese and Thallium.

Criteria for these elements were originally developed to set mine leachate permit limitations for the AMAX-Department of Natural Resources mine near Babbitt, MN.

Subsequently, the cobalt criterion has been used to set permit limitations for leachate at LTV mining near Birch Lake, evaluate conditions at Eveleth Taconite Mining Co., Eveleth, and assess conditions at two landfill leachate sites and two contaminated ground water sites.

The iron criterion has been used to assess the potential addition of coal ash leachate to the Red Wing municipal waste water treatment plant, and to assess the quality of landfill leachate at two sites. The manganese criterion has been used to assess leachate at the Flying Cloud, Kluver, and Dakhue sanitary landfills.

The thallium criterion has been used to evaluate clean up activities at the Twin Cities Army Ammunition Plant (TCAAP) in New Brighton.

These metals are common pollutants in mine leachate drainage, ash and landfill leachate and at some ground water clean up sites. The availability of statewide standards for these metals will expedite the review of potential pollution situations and the setting of site-specific effluent limitations in the future.

3. Naphthalene.

This criterion was developed for Harvest States Site, a contaminated grain elevator area, at the request of the Agency's Ground Water and Solid Waste Division. Naphthalene is commonly associated with coal gasification production, petroleum activities, coking facilities and wood treatment processes. The standard is needed to address clean-up activities involving these activities.

There is little or no evidence for any of the eight proposed standards that their toxicity changes significantly from one location to another. Therefore, site-by-site evaluation of the applicability of the criteria has not resulted in any changes to the original criteria. The same criterion is generally applicable at each new site. Promulgation of statewide standards for these common pollutants will facilitate the protection of Class 2 waters threatened by these pollutants.

E. Update nine current aquatic life standards for toxics.

When the Agency adopted 53 Class 2 (aquatic life) numerical standards for toxic pollutants in 1990, Agency staff indicated that the standards could be updated as part of each subsequent triennial review of Ch. 7050. Also, part 7050.0218, subpart 1 states that: "the agency may adopt new standards according to Minnesota Statutes, chapter 14, to replace those listed in part 7050.0220 that are more stringent or less stringent if new scientific evidence shows that a change in the standard is justified".

At this time the Agency proposes to update nine standards. All of the standards proposed to be updated are human health-based for Class 2A and 2Bd waters. Six of the proposed Class 2B and 2C standards are human health-based and two are toxicity-based (nickel is both). The discussion in the reasonableness part of this document on the proposed eight new standards provides a brief description of how standards are determined.

These standards are being proposed for change because the reference doses or potency slopes used to calculate the standards in 1990 have changed. Revising these nine standards will bring them up to date with the latest EPA consensus on human health risk as represented by the current reference doses and potency slopes in the Integrated Risk Information System (IRIS), or as recorded in the Health Effects Assessment Summary Tables (HEAST) for 1991. IRIS is current as of September, 1992. Exhibit T54.

IV. STATEMENT OF REASONABLENESS

Section IV describes the Agency's rationale for the proposed changes in the rule. The Agency is required by Minn. Stat. ch. 14 to make an affirmative presentation of facts establishing the reasonableness of the proposed rules. Reasonableness is the opposite of arbitrariness or capriciousness. It means that there is a rational and factual basis for the Agency's proposed action. The reasonableness of the proposed rules is discussed below.

Reasonableness of Individual Rules. The following discussion addresses the specific provisions of the proposed rules.

A. Part 7050.0110 SCOPE.

The Scope has been amended to state that Chapter 7050 applies to the physical alterations of wetlands, as well as point and nonpoint source discharges. This is reasonable because wetlands are waters of the state and waters of the state are protected against pollution from both point source discharges and alterations that can have significant adverse impacts to the designated uses. This clarification is necessary to emphasize that wetlands face both chemical and physical impacts and must be protected against these specific threats. The new language is within the Agency's existing authority (found in Minn. Stat. sec. 115.03, subd. 1, items (a) and (c)) to protect waters of the state from these impacts.

The word "both" has also been proposed to be deleted. This word is no longer appropriate with the language proposed to be added under this part.

B. Part 7050.0130 DEFINITIONS.

The State Revisor of Statutes has directed the Agency to add items A to G under this part to better identify each definition. Items A to C, E and G contain language from the current rules.

1. Item C. Nonpoint source.

The reference to Minn. Stat. sec. 115.01, subd. 15 is proposed to be changed to subd. 11 because the statute has been recodified.

2. Item D. Physical alterations of wetlands.

A definition for "physical alteration" is proposed to be added as follows:

"Physical alteration" means the dredging, filling, draining, or the permanent inundating of a wetland.

This definition is needed to clarify the narrative standards being proposed for physical alterations of wetlands. The definition is reasonable because, although the Agency must maintain the chemical, physical, and biological integrity of wetlands, the four alterations that are likely to cause a significant adverse impact on the designated uses of wetlands are dredging, filling, draining, and permanent inundation.

Dredging is defined as the excavation of the wetland bottom. Designated uses that could be adversely impacted or lost through dredging include wildlife habitat, recreation, aesthetics, and biological diversity.

Filling is defined as any solid material added to or re-suspended in a wetland that would alter its cross-section or hydrological characteristics, obstruct flow patterns, change the wetland boundary, or convert the wetland to a non-wetland. Designated uses that could be adversely impacted or lost through fill activities include low flow augmentation, biological diversity, wildlife habitat, recreation, erosion control, floodwater retention, stream sedimentation reductions, ground water recharge, aesthetics and biological diversity.

Draining is defined as the lowering of the water table by a method such as ditching, tiling, or lowering the outlet elevation. Another method to drain a wetland is to divert flow around it. Designated uses that could be adversely impacted or lost through draining activities include low flow augmentation, biological diversity, wildlife habitat, recreation, erosion control, floodwater retention, stream sedimentation reductions, ground water recharge, aesthetics and biological diversity.

Permanent inundating is defined as the raising of the water table by a physical change caused by human activity. Designated uses that could be adversely impacted or lost through permanent inundations include wildlife habitat, recreation, floodwater retention, aesthetics, and biological diversity.

Seasonal wetlands are accustomed to variations in flow. Draining or permanently inundating a wetland causes a loss of fluctuations, resulting in a decrease of plant and animal diversity and possibility a conversion to another wetland type. Exhibits W19, W20, W21 and W57. The loss of flood storage and erosion control may cause water quality impacts to downstream water bodies.

The 1987 MPCA Statement of Need and Reasonableness (SONAR) discussed the impacts of inundation on wetlands in some length. Exhibit W22. Although the contents were specific to calcareous fens, the point that even small permanent changes in water elevation can have significant adverse impacts to the designated uses of small seasonal wetlands was established.

A Biwabik Minnesota wetland is an example of how inundating can cause the gradual conversion of a bog to a marsh. The city uses a natural bog for final nutrient assimilation. The permanent inundation of the bog, the change in pH, and the introduction of nutrients from the wastewater caused the loss of Tamarack trees and the sphagnum moss that had predominated. In its place, cattails (a typical marsh plant) are growing profusely. Although total wetland acres are preserved, some of the designated uses of the natural bog have been lost.

The definition of "physical alteration" recognizes that filling, dredging, draining, and permanently inundating are the major causes of impacts in wetlands. However, as stated in part 7050.0185, subpart 9, the Agency is limiting application at this time to those activities where formal permitting or certification processes are in place in Chapter 7001. Currently, these are Section 401 Water Quality Certifications, National Pollutant Discharge Elimination System (NPDES) permits, and State Disposal System permits. Additional processes may be proposed in future revisions of this chapter if conditions warrant.

Several questions and statements from the public were received during the Agency's solicitation of outside opinion. The Agency's authority to control physical alterations of wetlands was questioned. Exhibits W13 and W23. Authority to prevent water pollution that includes physical alterations of a water's integrity is clearly contained in Minn. Stat. ch. 115.

3. Item F. Wetlands.

The definition for "wetlands" is proposed as follows:

> "Wetlands are those areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Constructed wetlands designed for wastewater treatment are not waters of the state. Wetlands must have the following attributes:
>
> (1) A predominance of hydric soils;
> (2) Inundated or saturated by surface water or ground water at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in a saturated soil condition; and

(3) Under normal circumstances support a prevalence of such vegetation."

The proposed definition is reasonable because it is consistent with both federal law (40 CFR 230.41(a)(1)) and the Wetland Conservation Act. Exhibit W53. Stating that constructed wetlands designed for wastewater treatment are not waters of the state is in accordance with federal regulations. 40 CFR 232.3(q) states that "(w)aste treatment systems, including treatment ponds or lagoons ...are not waters of the United States." Storm water is a type of wastewater. "Constructed wetlands" are designed and created for the primary purpose of treating wastewater. However, when a natural wetland is converted to a wastewater treatment system, which is not a water of the state, there is the potential for significant adverse impacts to wetland designated uses. This conversion must be mitigated.

The Agency received several comments that the Agency definition of wetlands must be consistent with the Wetland Conservation Act. Exhibits W13, W24, and W25; W53. The definition is consistent with the Wetland Conservation Act and the applicable federal regulation noted in the previous paragraph.

C. Part 7050.0150 DETERMINATION OF COMPLIANCE.

The Agency proposes to change the heading of this part from "Determination of Compliance" to "Determination of Water Quality Condition and Compliance." This change is reasonable because the process proposed to be established under part 7050.0150 will determine the quality condition of a water resource as well as compliance. The term "water quality condition" is proposed to be added to this part for the same reason.

The Agency proposes to establish biological integrity as an indicator of water quality and is part of the Agency's effort to establish narrative biocriteria. "Biocriteria" is discussed under section C of part I, Introduction, and the need for biocriteria is explained in more detail in item 3 of part III, Statement of Need, of this document.

The Agency proposes to restate EPA guidance for developing biocriteria under this part by saying that the condition of a surface water is determined by its physical, chemical, and biological qualities. Exhibit B3, page 3. The Agency currently relies mostly on water chemistry to judge a waters support of its designated uses. However, the Agency will increasingly be placing more emphasis on biological information and evaluations of physical habitat along with water chemistry data to make these aquatic life use support evaluations.

Use of biological information for determining support characteristics of a water is not new to the Agency. Biological monitoring for fecal coliform organisms and Chlorophyll a is currently used to determine if a water can support a "swimmable" use. As the Agency develops reference conditions, it will integrate biological information with chemical information to make use support determinations.

The proposed language establishes that the biological quality of a water body will be assessed by comparison to reference conditions which best represent the most natural condition for a given water body type within a geographic region. It is reasonable that the Agency proposes to establish expectations of biological quality based on a reference condition approach because it is not possible to provide specific biological community expectations for the nation or state as a whole.

Biological communities vary considerably in their structure and function from region to region, and in various types of surface waters. It is also difficult to evaluate the biological condition of a site without comparing against a benchmark. Implicit in the definition of biocriteria is the notion of comparison. The reference condition provides the biological community characteristics against which other similar sites can be measured.

The preferred way in which the reference condition for a waterbody or site will be established is from biological information gathered from natural settings that are unimpacted or minimally impacted by physical alteration, development, or discharges. These reference sites will be regionally representative of the the same types of waterbodies or sites in terms of their intrinsic watershed characteristics. Reference sites for a region will be sought where there is natural vegetation, unaltered channel and bed morphometry, and a natural hydrology. In regions where data has not been gathered from reference sites or the area has been extensively degraded, historical records from the region and/or consensus of expert opinion may be alternatively used to determine the reference condition.

The reference condition will be used as one method for assessing designated aquatic life use attainment. If a waterbody or site deviates considerably from the characteristics of the reference condition, then the aquatic life use designation will not be supported from a biological perspective. For purposes of determining the impacts of specific activities or discharges, control sites will also be developed. Control sites may be "upstream" locations, "far field" transects, or paired watersheds that are similar to the site under investigation but without the impact under evaluation. The methods for establishing controls will follow procedures similar to those given in EPA's Rapid Bioassessment Protocols for Use in Streams and Rivers Chapter 8.3. Exhibit B4.

In developing the reference condition for each designated use and waterbody type, the entire aquatic community will not be evaluated. Indicative communities that are considered good indicators of the overall biological condition in specific surface water body types will be used instead. Indicative communities are groups of organisms such as fish, macroinvertebrates, macrophtyes, or algae. Evaluating one or more of these selected communities is seen as being cost effective, practical and provides sufficient information to determine overall biological condition.

In sampling the reference condition, control sites, and/or sites under investigation, consistent sampling methods will be used to determine community characteristics. Habitat structure will also be assessed

because interpretation of biological data has to be considered in the context of habitat quality. The characteristics of the indicative communities will be analyzed through reliable measures of community structure and function, which are referred to as metrics. Structural metrics will be chosen that describe the composition of the assemblage such as number of species, number of specific species, composition of tolerant and intolerant species and biological diversity. Functional metrics will consider ecological processes such as community photosynthesis and respiration or proportion of various trophic levels. An example of an index that uses an array of structural and functional metrics is the Index of Biotic Integrity (IBI). Exhibit B5. The IBI is a fish community based index developed for midwestern streams and rivers. The index is comprised of 12 metrics. These metrics evaluate species richness and composition, indicator taxa (tolerant and intolerant), trophic guilds, fish abundance, and external anomalies.

Changes are being proposed to correct the rule citation that references effluent limitations for point source dischargers. The citation will be changed from "part 7050.0211, subpart 1" to "part 7050.0211 or 7050.0212."

This part was written to establish how compliance is determined for all types of point source dischargers. However, part 7050.0211, subpart 1, does not include the limitations for existing trickling filters, pond facilities or discharges of industrial or other wastes. The proposed citation identifies the spectrum of possible point source dischargers and their effluent limitations and, in turn, completes the list of options for considering dilution effects.

D. Part 7050.0170 NATURAL WATER QUALITY.

Part 7050.0170 deals with several important issues regarding natural background concentrations of pollutants. It provides guidance on the application of water quality standards when background concentrations approach or exceed the standards. Also, it provides general guidance on how background concentrations are used when water quality standards become the basis for setting effluent limitations.

The current language in this part is unnecessarily complex and convoluted, making it difficult for the reader to understand and apply it. The Agency proposes to clarify and simplify the wording without changing the meaning of the existing language.

Two minor substantive changes are being proposed as part of the effort to clarify this part. They are the addition of 1) a definition of natural conditions, and 2) references to the nondegradation parts in the current rule. The current language of part 7050.0170 does not define "natural (background) conditions", and a definition is needed to make this part more explicit. Secondly, one of the provisions of part 7050.0170 is in essence a nondegradation statement. The Agency proposes to link this statement to parts 7050.0180 and 7050.0185 so that the existing nondegradation procedures apply to this statement. The intent is to make these changes and simplify the wording without changing the primary meaning of this part.

The current language can be broken out into four separate provisions as follows:

1. Natural background concentrations of pollutants that are below applicable standards will be taken into account when determining allowable loadings from point or nonpoint sources.

2. When natural background concentrations are known and exceed the standard, the background concentrations can be used as the standard.

3. Natural background concentrations below (or better quality than) the standard may be used in lieu of the applicable standard, if the Commissioner can demonstrate the need for protecting the receiving water at its current high quality. This is essentially a nondegradation standard.

4. The adoption of standards will follow the guidance in the rule, but reasonable changes can be made to the standards based on evidence brought forth at a public hearing.

It is proposed to revise the current wording for provisions 1,2 and 3 listed above; no changes are proposed for number 4. The wording of the revised language is intended to preserve these meanings while making part 7050.0170 easier to understand.

The addition of a definition of "natural conditions" will clarify how this term is used in the context of this part. It is proposed to define natural conditions to mean water quality that:

a. is defined by monitoring programs,
b. is relatively unaffected by man-made sources of pollution, both point and nonpoint,
c. is not affected by physical alterations to wetlands, and
d. can be predicted based on data from a similar watershed when data are unavailable for the watershed of interest.

Most of these points are self explanatory. Point "b." will probably require more interpretation than the others. The Agency understands that no surface water in the state is entirely free from anthropogenic pollution. For example, atmospheric deposition of pollutants affects all waters in Minnesota. Careful evaluation will be needed to identify natural conditions affected only by ubiquitous pollution as opposed to natural conditions affected by identifiable local sources.

The provision of part 7050.0170 that allows the Commissioner, when there is sufficient justification, to preserve natural conditions that are better than the water quality standards (number 3 above), is a nondegradation clause. Therefore, the Agency believes it should be tied to existing nondegradation provisions and propose to add the statement: "The reasonable justification must meet the requirements under parts 7050.0180 and 7050.0185." These requirements will provide a process

that limits the Commissioner's discretion and uses the same levels of protection, the same social and economic tests, and other nondegradation provisions that are in the nondegradation parts to justify protecting a given water at a higher level.

Neither this addition, nor the addition of the definition of natural conditions are intended to make the rule any more or less stringent than it is now.

E. Part 7050.0180 NONDEGRADATION FOR OUTSTANDING RESOURCE VALUE WATERS.

In 1984, the Agency revised its nondegradation policy in Chapter 7050 to include a special category of waters identified as Outstanding Resource Value Waters (ORVWs). As stated in part 7050.0180, subpart 2, item A, waters assigned the ORVW designation are waters of the state with "high water quality, wilderness characteristics, unique scientific or ecological significance, exceptional recreational value or other special qualities which warrant stringent protection from pollution."

Waters designated as ORVWs are assigned in one of the following protection level categories:

Prohibited Discharges. Waters listed under the prohibited discharges category are afforded the highest level of protection in that no new or expanded discharges are allowed to these waters. Discharges to waters in the prohibited discharges category, in existence at the time a given water is designated as an ORVW is permitted to continue discharging to these waters so long as they remain at or under their National Pollutant Discharge Elimination System (NPDES) permit mass loadings for regulated pollutants contained in the applicable permit and no new pollutants are discharged.

Restricted Discharges. Under the restricted discharges category, new or expanded discharges are prohibited from discharging to these waters, unless there is no prudent and feasible alternative to the discharge. If there is no feasible and prudent alternative, the discharge will be restricted to protect the natural water quality of the receiving water in order to preserve the functional integrity of the characteristics or features which contribute to the water's unique, scientific or recreational value.

When the nondegradation provisions for the ORVWs were first adopted into rule, the Agency recognized that its list of ORVWs was not all inclusive and that additional waters would likely be added through future rulemaking proceedings. Such is the case in this rulemaking proceeding in that additional waters are proposed as ORVWs under subpart 4 and subpart 6b.

1. Subpart 4. DNR designated scientific and natural areas.

Scientific and natural areas (SNA) are areas of the state that possess exceptional scientific or educational value with respect to various natural features. See Minn. Stat. sec. 86A.05, subd. 5 items (a) and (b) (1992). To be designated, each site must possess outstanding

natural features of statewide significance such as unusual landforms, rare and endangered plant and animal communities, or other features of scientific and exceptional value. The MDNR manages these areas to preserve, perpetuate, and protect from unnatural influences the scientific and educational resources within them. Minn. Stat. sec. 86A.05, subd. 5, item (c) (1992). In support of these efforts to preserve and protect these resources, discharges to SNAs or other activities which would impair the natural features of the SNAs are prohibited under the provisions of part 7050.0180, subpart 3.

One SNA, identified by the MDNR as the Falls Creek SNA in Washington County, is proposed to be added as items M under part 7050.0180, subpart 4.

a. Item M. Falls Creek

The Falls Creek SNA, also referred to in certain references as the Cedar Bend White Pines site, has been described as one of the most diverse natural areas remaining in Washington County. The site includes two major physical geographical areas, a large ravine complex and a low terrace of the St. Croix River. Of particular significance is the fact that the area appears to contain a stand of virgin timber, which is reportedly quite rare for the St. Croix valley. The site contains a number diverse habitats ranging from cool, moist stream bottoms to very dry ridge tops. Two rare plant populations, kitten-tails (Besseya bullii) and bog bluegrass (Poa paludigena) occur on the site. Portions of Falls Creek, a designated trout stream, are also within the boundaries of this SNA. A further discussion of this site can be found in the Falls Creek SNA Project Evaluation report, Exhibit C1.

2. Subpart 6b. Calcareous fens.

The word "fen" has been used to describe a variety of different types of wetlands. In Europe, the terms has been applied to peatlands which have at least a portion of their source of water coming from ground water which has percolated through mineral soil or bedrock. In North America, similar types of peatlands are further differentiated into swamps, fens, and marshes, based primarily on their dominant vegetation. In the midwestern states, this terms has a narrower definition. In this region, a fen is considered to be a grassland on a wet and springy site, with an internal flow of water rich in calcium and magnesium bicarbonates and sometimes calcium and magnesium sulfates. "Springy" indicates the presence of peat deposits and "internal flow" refers to the availability of a constant supply of ground water.

Calcareous fens are a type of fen which can be characterized by a distinctive floristic species composition. Calcareous fens are typically grass-sedge dominated peatlands which apparently only develop where surface discharges of calcium and magnesium bicarbonate-rich ground water occur. The ground water is typically discharged from dolomitic bedrock and/or calcareous glacial deposits. These calcareous fens have a high pH (7.0 to 8.2) and high mineral content (Ca^{+2} 90-160 mg/l) and are maintained primarily by the ground water discharges.

Calcareous fens are dependent upon very localized water chemistry and hydrologic conditions. The circumstances producing the proper conditions necessary for the formation of calcareous fens are not common, making these fens a very rare and unique type of wetland. It has been theorized that as the ground water, supersaturated with calcium and magnesium bicarbonates, reaches the surface, its temperature increases and the calcium and magnesium bicarbonates precipitate out, thereby creating a harsh, alkaline soil condition. Since the cold internal ground water flows have low oxygen and nutrient concentrations, conditions are favorable for the formation and accumulation of peat. Many calcareous fens are noticeably raised in the middle, exhibiting a convex profile which reflects this build-up of peat.

Calcareous fen plant communities are characterized by a distinctive assemblage of plants adapted to the wet, calcareous peat soils. Many of these plants, called calcicoles, are rare in Minnesota. In this state, calcareous fens may be dominated by herbaceous plants (sedges, grasses and forbs) or by certain woody shrubs. Table I lists the calciphilic species found in Minnesota calcareous fens and that serve as indicator species for this plant community. Table II lists the endangered, threatened or special concern species found in these fens. Minn. Rules part 6134.0300 (1991) provides a list of endangered, threatened or special concern species.

TABLE I

Calciphilic Species Found in Minnesota Calcareous Fens

Scientific Name	Common Name
Aster junciformis	Rush aster
Valeriana edulis var. ciliata	Valerian
Betula pumila	Bog birch
Potentilla fruticosa	Shrubby cinquefoil
Lobelia kalmii	Brook lobelia
Parnassia glauca	Grass of Parnassus
Solidago riddellii	Riddell's goldenrod
Triglochin maritima	Arrowgrass
Gentiana procera	Lesser fringed gentian
Utricularia intermedia	Small bladderwort
Liparis loeselii	Yellow twayblade
Pedicularis lanceolata	Swamp lousewort
Carex sterilis	a sedge
Carex prairea	a sedge
Muhlenbergia glomerata	Fen muhly grass
Lysimachia quadriflora	Loosestrife
Cladium mariscoides	Twig-rush
Rhynchospora capillacea	Fen beak-rush
Scleria verticillata	Nut-rush
Gerardia paupercula	Pink gerardia

Source: MDNR Minnesota Natural Heritage Program

TABLE II

Rare Plant Species Found in Minnesota Calcareous Fens

Scientific Name	Common Name	Status
Carex sterilis	a sedge	State threatened1
Cladium mariscoides	Twig-rush	State special concern2
Scleria verticillata	Nut-rush	State threatened
Rhynchospora capillacea	Fen beak-rush	State threatened
Valerian edulis var. ciliata	Valerian	State threatened
Tofieldia glutinosa	False asphodel	State special concern
Eleocharis rostellata	Beaked spike rush	State threatened
Triglochin palustris	Arrowgrass	State special concern
Cypripedium candidum	White ladyslipper	State special concern

[1]Species listed as threatened by the state are species that may become endangered if their populations are significantly reduced. Species assigned to this category might be characterized by:

(1) Populations that have always been small and any decline in their numbers would be significant and/or,
(2) Populations that have already undergone an apparent decline and for which any further decline would be detrimental.

[2]Species listed as of special concern by the state are species that are not listed as threatened or endangered but do require special attention. Included are:

(1) Species subjected to species-specific exploitation; and
(2) Species whose habitats and habitats lend them to being particularly vulnerable to disturbance.

Source: MDNR Minnesota Natural Heritage Program

In Minnesota, calcareous fens have a sporadic distribution throughout the prairie region of the state. The calcareous fens in Minnesota occur in three broad geomorphic areas: 1) at the base of terrace escarpments in the major river valleys of southern Minnesota; 2) sides of glacial hills in the morainic uplands of western Minnesota; and 3) adjacent to Glacial Lake Agassiz beach ridges in northwestern Minnesota. The 31 calcareous fens already listed in subpart 6b of part 7050.0180 and the additional calcareous fens proposed for ORVW designation have been identified by the Natural Heritage Program of the Section of Wildlife, MDNR. The Natural Heritage Program identifies and locates significant examples of Minnesota's plant and animal species, plant community types, special wildlife habitats and special geologic features. Most of the information presented in this Statement of Need and Reasonableness (SONAR) on fens is directly from the Natural Heritage Program element abstract developed for the calcareous fen plant community. Exhibit C2.

Currently there are 31 calcareous fens identified as ORVWs in part 7050.0180, subp 6b. In addition to adding the 37 proposed calcareous fens to this list, the Agency is proposing some name changes for those fens currently in the rule to correspond to coding convention used by

the MDNR to inventory these plant communities in its Natural Heritage data base. The number following the name of the fen is the assigned occurrence number which uniquely identifies the record of information for the particular fen. The following list of calcareous fens reflect these name changes.

Fens listed according to current rule under part 7050.0180, subpart 6b:

A. Spring Creek WMA NHR fen, 34; Becker County (T.142, R.42, S.13); proposed to be part 7050.0180, subpart 6b, item A.

B. ~~B-B-Ranch~~ Felton Prairie fen, 36; Clay County (T.141, R.46, S.13); proposed to be part 7050.0180, subpart 6b, item C, subitem (5).

C. Barnesville WMA fen, 10; Clay County (T.137, R.45, S.1); proposed to be part 7050.0180, subpart 6b, item C, subitem (2).

D. Felton Prairie fen, 28; Clay County (T.142, R.46, S.36); proposed to be part 7050.0180, subpart 6b, item C, subitem (4).

E. Spring Prairie fen, 37; Clay County (T.140, R.46, S.11); proposed to be part 7050.0180, subpart 6b, item C, subitem (9).

F. Clearbrook fen, 61; Clearwater County (T.149, R.37, S.17); proposed to be part 7050.0180, subpart 6b, item D.

G. Fort Snelling State Park fen, 25; Dakota County (T.027, R.23, S.4); proposed to be part 7050.0180, subpart 6b, item E, subitem (1).

H. Minnesota Valley NWR fen, 63; Dakota County (T.27, R.24, S.34); proposed to be part 7050.0180, subpart 6b, item E, subitem (2).

It should be noted that the entry for this fen currently under part 7050.0470, subpart 5, item C, subitem (6) includes section 27 in the legal description. The Agency is proposing to delete reference to section 27 because MDNR has designated the fen in this section as noncalcareous.

I. Nicols Meadow fen, 24; Dakota County (T.27, R.23, S.18); proposed to be part 7050.0180, subpart 6b, item E, subitem (3).

J. Perched Valley ~~WMA~~ Wetlands fen, 2; Goodhue County (T.112, R.13, S.8); proposed to be part 7050.0180, subpart 6b, item F, subitem (2).

K. Heron Lake fen, 45; Jackson County (T.103, R.36, S.29); proposed to be part 7050.0180, subpart 6b, item H, subitem (1).

L. Thompson Prairie fen, 20; Jackson County (T.103, R.35, S.7); proposed to be part 7050.0180, subpart 6b, item H, subitem (2).

M. Fish Hatchery fen, 60; Le Sueur County (T.110, R.26, S.14); proposed to be part 7050.0180, subpart 6b, item I, subitem (1).

N. ~~St. Peter~~ Ottawa WMA fen, 7; Le Sueur County (T.110, R.26, S.11); proposed to be part 7050.0180, subpart 6b, item I, subitem (3).

O. ~~Altona State Wildlife Management Area~~ Hole-in-the-Mountain Prairie fen, 6; Lincoln and Pipestone Counties (T.108, R.46, S.1, T.109, R.45, S.31); proposed to be part 7050.0180, subpart 6b, items J and T, subitem (2).

It should be noted that the legal description proposed under part 7050.0180 is the legal description currently identified for Altona State Wildlife Management Area under part 7050.0470, subpart 9, item B, subitem (3). Township 109, Range 45, Section 31, is not identified in the legal description on Exhibit C3 (MDNR Cal fen locations and ownership in MN) because the computer system used to generate the list will accept only information for one township.

P. Waubun WMA fen, 11; Mahnomen County (T.143, R.42, S.25); proposed to be part 7050.0180, subpart 6b, item K.

Q. ~~Truman~~ Perch Creek WMA fen, 33; Martin County (T.104, R.30, S.7); proposed to be part 7050.0180, subpart 6b, item M.

R. Fort Ridgely fen, 21; Nicollet County (T.111, R.32, S.6); proposed to be part 7050.0180. subpart 6b, item O, subitem (1).

S. Le Sueur fen, 32; Nicollet County (T.111, R.26, S.16); proposed to be part 7050.0180, subpart 6b, item O, subitem (2).

T. ~~Adrian~~ Westside fen, 59; Nobles County (T.102, R.43, S.11); proposed to be part 7050.0180, subpart 6b, item P.

U. ~~Primula Meadow (~~Faith Prairie fen~~)~~, 27; Norman County (T.144, R.43, S.25); proposed to be part 7050.0180, subpart 6b, item Q, subitem (4).

V. ~~Rock Dell~~ Nelson WMA fen, 5; Olmsted County (T.105, R.15, S.16); proposed to be part 7050.0180, subpart 6b, item R, subitem (2).

W. Burke ~~State Wildlife Management Area~~ WMA fen, 57; Pipestone County (T.106, R.44, S.28); proposed to be part 7050.0180, subpart 6b, item T, subitem (1).

X. Chicog ~~WMA~~ Prairie fen, 41; Polk County (T.148, R.45, S.20, 29); proposed to be part 7050.0180, subpart 6b, item U, subitem (3).

It should be noted that the entry for this fen under part 7050.0470, subpart 3, item C, subitem (3) includes section 33 in the legal description. The MDNR has assigned three occurrence numbers to the fens at this site: one in sections 20 and 29 (occurrence number 41) and one in section SWNE33 (occurrence number 40) and one in section NENE33 (occurrence numbers 42). Therefore, the Agency is proposing to make three separate entries under part 7050.0470 for the one existing entry. The second and third entries under part 7050.0180 are proposed as follows:

Chicog Prairie fen, 40; Polk County (T.148, R.45, S.33); proposed to be part 7050.0180, subpart 6b, item U, subitem (2).

Chicog Prairie fen, 42; Polk County (T.148, R.45, S.33); proposed to be part 7050.0180, subpart 6b, item U, subitem (4).

Y. ~~Kertsonville WMA~~ Tympanuchus Prairie fen, 38; Polk County (T.149, R.45, S.16); proposed to be part 7050.0180, subpart 6b, item U, subitem (7).

Z. ~~Pankrats~~ Tympanuchus Prairie fen ~~(Svedarsky's fen)~~, 26; Polk County (T.149, R.45, S.17); proposed to be part 7050.0180, subpart 6b, item U, subitem (6).

AA. Ordway Prairie fen, 35; Pope County (T.123, R.36, S.30); proposed to be part 7050.0180, subpart 6b, item V, subitem (3).

BB. Cannon River Wilderness Area fen, 18; Rice County (T.111, R.20, S.34); proposed to be part 7050.0180, subpart 6b, item X, subitem (1).

CC. Savage fen, 66; Scott County (T.115, R.21, S.16); proposed to be part 7050.0180, subpart 6b, item Y, subitem (2).

It should be noted that the entry for this fen currently under part 7050.0470, subpart 3, item C, subitem (3) includes section 17 in the legal description. The MDNR has assigned separate occurrence numbers to the fens at this site: one in section 16 (occurrence number 66) and two in section 17 (occurrence numbers 22 and 67). Therefore, the Agency is proposing to make three separate entries under part 7050.0470 from the one existing entry. The second and third entries under part 7050.0180 are proposed as follows:

Savage fen, 22; Scott County (T.115, R.21, S.17); proposed to be part 7050.0180, subpart 6b, item Y, subitem (1).

Savage fen, 67; Scott County (T.115, R.21, S.17); proposed to be part 7050.0180, subpart 6b, item Y, subitem (3).

DD. ~~Kennedy~~ Wiscoy fen, 58; Winona County (T.105, R.7, S.15); proposed to be part 7050.0180, subpart 6b, item AA.

EE. Sioux Nation WMA NHR fen, 29; Yellow Medicine County (T.114, R.46, S.17); proposed to be part 7050.0180, subpart 6b, item BB, subitem (1).

New calcareous fens proposed to be added to Chapter 7050 are listed below as they will appear under part 7050.0180, subpart 6b. The noted exhibits refer to the site maps showing the locations of the calcareous fens proposed for ORVW designation during the current rulemaking revision.

B. Carver County: Seminary fen, 75 (T.116, R.23, S.35), Exhibit C5;
C. Clay County:
   (1) Barnesville Moraine fen, 44 (T.137, R.44, S.18), Exhibit C6;
   (3) Barnesville WMA fen, 43 (T.137, R.44, S.18), Exhibit C7;
   (6) Felton Prairie fen, 48 (T.142, R.45, S.31), Exhibit C8;
   (7) Felton Prairie fen, 53 (T.141, R.46, S.24), Exhibit C9;
   (8) Haugtvedt WPA North Unit fen, 54 (T.137, R.44, S.28, 29), Exhibit C10;
F. Goodhue County:
   (1) Holden 1 West fen, 3 (T.110, R.18, S.1), Exhibit C11;
   (3) Red Wing fen, 72 (T.113, R.15, S.21), Exhibit C12;

G. Houston County: Houston fen, 62 (T.104, R.6, S.26), Exhibit C13;
I. Le Sueur County:
(2) Ottawa Bluffs fen, 56 (T.110, R.26, S.3), Exhibit C14;
L. Marshall County:
(1) Tamarac River fen, 71 (T.157, R.46, S.2), Exhibit C15;
(2) Viking fen, 68 (T.155, R.45, S.18), Exhibit C16;
(3) Viking fen, 70 (T.155, R.45, S.20), Exhibit C17;
(4) Viking Strip fen, 69 (T.154, R.45, S.4), Exhibit C18;
N. Murray County: Lost Timber Prairie fen, 13 (T.105, R.43, S.2), Exhibit C19;
Q. Norman County:
(1) Agassiz-Olson WMA fen, 17 (T.146, R.45, S.22), Exhibit C20;
(2) Faith Prairie fen, 15 (T.144, R.43, S.26), Exhibit C21;
(3) Faith Prairie fen, 16 (T.144, R.43, S.35), Exhibit C22;
(5) Green Meadow fen, 14 (T.145, R.45, S.35, 36), Exhibit C23;
R. Olmsted County:
(1) High Forest fen, 12 (T.105, R.14, S.14, 15), Exhibit C24;
S. Pennington County:
(1) Sanders East fen, 65 (T.153, R.44, S.7), Exhibit C25;
(2) Sanders East fen, 74 (T.153, R.44, S.7), Exhibit C26;
(3) Sanders fen, 64 (T.153, R.44, S.18, 19), Exhibit C27;
U. Polk County:
(1) Chicog Prairie fen, 39 (T.148, R.45, S.28), Exhibit C28;
(5) Kittleson Creek Mire fen, 55 (T.147, R.44, S.6, 7), Exhibit C29;
V. Pope County:
(1) Blue Mounds fen, 1 (T.124, R.39, S.15, 14), Exhibit C30;
(2) Lake Johanna fen, 4 (T.123, R.36, S.29), Exhibit C31;
W. Redwood County:
(1) Swedes Forest fen, 8 (T.114, R.37, S.19, 20), Exhibit C32;
(2) Swedes Forest fen, 9 (T.114, R.37, S.22, 27), Exhibit C33;
X. Rice County:
(2) Cannon River Wilderness Area Fen, 73 (T.111, R.20, S.22), Exhibit C34;
Z. Wilkin County:
(1) Anna Gronseth Prairie fen, 47 (T.134, R.45, S.15), Exhibit C35;
(2) Anna Gronseth Prairie fen, 49 (T134, R.45, S.10), Exhibit C36;
(3) Anna Gronseth Prairie fen, 52 (T.134, R.45, S.4), Exhibit C37;
(4) Rothsay Prairie fen, 46 (T.136, R.45, S.33), Exhibit C38;
(5) Rothsay Prairie fen, 50 (T.135, R.45, S.15, 16), Exhibit C39;
(6) Rothsay Prairie fen, 51 (T.135, R.45, S.9), Exhibit C40;
BB. Yellow Medicine County:
(2) Yellow Medicine fen, 30 (T.115, R.46, S.18), Exhibit C41.

Calcareous fens in this state vary greatly in size and quality. Since fens are fed by ground water and not dependent on seasonally fluctuating amounts of precipitation, a constant microenvironment can be maintained, producing a climax vegetation type which has remained stable for thousands of years. For this reason, fens often harbor relict plant species that are uncharacteristic or absent from other vegetation types. Due to human activities, however, a number of these fens have been seriously degraded and have lost much of their original character. In general, impacts to calcareous fens are evidenced by a loss of calicoles which in turn are replaced by weedy opportunistic plant species that take advantage of the changed habitat conditions.

The major threats to calcareous fens come from ditching, drainage, permanently inundating, and filling operations relating to agricultural activities, commercial development, gravel mining activities and highway construction. Water pollution impacts from those activities and from point source discharges have the potential to significantly alter the quality and quantities of the water upon which fen development and maintenance are so dependent. For this reason, the Agency believes that it is reasonable to propose that the calcareous fens listed in part 7050.0470 be designated as Outstanding Resource Value Waters. By placing the calcareous fens under the restricted discharges category of the nondegradation section of the rule, activities which do or could potentially contribute to the degradation of the waters of these fens can be prohibited or more stringently controlled, depending on the outcome of the prudent and feasible test referenced in part 7050.0180, subpart 6. These prohibitions and controls can apply to both point source discharges as defined in Minnesota Statutes section 115.01, subdivision 11, and to nonpoint source impacts resulting from land management and land use activities.

Since calcareous fens are so dependent upon specific hydrological conditions, impacts to water quantities in these fens resulting from certain land use activities, and to lesser degree from point source discharges, become important considerations in their protection and preservation. Too much water or too little water can disrupt the unique habitat and can lead to a shift in the plant species composition to one where common plant species become more abundant.

Under item (b) of Minnesota Statutes section 115.01, subdivision 13, pollution of waters is defined as, "the alteration made or induced by human activity of the chemical, physical, biological or radiological integrity of waters of the state." A change in the physical integrity of waters of the state, in this instance a change in the quantity of water present in the calcareous fen needed to maintain a suitable habitat for this plant community, will be construed as pollution of waters.

Therefore, within the context of the Agency's regulatory authorities, a land use activity, or a point source discharge (notwithstanding its chemical quality), which could potentially bring about a detrimental change in the water quantity present in these fens will trigger the need for the prudent and feasible analysis.

In 1991 the State Legislature passed the Wetlands Conservation Act which contained a provision stating that calcareous fens, as identified by the MDNR commissioner, may not be filled, drained, or otherwise degraded, wholly or partially, by any activity, unless the MDNR commissioner, under an approved management plan, decides some alteration is necessary. Minn. Stat. sec. 103G.223. Standards and criteria for identification, protection, and management of calcareous fens have also been proposed by the Board of Soil and Water Resources in Minn. Rules pts. 8420.1010 to 8420.1060, which relate to the Wetlands Conservation Act. Exhibit W10. While the prudent and feasible analysis referenced above is a process whereby the Agency Board has the ultimate decision making authority on the existence or lack of prudent and feasible alternatives, the Agency plans to cooperate with the MDNR on issues regarding calcareous fen protection.

The proper hydro-geological conditions which allow for the formation of calcareous fens are uncommon occurrences throughout the State. The rare and endangered plant species they support make these fens unique resources deserving of a high degree of protection. The Agency therefore believes that it is reasonable to designate these calcareous fens as ORVWs. Essentially, all of the calcareous fens identified by the MDNR to date are being proposed for this designation. In doing so, it is hoped that an element of protection will be added to aid in the effort to preserve these unique wetland plant communities.

A county-by-county inventory conducted by the MDNR of rare natural features is currently proceeding by way of the Minnesota County Biological Survey. As this survey progresses, additional fens will likely be identified and inventoried in the future. As new calcareous fens are identified, it is the Agency's intent, in cooperation with the MDNR, to include additional calcareous fens as ORVWs in subsequent rule revisions. In those instances where a MDNR newly identified calcareous fen is threatened by a potential discharger or certain land use activity, the Agency will consider the calcareous fen as an unlisted outstanding resource value water pursuant to the provisions of part 7050.0180, subpart 7.

F. Part 7050.0185 NONDEGRADATION FOR ALL WATERS.

1. Subpart 1. Policy.

The policy statement is proposed to be revised to add phrases that: 1) emphasize that the beneficial uses inherent in the State's water bodies, including wetlands, are valuable public resources and 2) emphasize that wetland alteration can cause a significant degradation on wetland designated uses and that one of these designated uses is habitat. These phrases are reasonable because they serve to clarify the rules and propose no changes to protection levels of the standards. Wetlands are waters of the state and protected by the existing standards. "Wetland" must now be identified in the rules because of the effort to develop water quality standards that more specifically apply to wetlands.

2. Subpart 2. Definitions.

The reference to Minn. Stat. sec. 115.01, subd. 14 is proposed to be changed to subd. 20 because the statute has been recodified.

3. Subpart 4. Additional requirements for significant discharges.

The word "and" is proposed to be deleted because it does not belong in the sentence and confuses the meaning of the rule. The sentence was intended to refer to the economic and social development impacts of a project not the economic, social development and impacts of a project. "And" was mistakenly included during the original drafting of this subpart.

4. Subpart 9. Physical alterations of wetlands.

The Agency is proposing a new subpart to establish nondegradation rules for projects that propose to physically alter wetlands. The subpart is proposed as follows:

> Physical alteration of a wetlands. The permit or certification applicant shall comply with part 7050.0186 if there is a proposed physical alteration that has the potential for a significant adverse impact to a designated use of a wetland and that is associated with a project that requires a National Pollutant Discharge Elimination System (NPDES) permit, a 401 certification under parts 7001.1400 to 7001.1470, or a state disposal system permit.

Nondegradation is proposed to be accomplished through the mitigation sequence. In general, nondegradation means that there can be no net increase in pollution discharges. Physical alteration results from a discharge. It is reasonable to use the mitigative process as the standard for nondegradation because the process is specifically written to replace wetlands that have been significantly altered such that one or more designated uses are lost. Exhibit W55 contains a matrix of wetland designated uses and the most common potential significant physical impacts.

G. Part 7050.0186 WETLAND MITIGATION.

This is a new part that specifies the steps and conditions for the mitigative process that is identified in part 7050.0185, subpart 9 as the nondegradation standard for the physical alteration of wetlands.

1. Subpart 1. Policy.

The policy statement emphasizes that wetlands must be protected from significant adverse impacts on their designated uses. It also identifies the wetland mitigative process as the means to achieve nondegradation of wetland designated uses.

2. Subpart 2. Wetland mitigation principles.

Subpart 2 describes the mitigative sequence of avoiding, minimizing, and mitigating. This is reasonable because the process is consistent with the Agency's present review process for Section 401 water quality certification applications. The sequence is also consistent, and complements, 40 CFR 230.10, 40 CFR 1508.20, and the Wetland Conservation Act. Exhibits W17, W18, W27, W28, W53, and W58. The process of using the mitigative sequence involves negotiations between the applicant and the Agency, with specific case-by-case considerations being the paramount factor.

The Clean Water Act Section 404(b)(1) guidelines were promulgated in 1982. Since then the Agency has conditioned waivers of Section 401 water quality certifications for fill activities with the requirement that sequencing be satisfied. Exhibit W59. As the water quality standards are currently written, a fill activity violates water quality standards because of suspended solids exceedances and impacts to the biota in the wetland. This necessitated the use of a conditional waiver. The current revision would allow the certification process to

proceed without the necessity of a waiver because the mitigation sequence is being incorporated into the water quality standards, which satisfied the nondegradation requirements.

The most common types of activities requiring use of the mitigative process in Minnesota are fill activities associated with building developments and road construction. For example, during the last two years, only four agriculture-related projects (out of a total of 121 projects requiring Section 401 certification) were reviewed for water quality considerations and only one was required to have wetland replacement as a condition of the Section 401 Water Quality Certification waiver. Exhibit W59 contains several examples of projects the Agency reviews. In all cases, either the conditional waiver requires use of the mitigative sequencing or the proposed project is denied because nondegradation and mitigative sequencing requirements were not met.

3. Subpart 3. Determination of wetland dependency.

This subpart was added to ensure consistency with, and to complement, the Wetland Conservation Act. A project is wetland dependent if wetland features, functions, or values are essential to fulfill the basic purposes of the project. Projects that are wetland dependent are assumed to be unable to avoid having some impact on a wetland. Examples of wetland dependent activities are growing rice and constructing wetland interpretive trails. These projects are directed to the second step of the mitigative sequence, impact minimization.

4. Subpart 4. Impact avoidance.

This subpart emphasizes that the first step in the mitigative sequence is avoidance to the extent possible. According to 40 CFR 230.10, because wetlands are "special aquatic sites", there is a presumption that prudent and feasible alternatives that will not involve wetlands are available. Exhibits W28, W50, W52 and W58. It is the responsibility of the applicant to demonstrate otherwise. As noted in subpart 3, activities that meet the wetland dependency requirement may go directly to the second step in the mitigative sequence.

As an example, the Agency denied Section 401 certification for a proposed fill activity in 1987 (#NCSCO-RF 87-830-77 in Exhibit W59) because impacts to the wetland could be avoided, but were not.

The term "prudent and feasible" is one that is well known in environmental statutes. The phrase appears in the Minnesota Environmental Rights Act, Minn. Stat. sec. 116B.09, subd. 2, and in the Minnesota Environmental Policy Act, Minn. Stat. sec. 116D.04, subd. 6. To paraphrase, no Agency may allow an action that results in pollution if there is a reasonable alternative which avoids the impact.

5. Subpart 5. Impact minimization.

The second step in the sequence is impact minimization. All projects that can not avoid impacts to wetlands must actively pursue minimizing significant adverse impacts to wetland designated uses.

The seven factors to consider when evaluating attempts to minimize a project's impact on a wetland are consistent with, and complement, Minnesota Rules, part 8420.0520, subp. 4 (Exhibit W10) and 40 CFR 230, Subpart H. Spatial considerations involve reviewing the footprint of the proposed project. If rotating a project would avoid the wetland yet still meet the project purpose, that alternative should be selected. The location of existing features and the type of project would be reviewed for minimization potential also.

In addition to project-specific minimization considerations, landscape considerations must also be reviewed. These include topographic, hydrologic, and biotic information, wetland designated uses and distribution, and consideration of individual and cumulative impacts to wetlands. 40 CFR 230, Subpart H specifies actions to minimize adverse effects, including considerations to minimize impacts to plants and animals.

6. Subpart 6. Impact compensation.

The last step in the sequence is compensatory mitigation for those impacts that could not be avoided. Replacement wetlands are required to maintain nondegradation of wetland designated uses.

The mitigative process in subpart 6 specifically states a preference for restored wetlands over created wetlands. Although some types of wetlands have been created with short term success, most restored wetlands will have better long term success for most types of wetlands in providing the uses of natural undisturbed wetlands. Exhibits W24, W49 and W58.

Restored wetlands are re-established in an area that was historically wetlands but which provides no or minimal wetland uses because of past alterations, such as filling or draining.

Created wetlands are constructed in areas that were not wetlands in the past. These should have, at a minimum, undulating bottom contours, shallow side slopes, and irregular edges. These attributes will enable created wetlands to increase the likelihood of replacing the designated uses of natural wetlands that were impacted. Exhibits W10 and W49.

The mitigative process in subpart 6 also states preferences for in-kind and on-site wetlands. Exhibit W58. In-kind wetlands are the same type of wetland as the one being impacted. Exhibit W32. On-site wetlands are in the same immediate watershed as the impacted wetland. Exhibit W27. A replacement wetland that is in-kind and on-site will come closest to maintaining the uses of the impacted wetland. Also, the replacement wetland should be completed prior to the loss of the impacted wetland, if possible. This language is consistent with the Wetland Conservation Act. Exhibit W53.

Subpart 6, item C, uses the phrase "to the extent feasible". The Agency recognizes that, although it is preferable for a replacement wetland to be in-kind and on-site, it is not always possible. There may not be space available in the immediate area or there may not be a potential

restoration wetland in the immediate sub-watershed. As noted in subpart 2 above, the process of achieving a reasonable replacement wetland involves negotiations between the applicant and the Agency, with specific case-by-case considerations being the paramount factor.

To provide further insight in the area of water quality designated uses for replacement wetlands, the Agency will be guided by a wetland assessment matrix when possible. Exhibits W54; W44. The matrix is designed to qualitatively assess the water quality designated uses of the wetland to be impacted to help determine the qualities that should be possessed by the replacement. Reference wetlands are not always available but, when they are, they provide further valuable information as to the attributes the existing wetland might have had if it is now degraded. The qualitative attributes listed along the side of the matrix were selected because, taken together, they provide a picture that can be used to assess the relative value of the wetland. Because wetlands provide benefits both within the wetland and downstream (nutrient retention and bank erosion control are two examples) the matrix also assesses cumulative impacts and downstream resource protection in a qualitative manner.

The Agency received several comments regarding the wetland mitigative process language. Several commenters questioned whether the Agency has legal authority beyond the Wetland Conservation Act. Exhibits W23; W24; W53. The Agency's authority is established under Minnesota Statutes sections 115.03, 115.44, and 115.01 (see section II, Statement of Agency's Statutory Authority, and section I, Introduction, part C, Wetland Water Quality Standards, respectively). Authority is also authorized under Section 303(c)(1) of the federal Clean Water Act (see III, Statement of Need).

Another letter recommended the mitigative process be moved from the Water Quality Standards to the Permit Rule (Ch. 7001). Exhibit W15. The mitigative process parallels effluent limits as forms of overall nondegradation of the water resources.

H. Part 7050.0200 WATER USE CLASSIFICATIONS FOR WATERS OF THE STATE.

The State Revisor of Statutes has added subparts under this part.

1. Subpart 1. Introduction

The word "following" is proposed to be removed and the phrase "in subpart 2 to 8" is proposed to be added in response to the structural change under this part.

2. Subpart 3. Class 2.

The term "aquatic life" is proposed to replace "fisheries" in Class 2. This change is also proposed under part 7050.0222, subparts 2 to 7. This change is needed to indicate that the protection of the standards is given to aquatic life in general under the rules. In addition, because wetlands are proposed to be recognized as a separate use class under this rule, fisheries is not necessarily an inclusive term for the aquatic communities found in these habitats.

This change is part of the effort to establish biological criteria in the chapter. The change is reasonable because it does not change the level of protection established under the standards, but, instead, describes the coverage of the protection more explicitly.

The level of protection established under the standards already protects more than just fish. According to the 1990 SONAR for revisions to part 7050.0218, subpart 1, the protection of aquatic life is the primary purpose of the proposed standards and protecting the aquatic community means protecting sensitive organisms in the community from the direct effects of toxic chemicals. The 1990 SONAR for part 7050.0218, subpart 2, states that toxic-based standards are established to protect 95 percent of the species in a given aquatic community. Since the toxic standards protect more than fish, this change will not change the level of protection provided by the standards, but will increase the visibility of aquatic species other than fish and establish them as an indicators of water quality and a unit of measure for evaluating degradation.

The phrase "be used for fishing, fish culture" is proposed to be changed to "support fish, other aquatic life" in accordance with the change from "fisheries" to "aquatic life."

The word "are" is proposed to be changed to "do" and the words "for which" are proposed to be changed to "where" to achieve correct word usage.

The word "boating" is proposed to be added to make the description of Class 2 consistent with the language under part 7050.0222, subpart 7, item B and C in the proposed rules.

3. Subpart 8. Class 7.

The Agency proposes to replace the term "agency water quality assessment procedure" with "use attainability analysis". The use of the proposed term is consistent with the requirements under 40 CFR 131.10(j) which indicates that the state must conduct a use attainability analysis when a state designates or has designated uses that do not include the uses specified in Section 101(a)(2) of the CWA, or when the a state wishes to remove a designated use that is specified in section 101(a)(2). The water assessment procedures that have been conducted in the past have been a type of use attainability analysis. However, in the future there will be greater emphasis placed on conducting more formal biological assessments as part of the use classification and use attainability procedures.

There are three conditions that are evaluated to determine whether a water should be Classified as a limited resource value water. The revised rule seeks to change language to examine the broader community of fauna and flora rather than limiting the analysis only to fisheries. This change is proposed to provide for a context in which habitats such as wetlands can be assessed for their value to aquatic life.

Additional changes have been proposed to clarify the meaning of the rule language and to achieve correct word usage. Also, the State Revisor has relisted the paragraphs under this subpart to lettered items.

I. Part 7050.0210 GENERAL STANDARDS FOR DISCHARGERS TO WATERS OF THE STATE.

1. Subpart 9. Water quality based effluent limitations.

The Agency proposes to add the phrase, "for specific pollutants or whole effluent toxicity" to the description of water quality based effluent limitations. This addition does not change the manner in which effluent limitations are determined, but merely clarifies the nature or type of limitation that may be affected. This is a reasonable change, as it provides accurate and specific information to the reader. For a discussion of the reasonableness of whole effluent toxicity (WET) tests, see the discussion under part 7050.0218.

2. Subpart 13a. Wetland pollution prohibited.

The Agency proposes to add this subpart and the following language:

> "Wetland pollution prohibited. Wetland conditions shall be protected from chemical, physical, biological, or radiological changes to prevent significant adverse impacts to the following designated uses: maintaining biological diversity, preserving wildlife habitat, and providing recreational opportunities as specified in part 7050.0222, subpart 6; erosion control, ground water recharge, low flow augmentation, storm water retention, and stream sedimentation as specified in part 7050.0224, subpart 4; and aesthetic enjoyment as specified in part 7050.0225, subpart 2."

Part 7050.0218, subpart 13, uses narrative language to protect waters of the state from water pollution. Wetland protection is implicit in the term "waters of the state". The proposed subpart 13a will make wetland protection explicit and provides guidance to applicants as to what uses are commonly found in wetlands and the kinds of changes that can impact them. Exhibit W55. It does not change levels of wetland protection that have been available since subpart 13 was promulgated. Previous to this revision, when an application was reviewed for potential impacts to water resources, including wetlands, subpart 13 was used as a narrative guide for determining whether an impact to a designated use would occur as a result of the activity described on the application. With this revision, the Agency will review both subparts as appropriate.

It is reasonable to protect wetlands as specified under the proposed language because chemical, physical, biological, or radiological changes to a wetland may result in changes in the designated uses of the wetland. For example, a physical change in wetland hydrology, such as

permanently increasing the water level, could result in a complete die-back in wetland trees. The designated uses that would be impacted, in this case, include maintaining biological diversity and enhancing the natural beauty of the landscape. However the impact varies with each wetland. See SONAR language for part 7050.0130 for further discussion on the impact of varying water levels. Protecting the designated uses will ensure the attributes of a wetland will not be significantly degraded.

EPA's Water Quality Standards for Wetlands National Guidance, Exhibit W3, requires states to, at a minimum, "apply aesthetic narrative criteria and appropriate numeric criteria to wetlands and to adopt narrative biological criteria for wetlands by [September 30, 1993]." Narrative criteria are general statements designed to protect a specific designated use or set of uses for a waterbody. The Water Quality Standards Regulations (40 CFR 131.11 (b)) requires inclusion of narrative criteria in state water quality standards to supplement numeric criteria. Narrative criteria are particularly important in wetlands, since wetlands, depending on their particular type and background condition, may require different numeric standards to protect their designated uses. Therefore, it is reasonable to use the narrative criteria as stated.

J. Part 7050.0211 FACILITY STANDARDS.

1. Subpart 1. Minimum secondary treatment for municipal point source and other point source dischargers of sewage.

A formatting change is proposed under the standards table. The information under the "Limiting Concentration or Range" category for "Toxic or corrosive pollutants" is proposed to be formatted so that the text is contained within the column of the appropriate category. This is reasonable because it does not change the meaning of the text, but makes the rule easier for readers to understand.

The State Revisor of Statutes has also changed "5-day" to "five-day" here and throughout the standards.

The reference to part 7050.0218, subpart 3, item FF, is proposed to be changed to item HH to correspond to changes proposed under part 7050.0218.

Also, the sentence "The arithmetic mean shall not exceed the stated value in any calendar month." is proposed to be added to the double-asterisks note that corresponds to the standards table. This sentence is needed to address the environmental concern for phosphorus loading. This addition is reasonable because an arithmetic mean of 1 milligram per liter total phosphorus is generally sufficient protection and it clarifies the rule by identifying how the Agency will determine compliance.

2. Subpart 2. Exception for existing trickling filter facilities.

The Agency proposes to change the rule citation from "part 7050.0210, subpart 1" to "subpart 1" under this part. The reference to part 7050.0210, subpart 1 appears under items A and C and under subpart 3,

items A and C and is an error. The proposed change is needed to correct this error and make the rules accurate.

The purpose of this subpart is to identify exemptions to the requirements for minimum secondary treatment standards for municipal point source and other point source dischargers. This purpose is clearly illustrated in the context of the first sentence under item A, which lists standards for five-day carbonaceous biochemical oxygen demand and total suspended solids. Subpart 1 under part 7050.0210 does not contain these standards, but contains a general narrative standard for untreated sewage instead.

3. Subpart 3. Exception for pond facilities.

The Agency proposes to change the rule citation from "part 7050.0210, subpart 1," to "subpart 1" under part 7050.0211. This change appears under item A and item C. See subpart 2 for an explanation of need for and reasonableness of this revision.

K. Part 7050.0212 REQUIREMENTS FOR POINT SOURCE DISCHARGERS OF INDUSTRIAL OR OTHER WASTES.

1. Subpart 2a. Dredge disposal exemption.

This subpart establishes the basis for exemptions from secondary effluent limitations for suspended solids and phosphorous for dredge disposal facilities. It states that waters discharged from a dredge disposal facility and returned to the water body from where it was removed are not subject to limitations for these parameters if best management practices (BMPs) and best practicable technology (BPT) are established in a state disposal system (SDS) permit and the designated uses of the receiving water are maintained.

The exemption is needed to address the inability of the dischargers of return water to meet the existing standards for total suspended solids (TSS) and phosphorus. Minnesota has approximately 20 dredge disposal facilities that discharge excess water from dredge holding ponds into the state's waters and are unable to consistently meet a 30 mg/l limitation for TSS. SDS permits are required for all dredge disposal facilities. National Pollutant Discharge Elimination System (NPDES) permits are not required for dredge disposal facilities. Establishing permit limitations that are not achievable by the permittee sets up permit noncompliance situations that cause many problems for both the Agency and the regulated community.

Individual variances to these limitations may be obtained by the permit applicant; however, this is a rigorous and time consuming activity. In addition, obtaining a variance requires demonstration that either meeting the standard is technically infeasible or that it will result in a financial hardship for the permittee.

In general, technology does exist that would treat dredged materials so that return waters meet secondary effluent limitations. The technology may include several retention ponds operated in a series, sophisticated

filtration systems, mechanical treatment facilities or other highly technical options. However, discharges from dredge disposal facilities are generally temporary or intermittent. Investing in technically complex and expensive treatment systems would not usually be cost-effective for the incremental environmental benefit that might be achieved. In addition, these systems pose some operation problems due to the varied characteristics of dredged material.

In order to qualify for a variance on financial grounds, the applicant must demonstrate that meeting the standard would result in financial hardship. The test for financial hardship is dependent on the financial health of the applicant, rather than the cost-effectiveness of the treatment option.

The inability to achieve secondary effluent limitations for TSS is a problem with a class of facilities; variances are meant to address specific and unique cases. Therefore, it is reasonable to address this problem through the standards rules rather than through the variance process.

None of the current SDS permits for dredge disposal facilities include limitations for phosphorous, although according to current standards, this limitation should apply. Because of that fact, the Agency does not have data on the phosphorous content of dredge return water. One of the properties of phosphorous is that it binds with solids, so it is expected that a dredge return water with elevated suspended solids is likely to exceed the 1 mg/l phosphorous effluent limitation. However, removal of phosphorous-rich sediments from a water body is likely to reduce the overall reintroduction of phosphorous into the water column, thereby resulting in a net benefit from the dredging activity. Therefore, it is reasonable to include phosphorous in this exemption.

This exemption is limited to effluents that are returned to the water body from where the sediments were removed. This is reasonable because it ensures that physical, chemical and biological impairments are not transferred from one water body to another. This revision does not exempt permittees from meeting effluent limitations for toxics, metals or other parameters not expressly exempted in this part. Dredge disposal system permits will continue to include effluent limitations for parameters other than total suspended solids and phosphorus where appropriate. Those permittees not employing best management practices will continue to be subject to effluent limitations for total suspended solids and phosphorus.

a. Item A.

In order to qualify for this exemption, BPT and BMPs must be established in the SDS permit.

Best practicable control technology (BPT) refers to the design of the treatment system. In order to achieve BPT, an evaluation of alternatives for the specific project is necessary and will be reviewed as a part of the permit application. Typical alternatives to be evaluated would be:

- alternative dredging technology that may be less water-intensive.
- alternative sites for the disposal facility
- alternative design of the treatment facility, such as a confined or non-discharging facility
- use of polymers to aid in settling solids

Best management practices (BMPs) are practices to prevent or reduce the pollution of the waters of the state. These practices may include schedules of activities, prohibitions of land use practices, specific operating procedures and control practices for site runoff or dredge material storage.

It is reasonable to require BPT and BMPs in order to protect the receiving water to the greatest extent practicable because the permittee is relieved from having to meet stringent effluent standards. This does not exempt permittees from monitoring for these parameters. As a matter of fact, monitoring is very important to measure the effectiveness of the technology and management practices.

b. Item B.

It is required that the designated uses for the receiving water body as established under part 7050.0200 are maintained. It is reasonable to require that the goals of the federal Clean Water Act are maintained.

A comment was received from Cleveland-Cliffs Incorporated of Duluth, Minnesota in response to the August 31, 1992 Notice of Intent to Solicit Outside Information. They requested that, in its standards revisions, the Agency take into account the importance of maintaining safe shipping lanes, the nature of the material being dredged, and the practical limitations on the handling of the return water and dredged materials. These revisions do not place any additional restrictions that would impede the maintenance of safe shipping lanes. In addition, the purpose for these revisions was to address the practical limitations and varied characteristics of dredged material. Characteristics of dredged material vary widely depending upon the water body from which it was removed. The dredged material may include clay, silt and/or sand, all of which have different properties in solution. Some materials may remain suspended for longer periods of time than others, or resuspend more easily with the influence of wind mixing. This supports the use of BPT and BMPs, since they are applied to the specific situation.

Another comment was received from Northern States Power (NSP), agreeing with the proposal to regulate discharges from dredge disposal facilities through best management practices and best practical technology instead of through numeric limits on total suspended solids and phosphorus. NSP also suggested that when the Agency reviews proposed disposal options, it should recognize that the source of the accumulated sediment is not necessarily the dredger. Within the standards rule, the Agency's responsibility is to ensure environmentally safe disposal of dredged materials. Issues of liability must be addressed in another forum. And finally, NSP suggested that the Agency undertake activities with other regulators to streamline the regulatory process concerning dredge and

fill activities. The Agency believes this revision moves toward that goal. The Agency is participating in discussions with other state and federal agencies in an effort to streamline the regulatory process, however, most of those activities are outside of the scope of this rule revision.

The Agency also received a comment from Project Environment Foundation indicating a concern that there is a lack of consistency in the definitions of the terms BPT and BMPs. They suggest that numerical standards should be used in conjunction with BPT and BMPs to ensure the best protection of water quality. The definition and application of BPT and BMPs are addressed in item A above. In addition, as stated earlier, characteristics of dredged material vary widely, depending upon the source of the materials. The Agency does not have sufficient data to establish a "ceiling" effluent limitation that would be achievable and appropriate. Therefore, the Agency has elected not to change the proposed rule language in response to this comment.

L. Part 7050.0213 ADVANCED WASTEWATER TREATMENT REQUIREMENTS.

The Agency proposes to break the first paragraph of the asterisks note into two paragraphs. This division will separate the information about compliance at treatment works designed and constructed to meet limitations into the second paragraph. This format change is reasonable because it does not change the meaning of the rules and it makes the language easier to read and understand.

The State Revisor of Statutes added subparts under part 7050.0220, which made changing "part 7050.0200, number 7" to "part 7050.0200, subpart 8" necessary under this part. This reference change is also proposed under part 7050.0214, subparts 1 and 4.

M. Part 7050.0214 REQUIREMENTS FOR POINT SOURCE DISCHARGERS TO LIMITED RESOURCE VALUE WATERS.

1. Subpart 1. Effluent limitations.

"Part 7050.0220, number 7" is proposed to be changed to "subpart 8." See part 7050.0213 for an explanation.

2. Subpart 2. Alternative secondary treatment effluent.

This subpart references part 7050.0211, subpart 1. The Agency proposes to delete "subpart 1" from this reference.

This subpart identifies the limitations that will be used to determine the construction or operation of a wastewater treatment facility that discharges into a limited resource value water. While the reference to part 7050.0211, subpart 1, is appropriate for most types of treatment facilities, it is not appropriate for existing trickling filters or pond facilities. The effluent limitations for these types of treatment facilities are identified under part 7050.0211, subparts 2 and 3 respectively. Therefore, the reference only to subpart 1 inadvertently excludes the application of this subpart to existing trickling filters and pond facilities. The change is reasonable because it corrects a reference error and does not establish new effluent limitations.

3. Subpart 4. Public waters designated unaffected.

The State Revisor of Statutes has deleted the phrase "applicable provisions and requirements of."

The reference to Minn. Stat. ch. 105 has been changed to 103G because the statutory chapter has been recodified.

"Part 7050.0220, number 7" is proposed to be changed to "subpart 8." See part 7050.0213 for an explanation.

N. Part 7050.0215 REQUIREMENTS FOR ANIMAL FEEDLOTS.

1. Subpart 1. Definitions.

a. Item D.

The reference to Minn. Stat. sec. 115.01, subd. 7 has been changed to subd. 21 because of a recodification.

2. Subpart 2. Effluent limitations for a discharge.

a. Item A.

The Agency proposes to substitute the term "requirements" for the term "effluent limitations," to delete the phrase "comply with the following limitations" and to substitute "a feedlot pollution rating of zero using a 25-year, 24-hour rainfall event" for the 25 milligrams per liter standard for five-day biochemical oxygen demand (BOD). These changes are reasonable because the zero model rating that is substituted is a widely recognized method of uniformly and objectively evaluating a feedlot facility's pollution potential without costly storm event monitoring. The model represents the Best Professional Judgment of the authors who are leading research specialists who deal with agricultural nonpoint source pollution and experienced Agency engineers.

A model rating of zero corresponds to an estimated discharge of 25 mg/L BOD, therefore the change does not constitute back sliding. The size of the storm event being modeled is one of the variables to be inputted during the rating calculation. The 25-year, 24-hour storm is specified to be consistent with the current language. Where phosphorus (P) is an issue, the model rating is not proposed to be used because the model does not accurately predict P discharges. Overland flow will effectively reduce BOD, but is not as effective in reducing P. Exhibit F1, page 9 and 11. The requirement for P currently follows the 25 mg/l BOD standard in item A. This requirement is proposed to be made item B and the existing item B is proposed to be made item C. This restructuring is to avoid potentially confusing redundancy, since the 25-year, 24-hour storm event is already specified in item A.

As noted in the model documentation, the model is the result of efforts by four Federal and State agencies - the Agricultural Stabilization and Conservation Service, the Soil Conservation Service, the Minnesota Soil

and Water Conservation Board, (which has since become part of the Minnesota Board of Water and Soil Resources), and the Agency, to coordinate their animal waste control programs so that Federal and State cost-share funds, the Federal technical assistance program, and the State permit program could all work together to efficiently combat this source of pollution. The model is impartial, relatively simple to use, reasonably accurate and based on research data.

The model will more effectively use limited financial resources to abate and correct water pollution than the existing BOD standard. There are an estimated 40,000 facilities which are regulated by Minn. Rules ch. 7020, governing animal feedlots. Costs to monitor an individual feedlot would be a minimum of $6,000 to set up a monitoring station, and a minimum of $3,000 per year for sample collection and analysis. These costs would not contribute to solving any potential pollution hazards. In view of the limited resources available to both producers and in government cost share programs, it is reasonable to use the model to determine which sites need additional pollution control efforts, so that money that would otherwise be spent on monitoring can be spent on correcting pollution hazards. The model is and has been used in standard practice for the evaluation of potential pollution hazards from feedlots.

The publication "An Evaluation System to Rate Feedlot Pollution Potential," which contains the feedlot evaluation system model, is available through the MPCA library and the State Law Library for interlibrary loan.

O. Part 7050.0218 METHODS FOR PROTECTION OF SURFACE WATERS FROM TOXIC POLLUTANTS FOR WHICH NUMERICAL STANDARDS NOT PROMULGATED.

1. Subpart 3. Definitions.

"Whole effluent toxicity test" is defined under part 7050.0218, subpart 3, item FF, of the existing rules. Whole effluent toxicity (WET) testing has been established by the EPA and many states including Minnesota as an important means to assess the potential toxicity of effluents. WET tests are based on the well established narrative standard that pollutants should not be discharged in toxic amounts.

WET tests measure the composite effect of a largely unknown array of substances in an effluent on aquatic organisms. WET tests can quantify these effects and the results transformed into water quality-based effluent limitations similar to how pollutant specific standards are used to set effluent limitations. As a state with delegated NPDES permit authority, the Agency is entrusted to carry out the requirements of the Clean Water Act, and to implement major policy initiatives directed by the EPA. One of the EPA's major efforts is the implementation of toxicity testing requirements in the NPDES permit program.

The Agency has been requiring dischargers to do WET tests on their effluents for several years. In an acute WET test, test organisms such as fathead minnows or Daphnia (water fleas) are placed in samples of

effluent, the same effluent that is discharged to the receiving stream, and the number of organisms that die in two days is recorded. If more than half of the organisms die, the effluent is considered acutely toxic. In general, if a repeat test also shows acute toxicity, the discharger is required to determine the cause of the toxicity and to eliminate it.

The rule is clear regarding the use of acute WET tests as an effluent limitation in permits. However, there is a need to clarify the rule language so that WET tests, as well as chemical-specific standards, can be used as the basis for permit limitations in water quality limited situations. In situations where the allowable dilution provided by the receiving stream is limited or absent, the end point of the WET test must be chronic toxicity rather than acute toxicity. Also, there is a need to add to the definitions in part 7050.0218 so the terminology associated with whole effluent testing will be in the rule. Together these proposed changes will help establish a clearly defined method for evaluation and compliance that parallels the process used with the numerical standards identified under parts 7050.0220 through 7050.0227.

Part of the 1990 amendments to ch. 7050 was the addition of a number of definitions related to toxicity. These definitions were designed to accompany the procedures for developing pollutant specific criteria added to the rule in 1990. Included was a definition of, and references to, WET tests. Many of the concepts embodied in the definitions are common to both pollutant specific and whole effluent approaches. The difference is in terminology that may be employed, primarily when quantifying the effects.

The Agency propose to add some language to three existing definitions and add two new definitions

a. Item B. Acute toxicity.

The Agency is proposing to add the phrase "represented as LC50s or EC50s, and expressed as concentrations of mass per unit volume, percent effluent, or toxic units" to the definition of Acute toxicity. This language is needed to clarify how the effects of acute toxicity will be evaluated and quantified.

The terminology used in the proposed phrase corresponds to whole effluent tests, defined under item FF of the existing rules. "LC50" is an abbreviation for "lethal concentration" and is currently defined under item R. "EC50" is an abbreviation for "effect concentration" and is currently defined under item N. "Percent effluent" is proposed to be defined under item Z and "toxic unit" is proposed to be defined under item EE.

Acute toxicity in pollutant specific toxicity tests and whole effluent tests can be represented as lethal concentrations or effect concentrations, the concentration of chemical or effluent which is lethal or debilitating to 50 percent of exposed organisms at acute durations (usually 2 to 4 days). Pollutant specific concentrations are expressed as mass per unit volume, whereas whole effluent concentrations express toxicity as percent effluent or its reciprocal, toxicity units.

The proposed terminology and units of measure are reasonable because they correspond to the standards for toxics identified under part 7050.0222 and to the methods the MPCA uses to determine compliance with those standards. Also, they are consistent with common usage by EPA and in EPA guidance. Exhibit T61.

b. Item H. Chronic criterion.

A situation analogous to to the one discussed under item B for acute toxicity exists for chronic toxicity. Chronic no observed adverse effect levels (NOAEL) for pollutant specific criteria are expressed as mass per unit volume, whereas chronic whole effluent tests express their NOAEL's as percent effluent or as toxicity units.

The Agency proposes to add the word "effluent" to the definition of chronic toxicity to establish that a chronic criterion can be designated for an effluent. Adding this word is reasonable because chronic toxicity is part of whole effluent toxicity testing. Effluents usually contain a mixture of toxicants which can have an unknown chronic as well as acute effect.

c. Item Z. Percent effluent.

This is a new item. Since this part contains terms that are in alphabetical order, the existing items lettered Z to CC will be changed to correspond to this addition.

The Agency is proposing to add a definition for "percent effluent." This definition is needed to further explain the language proposed to be added to the definition of "whole effluent toxicity test," under item FF of the existing rules.

The definition will identify how a WET test is quantified and expressed in a fashion that is parallel to chemical-specific terms. The definition is consistent with terminology used in EPA guidance. Exhibit T58.

d. Item EE. Toxic unit.

This is a new item and items lettered DD to FF will be changed to accommodate this addition.

The Agency is proposing to add a definition for "toxic unit." This definition is also needed to further explain the language proposed to be added to the definition of "whole effluent toxicity test," under item FF of the existing rules.

This definition is consistent with the terminology used in EPA guidance. Exhibit T58.

e. Item HH. Whole effluent toxicity test.

This item letter is proposed to be changed from "FF" to "HH" due to the addition of two definitions under this part.

The Agency is proposing to add the following sentence to the definition of whole effluent toxicity test: "Effects on tested organisms are measured and expressed as toxic units or percent effluent for both acute and chronic whole effluent toxicity tests." This sentence is needed to clarify how tests results will be reported. The proposed language is reasonable because the terminology is the common terminology used in EPA guidance, Exhibit T58, and the procedures are consistent with those used to establish the numerical toxicity standards identified under part 7050.0222.

2. Subpart 10. Applicable criteria.

a. Item C.

"Part 7050.0220, subpart 3, items E to H" is proposed to be changed to "7050.0222, subpart 7, items B to E" because of the proposed restructuring of part 7050.0220.

P. Part 7050.0220 SPECIFIC STANDARDS OF QUALITY AND PURITY FOR DESIGNATED CLASSES OF WATERS OF THE STATE

Upon the advise of the Revisor's Office, the Agency proposes to split the current part 7050.0220, which contains all the numerical and narrative standards for the various use classes, into eight new parts. The proposed addition of the tables of standards, the eight new Class 2 standards, and the new Class 2D for wetlands makes the current part 7050.0220 very large and unwieldy. The Agency, in consultation with staff of the Revisor's Office, believes that the addition of several new parts will reduce confusion and make the rule easier to read and to amend in the future.

The current rule is proposed to be modified to create eight new parts as follows:

Part 7050.0220. The heading for this part is proposed to be changed from "Specific Standards of Quality and Purity for Designated Classes of Waters of the State" to "Specific Standards of Quality and Purity By Associated Use Classes." This part will include part 7050.0220, subpart 1, from the current rules and the proposed new tables of numerical standards arranged by the four associated use classes.

Part 7050.0221. This part will contain part 7050.0220, subpart 2, from the current rules and contain the standards for Class 1 waters.

Part 7050.0222. This part will contain part 7050.0220, subpart 3, from the current rules and contain the standards for Class 2 waters.

Part 7050.0223. This part will contain part 7050.0220, subpart 4, from the current rules and contain the standards for Class 3 waters.

Part 7050.0224. This part will contain part 7050.0220, subpart 5, from the current rules and contain the standards for Class 4 waters.

Part 7050.0225. This part will contain part 7050.0220, subpart 6, from the current rules and contain the standards for Class 5 waters.

Part 7050.0226. This part will contain part 7050.0220, subpart 7, from the current rules and contain the standards for Class 6 waters.

Part 7050.0227. This part will contain part 7050.0220, subpart 8, from the current rules and contain the standards for Class 7 waters.

Q. Part 7050.0220 SPECIFIC STANDARDS OF QUALITY AND PURITY BY ASSOCIATED USE CLASSES.

The Agency is proposing to add to the rule four tables listing numerical and narrative standards together for all the use classes applicable to a particular surface water of the state. For example, trout streams are protected for six separate beneficial uses; fisheries and recreation, drinking water, industrial consumption, irrigation and livestock watering, aesthetics, and other uses. Each of these beneficial uses, except "other", has numerical and narrative standards that protect these uses. Currently the rule lists the standards separately under each use class in part 7050.0220, subparts 2 through 8. The proposed tables will list, side-by-side, all the numerical and some narrative standards for the associated use classes applicable to surface waters. The longer narrative standards will be listed at the end of each table.

The Agency believes that the proposed tables will make the rule easier to use and reduce the chances of making errors in selecting the correct standards for a particular surface water.

The standards in the proposed tables are restricted to surface waters because surface waters have multiple beneficial uses and multiple sets of standards assigned to them, which has been the source of some confusion as mentioned above. Ground waters (Class 1) are protected for just one beneficial use, drinking water, and only the drinking water standards apply to ground waters. For this reason the proposed tables are restricted to the associated use classes and standards applicable to surface waters. However, it should be noted that some surface waters are protected for drinking water in addition to their other uses, and the same drinking water standards applicable to these surface waters are applicable to ground waters.

The addition of the tables will address three issues. Two aspects of the current arrangement of standards make it confusing to readers, often leading to errors in the application of standards. A third issue is the updating of the documents that incorporate the Class 1 primary and secondary drinking water standards in the current rule which were originally established in 1962.

First, many users of the rule are not fully aware that all surface waters are protected for more than one beneficial use, and therefore, they may be unaware that numerous standards for the multiple beneficial uses apply to their surface water of interest. The result is surface waters may go unprotected for these other uses. Second, several use classes, particularly class 1 and 2, have standards for the same pollutant that differ from class to class. PH provides an example; a total of six use classes have a standard for pH, and they are not all the same. Part 7050.0450 states that if use classes have different standards for the same pollutant, the lowest (most restrictive) standard applies. The current rule arrangement of the numerical standards (listed separately by use class) makes determining the correct standard

more difficult and time consuming, and could lead to the application of an incorrect standard or no standard at all.

The third issue is the potential confusion and mistakes that users of the rule might make due the presence of the outdated Class 1 primary and secondary drinking water standards in the current rule. These standards are based on a 1962 document (Public Health Service Drinking Water Standards Revised 1962, U.S. Department of Health, Education, and Welfare, Public Health Service, Washington 25, D.C.). These outdated standards have never been updated because of the language in part 7050.0220, subpart 2 which cites the 1962 document and "any revisions, amendments, or supplements to it." This language has been in ch. 7050 since statewide standards were first adopted in 1967. The Agency has interpreted "revisions, amendments, or supplements to it" to mean that the latest drinking water standards issued by the EPA are applicable. The presence of the 1962 standards in the rule caused only limited confusion for many years because there were few changes to the drinking water standards from 1962 to about 1985. However, since 1985, as more and more new drinking water standards have been finalized by EPA and more of the old standards have changed, the outdated standards and the reference to the 1962 document in the rule has increasingly become a major source of confusion to outside parties.

It is proposed to include most of the current drinking water standards in the proposed tables of standards and replace the reference to the 1962 document with a reference to the current drinking water standards standards in the Code of Federal Regulations. These proposals are further discussed below.

1. Subpart 1. General.

In the current rule, this subpart provides an introductory statement leading into the numerical and narrative standards for all use classes. The words "and narrative" are proposed to be added at this time to address the existing narrative standards already in ch. 7050 and the proposed addition of narrative standards for designated classes of wetlands. This general language is proposed to be repeated under subpart 1 of parts 7050.0221 to 7050.0227.

The Agency received several comments regarding the use of narrative language as a tool to protect state water resources. All waters of the state, including wetlands, are covered by narrative language in the existing standards. Although wetlands are already protected through existing water quality standards, the additional language proposed under parts 7050.0222, subpart 6; 7050.0223, subpart 5; 7050.0224, subpart 4; and 7050.0225, subpart 2, will more appropriately address the unique characteristics of wetlands.

2. Subpart 2. Explanation of the tables of standards in subparts 3 to 6.

This proposed subpart will contain information needed for the reader to use the proposed tables of standards in the rest of this part. In order to accommodate the standards in a table format, a number of abbreviations, acronyms and explanatory notes must be included. All are defined or explained in this subpart to make the tables easier to use. Three of the terms used in the tables have been defined elsewhere in the rule and these definitions are repeated in subpart 2 so the reader does not need to hunt for the definitions when using the tables of standards.

The abbreviations and acronyms used in the tables are:

(C) This means the chemical is considered carcinogenic and the standard is human health-based. This symbol is used in the current rule in part 7050.0220, subpart 3, and it has the same meaning there. A cancer potency slope or a reference dose plus an extra safety factor of 10 (class C carcinogen) was used to calculate the human health-based standard.

CS This means "chronic standard". CS is defined in the current rule (part 7050.0218, subpart 3, item I.) as the highest water concentration of a toxicant to which organisms can be exposed indefinitely without causing chronic toxicity.

exp. () This means the natural antilogarithm (base e) of the expression in parenthesis. The expression refers to the standards that vary with total hardness or pH. These standards are in the form of a formula and are listed at the end of the tables as "Notes".

FAV This means "Final Acute Value". FAV is defined in the current rule (part 7050.0218, subpart 3, item O.) as an estimate of the concentration of a pollutant corresponding to the cumulative probability of 0.05 in the distribution of all the acute toxicity values for the genera or species from the acceptable acute toxicity tests conducted on a pollutant. The FAV can be applied as an effluent limitation or to prevent acutely toxic conditions in mixing zones.

MS This means "maximum standard". MS is defined in the current rule (part 7050.0218, subpart 3, item U.) as the highest concentration of a toxicant in water to which aquatic organisms can be exposed for a brief time with zero to slight mortality. The MS equals the FAV divided by two. The MSs are often used as remedial action cleanup goals to protect surface waters in some ground water contamination situations.

(S) This means the associated value is a secondary drinking water standard. Secondary drinking water standards are based on non-health related end points such as unpleasant tastes or odors and properties that stain laundry.

TH This means "total hardness" in mg/l; used in the calculation of the hardness related metal standards

TON This means "threshold odor number", which refers to the number of times a sample must be diluted to produce odor-free water from a sample having a perceptible odor.

Common synonyms or acronyms for some of the chemicals, pollutants and other materials listed under "Substance or Characteristic" are included in the proposed tables. For example, under "polychlorinated biphenyls", "(PCBs, total)" is listed. The synonyms and acronyms are either after or under the primary listing, and they are always in parentheses. In the case of "Trihalomethanes, total", the four chemicals in parentheses which follow are the four trihalomethanes included in the total. Additional identifying information such as ortho, para, cis and trans is included after some chemical names in parentheses.

3. Subparts 3. through 6.

The use classes for waters of the state are defined in part 7050.0200. The numerical and most narrative standards for surface waters have been arranged into four tables, based on the three subcategories of Class 2 waters (fisheries and recreation), plus limited resource value waters (Class 7) and their associated uses, as follows:

Proposed Subpart	Aquatic Life and Recreation Category	Associated Use Classes
3	Trout Waters, including drinking water	1B, 2A, 3A or 3B, 4A and 4B, and 5
4	Cool and warm water fisheries including drinking water	1B or 1C, 2Bd, 3A or 3B, 4A and 4B and 5
5	Cool and warm water fisheries (2B), or "rough fish" waters (2C), or wetlands (proposed 2D)	2B, 2C or 2D; 3A, 3B, 3C or 3D; 4A and 4B, or 4C; and 5
6	Limited Resource Value Waters	3C, 4A and 4B, 5 and 7

All surface waters are protected for Class 6, "other" uses, but there are no numerical standards associated with this use class and it is not included in the tables.

The proposed tables include all the numerical and some narrative standards currently listed in part 7050.0220, subparts 3 through 8, plus the proposed new eight standards. When a narrative standard is included in the table, such as the dissolved oxygen standard for trout waters (Class 2A) of "7 [mg/l] as a daily minimum", the standard given is the chronic standard. In these cases, there are no maximum or final acute value standards. In another case, such as the trout water standard for silver, there is single numerical chronic standard of 0.12 ug/l followed by "note # 8", which refers the reader to the hardness variable maximum and final acute value standards at the end of the table.

Other narrative standards, those too long to fit in the table itself, are either listed in full at the end of the tables in the "notes", or the "note" refers the reader to the portions of the rule containing the full standard. The latter include the narrative standards for radioactive materials, the site specific dissolved oxygen standards, and some of the standards pertaining to wetlands.

The tables include the following narrative standards as "notes".

Fecal coliform organisms
Radioactive materials (reference)
Temperature
Site specific Dissolved Oxygen (DO) standards for Class 2B and 2C waters (reference), and the DO standard for Class 7 waters
Class 3D, 4C and 5 standards for wetlands (reference)
Class 2D (wetlands) standard for pH
Toxic Pollutants standard for Class 7 waters

The only narrative standards not listed or referenced in the proposed tables are the Class 4B Toxic substances standard, and a statement following the Class 2 Dissolved oxygen standards. The Toxic substances standard reads: "Toxic materials - None at levels harmful either directly or indirectly". The statement following the dissolved oxygen standards provides guidance on implementing the standard and reads: "This dissolved oxygen standard requires compliance with the standard 50 percent of the days at which the flow of the receiving stream is equal to the lowest average 7-day flow with a once in ten year recurrence interval (7Q10). These were omitted because of space limitations in the tables.

The other "notes" at the end of the tables list the eight standards which vary with total hardness or pH. These standards are in the form of formulas. Seven of the eight are trace metal standards which vary with total hardness. Some trace metals are more toxic in soft waters than they are in hard waters. The standards reflect this toxicity-hardness relationship. Example standards are included for hardness values of 50, 100, 200, 300 and 400 mg/l as a convenience to the reader. The pentachlorophenol standard varies with pH; example standards are listed for pH values of 6.5, 7, 7.5, 8, 8.5 and 9.

The drinking water standards included in the proposed tables are the current primary and secondary drinking water standards issued by the EPA under the Safe Drinking Water Act. EPA primary and secondary drinking water standards are called Maximum Contaminant Levels (MCL). These standards are codified in the Code of Federal Regulations, Title 40, part 141 subparts B and G, and part 143. Exhibit T64. No MCLs which are not final and no Maximum Contaminant Level Goals (MCLG), which are the precursors to MCLs, are included in the tables.

Placing the latest drinking water standards and the other standards in the tables does not change the standards currently applicable to Minnesota's ground or surface waters. Tabulation of the standards does not cause any standard to go up or down, nor will it add or subtract any standard that is applicable now. This change is intended only to make the rule more usable and reduce commonly committed errors and misinterpretations made by users. Some drinking water standards are not included in the tables for the reasons discussed below.

A few drinking water standards are relevant to ground water but not to the raw surface water supplies. These standards, fecal coliform bacteria and two water treatment additives, are not included in the tables. The current rule addresses this situation for fecal coliform by including the term "bacteriological standard" in the standards normally restricted to ground waters (Class 1A), but excludes the bacteriological standard from the subclasses that include surface waters (Classes 1B through 1D). The total coliform bacteria standard is excluded by the purposeful omission of "bacteriological standards" in the last line in part 7050.0220, subpart 2, item B which reads: "The physical and chemical standards quoted above for Class 1A waters shall also apply to these [Class 1B] waters in the untreated state". No surface waters are classified 1A currently. Therefore, the total coliform standard does not currently apply to surface waters protected for drinking, and it is not included in the proposed tables under Class 1.

Two water treatment additives have EPA drinking water standards which are not in the tables. These chemicals, acrylamide and epichlorohydrin, may be added to the water as part of the treatment process before it is distributed to the consumer. These chemicals are not likely to be found in the raw surface water supplies.

The primary drinking water standards for copper and lead consist of required treatment techniques including corrosion control treatment, source water treatment, lead service line replacement, and public education rather than the usual numbers. These treatment standards for copper and lead are not included in the tables.

The EPA drinking water standards for radioactivity are excluded from the tables due to the space limitations.

Two pollutants, fluoride and hexachlorocyclopentadiene, have both primary and secondary drinking water standards. In both cases the secondary standard is the lower of the two standards and the lower secondary standard would be the applicable standard for compliance and enforcement purposes. The primary standards are listed to be complete and for the benefit of the reader.

Should any discrepancy occur between a standard listed in the proposed tables (part 7050.0220, subparts 3 through 6) and the standards listed under each use class separately (parts 7050.0221 through 7050.0227), the latter, class by class listings of standards, will be considered the correct standards for application and compliance determinations. This includes the drinking water standards in the Code of Federal Regulations.

R. Part 7050.0221 SPECIFIC STANDARDS OF QUALITY AND PURITY FOR CLASS 1 WATERS OF THE STATE, DOMESTIC CONSUMPTION.

This part was created from part 7050.0220 as follows:

Proposed rules	Current rules
Subpart 2	7050.0220, subpart 2, item A
Subpart 3	7050.0220, subpart 2, item B
Subpart 4	7050.0220, subpart 2, item C

Subpart 5	7050.0220, subpart 2, item D
Subpart 6	7050.0220, subpart 2, item D

As already stated, the EPA primary and secondary drinking water standards are incorporated by reference as Class 1 standards to protect raw water supplies for domestic consumption. The primary drinking water standards, or MCLs, are established to protect human health, but they also take into account non-health related factors such as treatability and analytical detection limits. MCLs go through a lengthy promulgation and public notice process before being finalized and published in the Federal Register. Secondary drinking water standards are based on non-health related aesthetic end points.

Several changes are proposed for this subpart in conjunction with the addition of the proposed tables of standards.

First, the reference to the 1962 Public Health Service document will be deleted and replaced with the reference to the primary and secondary drinking water standards in the Code of Federal Regulations (CFR), Title 40, part 141 subparts B and G, and part 143. Exhibit T64. It is proposed to retain the "revisions, amendments, or supplements" language so the Agency can use the latest EPA drinking water standards in their risk assessment, compliance and enforcement activities.

Second, the outdated standards listed for Class 1A waters are proposed to be deleted to eliminate a source of confusion with the updated standards in the proposed tables. The Agency is not proposing, at this time, to list out all the updated standards in subpart 2. The Agency believes this would be an unnecessary duplication in the rule since all but a few standards (the bacteriological, radiological, treatment technique (Cu and Pb), and water treatment additive standards) will be listed in the proposed part 7050.0220, subparts 3 and 4, and the complete set of primary and secondary standards are incorporated by referencing the CFR.

Third, it is proposed to delete the references in subparts 3 and 4 (Class 1B-1C), back to the standards in item A (Class 1A). The incorporation by reference of the standards in the CFR will suffice as the source of the numerical standards. However, the exception to the current Class 1A total coliform standard, as discussed above, for Class 1B and 1C will be retained. Also, the more lenient turbidity standard for Class 1C of 25 NTU will be retained.

Finally, some of the standards for Class 1D waters in the current rule are less stringent than the Class 1A primary and secondary drinking water standards. This is a recognition that very poorly protected aquifers in karst topographies may not be able to meet the Class 1A standards. The Agency is proposing to retain the Class 1D standards and not change them at this time.

In conclusion, these changes are being proposed to help end the confusion over selection of appropriate standards, and to update the primary drinking water standards. These changes will not make the rule more or less stringent than it is now, nor will these changes affect treatment or cleanup costs.

1. Subpart 6. Additional Standards.

The proposed dividing of part 7050.0220 made it necessary to change the reference to "above listed" standards to standards "in subparts 2 to 5." This does not change the meaning of the current rules.

S. Part 7050.0222 SPECIFIC STANDARDS OF QUALITY AND PURITY FOR CLASS 2 WATERS OF THE STATE; AQUATIC LIFE AND RECREATION.

This part was created from part 7050.0220 as follows:

Proposed rules	Current rules
Subpart 2	7050.0220, subpart 3, item A
Subpart 3	7050.0220, subpart 3, item B
Subpart 4	7050.0220, subpart 3, item C
Subpart 5	7050.0220, subpart 3, item D
Subpart 7	
item A	7050.0220, subpart 3, item D
item B	7050.0220, subpart 3, item E
item C	7050.0220, subpart 3, item F
item D	7050.0220, subpart 3, item G
item E	7050.0220, subpart 3, item H
Subpart 8	7050.0220, subpart 3a

Revision subjects.

Three of the major revision subjects identified in the SONAR introduction are discussed under this part of the SONAR. These subjects are: narrative biocriteria, the eight new aquatic life standards, and the nine updated aquatic life standards. This part of the SONAR includes a general discussion of each major subject as a preliminary introduction and background to the specific revisions that will be made in each item. Then, the changes that are unique to an item will be discussed separately under the heading for the corresponding item.

1. Narrative biocriteria.

The aquatic life use classes are currently described in terms of various fisheries group. The Agency is proposing changes in the language that will maintain fish as a descriptor of use class in Classes 2A, 2B, 2Bd, and 2C but also include the terms "healthy community" and "associated aquatic organisms". It is reasonable to make these changes because, as discussed in the SONAR for part 7050.0200, Class 2, the criteria that are set forth under this rule are established to protect the entire aquatic community. The wording change describes this protection more explicitly.

The emphasis of the proposed changes provides the narrative language for utilizing indicator community for use support determinations. Fish communities may be good indicators of biological condition and may be sensitive to various impacts. However, in certain waterbody types and for assessing some impacts macroinvertebrates, macrophytes, algae, or

other indicative communities may be a better choice. In adding the 2D classification, "fish" were not highlighted because in many wetland types they may not be present.

The term healthy was added to all the aquatic life use class descriptions to indicate what the attainable goal is for each aquatic life use class. Healthy can be defined as a community that has a structure and function comparable to that of the most natural situations or reference condition for that region and waterbody type.

The Agency also proposes to delete the terms "commercial" and "rough fisheries" in the use class description. These terms are ambiguous in that the Agency has never identified what are considered to be rough or commercial fish species for this rule. Where they have been identified, the terms "rough" and "commercial" describe many of the same fish species. According to the game and fish regulations, Minnesota Statutes chapter 97A and 97C, "rough fish" include carp, buffalo, sucker, sheepshead, bowfin, burbot, cisco, gar, goldeye, and bullhead. Under the same statutes, many of these fish species are considered commercial fish when taken for sale in inland waters.

The intent of the designated use classification scheme is not to distinguish the types of fishing regulations that are being imposed in the waters. The Agency's intent is to illustrate differences in aquatic life, habitat type, and biological potential and establish criteria to protect these different aquatic life uses. Class 2A waters are those waters that are or have the potential to support coldwater sport fish species in the Salmonidae family including, for example, brook trout, rainbow trout, brown trout, and lake trout. Class 2B waters are those waters that because of their size and natural condition can support or have the potential to support populations of warm or cool water fish that are top carnivore species and are typically of interest to sport anglers. These fish species for example would include walleye, smallmouth bass, northern pike, channel catfish, and white bass. Class 2C waters are those waters that because of their size and natural condition do not support or have the potential to support populations of top carnivore species but do support a community of fish and associated organisms that naturally occur in an area; in other words, an indigenous community.

2. Eight new aquatic life standards.

a. The development of the proposed water quality standards.

The Agency has developed 17 site-specific criteria since 1990. Eight of these are being proposed as state wide standards. The procedures used to develop state wide standards are the same procedures used to develop site-specific criteria. These procedures are contained in part 7050.0218, subparts 4 through 10. The difference between a criterion and a standard is that a standard has been promulgated through the rulemaking process and is listed in chapter 7050.

Each criterion or standard takes about two to three months of an Agency staff person's time to complete the extensive data search and evaluation needed to determine the number. Toxicity data are summarized in tables

and the most pertinent data are recorded on "summary sheets". Page one of the summary sheets provides an overall summary of the process and includes the criterion or standard. Page two of the summary sheets is reserved for pollutants that have an EPA criterion. Since none of the eight proposed standards has a recent (since 1980) EPA aquatic life criterion, page two was not used. (Iron has an old aquatic life criterion of 1000 ug/l dating from 1976, and antimony has a draft aquatic life criterion dated 1988. Exhibits T50 and T36.) Page three is used to summarize the toxicity data when no EPA criterion is available. And finally, page four of the summary sheets records the information for the human health-based criterion. The data tables and summary sheets for all eight proposed standards are contained in Exhibit T1. Table 1 lists the eight proposed standards (also listed in Exhibit T48).

Same as Exhibit T48

Table 1. Proposed Water Quality Standards for Class 2 Waters.

Chemical	Class 2A			Class 2Bd	Class 2B/2C/2D			Basis
All units in ug/l	CS	MC	FAV	CS	CS	MC	FAV	
1. Alachlor (c)	3.8	800	1600	4.2	59	800	1600	PCA Hc, T1
2. Antimony	5.5	90	180	5.5	31	90	180	PCA Hs, T1
3. Atrazine (c)	3.4	323	645	3.4	10	323	645	PCA Hc, T1
4. Cobalt	2.8	436	872	2.8	5.0	436	872	PCA Hs, T1
5. Iron	221	243	485	1245	1245	1363	2726	PCA T1
6. Manganese	138	4643	9285	138	491	4643	9285	PCA Hs, T1
7. Naphthalene	81	409	818	81	81	409	818	PCA T1
8. Thallium	0.28	64	128	0.28	0.56	64	128	PCA Hs

Abbreviations

CS = Chronic standard
MS = Maximum standard
FAV = Final acute value
(c) = Carcinogen

Class 2A = Trout waters, protected for drinking and aquatic life
Class 2Bd = Warm and cool waters protected for drinking and aquatic life
Class 2B/2C = Warm and cool waters protected for aquatic life
Class 2D = Wetlands

Note: The MS and FAV standards applicable to Class 2Bd are shown under Class 2B/2C

Basis codes for standards

PCA = Criterion developed by MPCA staff
Hc = Human health carcinogenic effects
Hs = Human health systemic effects
T1 = Direct aquatic life Toxicity, EPA national procedures used

Aquatic life criteria (standard) development is broken down into three major portions: (1) Toxicity-based criteria development for protection of aquatic life from direct toxicity, (2) Human health-based criteria development for protection of humans who eat the fish and other edible aquatic organisms, and (3) wildlife-based criteria development for protection of wildlife that consume aquatic life. The three steps are briefly described below. Exhibit T40 provides a detailed description of the process.

1) Toxicity-based criteria development.

Development of a toxicity-based criteria begins with a data search using EPA's AQUatic toxicity Information REtrieval data base (AQUIRE). AQUIRE provides a systematic computerized data base including toxicity, physicochemical bioaccumulation, and bioconcentration data for thousands of chemicals. The Agency also utilizes the state's library system to do further literature search, access EPA and U.S. Fish and Wildlife Service publications, International Joint Commissions reports, and obtain other reports and publications from scientific journals and universities, to gather acute and chronic data for a particular chemical.

The literature is reviewed and acceptable acute and chronic data are tabulated. If acute data is available for at least eight species, a method developed by EPA is used to determine the toxicity-based criterion. Logarithmic means of the acute data, by genus, are ranked from highest to lowest. The four lowest "genus mean acute values" (GMAV) are used to calculate a statistical estimate of the fifth percentile GMAV from the low or sensitive end of the distribution of all GMAVs. This value is called the Final Acute Value (FAV). Thus, the goal of the FAV is to protect 95 percent of the species in an aquatic community from unacceptable acute toxicity.

If acute data for eight species are not available, the Agency uses an alternative method that utilizes the limited available toxicity data to calculate the FAV. This method is known as the EPA Advisory Method.

The next step in the toxicity-based criterion development is the calculation of an Acute to Chronic Ratio (ACR). Acute values (LC50s) and chronic values for the same test organism from the same experiment or laboratory are needed to calculate ACRs. The ACR is simply the acute value divided by the chronic value. All the acceptable ACRs available for the chemical are averaged together. The ACR is used to determine the chronic criterion by dividing the FAV by the ACR.

Toxicity data for algae and other aquatic plants are also reviewed. If plants are more sensitive to a pollutant than the animal species, the criterion is lowered to protect aquatic plants.

2) Human health-based criteria development.

Human health-based criteria protect human consumers of fish and shellfish that are taken in Minnesota waters. A bioaccumulative pollutant may be at a very low concentration in the water such that no acute or chronic toxicity is observed. The pollutant, however, may

accumulate in fish or shellfish over a period of time which is passed on to consumers who eat these organisms. Bioaccumulative pollutants may cause health problems, especially to those who frequently eat contaminated organisms.

The primary task in the development of the human health-based criterion is the determination of a bioaccumulation factor (BAF). Most BAFs are based on bioconcentration tests and bioconcentration factors (BCF). Both BAFs and BCFs are the ratio of the concentration of the pollutant in fish tissue to the concentration in the surrounding water. The difference between a BAF and BCF is that a BAF reflects uptake of the chemical from both the food chain and the water, whereas a BCF reflects uptake of the chemical only from the water. BAFs are measured in the field and BCFs are based on lab tests. Minnesota's criteria development procedures include a method to predict a BAF from a BCF. Exhibit T40.

The greater the BAF, the more likely the pollutant will be a concern to human consumers of fish. BAF data are gathered through the same literature search as is done for toxicity data.

There are two different pathways that can be taken to calculate human health-based criteria. One pathway is taken if the pollutant is known or believed to cause cancer. While another pathway is taken for a noncarcinogenic pollutant. If the pollutant causes cancer, the Agency uses a cancer potency slope to calculate the criterion. If the pollutant is a noncarcinogen, a reference dose is used to calculate the criterion. Both the potency slopes and reference doses are obtained from the EPA Integrated Risk Information System (IRIS) through the Minnesota Department of Health (MDH). The Agency is careful to use the same potency slopes and reference doses used by the MDH to set drinking water criteria which are referred to as Recommended Allowable Limits (RAL). Exhibit T47.

For most surface water of the state (Class 2B, C and D) the human health-based criteria protect people who catch and eat fish from these waters. For this purpose it is assumed people eat 30 grams of fish per day. Some surface waters are also protected as a source of drinking water. All trout waters (Class 2A) and certain nontrout waters, such as a portions of the Mississippi and Red Rivers (Class 2Bd), are protected for drinking water plus fish consumption. Human health-based standards for these waters are calculated assuming people drink two liters of water and eat 30 grams from the same water. Exhibit T40.

3) Wildlife-based criteria development.

This process is designed to protect wildlife that feed on aquatic life. To date the Agency has not developed any wildlife-based criteria. The procedures for developing wildlife-based criteria are contained in part 7050.0218, subpart 9.

b. Selection of the criterion.

The lowest of the two criteria, toxicity-based or human health-based, becomes the Chronic Criterion (CC). Finally, the CC is checked against

EPA taste and odor criteria that protect humans from objectionable tastes or odors in edible fish tissue. The CC is lowered to the taste and odor criterion if the latter is lower.

c. The eight proposed standards.

The eight proposed standards fall into three categories: 1) herbicides, 2) metals, and 3) other organics. The proposed standards are listed in Table 1. Table 1 is the same as Exhibit T48. A discussion of the important aspects of the toxicity or bioaccumulation data, background concentrations, analytical detection limits, and other relevant information for each of the proposed standards follows.

1) Herbicides.

Standards are proposed for two herbicides: Alachlor and Atrazine.

a) Alachlor

Alachlor is a preplant or preemergence herbicide sold under several trade names including Lasso. The chemical name is: 2-chloro-2', 6'-diethyl-N-(methoxymethyl) acetanilide. Alachlor is used to control annual grasses, certain broadleaf weeds, and yellow nutsedge. It is used in growing corn, soybeans, potatoes, peanuts, and cotton. It acts by preventing germination in the target plants. Exhibit T6.

The proposed alachlor standard is human health-based for surface waters protected for drinking and aquatic life (Class 2A and 2Bd), but toxicity-based for Class 2 waters not protected for drinking (Class 2B, 2C and 2D). Exhibit T1.

The toxicity-based criterion was developed using the EPA national method, however, one of the eight species requirements was not met. The MPCA advisory method produced a criterion that seemed overly protective and, therefore, the national method was used. The chronic data available for alachlor indicate that using the national method (rather than the advisory method) is adequately protective. Table 2 of Exhibit T1. The usable plant toxicity data suggests that aquatic plants will be adequately protected by the proposed standard as well. Exhibits T2 through T6 contain the most pertinent toxicity data used to set the proposed alachlor standard.

Alachlor is classified by the EPA as a carcinogen, and the Agency used the latest cancer potency slope recommended by the MDH to calculate the human health-based criterion. Alachlor is not highly bioaccumulative. The final BAFs of 2.5 (Classes 2B, 2C, and 2D) and 10 (Class 2A) were obtained from an excellent bioconcentration study done at the University of Wisconsin, Superior. Exhibit T3.

In 1988 the Agency, with the cooperation of the Department of Agriculture, started analyzing river samples for herbicides. The samples were taken at selected stations in the Agency's routine water quality monitoring program. Most stations selected were located in the agricultural regions of Minnesota with a few in nonagricultural areas.

Samples were taken in June of 1988 and 1989, the two years for which data are available. The results show only a few values, most from the 1989 sampling, above detection limits. The detection limit is 0.02 ug/l, but some values were reported as less than 0.2 ug/l. A notable exception to this pattern was a 1989 value of 3.4 ug/l from the Blue Earth River near its mouth in Mankato. The next highest value, 1.4 ug/l, was measured in 1989 in the Cedar River, three miles south of Austin. The highest values measured are below the proposed standards.

b) Atrazine

As with alachlor, the proposed atrazine standard is human health-based for surface waters protected for drinking and aquatic life, but toxicity-based for Class 2 waters not protected for drinking. Exhibit T1.

The discussion of atrazine is more extensive than the discussion provided for the other chemicals because of its widespread use, its presence in surface and ground waters, and the emphasis being placed on nonpoint source pollution prevention in general by the Agency. More information is also available about the toxicity of atrazine and the toxicity of its breakdown products.

Atrazine is a heterocyclic nitrogen compound and one of several common triazine herbicides (chemical name: 2-chloro-4-ethylamino-6-isopropyl-amino-1, 3,5-triazine). Commercial names include AAtrex and Atranex. Atrazine kills weeds by interfering with the photosynthetic process. Exhibit T10.

Atrazine is used for weed control in a variety of crops such as corn, asparagus, potatoes, tomatoes, sorghum, rye and sugar cane. Exhibits T10 and T32. Atrazine is the most heavily used herbicide in the United States. Exhibit T10. Atrazine can enter the surface water through surface runoff, ground water upwelling, and atmospheric deposition. The amount of atrazine entering the surface water is dependent on the soil type, how soon a major rainfall occurs after application, the amount of humus in the soil, and other factors. The more sandy the soil and the less humic material present, the more likely atrazine will migrate to ground water. Exhibit T32.

Atrazine has been found to be persistent in soils (half lives of 20-101 days), but little is known about persistence in the aquatic environment. Its mobility is largely dependent on factors such as soil type, and amount of rainfall. Highest surface water concentrations are found in late spring and summer months, following application. Residual atrazine values, however, are found throughout the year. After application, atrazine breaks down into the major metabolite products of deethylatrazine, deisopropylatrazine, diaminoatrazine, hydroxyatrazine, deethylhydroxyatrazine, deisopropylhydroxatrazine, and diaminohydroxyatrazine. The metabolites appear to be fairly mobile in surface water. Exhibit T32.

Atrazine metabolite toxicity.

For the most part, the literature suggests that in the aquatic environment, the toxicity of the metabolites appears to be equal to, or less than, that of the parent chemical. Stratton (1984) reports deethylated atrazine to be less toxic than atrazine itself, but it was more toxic than the other metabolites tested. Exhibit T49. In the same study, Stratton investigated the toxicity of mixtures of metabolites and the parent compound to blue-green algae. In most tests, Stratton found toxicity to be less than additive. However, when atrazine was mixed with deisopropylated atrazine or deethylated atrazine, there was a greater than additive effect (synergism). Deisopropylated atrazine and deethylated atrazine mixtures were additive in their toxicity. In spite of Stratton's important study, the information on metabolite toxicity is fragmented and does not give sufficient information to establish separate criteria for each metabolite. Exhibit T34 illustrates that individual metabolite toxicity values for plants are above the proposed standard.

The Agency assessed the options of applying the atrazine standard as 1) the parent compound plus metabolites, or 2) the parent compound alone. A standard of "Atrazine plus metabolites" would assure protection of aquatic communities as the parent chemical is broken down into the various metabolites, and, conversely, a standard of "atrazine" alone may be under protective as atrazine is metabolized into other compounds. However, the Agency is proposing an atrazine alone standard at this time for the following reasons. First and most importantly, the breakdown products of all triazine herbicides (cyanazine, simazine and prometone for example, as well as atrazine) are chemically very similar, and triazine metabolites can not be traced back to an individual parent chemical. Thus, it would not be possible to attribute the metabolites measured in surface waters to atrazine or any other single triazine herbicide. Secondly, while there is ample toxicity data to develop an atrazine standard, there is insufficient data to develop standards for individual metabolites.

Determination of the proposed atrazine standard.

There is enough acute data to use the EPA national method to determine the toxicity-based criterion. Also, there is a great deal of information on chronic toxicity as listed in table 2a of Exhibit T1, as well as acute to chronic data for ACRs as shown in table 2b of Exhibit T1 for this pollutant. However, the calculated toxicity-based criterion is greater than some toxicity values for aquatic plants. Table 4b or Exhibit T1. Criteria development procedures allow for the lowering of the criterion to protect sensitive aquatic plants in this situation. Therefore, the Agency lowered the toxicity-based criterion of 30 ug/l to match the results of the lowest acceptable plant toxicity test which is 10 ug/l.

The EPA advisory value for atrazine of 1.0 ug/l is considerably lower than the proposed standard. Exhibit T10. However, EPA urges caution in the use of this advisory number because it is not based on their 96 hour algal exposure or acceptable chronic exposures to vascular plants. The advisory is based on the lowest effect level found to algae. However, the plant toxicity data listed in Table 4a and 4b in Exhibit T1 shows

that by lowering the proposed standard to 10 ug/l, algae will be protected. Other toxicity information pertaining to the proposed atrazine standard can be found in Exhibits T11 and T12. Tables B-1 and C-1 in Exhibit T34 provide a concise summary of animal and plant toxicity data.

Atrazine is a class C carcinogen according to the EPA. A class C designation means this chemical is a suspected carcinogen but the evidence is not conclusive. The reference dose plus an additional safety factor of 10, rather than a potency slope, is used to determine human health criteria for class C carcinogens. The Agency has learned that the reference dose for atrazine may be changed soon. The information Agency staff has indicates the reference dose will be raised or made less stringent. If the change occurs before the hearing record closes, the Agency proposes to adjust the proposed atrazine standard accordingly.

Atrazine is not bioaccumulative in fish. The final BAF value of 2 came from a whitefish bioconcentration study. Bioconcentration data for some invertebrates are available, but vertebrate animals tend to metabolize atrazine more readily than do invertebrates. Fish BCFs and BAFs are given preference over invertebrate BCFs and BAFs when they are not in agreement because fresh water invertebrates caught in Minnesota are seldom eaten by people while fresh water fish are readily consumed by Minnesotants and visitors. The most pertinent BCF information on atrazine is in Exhibits T13 through T15.

Atrazine in surface and ground water.

Samples taken from the Mississippi River and its tributaries in a United States Geological Survey study found that 27 percent of the samples exceeded the federal drinking water standard of 3 ug/l. Exhibit T33. The Des Moines River in Iowa had an atrazine concentration ranging from 0.05 to 0.8 ug/L. The South Skunk River, which parallels most of the Des Moines River, had an atrazine concentration of 0.16 to 12.0 ug/L. Exhibit T34. Concentrations higher than 40 ug/l have been measured in some streams in Iowa, Ohio and in the tributaries to Chesapeake Bay.

Samples taken in Minnesota as part of the routine water quality monitoring in 1988 and 1989, as discussed for alachlor, showed concentrations ranging from 0.02 to 2.0 ug/l. The value of 2.0 ug/l was measured in 1989 in the Cedar River, three miles south of Austin. Values of 1.8 and 1.9 ug/l were measured in 1989 in the Rabbit River five miles northwest of Cambell (near western Minnesota boarder, southwest of Fergus Falls). A concentration of 2.3 ug/l was measured in Garvin Brook in 1982. All these samples were taken in June. The highest values measured are below the proposed standards. More typical concentrations were in the 0.1 to 0.4 range in agricultural watersheds, and below detection (0.02 ug/l) in watersheds with little agriculture. These results show generally lower concentration than have been reported elsewhere in the United States. The results of ongoing intensive surveys by the Department of Agriculture should help define the potential herbicide problem, including atrazine, in Minnesota in more detail.

2) Metals.

Standards are proposed for five metals: Antimony, Cobalt, Iron, Manganese, and Thallium. Table 1 and Exhibit T48 contain a list of the proposed standards for metals.

a) Antimony

Antimony is a silverly-white metallic alloy that is used in making matches, fireproofing materials, and hardening other metallic compounds. The proposed standard is human health-based for Class 2A and Class 2Bd waters, and toxicity-based for Class 2B, 2C and 2D waters. Exhibit T1.

The toxicity-based criterion was developed using the EPA national method. A great deal of the most useful information was developed by the University of Wisconsin at Superior, under contract by the EPA Environmental Research Laboratory-Duluth. Exhibit T7. Exhibits T8 through T9 contain other pertinent antimony toxicity information.

The human health-based criterion was developed using a BCF of 1 based on data in the EPA draft criterion. Exhibit T36. The Agency used 0.4 for the Relative Source Contribution Factor (RSC) in calculating the criterion. This RSC was used by the EPA to calculate the new antimony primary drinking water standard of 6 ug/l. Exhibit T35. The Agency proposes to use the recent RSC from EPA, together with the reference dose from the MDH to calculate the human health-based criterion.

No usable ambient stream or lake data for antimony were found in the STORET data base for Minnesota.

b) Cobalt

Cobalt is a steel-gray metallic element used in ink coloration, and as a metal alloy. The proposed standard is human health-based for Class 2A and Class 2Bd waters, and toxicity-based for Class 2B, 2C and 2D waters. Exhibit T1.

The toxicity-based criterion was developed using the EPA national method despite the lack of information for salmonids. There are a total of 14 Genus Mean Acute Values (GMAV) available to calculate the Final Acute Value (FAV). The toxicity-based criterion was lowered to match the chronic value of 5 ug/l for Daphnia magna as shown in table 2a of Exhibit T1. Daphnids have often been shown to be sensitive to metals. Other pertinent cobalt toxicity information can be found in Exhibits T8 and T16.

A single BCF of 0.3 is available for calculating the human health-based criterion. Exhibit T17. The procedures require using a BAF of 1.0 when the measured value is less than 1.0. The procedures also require the use of a RSC of 0.2 when no chemical specific data are available, which is the case for cobalt. Since the RAL list number 3 was issued in January 1991, the reference dose for cobalt has been withdrawn from the Health Assessment Summary Tables (HEAST). Because 0.0004 is the last reference dose available, the human health-based criterion is based on this reference dose. The human health-based criterion is not much lower (2.8 compared to 5.0 ug/l) than the toxicity-based criterion, but the Agency believes that the lower human health-based criterion should be used for the proposed Class 2A and Class 2Bd standards based on the last reference dose available.

The Agency has monitored for cobalt on a few occasions as part of the routine monitoring program. In general, concentrations range from about 1.0 to 2.2 ug/l in rivers across Minnesota, but some of these values may not reflect true concentrations because ambient levels are near or below the analytical detection limit of 0.5 ug/l. Cobalt data from the copper-nickel study in northeastern Minnesota reported most of concentration to be below detection limits of 0.2 to 0.5 ug/l. This study made special efforts to obtain the lowest detection levels possible.

c) Iron

Iron is a metallic element used in steel production. The proposed standard is toxicity-based for all Class 2 waters. Exhibit T1.

The EPA national method was used in developing the toxicity-based criterion despite the lack of a third fish species. The advisory method would have resulted in a criterion lower than background concentrations in most areas of the state. A single measured acute to chronic ratio of 2.19 for Daphnia magna is available. Exhibit T16. Daphnia magna is the third most sensitive organism to iron toxicity. The use of the D. magna ACR will be protective. Also, use of the generic acute to chronic ratio of 55, as called for in the procedures to "fill in" for the required second and third ACRs (resulting in an ACR of 18.8), would have driven the toxicity-based criterion well below background concentrations found in Minnesota.

The brook trout appears to be considerably more sensitive to iron toxicity than other aquatic organisms. Exhibit T1. The low brook trout LC50 of 917 ug/l is the reason for the lower proposed standard for trout waters. Other pertinent iron toxicity information can be found in Exhibits T18 through T21.

There was no BCF or BAF data found for iron, so a human health-based criterion could not be developed. Iron is not known to bioaccumulate in fish tissue and the toxicity-based criterion should protect human health. The secondary drinking water standard of 300 ug/l is based on iron's ability to stain laundry and impart unpleasant tastes to drinking water. Iron has no primary drinking water standard.

Background concentrations of iron in Minnesota's waters become an important issue relative to the proposed standard. Background concentrations may exceed the proposed standard in all areas of the state. Background data from the Agency's routine water quality monitoring network are summarized in Table 2, and in Exhibit T51. As shown in Table 2, the percent of measured iron concentrations above the proposed Class 2B, 2C and 2D standard range from a low of six percent in

the Upper Mississippi River basin to a high of 35 percent in the Red River basin. The percent of values above the proposed standard of 221 ug/l for trout waters (Class 2A) is substantially higher. Ninety, 81 and 67 percent of the measured values exceeded the Class 2A standard in the Lower Mississippi, Lake Superior and Rainy River watersheds, respectively. Very few routine monitoring stations are located on trout streams.

Table 2. Summary of Background Data for Total Iron For Rivers and Streams in Minnesota

Showing % of Values Above Proposed Class 2B, 2C and 2D Chronic Standard of 1245 ug/l

Watershed	% Above Std.	Median Value ug/l	No. of Values
Big Sioux, Cedar, Des Moines	28	743	541
Minnesota	30	660	1303
Red	35	680	665
Rainy	13	350	346
Lake Superior	15	520	890
St. Croix	15	660	370
Upper Mississippi	6	340	1228
Lower Mississippi	23	640	888

The Agency is aware that proposing a standard that will be below some background concentrations poses potential problems in the application of the standard. Application of the iron standard in risk assessment or in determining the need for remedial action or treatment will have to be within the context of the local background concentrations of iron. Several issues are involved when background concentrations often exceed a standard. These issues include: 1) the quality of the toxicity data upon which the standard is based and how those data are interpreted, 2) the form of the metal in the toxicity test and the form as measured in ambient waters, and 3) the guidance in part 7050.0170 on how to treat background levels that are greater than the standard.

The iron toxicity data base, while small compared to the data base for the trace metals, consistently shows iron to be fairly toxic. As noted above, in evaluating the toxicity data for iron, the Agency used the national method rather than the advisory method and selected a lower acute to chronic ratio (ACR). These choices resulted in the proposed standards being less stringent in recognition of naturally high concentrations of iron in Minnesota waters.

The proposed standard is consistent with the laboratory toxicity tests. However, it is quite possible that unaccounted for, or unknown, factors are mitigating iron toxicity in nature. The proposed standard is for total iron, as are the background concentrations shown in Table 2. The

chemistry of iron in natural water is very complex, Exhibit T53, and it is reasonable to assume that some forms of iron are not toxic to aquatic life, at least in concentrations likely to occur in natural waters. Iron toxicity is usually attributed to the soluble ferrous (Fe++) ion and the insoluble ferric (Fe+++) ion. However, particulate ferric hydroxide can accumulate on and clog the gills of small fish and invertebrates causing reduced survival or growth. A "total" iron analysis includes the complexed and particulate iron in suspension as well as dissolved iron, and, therefore, will be protective or potentially over protective of aquatic life. A filtered or "dissolved" iron analysis would exclude the particulate forms of iron and may be under protective. Exhibit T52. Until more definitive information is available on the toxicity of common forms of iron in natural waters, the Agency believe the standard should be in terms of total metal as recommended by Exhibit T52.

The third issue mentioned above is the guidance provided by part 7050.0170 on dealing with background levels that exceed standards. The most pertinent provision states that, if the background levels exceed the standard, the background levels can be used as the standard in place of the numerical standard to control loadings from point or nonpoint sources. This provision means that those waters that have natural levels higher than the proposed standard will not be considered in noncompliance with the standard, and that the background levels become the standards used to control additional loadings. In implementing this provision, the Agency assesses the variability of the background levels and allow loadings or effluent concentrations within the range of this variability.

d) Manganese

Manganese is a grayish-white metallic element used in an alloy with the manufacturing of iron, aluminum, and copper. The proposed standard is toxicity-based for Classes 2B, 2C and 2D waters and human health-based for Class 2A and 2Bd waters. Exhibit T1.

The manganese toxicity-based criterion was developed using the EPA national method. The national method was used despite the lack of a third fish species and the lack of a species from a phylum other than Arthropoda or Chordata. The EPA advisory method results in a criterion that is believed to be unreasonably low. Pertinent manganese toxicity data can be found in Exhibits T8, T16, T22, and T23.

A new Reference dose (RfD) for manganese of 0.005 mg/kg/day has recently been added to IRIS. The RfD is based on effects to the central nervous system. The MDH proposes to use this RfD to determine a Health Risk Limit (HRL) to add to their draft HRL rule. The new HRL for manganese is not in the draft rule dated January 11, 1993. Exhibit T62. MDH is using a relative source contribution factor of 0.8 for manganese. The Agency proposes to use the new RfD and the relative source contribution factor of 0.8 to calculate the human health-based criterion. Acceptable BAF or BCF data for manganese for fresh water fish is scarce. Based on the limited data, the Agency believes that manganese is not

bioaccumulative in fish and propose to use a BAF of one. This results in a proposed human health-based standard of 138 ug/l for Classes 2A and 2Bd waters.

The proposed Class 2A and Class 2Bd manganese standard will be exceeded frequently by background concentrations, as shown in Table 3. Not all waters in these watersheds are Class 2A and Class 2Bd. Exceedances of the Class 2B standard of 491 mg/l will be infrequent. The percent exceedance of the Class 2B standard ranged from zero to six percent for the same watersheds listed in Table 3. The Big Sioux, Cedar and Des Moines watersheds had six percent exceedances. When natural levels exceed the standard the provisions of part 7050.0170 apply as in the case of iron.

Table 3. Summary of Background Data for Total Manganese
For Rivers and Streams in Minnesota

Showing % of Values Above Proposed Class 2A and 2Bd Chronic Standard of 138 ug/l

Watershed	% Above Std.	Median Value ug/l	No. of Values
Big Sioux, Cedar, Des Moines	54	150	539
Minnesota	62	160	1182
Red	37	110	666
Rainy	21	59	347
Lake Superior	11	21	898
St. Croix	37	100	371
Upper Mississippi	37	110	1225
Lower Mississippi	45	130	875

e) Thallium

Thallium is a bluish-white metallic element used to make photo electric cells and rat poison. The proposed standard is human health-based for all Class 2 waters. Exhibit T1.

The thallium toxicity-based criterion was developed using the EPA advisory method. There was one low plant toxicity value of 8 ug/l; however, the difference between 11 and 8 ug/l is not significant and the Agency believes the toxicity-based criterion of 11 ug/l will protect aquatic plants. The human health-based criterion of less than 1 ug/l should protect all biota. Pertinent thallium toxicity information can be found in Exhibits T8, T38 through 39, and T41 through T44.

The human health-based criterion was developed using BCF of 66.5 based on data from Atlantic salmon and bluegill studies. BCFs for saltwater clams are available, but these data were not used because the BCF values

were lower than the fish BCFs, and clams are eaten less frequently than fish. Pertinent thallium BCF data is shown in Exhibits T41, T45, and T46. The Agency used a reference dose obtained from the MDH for thallium, and the default RSC of 0.2. The MDH used an RSC of 0.1 for antimony and other metals in the RAL list number 3 RAL (January 1991). Exhibit T47.

No usable ambient stream or lake data for thallium were found in the STORET data base for Minnesota.

3) Other Organics

Standards are proposed for one chemical under this category: Naphthalene.

a) Naphthalene

Naphthalene is a polynuclear aromatic hydrocarbon used as a wood preservative, the production of certain dyes, and as a moth repellent. The proposed standard is toxicity-based for all Class 2 waters.

The toxicity-based criterion was developed using the EPA national method. The lowest GMAVs were selected so that no more than two saltwater GMAVs were among the lowest four GMAVs (See part 7050.0218, subpart 5, item C.). Table 3b of Exhibit T1. The Agency found one chronic value that was lower than the toxicity-based criterion. Table 2a of Exhibit T1. However, this value is for a saltwater species and the proposed standard should protect freshwater organisms, based on the chronic data for them. Exhibit T1. Exhibits T24 through T29 and Exhibit T37 contain pertinent naphthalene toxicity data.

The human health-based criterion was developed using a new reference dose of 0.04 milligram per kilogram per day (mg/kg/day) as recommended by the MDH. The MDH used 0.004 mg/kg/day to calculate the RAL, which was the reference dose available at the time the RAL was released (January 1991). Exhibit T47. The bioaccumulation factor is from a whole body bluegill BCF and a rainbow trout edible portion BCF. Exhibits T30 and T31.

No usable ambient stream or lake data for naphthalene were found in the STORET data base for Minnesota.

Analytical Detection Limits.

The analytical detection limits obtained by the MDH analytical laboratory are shown in Table 4. The proposed Class 2A and Class 2Bd standard of 0.28 ug/l for thallium will be below the detection limit of 0.5 ug/l, otherwise, the proposed standards are above detection levels. The Agency believes that standards have to be set at levels required to protect aquatic life and human health independent of detection limits. A standard below detection does make ascertaining compliance with the standard more difficult. Techniques employed by the Agency to deal with this situation include monitoring the effluent before dilution, predicting water concentrations based on loading data, monitoring the pollutant in sediments where concentrations are likely to be higher, and monitoring bioaccumulative pollutants in fish tissue.

Table 4. Analytical Detection Limits
Compared to the Lowest Proposed Chronic Standard

Chemical	Detection Limit ug/l	Chronic Standard ug/l
Alachlor	0.02	3.8
Antimony	2	5.5
Atrazine	0.02	3.4
Cobalt	0.5	2.8
Iron	20	221
Manganese	3	138
Naphthalene	0.5	81
Thallium	0.5	0.28

d. Nine updated aquatic life standards for toxics.

The Agency is proposing to update nine of the 53 Class 2 aquatic life standards for toxics in parts 7050.0220 and 7050.0222. All nine are proposed for change because the reference doses (RfD) or potency slopes (q1*) used to calculate the standards have changed since the standards were first promulgated in 1990. (See part 7050.0218, subpart 6 and Exhibit T40 for details on how standards are determined.)

The RfDs or q1*s for 26 of the chemicals for which the Agency has Class 2 standards have undergone some change since 1990. The new RfDs and q1*s were obtained from the Health Risk Assessment Section of the Minnesota Department of Health (MDH). They are the latest values as of September 1992. Exhibit T54.

MDH obtains the Rfds and q1*s from the Integrated Risk Information System (IRIS) and the Health Effects Assessment Summary Tables (HEAST). IRIS and HEAST sources are maintained by the EPA, and the RfDs and q1*s represent a consensus of opinion within EPA on the toxicity and carcinogenicity of chemicals. As stated previously, Agency uses the same RfDs and q1*s the MDH uses to set their Recommended Allowable limits (RAL) and their proposed Health Risk Limits (HRL). Use of IRIS as the source for the RfDs and q1*s is specified in part 7050.0218, subpart 6.

The review of the 26 standards with new RfDs or q1*s resulted in nine chemicals needing to be updated. The reason many of the remaining standards are not changing is that the toxicity-based criteria remain lower than the human health-based criteria, and, therefore, the former control the standards. Some standards are being left unchanged for the reasons listed in Table 5, and as explained further below. The updated information for all human health-based criteria is contained in Exhibit T56.

Table 5. Review of Chemicals with Class 2 Standards
With new or Revised RfDs or q1*s

Chemical	Change	Status of Standard
Acenaphthene	new RfD	Remains toxicity-based
Anthracene	new RfD	Remains toxicity-based
Arsenic	revised RfD	**Updated standard
Benzene	revised q1*	Updated standard
Bromoform	revised RfD	Updated standard
Chlorpyrifos	new RfD,BAF	Remains toxicity-based
Chromium VI	revised RfD	Remains toxicity-based
1,2-Dichloroethane	revised q1*	**Remains unchanged
Di-n-octyl phthalate	new RfD	**Remains toxicity-based
Endosulfan	revised RfD	Updated standard
Ethyl benzene	revised RfD	Remains toxicity-based
Fluoranthene	revised RfD	Updated standard
Hexachlorobenzene	revised q1*	Updated standard
Lindane	new RfD	Remains based on 1990 q1*
Mercury	revised RfD	**Remains unchanged
Nickel	revised RfD	Updated standard
Parathion	new RfD	Remains toxicity-based
Pentachlorophenol	new q1*	**Updated standard
Selenium	revised RfD	Remains toxicity-based
Silver	new RfD	Remains toxicity-based
Tetrachloroethylene	revised q1*	**Remains unchanged
Toluene	revised RfD	Remains toxicity-based
Toxaphene	revised q1*	**Remains unchanged
2,4,6-Trichlorophenol	revised q1*	Remains organoleptic-based
Vinyl chloride	revised q1*	Updated standard
Zinc	new RfD	**Remains toxicity-based

** See further discussion in text

Of the nine updated standards, five are greater or less stringent, and four are lower or more stringent, than the current standards. The former category includes benzene, fluoranthene, hexachlorobenzene, nickel, and vinyl chloride. The latter category includes arsenic, bromoform, endosulfan, and pentachlorophenol; of these, arsenic and pentachlorophenol are significantly lower. Since these nine standards are being updated based only on new or revised RfDs or q1*s, according to established procedure, not all of them will be discussed individually. A comparison of the current and proposed chronic standards is shown in Table 6. None of the toxicity-based maximum standards or final acute values for the nine chemicals are proposed for change.

Table 6. Comparison of Current and Proposed Class 2 Chronic Standards
All units in ug/l Unless Noted

Chemical	Current Standards			Proposed Standards			Basis
	2A	2Bd	2B,C,D	2A	2Bd	2B,C,D	
Arsenic	50	50	70	2.0	2.0	53	Hs
Benzene	5.9	6.9	114T	9.7	11	114T	Hc,T
Bromoform	103	128	558	33	41	466	Hc
Endosulfan	0.044	0.15	0.15	0.0076	0.029	0.031	Hs
Fluoranthene	1.1	4.1	4.6	7.1	20T	20T	Hs,T
Hexachlorobenzene ng/l	0.056	0.22	0.22	0.061	0.24	0.24	Hc
Nickel*	88	88	158	297	297	NA	Hs&T
Pentachorophenol	5.7T	5.7T	5.7T	0.93	1.9	5.5	Hc
Vinyl chloride	0.14	0.15	7.6	0.17	0.18	9.2	Hc

NA = not applicable
Hc = standard is human health-based and chemical is considered a carcinogen
Hs = standard is human health-based and chemical is a systemic toxicant
T = standard is toxicity-based
* Values shown are human health-based; hardness related toxicity-based standard will be lower than the proposed standards for hardness values less than 212 mg/l.

The bioaccumulation factor (BAF) is the other major variable, besides the RfDs and q1*s, which can change with new information and can affect the human health-based criteria. BAFs are needed so that it can be determined whether the revised human health-based criteria will be lower than the current toxicity-based criteria. Most BAFs used in 1989 remain unchanged, but a few were changed based on new information, as shown below.

Chemical	1990 BAF	1992 BAF	Comments
Arsenic	4.4	4.4	no change justified after review
Chlorpyrifos	none	238	for Class 2B
		950	for Class 2A
Di-n-octyl phthalate	none	none	inadequate data
Nickel	47	1	new BAF based on fish
Parathion	none	71	
Pentachloro-phenol	467	35	for Class 2B
	467	142	for Class 2A
Silver	none	1	Great Lakes Initiative
Zinc	none	4.4	Great Lakes Initiative

1) Arsenic

The proposed new arsenic standard for Classes 2A and 2Bd waters of 2.0 ug/l is considerably lower than the current standard of 50 ug/l. The current Classes 2B and 2C standard of 70 ug/l is proposed to be lowered to 53 ug/l. This change is based on a lower (more stringent) RfD. The RfD is based on arsenic's noncarcinogenic human health effects. Arsenic is a well known human carcinogen based on inhalation studies. However, the evidence suggesting it is a carcinogen when ingested, either in water or with fish tissue, is less conclusive. The information the Agency has at this time is that EPA is reviewing the current primary drinking water standard for arsenic of 50 ug/l, and may propose a standard based on its carcinogenicity in the future.

The Recommended Allowable Limit (RAL) for arsenic, released by the MDH in 1990, is 0.2 ug/l, and is based on arsenic's carcinogenicity. RALs are used as drinking water or ground water criteria; i.e., they protect humans from the harmful effects of ingesting drinking water contaminants. However, because of the uncertainties about arsenic's carcinogenicity and concern about having a HRL below most natural background concentrations, the MDH is not proposing to include a HRL for arsenic in their pending HRL rule. Exhibit T62.

The bioaccumulation factor used to calculate the 1990 arsenic standard was 4.4. The Agency reviewed the bioaccumulation and bioconcentration data again and concluded that there was no need to change the BAF. The Great Lakes Initiative draft BAF for arsenic in fish is 1.0.

The Agency believes that, in spite of the uncertainties and pending review within EPA, the proposed arsenic standards will be protective of both human health and aquatic life. Use of the q1*, as used by the MDH for the 1991 RAL, to calculate the standard would lower the proposed standards by a factor of 10 (0.2 for Classes 2A and 2Bd waters and 3.3 ug/l for Class 2B waters). Standards in the 0.2 to 3.3 ug/l range would be below background concentrations in much of the state. Based on data from the routine surface water monitoring program, the proposed 2A and 2Bd standard of 2.0 ug/l will be below most background concentrations in some watersheds in the state, as shown in Table 7. The proposed 2B and 2C standard of 53 ug/l will not be exceeded by natural background levels. Where natural background concentrations exceed the standard, the natural background levels can be used as the standard (part 7050.0170).

Table 7. Summary of Background Data for Arsenic
For Rivers and Streams in Minnesota

Showing % of Values Above Proposed Class 2A and 2Bd Chronic Standard of 2.0 ug/l

Watershed	% Above Std.	Median Value ug/l	No. of Values
Big Sioux, Cedar, Des Moines	59	2.76	56
Minnesota	88	3.2	128
Red	76	3.3	78
Rainy	5	1.0	41
Lake Superior	2	1.0	123
St. Croix	--	--	--
Upper Mississippi	19	1.2	120
Lower Mississippi	19	1.3	137

In conclusion, the Agency is proposing a revised arsenic standard considerably more stringent than the current standard. The proposed 2A and 2Bd standard of 2.0 ug/l will be exceeded by background concentrations in the surface waters in some parts of the state. The uncertainties over arsenic's carcinogenicity may not be resolved soon. The promulgation of a new EPA primary drinking water standard often takes several years. Also, final MCLs for carcinogens are based on nonhuman health end points such as analytical detection limits, background concentrations, or treatability, which often makes the final MCLs less stringent.

2) 1,2-Dichloroethane

The change in potency slope was very slight (9.2 to 9.1), so the standard was left unchanged.

3) Di-n-Octyl Phthalate

Neither bioaccumulation or bioconcentration data are available for this chemical, and, therefore, a human health-based criterion can not be determined. If the BAF for di-2-ethylhexyl phthalate, a related chemical, is used to calculate a standard for di-n-octyl phthalate, the resulting criterion is within a factor of three of the current toxicity-based standard for this chemical (11 compared to 30 ug/l). In the absence of bioaccumulation data, the Agency believes the standard should be left unchanged.

4) Mercury

The latest RfD for mercury is roughly twice as large as the RfD used in 1990 (0.0003 to 0.00016). Consequently, use of the new RfD would result in a mercury standard about double the current standard of 0.0069 ug/l. The Agency believes a mercury standard of 0.013 ug/l would be under protective, and proposes to leave the current standard unchanged. For

example, it is known from the very low detection level mercury monitoring done in northern Minnesota lakes that even the current standard is not protective of the fish in these sensitive lakes. The mercury concentrations in these lakes is in the 0.001 to 0.002 ug/l range, but mercury concentrations in fish are high enough to require consumption advisories. Exhibit T63. Also, wildlife can be sensitive to mercury toxicity and it is believed a higher standard would not protect sensitive wildlife.

5) Pentachlorophenol

The proposed Class 2A and 2Bd pentachlorophenol (PCP) chronic standards of 0.93 and 1.9 ug/l, respectively, are lower than the current Class 2 standards. The proposed Class 2B chronic standard of 5.5 ug/l will be lower than the current standard for most Class 2B waters of the state. Only for those waters with average pH values less than 6.97 will the current standard be lower (more stringent). The current chronic standard varies with the pH of the ambient waters, and ranges from 3.5 to 26 ug/l over a pH range of 6.5 to 8.5. The reason the proposed standard is lower is that EPA now considers PCP a potential human carcinogen. PCP has been classified as a 2B carcinogen and has been given a potency slope of 0.12. Exhibit T54. EPA defines a class 2B carcinogen as a "probable human carcinogen based on a combination of sufficient evidence in animals and inadequate data in humans". Exhibit T35. The new q1* replaces a RfD which was used to calculate the human health-based criterion in 1990. However, the pH dependent toxicity-based criterion was lower than the RfD based human health criterion in 1990.

The bioaccumulation factor for PCP was reviewed for the proposed standard. Exhibit T56. BCF and BAF data are summarized and discussed in the 1986 EPA water quality criterion for PCP, in the draft Great Lakes Initiative documents, and in a paper by Niimi and Cho (1983). All three sources report BCFs or BAFs in the range of 23 to 40. These BAFs and BCFs are adjusted to account for the lipid (fat) content of the various test fish used. Niimi and Cho (1983) provide evidence that PCP does not biomagnify up the food chain. Biomagnification refers to an increase in the tissue concentrations of a bioaccumulative chemical with each step in the food chain, such that top predator fish have higher concentrations than small fish, small fish higher concentrations than zooplankton, and so on. The Agency proposes to use the BAF data in Niimi and Cho (1983) as the basis for the BAF used to calculate the proposed standard. Exhibit T57. Field measured BAF data is preferred over laboratory measured BCF data because BAFs take into account potential biomagnification, metabolism and other factors that affect bioaccumulation in nature. Also, since field measured BAF data are available, the BCF to BAF adjustment factor in part 7050.0218, subpart 7, item B. is not used.

The geometric mean of the four lipid normalized BAFs in Exhibit T57 is 23.6. The resulting BAFs are as follows:

Revised BAFs for PCP:

23.6 X 1.5 % lipid (for Class 2B, 2C and 2D waters) = 35
23.6 X 6 % lipid (for Class 2A waters) = 142

PCP was analyzed in river samples taken during the routine monitoring program in 1978 and 1979. In total, 78 samples from around the state were analyzed for PCP. Of these, one value was above the most stringent (Class 2A) proposed standard of 0.93 ug/l. This was 0.97 ug/l measured in the Red River four miles south of Georgetown. This value would be below the proposed standard for the Red River of 1.9 ug/l. The lowest analytical detection level achieved for these data was 0.1 ug/l.

6) Tetrachloroethylene

The change in potency slope was very slight (from 5.3 to 5.1 mg/kg/day) and, in addition, the new q1* has be withdrawn for HEAST since September, 1992. The Agency proposes to leave the standard unchanged.

7) Toxaphene

The change in the potency slope was very slight, apparently due to rounding off the value the Agency proposes to leave the standard unchanged.

8) Zinc

The new RfD for zinc results in a human health based criterion of 328 ug/l for zinc. This is calculated using a BAF of 4.4, which is the draft BAF from the Great Lakes Initiative. This human health-based criterion is only slightly lower than the hardness dependent toxicity-based standard of 343 ug/l calculated for the maximum hardness of 400 mg/l. The Agency believes this is not enough difference to warrant a human health-based "cap" in the standard.

Revisions unique to each item

A discussion of the proposed changes that are unique to each item follows.

3. Subparts 2, 3 and 4.

The following changes to the standards are proposed to correct several minor errors left over from the amendments to ch. 7050 completed in 1990.

The Agency proposes to round off three of the current Class 2 standards to two significant digits. This change is being made to make these standards consistent with the practice, started when the 53 standards for toxics were adopted in 1990, to round values off to two significant figures. The three standards are:

Class 2 maximum standards for Dieldrin, from 1.25 to 1.3 ug/l;
Class 2Bd chronic standard for 1,1,2,2 Tetrachloroethane, from 1.54 to 1.5 ug/l; and

Class 2A Final Acute Value for Cadmium at a hardness of 200 mg/l, from 17.1 to 17 ug/l.

These changes do not involve any reassessment of the basis for the three standards.

The Agency proposes to add to the Class 2Bd standards in part 7050.0222, subpart 3, the following:

Color value Pt.-Co units	none	none	none

This will correct an error that says that Class 2Bd waters have a color standard because all Class 2A standards, which includes a color standard, apply to Class 2B waters, except those standards listed in the current part 7050.0220, subpart 3, item B. The Class 2A color standard is a carry over from the rule prior to the amendments in 1990. Class 2B waters have never had a color standard. When the new class "2Bd" was created in 1990 to include nontrout waters protected for drinking, a use they have in common with Class 2A (trout) waters, the error was made in not excluding the color standard from Class 2Bd waters.

The chemical "Acenaphthene" is misspelled in the current rule as "Acenapthene". It is proposed to correct this error.

In the lists of Class 2 standards, the "(C)" designation is associated with substances that are carcinogenic, and for which the human health-based criterion is the basis for the standard. The Class 2A and 2Bd standards for some substances are human health-based due to the inclusion of drinking water in the determination of the standards. However, the Class 2B standard for the same substance may be toxicity-based because the human health-based criterion is based on fish consumption only. The "(C)" designation is erroneously associated with three Class 2B standards that are in this category. It is proposed to delete the "(C)" from the following toxicity-based Class 2B standards. The Class 2Bd and 2B standards are shown to illustrate the change from human health to toxicity-based standards.

Substance	Human Health-based Class 2Bd standard ug/L	Toxicity-based Class 2B standard ug/L
Benzene	11	114
Chloroform	55	224
Methylene chloride	46	1561

A third change to these subparts is proposed to make the rule easier to use. It is proposed to add to the top of each page that includes the Class 2A, 2Bd, and 2B standards the following headings:

Class 2A standards continued
CS MS FAV

A similar heading will appear at the top of the pages listing the Class 2Bd and 2B standards. This will help the reader identify the use class that the standards on each page pertain to, and it will help identify which standards are the CS, MS and FAV.

4. Subpart 2. Class 2A waters; aquatic life and recreation.

The Agency proposes to change the word "fisheries" to "aquatic life" in the name of designated use Class 2. This change is also proposed under subparts 3 to 4. See part 7050.0200, subpart 3 (Class 2) for a discussion of the need for and reasonableness of this change.

The Agency proposes to delete reference to warm water sport fish by deleting "warm or." The term warm is being removed from the description of Class 2A waters because, even though warm water fish may be present, it is the presence or potential presence of the cold water fish species that is used to classify a waterbody under Class 2A. For a more detailed explanation of the intent the use classification scheme and Class 2A, see the discussion of narrative biocriteria in the part 7050.0222 revision subject text.

The restructuring of part 7050.0220 has made it necessary to change the "part 7050.0220, subpart 3, item H" to "part 7050.0222, subpart 7, item E." This change is also proposed under subparts 3 and 4.

The Agency proposes to delete the phrase "this dissolved oxygen standard requires compliance with the." This phrase appears twice in the rule due to a word processing error made during the 1990 rule revision. This change will correct this error without causing a change in the standard. This correction also occurs under subparts 4 and 5.

5. Subpart 5. Class 2C waters.

The phrase "species commonly inhabiting waters of the vicinity under natural conditions" is proposed to be condensed to the word "indigenous." This change will eliminate a wordy statement without changing the meaning of the standard.

The restructuring of part 7050.0220 has made it necessary to change "item C" to "subpart 4."

6. Subpart 6. Class 2D waters.

The Agency proposes to establish a designated use Class 2D to protect indigenous species in wetlands. Narrative standards are proposed for dissolved oxygen, pH, and temperature. Wetland background ranges are proposed as benchmarks.

This addition is reasonable for the reasons summarized below. Currently, most wetlands are classified as Class 2B waters, because they are not listed in part 7050.0470. The existing Class 2 parameters do

not take into account the wide range of variability of dissolved oxygen, pH, and temperature wetlands can have. Wetland soils are anaerobic (without oxygen) at least a portion of the year and this can result in an accumulation of organic matter in the sediments. The presence of organic soils and active photosynthesis can result in large dissolved oxygen swings in the water column during a 24 hour period.

Therefore, the Agency is proposing "maintain background" standards for dissolved oxygen, when the background level is a daily minimum below 5 mg/l. Class 2B standards for other substances or characteristics will continue to apply. The narrative standard of maintaining 'background ' allows a natural assemblage of plants and animals.

In the same manner, some wetlands are characterized by low pH (bogs) or high pH (calcareous fens). Requiring a circumneutral pH could significantly impact the designated uses of those wetlands. Exhibits W56 and W58. The Agency is not aware of impacts to wetlands from temperature restraints. Using a narrative standard does not decrease protection but does allow flexibility in permitting as new information becomes available.

One respondent, Exhibit W24, was concerned with the difficulty of determining "background conditions" in a wetland. Background condition is an evaluation of a wetland in its present condition. The Agency uses water chemistry data gathered through monitoring programs or reference data from a similar wetland when data are unavailable for a specific wetland, and inventory plant and animal species and their diversity to determine background conditions. These evaluation techniques are similar to those used to determine natural water quality. See the discussion for part 7050.0170 for more discussion on natural water quality. The level of physical, biological, and chemical monitoring that will be required to determine background condition will be a case by case determination. The type of wetland, condition of the wetland, and the type of discharge being proposed vary greatly with each project and justify this case by case approach.

The EPA has suggested that the Agency plan to add numeric standards for wetlands in subsequent triennial revisions as data become available. Exhibit W3. This progression of narrative standards followed by numeric standards is the same as the progression for protection of rivers and lakes in previous water quality standard revisions.

a. Normal farm practices.

The following paragraph concerning normal farm practices is also proposed:

> "Activities in wetlands which involve the normal farm practices of planting with annually seeded crops or the utilization of a crop rotation seeding of pasture grasses or legumes, including the recommended applications of fertilizer and pesticides, are excluded from these standards and the standards in parts 7050.0224, 7050.0225, and 7050.0227. All other activities in these wetlands must meet water quality standards."

Normal farming activities are exempt from Clean Water Act Section 404 permitting requirement by 40 CFR 232.3(c)(1)(i). Exhibits W46 and W47. The normal farm practices of seeding, cultivating, and applying fertilizers and pesticides will not significantly or permanently alter seasonal wetland uses. Exhibit W51. These practices are likely to occur only in seasonal wetlands that have dried sufficiently as to allow farm equipment on them. These activities are allowable, but the water quality standards do not explicitly state this. The Agency was requested to add this paragraph. Exhibit W51. Since it is allowable and reasonable, the paragraph was added.

b. Reclassification of waters.

Waters that are presently listed as Class 2B waters but are fens or other wetlands contained within an ORVW geographic area are being proposed to be changed to 2D waters. It is reasonable to make this change because the 2B aquatic use description regarding sport fish and several of the accompanying standards (i.e. pH, temperature and dissolved oxygen) are not appropriate for these wetlands. As noted previously, the 2D designated use classification was developed to address the unique characteristics of wetlands. These changes in classification will appear under part 7050.0470.

7. Subpart 7. Additional standards.

The Agency is proposing to establish a separate subpart to address standards that are required for all Class 2 waters. This subpart will be comprised of existing text. Item A contains text that currently follows part 7050.0220, subpart 3, item D. Even though the first part of the text states "for all classes," the existing format made the text appear to be part of item D and apply only to Class 2C. Therefore, the language has been proposed to be moved to part 7050.0222, subpart 7, item A instead of subpart 5 with the rest of the text from item D.

The restructure made it necessary to change "above listed" classes to classes "in subparts 2 to 6."

8. Subpart 8. Site-specific modifications of standards.

The restructuring of part 7050.0220 made it necessary to change standards "listed in subpart 3" to standards in "subparts 2 to 6."

T. Part 7050.0223 SPECIFIC STANDARDS OF QUALITY AND PURITY FOR CLASS 3 WATERS OF THE STATE; INDUSTRIAL CONSUMPTION.

This part was created from part 7050.0220 as follows:

Proposed rules	Current rules
Subpart 2	7050.0220, subpart 4, item A
Subpart 3	7050.0220, subpart 4, item B
Subpart 4	7050.0220, subpart 4, item C
Subpart 6	7050.0220, subpart 4, item C

1. Subpart 5. Class 3D waters.

The Agency proposes to establish a new designated use Classification called "Class 3D." Class 3D will protect those wetlands that have pH values that deviate significantly from neutral. It also protects wetlands with naturally high concentrations of chloride or hardness.

This class has been added for reasons similar to Class 2D, proposed under part 7050.0222, subpart 6. The proposed class is reasonable because the narrative language does not decrease protection, but does allow flexibility for permitting discharges to a wide variety of wetlands. Without this flexibility, variances are required to avoid violating the water quality standards. The data are not available yet to list numeric standards for chlorides and hardness for all wetlands.

Wetlands with an industrial consumption designated use are currently classified as Class 3B waters. Specific water quality standards for Class 3B water include the following: chlorides, 100 mg/l; hardness, 250 mg/l; and pH, a range of 6 to 9. Some wetlands naturally have concentrations of chlorides and hardness that exceed these standards and "maintain background" standards are proposed under Class 3D to protect these wetlands. Levels of pH naturally vary widely in the different types of wetlands and a "maintain background" standard is proposed under Class 3D for all pH levels to provide protection to these diverse waters.

This approach is based on the general standard for discharges proposed under part 7050.0210, subpart 13a, wetland pollution prohibited, which states, in part, that wetlands will be protected from significant adverse chemical changes to wetland designated uses. See the part 7050.0210, subpart 13a, for a discussion of the reasonableness of this standard.

2. Subpart 6. Additional standards.

The Agency is proposing to establish a separate subpart to address standards that are required for all Class 3 waters. This subpart will be comprised of text that is currently follows part 7050.0220, subpart 4, item C. Even though the first part of the text states that these standards are in addition to the specialized Class standards, the existing format made the text appear to be part of item C and apply only to Class 3C. Therefore, the language has been proposed to be moved to part 7050.0223, subpart 6, instead of subpart 4 with the rest of the text from item C.

The restructuring of part 7050.0220 made it necessary to change "above listed" standards to standards "in subparts 2 to 5."

U. Part 7050.0224 SPECIFIC STANDARDS OF QUALITY AND PURITY FOR CLASS 4 WATERS OF THE STATE; AGRICULTURE AND WILDLIFE.

This part was created from part 7050.0220 as follows:

Proposed rules	Current rules
Subpart 2	7050.0220, subpart 5, item A
Subpart 3	7050.0220, subpart 5, item B

1. Subpart 4. Class 4C waters.

The Agency proposes to establish a new classification "Class 4C". Class 4C is proposed to protect wetland designated uses that enhance agriculture and wildlife. The specific designated uses proposed are erosion control, ground water recharge, low flow augmentation, storm water retention, and stream sedimentation. These uses are potentially important in the wetland and in downstream water resources. Not all wetlands have all these uses, but, where they do occur, they are valuable.

Erosion control by wetlands occurs because stream velocities decrease as the stream channel widens at the site of the wetland. The plants in the wetland provide increased friction to flows also. The decrease in erosion results in improved water quality downstream through reductions in bank erosion.

Ground water recharge in wetlands can be an important resource, both to people and as discharge points, such as springs and seeps. Water that is detained in wetlands is naturally cleansed of sediments and toxics and, because of the slowed velocities, given time to percolate into the aquifer, if there is appropriate geology below the wetland.

Low flow augmentation by wetlands can be important for maintaining flow in streams during droughty periods. Wetlands perform this function not only because of its larger basin, but also because its organic sediments have greater water-holding capacity than inorganic sediments. The augmented flows from wetlands help sustain aquatic organisms downstream and could lengthen the amount of time water is available for livestock and wildlife watering needs and for irrigation purposes.

The storm water retention potential provided by wetlands is important to moderate the peak flows after a storm event. The retention also enhances the other designated uses listed in subpart 4.

Stream sedimentation is a natural result of the reduced velocities that occur in wetlands. Nutrients and toxics, when present, are often associated with the particles in the water column. The filtering that wetlands perform by allowing these particles to settle can greatly improve water quality downstream, especially in lakes. However, excessive sedimentation can smother the natural organic wetland sediments, which can potentially result in an impact to other designated uses. Excessive sedimentation usually occurs only if the upstream river channel is significantly disturbed.

V. Part 7050.0225 SPECIFIC STANDARDS OF QUALITY AND PURITY FOR CLASS 5 WATERS OF THE STATE; AESTHETIC ENJOYMENT AND NAVIGATION.

This part was created from part 7050.0220 as follows:

Proposed rules	Current rules
Subpart 2	7050.0220, subpart 6

The substances proposed to be listed under subpart 2 for wetlands are pH and hydrogen sulfide, measured as sulfur. Changing pH to a narrative standard is discussed under part 7050.0222, subpart 6. In a parallel sense, the data are not yet available for numeric criteria in wetlands for hydrogen sulfide.

W. Part 7050.0226 SPECIFIC STANDARDS OF QUALITY AND PURITY FOR CLASS 6 WATERS OF THE STATE; OTHER USES.

This part was created from part 7050.0220 as follows:

Proposed rules	Current rules
Subpart 2	7050.0220, subpart 7

The proposed restructuring of part 7050.0220 made it necessary to change "the foregoing categories" to "parts 7050.0221 to 7050.0225."

X. Part 7050.0227 SPECIFIC STANDARDS OF QUALITY AND PURITY FOR CLASS 7 WATERS OF THE STATE; LIMITED RESOURCE VALUE WATERS.

This part was created from part 7050.0220 as follows:

Proposed rules	Current rules
Subpart 2	7050.0220, subpart 8

A format change is proposed for the list of Class 7 numerical standards. The text for the fecal coliform organisms, pH value, and dissolved oxygen standards is proposed to be formatted into a column under the heading "standard." This change is reasonable because it does not change the text or meaning of the rules, but will help readers differentiate "substance or characteristics" from "standards."

Y. Part 7050.0410 LISTED WATERS.

Part 7050.0410 functions as a key for part 7050.0470, which lists waters of the state by major surface water drainage basins, and allows the list of designated use classes for a listed water to be abbreviated. Existing text establishes the classifications that are designated to all waters listed under part 7050.0470, and a change is proposed to exclude wetlands from this list of classifications. Language is also proposed to establish that wetlands listed under part 7050.0470 are classified as Classes 3D, 4C, 5, and 6 in addition to the classifications specified in a part 7050.0470 entry for a wetland. These changes reflect the use classifications and standards being proposed for wetlands under parts 7050.0222, subpart 6; 7050.0223, subpart 5; 7050.0224, subpart 4, and part 7050.0225.

Z. Part 7050.0420 TROUT WATERS.

The Agency proposes to change part 7050.0420 to update reference to the MDNR list of designated trout waters and to designate MDNR-specified tributaries to trout waters as Class 2A waters.

The MDNR updated the list of designated trout waters by publishing the Commissioner's Order No. 2450 in the June 22, 1992, State Register (16 S.R. 2785, 2902-28). Exhibit C55. This list is referenced as Minn. Rules part 6262.0400, which is proposed to be added under this part. It is reasonable for the MPCA to update the list of waters identified under part 7050.0420 to match the list identified by the MDNR because the Agency and MDNR should be in coordination in their management and protection efforts and all MDNR designated trout waters should be identified as Class 2A waters under Chapter 7050 to receive the appropriate level of protection.

Minn. Rules part 6262.0400, subpart 5, also designates tributaries to trout waters as trout waters. The Agency is proposing to add these tributaries as trout waters under Minn. Rules ch. 7050 and designate them as 2A waters to be consistent with the MDNR Commissioner order.

Under the current rule, the MDNR designated trout streams and trout lakes were incorporated by reference into Ch. 7050. Under the proposed rule, these trout waters listed under the Commissioner's Order No. 2450, with the exception of Shakopee Mill Pond, are incorporated under the appropriate water basin within part 7050.0470. According to MDNR, Shakopee Mill Pond is not managed as a trout water and the entry for the pond in the Commissioner's Order as it appeared in the State Register was an error. Therefore, staff propose not to list Shakopee Mill Pond under part 7050.0470 as a trout water.

AA. Part 7050.0425 UNLISTED WETLANDS.

This subpart is proposed to be added to parallel the existing language in 7050.0430:

> "Those waters of the state that are wetlands as defined by part 7050.0130, item F, and that are not listed in part 7050.0470 are classified as Class 2D, 3D, 4C, 5, and 6 waters."

This part is needed to address the many wetlands that have not been listed under part 7050.0470. Adding this language is reasonable because it clarifies how these unlisted waters will be classified. Classes 2D, 3D, 4C and language under Classes 5 and 6 are being proposed during this rule revision to establish water quality standards that directly relate to wetlands and their unique characteristics and designated uses.

One respondent, Exhibit W48, disagreed with the concept of classifying wetlands according to their potential uses. In the Agency's current rules, all waters of the state, including wetlands, are assigned uses so this action does not change the use attainability process, which was defined in the NEED section of this SONAR.

BB. Part 7050.0430 UNLISTED WATERS.

Part 7050.0430 was modified to reflect that wetlands have been given the new Classes of 2D, 3D, and 4C. These changes are reasonable because, without this modification, wetlands would be placed in both wetland and non-wetland criteria, creating confusion.

CC. Part 7050.0465 MAP: MAJOR SURFACE WATER DRAINAGE BASINS.

The map label for Olmsted County is currently misspelled as "Olmstead." This spelling error is proposed to be corrected.

The map contained in part 7050.0465 identifies the nine (9) major surface water drainage basins under which the waters in part 7050.0470 are organized. The watershed boundaries separating these drainage basins was based on a hydrologic unit map developed by the United States Geological Survey (USGS) in 1974. The hydrologic units established on this map are divided into Regions, Subregions, Accounting, and Cataloging units. The bold drainage basin lines identified on the map correspond to the Subregional unit codes established for the state.

The use of the Subregional unit code boundaries in the southeastern corner of the state has led to some confusion when attempting to determine the water use classifications for waters in that area. Waters within Houston, Fillmore, and some waters in Mower Counties flow either directly into the Mississippi River or into either the Wapsipinicon River or the Upper Iowa River watershed, which are direct tributaries to the Mississippi River. They do not flow into the Cedar River basin as is inferred from the map. Therefore, the Agency is proposing to modify the map in part 7050.0465 to more accurately reflect the actual watershed drainage patterns for these three counties. In doing so, six watercourses that were specifically listed under the Cedar-Des Moines Rivers Basin in part 7050.0470, subpart 8, are proposed to be listed under Lower Mississippi River Basin in part 7050.0470, subpart 7. The water use classifications for these waters remain unchanged.

DD. Part 7050.0470 CLASSIFICATION FOR WATERS IN MAJOR SURFACE WATER DRAINAGE BASINS.

There are a number of proposed rule amendments that are reflected in changes to part 7050.0470. These amendments include: 1) the assignment of the Class 1C Domestic Consumption water use classification to certain waters that have been identified as drinking water sources; 2) the proposed reclassification of six watercourses as Class 7 Limited Resource Value waters; 3) the addition of entries for stream trout lakes and trout streams designated by the Commissioner of the Minnesota Department of Natural Resources; 4) removal of lake trout lake ORVW status at request of MDNR; 5) changes to entries for ORVW calcareous fens and addition of newly designated ORVWs; 6) changing the use class for fens; and 7) other minor organizational changes to the listing of waters. Each set of proposed amendments are explained in greater detail as follows.

1. Class 1C Domestic Consumption Classifications

The domestic consumption water use classification is assigned to waters of the state that serve as a source supply for drinking, culinary or

food processing or other domestic purposes. Agency staff, with the assistance of staff from the Minnesota Department of Health, Environmental Health Division, have identified surface waters that are used as source waters for public water systems but that are not currently assigned the domestic consumption use classification.

A public water supply system is a system supplying piped water for human consumption, and has a minimum of 15 service connections or 15 living units, or serves at least 25 persons daily for 60 days of the year. Minn. Rules pt. 4720.0100, subp. 16. Public water supplies are divided into three categories: community water supplies, noncommunity water supplies, and nontransient, noncommunity water supplies. Examples of public water supply systems within these three categories are listed below.

A community water supply system is a public water system that serves at least 15 service connections or living units used by year-round residents, or that regularly serves at least 25 year-round residents. Examples of these type of systems are: municipalities, mobile home parks, and apartments.

A noncommunity water system is a public water system that serves the traveling or transient population. Examples of such systems include: hotels, motels, resorts, restaurants, campgrounds, recreation areas, churches, and gas stations.

A noncommunity, nontransient water system is a public water supply system that regularly serves at least 25 of the same persons over six months per year. Examples include: schools, day-care facilities, factories, and businesses.

The Agency is proposing to classify 18 additional surface waters which have been identified by the Minnesota Department of Health as public water supply system sources as Class 1C waters. The quality of this class of waters of the state shall be such that with treatment consisting of coagulation, sedimentation, filtration, storage, and chlorination or other equivalent treatment processes, the treated water will meet the primary and secondary drinking water standards. Exhibit C42 is a listing of the surface waters proposed for the Class 1C use classification, the municipalities or facilities using these waters as supply sources, and the counties in which these cities or facilities are located.

It should be noted that one of the public water supply sources utilized by the Hibbing Taconite Company, the Scranton Mine Pit Lake, is not a discrete body of water at this time. Under current water level elevations, the Scranton is inundated by other surface waters within the Hull-Rust-Mahoning-Scranton-Susquehanna complex. Exhibit C43 contains an aerial photograph of this inundated mining complex. Hibbing Taconite has a floating barge within this waterbody which is reportedly used to dewater the pit at a current rate of approximately 12,000 gallons per minute (gpm). Once the water level is established at an elevation of

1290 feet, pumping rates will be re-evaluated. For the near future, the Scranton will continue to remain inundated. Based on this information, the Agency is proposing to classify the surface waters within this complex as Class 1C waters. The entry in Minn. Rules pt. 7050.0470, subp. 1 will read as follows:

Scranton Mine Pit Lake (Hull-Rust-Mahoning-Scranton-Susquehanna), (T.57, R.20, S.6,7; T.57, R.21, S.1,2,11,12): 1C, 2Bd, 3B;

Comments letters and oral statement submissions were received regarding the proposed classification of these public water supply sources as Class 1C waters. Many of the comments were specifically directed toward the mine pit lakes on the Iron Range, their uses, and concerns for their continued protection because of their important role as drinking water supplies. Several commenters proposed that all mine pit waters situated within the Biwabik Iron Formation Aquifer be classified as Class 1C waters. Exhibit C44. The Agency has considered this proposal and has concluded that assignment of the Class 1C use classification should be restricted to those mine pit lakes that are currently being used for drinking water purposes. The Agency therefore believes it is reasonable to designate those waters that have been identified by the Minnesota Department of Health as public water supply sources to be classified as Class 1C waters in Minn. Rules pt. 7050.0470.

2. Class 7 Limited Resource Value Water Use Reclassifications

The waters included in the Class 7 use classification include surface waters of the State which are of limited value as a fisheries and recreational resource and are generally either intermittent or have a flow at the once in ten year, seven day low flow (7Q10) of less than one cubic foot per second. Class 7 waters are protected so as to allow secondary body contact use, preserve the ground water for use as a potable water supply and to protect aesthetic qualities of the water. Discharges to Class 7 waters are regulated so that downstream waters are protected for their designated uses.

Stream assessment surveys are conducted on waters proposed for Class 7 reclassification and the information obtained during this assessment process is used to determine the extent to which these waters demonstrate the Class 7 criteria conditions which are set forth below:

a. The existing fishery and potential fishery are severely limited by natural conditions as exhibited by poor water quality characteristics, lack of habitat or lack of water;

b. The quality of the resource has been significantly altered by human activity and the effect is essentially irreversible; and

c. There are limited recreational opportunities (such as fishing, swimming, wading, or boating) in and on the water resource.

Conditions "a" and "c" or "b" and "c" must be established by the MPCA stream assessment procedure before a water can be classified as a Class 7 Limited Resource Value water. (Refer to Minn. Rules pt. 7050.0200, subp. 7)

Since the last revision of Minn. Rules ch. 7050, the Agency assessed nine watercourses for potential Class 7 reclassification. These nine watercourses, and the six watercourses proposed for reclassification are shown in the table below.

Existing or Potential Discharger	Assessed Watercourse	Present Use Classification	MPCA Recommended Use Classification
Rogers	Unnamed Ditch	Class 2B	Class 7
	Unnamed Creek	Class 2B	Class 7
Gaylord/M.G.Waldbaum	Lateral Ditch C	Class 2B	Class 7
	County Ditch # 55	Class 2B	Class 7
McGregor	County Ditch # 42	Class 2B	Class 7
New Auburn	Unnamed Ditch	Class 2B	Class 7
Wyoming	Unnamed Creek	Class 2B	No Change(Class 2B)
Boise Cascade (Int'l Falls)	Moon Light Rock Creek	Class 2B	No Change(Class 2B)
Fairmont	Center Creek	Class 2B	No Change(Class 2B)

Based on information gathered during the field assessments, comments provided by local residents living near the assessed watercourses, and comments from the MDNR Area Fisheries staff, six of the nine assessed waters are being proposed for Class 7 reclassification. Moonlight Rock Creek at International Falls, Center Creek at Fairmont, and an unnamed creek near Wyoming, Minnesota are not being proposed for reclassification as Class 7 waters based on information that indicates existing or potential fisheries and recreational uses of these waters.

The water assessment surveys performed on the waters proposed for reclassification serve to document whether the Class 7 criteria have been met on the assessed waters. These criteria are not a separate test for a limited fishery or limited recreational opportunities but instead are the factors that lead to the conclusion that these uses are limited. The following summaries discuss the reasons in support the recommended classifications of the assessed watercourses. Survey information, photographs of the assessed waters and site maps are part of the assessment surveys. Exhibits C45 to C51.

a. Unnamed creek and unnamed ditch at Rogers

The city of Rogers presently has a continuous discharging wastewater treatment facility (WWTF) which discharges to a ditch that connects to an unnamed creek which flows through a wetland and then to the Crow River. The city had explored an alteration of this discharge route which included a low flow diversion structure and diversion ditch around the wetland. There were some concerns as to the impacts to the wetland resulting from such a diversion, so this proposed discharge option was not pursued.

Both the unnamed ditch and the unnamed creek are proposed for Class 7 reclassification because their existing fisheries and recreational uses are limited due to the lack of water within these watercourses. The stream assessment survey was conducted in August of 1990 during a relatively wet period of time. The rainfall record from Rogers indicate that the area had received 2.3 inches of rain two weeks prior to the assessment survey. Prior to that, monthly rainfall totals for June and July 1990 were 8.4 inches and 8.3 inches respectively. Despite this, the unnamed creek was dry at an observation point three quarters of a mile south of the Interstate 94 culvert undercrossing. (Reference the site map in Exhibit C45).

While the Agency is proposing to designate the unnamed ditch and the unnamed creek as Class 7 waters, the wetland, through which the unnamed creek flows, will retain its Class 2B fisheries and recreational use classification.

b. Lateral Ditch C of County Ditch Number 55 and County Ditch Number 55 at Gaylord

The City of Gaylord operates a stabilization pond WWTF with a controlled discharge to Lateral Ditch C of County Ditch No. 55. Until recently, a major egg processing industrial facility located in Gaylord, the M.G. Waldbaum Co., was a major discharge to the city's WWTF. Discharges from the industrial facility contributed to an overloading condition of the city's treatment pond facility which resulted in exceedances in permit effluent limitations and odor problems from the WWTF. To correct these problems, the city proposed the construction of a separate wastewater treatment facility to service the treatment needs of the city's proposed industrial park, with M.G. Waldbaum Co. being a major contributor to this new WWTF. In order to assign appropriate effluent limits for this proposed facility, the two proposed receiving waters were assessed for potential Class 7 reclassification.

Lateral Ditch C of County Ditch Number 55 and County Ditch Number 55, also known as North Branch Rush River, have both been extensively channelized. The channelization of these watercourses has: 1) created a uniform depth and bottom substrate; 2) decreased the length of the stream and the stream's sinuosity; and 3) lead to abnormally low stream discharge during low flow periods. These impacts can decrease the habitat diversity of the watercourse and reduce the stream's fisheries and recreational use potential. Due to the channelized nature of these two watercourses, the Agency is recommending a Class 7 use classification for Lateral Ditch C and County Ditch Number 55 to a point approximately eight river miles below the new WWTF discharge. Downstream of this point, the watercourse would retain its present Class 2B water use classification.

Effluent limitations assigned to the treatment facility servicing the Gaylord Industrial Park have presently been assigned in accordance with a variance that has been granted to the city and its co-permittee the M.G. Waldbaum Co. These limitations are based on maintenance of the Class 7 instream standards as well as being protective of the downstream

Class 2B use classification. Additional instream ambient monitoring requirements have been included in the discharge permit for this facility in order to assure maintenance of the downstream Class 2B water quality standards. Exhibit C46 is a copy of the stream assessment worksheet for these two waters and it includes as an attachment a copy of the September 13, 1991, Agency Board item dealing with the discharge permit and variance request.

c. County Ditch Number 42 at McGregor

The city of McGregor operates a stabilization pond WWTF which now discharges directly to County Ditch Number 42 on a controlled basis. Prior to the construction of this new pond treatment facility, the city discharged their treated wastewater to an unnamed ditch which is tributary to County Ditch Number 42. Both of these watercourses were assessed in 1978 and subsequently designated as Class 7 waters in 1980. The new pond treatment facility is located southwest of the old system, further upstream on County Ditch Number 42. This portion of County Ditch Number 42 was not previously considered for reclassification since at the time of the 1978 survey it was upstream of the old treatment facility.

Conditions along the upper reaches of County Ditch Number 42 are similar to the conditions which were observed during the 1978 stream assessment survey in sections of the ditch that have been classified as Class 7 waters. The county ditch has been extensively channelized and the fisheries habitat within this ditch segment appears to be limited. Huntting was identified as a potential use along this watercourse. Due to the degree of channelization, the upper reach of County Ditch Number 42 is also recommended for Class 7 reclassification. Reference Exhibit C47.

d. Unnamed Ditch at New Auburn

The city of New Auburn operates a stabilization pond treatment facility followed by land application of the treated wastewater. Due to excessive inflow and infiltration, the city's pond system is hydraulically overloaded. This coupled with the fact that the land application site is not operating according to design has forced the city to explore different treatment and discharge options.

One option calls for an expansion of the treatment pond system with a controlled discharge to a county tile which outlets to an unnamed ditch that flows into High Island Lake. This ditch is roughly one half mile long and is located on the eastern side of the town. The flows in this ditch consist of water from the county tile system as well as storm water runoff from town and the surrounding area.

The unnamed ditch is 100 percent channelized. According to the city clerk, maintenance clean-out of the ditch occurred within the last couple of years. Due to the low topography of the area and the close proximity of the ditch to the lake, the depth of water in the ditch would appear to fluctuate with the level of the lake. High Island Lake experiences periodic fish winterkills. Based on this information and the channelized nature of the ditch, the Agency is proposing to classify the unnamed ditch as Class 7. Reference Exhibit C48.

e. Unnamed Creek near Wyoming

The city of Wyoming presently has a wastewater stabilization pond facility followed by land application of the treated wastewater. In conjunction with a planned expansion of the WWTF, the city is considering piping the treated wastewater 6.7 miles to an unnamed creek that is tributary to the Sunrise River. The treatment facility presently servicing Chisago City/Lindstrom discharges to this unnamed creek and the upper segment of the unnamed creek from the outlet from Wallmark Lake to a point approximately one (1) mile above its confluence with the Sunrise River is classified as a Class 7 water. (See the site map contained in Exhibit C49.) This reclassification occurred in 1980 based on an assessment survey conducted in 1978. Information from this survey indicated that the remaining one mile of creek should retain its Class 2B fisheries and recreational use classification.

The unnamed creek was assessed again in 1984, and at that time, Agency field staff recommended that the lower reach of the unnamed creek should be classified as a Class 7 water due to low dissolved oxygen concentrations, minimal flows, and the presence of a plant community more typical of a wetland than a free flowing stream. The issue of reclassifying this lower segment of the unnamed creek was not considered during the 1987 or 1990 revisions to chapter 7050.

In response to a request to reevaluate the use classification of the lower reaches of the unnamed creek, Agency staff assessed the unnamed creek in September 1992. At the time of this survey, the creek bed upstream of the Chisago City/Lindstrom WWTF was dry. At survey stations below this WWTF, which discharges to the unnamed creek approximately 2.7 miles upstream from its confluence with the Sunrise River, there was water present in the creek but the flow velocities were not perceptible. This was also the case at the point on the unnamed creek where the city of Wyoming is proposing to discharge treated wastewater from their proposed upgraded facility. These reductions in creek flow velocities appear in part to be due to beaver activity backing-up the creek, thereby creating more of a wetland condition along the creek. Between the area of the proposed point of discharge and the mouth of the unnamed creek, there is a shift to more of a riverine condition.

If the city of Wyoming obtains a discharge permit to pipe the wastewater effluent to the unnamed creek, a recommended condition of the discharge permit will be to insure that the unnamed creek be maintained as a free flowing watercourse from the point of discharge to the Sunrise River. At a minimum this would mean that periodic inspections of the area and removal of any beaver dams which may impede the flow of the unnamed creek. Under these circumstances, the lower reach of the unnamed creek is expected to revert back to a more riverine condition, similar to the conditions observed during the 1978 assessment survey. This fact plus local fisheries use of the unnamed creek at the road the culvert crossing closest to the mouth of the creek supports maintenance of the present Class 2B fisheries and recreational use classification of this lower reach of the creek. Exhibit C49 is the stream assessment worksheet for this creek.

f. Moon Light Rock Creek at Boise Cascade Industrial Landfill at International Falls.

Moon Light Rock Creek was originally assessed in 1983 for the purpose of potential reclassification as a Class 7 Limited Resource Value water. At that time, Agency staff concluded that it should not be reclassified as a Class 7 water and it was not proposed for reclassification during the 1984 revisions of Chapter 7050. Boise Cascade requested reconsideration of the designated use classification and this prompted a reassessment of the creek in October 1992.

The natural stream bed of the creek did, historically, flow through the area where the landfill is now situated. To divert the flow around the landfill, the creek flows were directed to a channelized watercourse adjacent to a set of railroad tracks on the south side of the landfill. The creek flow runs westerly along this channelized segment for approximately one-half mile before it is directed to the north to reconnect with the natural creek bed.

While there has been some physical changes that have taken place along this channelized reach since the 1983 survey, such as bank stabilization and the presence of more overhanging shrub and grass vegetation, fisheries habitat within this reach is still limited as a result of this channelization. Agency staff, however, do not believe it is reasonable to reclassify Moon Light Rock Creek as a Class 7 water when one considers that upstream of the channelized segment that the creek retains its natural character and that just downstream of the landfill site, the creek flows through a residential area where it does afford a fisheries and recreational use by local residents.

Based on the survey information obtained in 1983 and the observations and information obtained during the 1992 reassessment of the creek, no change in the assigned use classification of Moon Light Rock Creek is being proposed. Exhibit C50 contains the stream assessments from both the 1983 and 1992 surveys.

g. Center Creek at Fairmont

Center Creek originates at the outlet of Lake George, which is one in a series of a chain of lakes located south of the city of Fairmont. Like many other river systems in the southern and southwestern part of the state, stream flows along Center Creek can get very low and at times may dry-up completely or essentially freeze solid in the winter. Both these conditions have been documented on Center Creek.

The city of Fairmont operates a continuously discharging WWTF which discharges to Center Creek at a point approximately 28 river miles above the creek's confluence with the Blue Earth River. Average annual wet weather design flow for this WWTF is 3.9 million gallons per day (MGD) or approximately 6.0 cubic feet per second (cfs). The average annual design flow for this facility is 2.86 MGD or approximately 4.4 cfs.

According to Minn. Rules pt. 7050.0210, subp. 7, "Discharges of sewage, industrial waste, or other wastes shall be controlled so that the water quality standards will be maintained at all stream flows which are equal to or exceeded by 90 percent of the seven consecutive daily average flows of record (the lowest weekly flow with a once in ten-year recurrence interval) for the critical month(s)." This flow statistic is commonly referred to as the 7Q10 flow. The 7Q10 flow upstream of the Fairmont WWTF discharge has been estimated to be 0.0 cfs. Since there is no upstream dilution in Center Creek under 7Q10 conditions, the quality of the wastewater effluent being discharged from the Fairmont WWTF must meet the water quality standards applicable to the creek. Center Creek is classified as a Class 2B fisheries and recreational use water.

In March 1992, the city submitted a formal reclassification request to reclassify Center Creek as a Class 7 Limited Resource Value water from the outlet of Lake George to the creek's confluence with the Blue Earth River. The city contends that fisheries and recreational uses of Center Creek are limited due to lack of water, lack of habitat, and lack of public access to the creek. Exhibit C52. The Agency responded to the request by stating that based on available information, it was the staff's opinion that Center Creek was not a Class 7 water and that the Agency would be conducting a stream assessment survey of Center Creek to justify this position. Exhibit C53.

This stream assessment survey was conducted on September 21-22, 1992. Agency staff, with assistance from the Minnesota Department of Natural Resources (MDNR), assessed three stations along the creek at points above and below the WWTF discharge at Fairmont and at a site approximately 21 river miles below the WWTF outfall. The stream flows in the creek at the time of the survey ranged from 32 cfs above the treatment facility to 51 cfs at the most downstream station. Exhibit C51 contains the 1992 stream assessment survey and the fish electroshocking results, results from the August 1986 MDNR survey and a copy of a September 22, 1992 office memorandum from the MDNR Windom Area Fisheries Office.

To summarize this information, Agency staff believe that the survey data support the continued classification of this creek as a Class 2B fisheries and recreational use water. Game fish, as well as rough fish and minnow species, were electroshocked at stations throughout the various survey reaches of the creek. There is a minimal amount of channelization that has occurred along this creek and there is a diversity in the physical characteristics of the stream channel and bottom substrate composition which provide suitable fisheries habitat.

Habitat availability is most limited upstream of the WWTF discharge during periods of low stream flow. Downstream of the treatment facility, low flow impacts are less pronounced since the wastewater discharge provides a sustaining flow in the creek. One treatment option that the city is exploring calls for the removal of all or part of the wastewater effluent from Center Creek during low flow conditions. This proposed option indicates that the treated wastewater would be piped to another watercourse in the area with an existing Class 7 classification

during periods when there is insufficient upstream dilution in Center Creek. This option is being considered by the city in lieu of upgrading their nitrification capabilities at the WWTF. If this wastewater diversion option is instituted, downstream pool areas in Center Creek that presently serve as fish refuges during periods of low flow would decrease in numbers and size and may even be lost during extended periods of drought. This treatment option is not favored by the Agency because of the potential downstream physical impacts.

3. The addition of entries for Stream Trout Lakes and trout streams designated by the Commissioner of the Minnesota Department of Natural Resources.

   Under the part 7050.0420, the Agency incorporates by reference the most current MDNR Commissioner's Orders with respect to stream trout lakes and trout streams which are in effect at the time the proposed amendments to Minn. Rules ch. 7050 go to rulemaking hearings. While this does have the net affect of shortening the list of waters specifically listed in part 7050.0470, it has complicated the process by which one determines the applicable use classifications for a given water.

   The process as it currently stands requires a person to first determine what basin the waterbody is located in, check the listing of waters in the use classification section of part 7050.0470, and if it is not listed there, then one has to refer to the Commissioner's Orders to see it the water is list as a designated trout water. If it is not listed in either part 7050.0470 or the Commissioner's Orders, then the water is considered an unlisted water, and is classified under part 7050.0430. This generally is not a problem, so long as one has a copy of the appropriate Commissioner's Orders. If a copy is not available, at a minimum this can lead to time delays in determining the appropriate use classification.

   To make the process of determining the use classification less complicated, the Agency is proposing to specifically list the trout streams and lakes identified by the MDNR Commissioner in Minn. Rules pt. 7050.0470. There will still be a need to carefully reference the legal descriptions for the designated trout streams. Not only are the named stream segments of a trout stream classified by the Agency as trout waters, but the tributaries to these identified trout stream segments within the sections specified in the legal descriptions are classified as trout waters as well. This designation is consistent with MDNR's classification of these tributaries as trout streams in Minn. Rules pt. 6262.0400. To address this fact, rule language has been added to part 7050.0420 to classify these tributary segments to the identified trout streams as Class 2A waters as well. Entries for parts of these waters that are not designated as trout waters will also have to be altered to include the phrase "excluding trout waters."

4. Removal of lake trout lake ORVW status at request of MDNR.

   In 1987 the Agency proposed to designate lake trout lakes as ORVWs under the restricted discharges category of part 7050.0180. Included in the list of candidate lakes at that time were 48 lakes that were either

existing lake trout lakes or they were thought to have the potential for lake trout management. There were a considerable number of comments received during the public hearings on this proposal. As a result, 35 existing and potential lake trout lakes were designated as ORVWs in March 1988.

Additional information obtained from lake surveys conducted since 1988 and recommended alternate fisheries management goals for some of these lakes has prompted the MDNR to request that the following lakes be removed from the ORVW designation since they do not support self-sustaining lake trout populations (reference Exhibit C54).

Cook County	
Devilfish Lake	(16-29)
Esther Lake	(16-23)
Hungry Jack Lake	(16-227)
Jim (Jerry) Lake	(16-135)
Musquash Lake	(16-104)
Itasca County	
Trout Lake	(31-216)

Esther and Musquash Lakes are presently being managed as stream trout lakes. Survey information for Devilfish and Jim Lakes indicate marginal lake trout conditions and Devilfish Lake has a walleye management classification assigned to it. Trout Lake, near Coleraine, has been judged to no longer be suitable for trout management and is being managed as a walleye fishery. The 1992 Lake Management Plan for Hungry Jack Lake indicated that while temperature-oxygen conditions are suitable for lake trout in Hungry Jack Lake, the management goals for increased walleye and northern pike populations would preclude an attempt to manage for lake trout. It should be noted as a clarification, that while Big Watab Lake and Lower Hay Lake were proposed as ORVWs in 1987, these two lakes were not assigned the ORVW designation in 1988.

5. Revise the names of the ORVW calcareous fens to correspond to the names established by MDNR.

   See the SONAR discussion under part 7050.0180, subpart 6b.

6. Change the class designation for listed fens to Class 2D.

   See the SONAR discussion under part 7050.0222, subpart 6.

7. Minor Organizational Changes to Minn. Rules pt. 7050.0470.

   A new item is proposed to be added throughout this part. Waters in a major drainage basin are currently categorized under streams, item A; lakes, item B; or fens, item C, within this part. The Agency proposes to add a fourth category, as item D, called scientific and natural areas (SNAs). This category is needed to make scientific and natural areas easier to identify under part 7050.0470.

Currently SNAs appear at the end of existing categories and are overlooked because they are not alphabetized with the other entries. Scientific and natural areas are stringently protected as outstanding resource value waters under part 7050.0180. The proposed category is reasonable because it does not change how the waters are addressed in the rules but makes it easier for readers to identify them and their restricted use status.

Also, subitem numbers identified in the proposed rules under part 7050.0470 may change to incorporate the trout waters identified in MDNR Commissioner's Orders No. 2450 and to place other waters proposed to be listed in proper alphabetical order.

Changes are being made under specific items to address issues other than those listed above as follows:

8. Subpart 1. Lake Superior Basin.

a. Item A. Streams.

Subitem (15).

The Agency proposes to delete subitem (15) "Unnamed Ditch, Eveleth, (T.57, R.17, S.6). This deletion is reasonable because it is a duplicate entry. This ditch is also listed as "Elbow Creek, Eveleth" under subitem (7). The following subitems will be renumbered to correspond with this change.

9. Subpart 2. Lake of the Woods Basin.

a. Item B. Lakes.

Subitem (115) and (129).

The Agency proposes to change the entry for Lake of the Woods. The information proposed under subitem (129) for the new entry is currently listed under subitem (115) as "Woods, lake of the" with the exception of an added geographic range coordinate of "36." The additional range coordinate is needed to more completely identify the water body. It is reasonable to provide the best identification possible in the rule. Changing the format of the lake name is reasonable because it utilizes the most common form of the name, will make it easier for readers to find the water resource under this part and does not change the status of the lake under the rules. The proposed "Lake of the Woods" entry is proposed under subitem (129), but will be placed in proper alphabetical order and given a corresponding subitem number after the rule has been adopted.

10. Subpart 3. Red River of the North Basin.

a. Item A. Streams.

Subitem (34).

The Agency proposes to change "Tamarack" to "Tamarac." This change is reasonable because it corrects the spelling of river name.

Subitem (15).

The Agency proposes to delete the phrase "(excluding trout waters)" for the Hoover Creek listing. This phrase is no longer needed under this entry because portions of Hoover Creek are no longer designated trout waters. This change is part of the Agency's effort to list all the trout waters designated by the MDNR under Commissioner's Order No. 2450.

11. Subpart 4. Upper Mississippi River Basin.

a. Item A. Streams.

Subitem (97).

The Agency proposes to change the word "Brook" to "Branch." This change is reasonable because it corrects the name of the water body, which is Stanchfield Branch.

12. Subpart 5. Minnesota River Basin.

a. Item A. Streams.

Subitem (74).

The Agency proposes to add a new subitem (74) to add another entry for Judicial Ditch Number 10 that cross references Wood Lake Creek currently listed under subitem (158). Wood Lake Creek has been discovered to be the same water resource as a portion of Judicial Ditch Number 10. It is reasonable to add a cross reference to clarify the identification of a water body and to ensure readers looking for Judicial Ditch Number 10 find all of the information that concerns that resource. Subitems (74) through (161) are proposed to be renumbered to correspond with this change.

Subitem 153.

The Agency proposes to delete the name "Dawson Mills Soy Isolate" since there is no longer a discharge from this company to the unnamed stream which is a tributary to Lac qui Parle River.

Subitem 158.

The Agency proposes to add reference to Judicial Ditch Number 10 as part of the existing entry for Wood Lake Creek. This is reasonable because both Judicial Ditch Number 10 and Wood Lake Creek identify the same water body. A cross reference to Wood Lake Creek has also been proposed under the entry for Judicial Ditch Number 10 (see subitem 74).

13. Subpart 6. Saint Croix River Basin.

a. Item A. Streams.

Subitem 7

The Agency proposes to delete the entry for King Creek. The entire segment of King Creek in Township 47, Range 19, is identified as trout waters in the MDNR Commissioner Order No. 2540. The Agency is proposing to add entries under part 7050.0470 for all the waters listed in the Commissioner Order. Since the entire creek is trout water, it is reasonable to delete the existing entry for King Creek to avoid having duplicate entries.

b. Item C. Fens.

The Agency is proposing to add this item as a place holder. Throughout this part, item A lists streams; item B lists lakes; item C lists fens and the Agency is proposing that item D be created to list scientific and natural areas. Even though there are no fens currently listed under this subpart, this category may be used in the future. It is reasonable to add item C because it establishes a consistent format under this part and makes the organization easier to follow for the readers.

14. Subpart 7. Lower Mississippi River Basin.

a. Item A. Streams.

Subitem (7).

The Agency proposes to add "(Cold Spring Brook)" to the entry for Cold Creek because this creek is commonly referred to by this name too. The Agency also proposes to add "(excluding trout waters)" into this entry. See subitem (10) under this item for a discussion of the need and reasonableness for this addition.

Subitem (10).

The Agency proposes to add "(excluding trout waters)" after "Dakota Creek." The State of Minnesota Department of Natural Resources Commissioner's Order Number 2450 identifies Dakota Creek and its tributaries within township 105, range 4, section 7 and township 105, range 5, sections 1, 2, 3, 11, and 12, as "trout waters" in Winona County. Since this subitem currently does not reference this designation, a reader may not know to look for trout water restrictions. Trout waters are designated as Class 1B, 2A, 3B, 3C, 4A, 4B, 5, and 6 under part 7050.0420. The proposed language highlights an existing designation for the creek and alerts readers to the fact that portions of the creek have additional protection under the rules.

Subitem (13).

The Agency proposes to delete the existing entry for Gilmore Creek. See subpart 6, item A, subitem (7), for the discussion of need and reasonableness for this change.

Subitems (16), (19), (24), and (33).

The Agency proposes to add "(excluding trout waters)" in the existing entries for Indian Spring Creek, Long Creek, Pine Creek, and Snake Creek. See subitem (35) for the discussion of need and reasonableness for these changes.

Subitem (35).

The Agency proposes to add "(excluding trout waters)" after "Sullivan Creek." This addition is needed to alter readers to the fact that portions of the creek have additional classifications and protection under the rules. The Minnesota Department of Natural Resources Commissioner's Order Number 2450 identifies Sullivan Creek and its tributaries within township 103, range 5, sections 12, 13, 14, 23, 24, 25, and 26, as trout waters in Houston County. Without this exclusion, a reader may not know to look for trout water restrictions. Trout waters are designated as having user classifications 1B, 2A, 3B, 3C, 4A, 4B, 5, and 6 under part 7050.0420. The proposed language is reasonable because it highlights an existing designation and clarifies that portions of the creek are not classified as 2C as indicated in this subitem.

Subitem (38).

The Agency proposes to delete the township designation of "104" under the existing entry for Trout Run Creek (Trout Creek). This is reasonable because a new entry is proposed for Trout Run Creek (Trout Creek) (T.104, R. 10) because this portion of the creek is designated trout water. This is part of the Agency's effort to incorporate all trout waters listed in MDNR Commissioner's Order No. 2540.

V. ECONOMIC CONSIDERATIONS

A. Economic Impact of the Proposed Amendments

1. In the exercise of its powers, the Agency is obligated by Minn. Stat. sec. 116.07, subd. 6 (1992) to give due consideration to economic factors. The statute provides:

> In exercising all its powers the pollution control agency shall give due consideration to the establishment, maintenance, operation and expansion of business, commerce, trade, industry, traffic, and other economic factors and other material matters affecting the feasibility and practicability of any proposed action, including, but not

> limited to, the burden on a municipality of any tax which may result therefrom, and shall take or provide for such action as may be reasonable, feasible and practical under the circumstances.

Minn. Stat. sec. 115.43, subd. 1 (1992) imposes a similar consideration of economic factors.

In proposing these amendments, the Agency has considered their impact on industry, municipalities, small business, and other regulated parties. But the Agency is not able to determine an overall cost, if any, that may be incurred because establishing numerical and narrative standards is only half of the regulatory process that ultimately determines the cost of meeting the standards. The other half of the regulatory process is the application of the standards to control pollution through the establishment of effluent limitations. While it is impossible to determine the exact costs, it is the opinion of the Agency that these amendments will not substantially change the overall economic burden to the regulated community. Some additional costs may be incurred as a result of the amendments, which will be described in detail in the following paragraphs. In most situations, treatment costs are unlikely to change. The remainder of this section will discuss in more detail the economic impacts that were considered.

2. Determination of Costs

These amendments deal with the establishment of numerical and narrative standards to provide protection of designated beneficial uses. Setting the standard is the first step of a two step regulatory process that ultimately determines treatment needs and costs. The second step is the determination of the effluent limitations or measures to minimize degradation of the states waters through water quality permits or certifications or, in the case of superfund remedial actions, cleanup requirements that will be required to meet the water quality standards. Water quality standards, rather than minimum technology-based treatment requirements, usually determine the need for treatment when receiving waters provide little or no dilution for discharges.

In practice, the "second step" of the process is always site-specific or discharge-specific, and it is carried out as part of the permit or certification process or cleanup evaluation. For this reason costs are best determined by looking at specific permits or remedial action sites and comparing the current limitations or cleanup requirements to what they would be based on the proposed standards or classification changes.

In summary, an overall cost can not be determined because it is the actual application of the standards on a case by case basis that determines the costs, and the number of situations where these amendments would alter the treatment or cleanup needs cannot be determined at this time. However, the economic effects are likely to be minimal even where the proposed amendments would have an impact. The following section addresses the major changes to the rule, and discusses the possible economic impact of those changes.

3. Economic Impact of Specific Amendments

a. Revising water quality standards to address wetlands specifically. The revisions to the 7050 Water Quality Standards regarding wetlands are intended to be clarifications of the Agency's existing standards.

1) Definition of wetlands: The proposed definition is consistent with the federal definition (40 CFR 230.41(a)(1)) and the Wetland Conservation Act definition. Exhibit 53. No additional costs will be incurred as a result of adding this definition to the standards.

2) Use classification changes: The proposed revisions to Parts 7050.0222 through Part 7050.0225 modify use classifications 2, 3, 4, and 5 to more appropriately identify specific designated uses for wetlands. Since the designated uses for all waters of the state are protected implicitly by part 7050.0185, subpart 1., explicitly listing wetland uses provides additional guidance but does not exceed the protection to uses already stated in part 7050.0185.

The parameters that are proposed as narrative standards are pH, dissolved oxygen, temperature, chlorides, hardness, settleable solids, and hydrogen sulfide. For point source dischargers, the pH and dissolved oxygen standards are most important.

Wetlands naturally have large dissolved oxygen variations on a daily basis because of their organic sediments. If a point source discharge is planned for a wetland determined to have naturally low oxygen concentrations, the effluent limitation would be set at a level such that the natural background level would not be lowered further, and at the level needed to maintain the dissolved oxygen concentration of the water resources downstream from the wetland that may require a minimum of 5.0 mg/l (Part 7050.0210 Subp. 13.). This assessment will be performed on a case-by-case basis as it has been in the past.

The same case-by-case analysis would be performed when considering pH. Just as an acidic discharge must be treated sufficiently so that the designated uses of the receiving water resource are not impacted, a neutral pH discharge to a low or high pH wetland may require treatment if a use is threatened.

There are currently approximately 600 municipal NPDES permits. Of these dischargers, it is estimated that about 40 discharge directly to a wetland. None of these dischargers incurred greater costs to meet the dissolved oxygen or pH standards. Although it is possible that a future discharger may incur added costs, most likely to treat a circumneutral pH being discharged to a bog, this situation would be very rare, based on the Agency's past 20 years history of issuing NPDES permits. It is possible to estimate what this hypothetical cost would be though. For example if a community of 500 people was required to modify its effluent pH concentration from 7 to 5, the added capital cost would be approximately $5000 and the added annual operation and maintenance cost would range from $4000 to $40,000, depending on the buffering capacity of the wastewater.

It is also possible that a discharger could permanently inundate a natural wetland to enhance treatment, especially for phosphorus. Depending on the wetland, the result could be an impact to wetland designated uses which would require wetland replacement. Wetland replacement costs vary widely, from a few hundred dollars to restore a degraded wetland by sealing off a tile line (plus land acquisition costs, if necessary) to thousands of dollars per acre to create a wetland at a non-wetland site. Since the Agency prefers restoration to creation, wetland replacement costs by point source dischargers are anticipated to be very low, and to occur very rarely.

The procedures noted above are required by Parts 7050.0185, 7050.0200, and 7050.0210 currently. For example, the Agency requires an effluent limit of 1.0 mg/l total phosphorus if the discharge is directly to a lake (part 7050.0211). The existing language, on a case-by-case basis, allows a stricter limit if it is determined that the 1.0 mg/l TP would still cause significant impacts to the lake's designated uses. Review of dissolved oxygen and pH impacts, and the result that additional treatment may be needed, is consistent with the processes followed for phosphorus under both the current rule and the proposed revisions in the existing rule and the proposed revisions.

Excess sediments in concentrations that threaten wetland designated uses are mainly the result of excess bank erosion or human disturbances upstream. Mitigation would be through the voluntary adoption of Best Management Practices in the affected watershed. Voluntary BMPs are being implemented through education, cost sharing, and other programs to reduce a broad range of pollutants.

3) Physical alterations of wetlands and the mitigative process: The use of the mitigative sequencing as a result of a proposed physical alteration to a wetland is limited to the following processes the Agency already has in place: Section 401 water quality certifications for Section 404 permits, NPDES permits, and state disposal system permits. The proposed mitigative sequencing procedures merely formalizes the environmental review process that has been used by the Agency since the 1982 promulgation of 40 CFR 230.

Incorporating mitigative sequencing into the 7050 water quality standards is important however. The Agency cannot presently positively certify that a fill activity covered by a CWA Section 404 permit will not cause violations of the water quality standards, because, without the mitigative process, non-degradation would be violated. Instead the Agency must require the mitigative process covered by 40 CFR 230.10(a) as a portion of the waiver to certification. Exhibits 27; 28. This revision makes it possible to provide a positive certification since non-degradation requirements will be met. Since the requirements are unchanged, this revision will not cause an increase in cost. For information purposes, during 1991 and 1992 the Agency reviewed 121 projects requiring Section 401 water quality certifications. The general breakdown of projects by type is as follows: transportation - 56; development - 17; agriculture - 4; and others - 44. Of the four agricultural permits, only one required replacement wetlands.

There is interest in comparing the 7050 mitigative sequencing with the Wetland Conservation Act (WCA) mitigative sequencing. Exhibits 10; 53. It is a very high priority for the Agency and the Board of Water and Soil Resources (BWSR) to have consistent guidelines to the extent possible.

Comparisons of the two mitigative processes reveal many similarities: both use the same sequencing of avoid, minimize, and replace and both have the same general reporting documentation. The main divergence is in the area of wetland replacement determinations. The WCA rule uses site-specific criteria while the Agency is required by the federal Clean Water Act and its associated rules to protect designated uses and to prevent cumulative impacts to the extent possible (40 CFR 230; 40 CFR 1508.7). As examples, the Agency might require the wetland mitigation replacement plan to be modified in the following cases:

(1) If, in the Agency's determination, there are cumulative impacts that will result in a significant adverse impact to a downstream water resource or to the wetland complex itself. The WCA rules only address site-specific impacts.

(2) If, in the Agency's determination, a wetland that removes sediment before it reaches a very sensitive downstream waterbody is being replaced with a wetland that would not protect the downstream resource such that downstream designated uses were threatened. The WCA rules replaces on an acreage basis without specifically focusing on designated uses.

The Agency has been using the mitigative process since 1982 without requiring a project modification because of cumulative impacts, so that situation would apparently occur only on a very rare basis. There is only a very short history regarding WCA mitigative requirements, but since BWSR and the Agency are coordinating very closely, it is anticipated that additional requirements to maintain unusual designated uses would occur very rarely also.

b. Amending the biological narrative standards. This part of the rule identifies the standard and procedure to identify whether a waterbody is meeting its designated use for aquatic life.

The incorporation of narrative biological criteria in this rule means that the biological condition of surface waterbodies will be determined by comparison to a reference condition. The assessments that will be conducted to establish the reference condition and biological surveys that are undertaken to measure biological condition of waters will be accomplished by the Agency staff or in cooperation with other governmental entities. These biological surveys will not result in any additional costs to the regulated community.

Biological surveys are part of an integrated diagnostic assessment that can be used to gain information about the condition of surface waters. In the process of conducting such assessments, waterbodies or waterbody segments may be found that are in nonattainment with their designated

aquatic life uses because their biological condition deviates significantly from the reference condition. When these situations arise, other information from the assessment including habitat conditions, surface water chemistry information, and proximity to pollution sources can assist in diagnosing the cause and source of the impairment.

Where the cause of the impairment is perceived to be due to a permitted discharge, then the Agency would need to determine if the permittee was in compliance with their permit. If the permittee is in compliance with their permit effluent limitations, they would not be considered out of compliance due to the biological impairment or measured exceedances of any chemical criteria in the receiving stream. The Agency may, however, request the permittee to conduct additional monitoring to further evaluate the nature of the discharger's effluent and its impact on the receiving water.

The Agency at the present, requests some dischargers to monitor up and downstream of their discharge points, conduct bioassays, and conduct toxicity reduction evaluations when questions arise regarding the toxicity of an effluent or the impact of the effluent on the receiving waterbody. The requirements for additional monitoring would be done on a case-by-case basis. The types of monitoring requested could vary considerably and would be dependent on what stream water chemistry information was already available, and what was already known about the nature of the effluent.

New monitoring requests or requirements will not arise solely from information from biological surveys but information from the total diagnosis of the situation. In this sense, it is very unlikely that the result of a biosurvey by itself would result in any additional monitoring costs. Likewise it is most likely that information from a biological survey would be the starting point of a more detailed evaluation to determine the potential need to modify a permit and establish different effluent limitations. The actual setting of the effluent limits and changes in treatment that would occur, however, are ultimately based on effluent toxicity evaluations and the numerical chemical criteria that is established. They are not a direct result of the biological survey.

When the cause of an impairment is attributable to a nonpoint source pollution that is not affected by a permit, the Agency could choose to mitigate through the implementation of projects involving voluntary measures. These projects involve promoting Best Management Practices through education, cost sharing and other voluntary mechanisms. In this case, costs would be voluntarily incurred.

c. Conditional exemptions from secondary treatment standards for TSS and phosphorus for some dredge disposal facility discharges. This provision relaxes the TSS and P standards for temporary or intermittent discharges from dredge disposal facilities when BMPs and BPT are employed. There will be no additional cost to permittees as a result of this change.

d. Adding eight new aquatic life standards for the following toxics: Alachlor, Antimony, Atrazine, Cobalt, Iron, Manganese, Naphthalene, and Thallium.

A part of the proposed amendments deals with the promulgation of eight new water quality standards for toxic pollutants. Water quality standards may be used as the basis for setting National Pollutant Disposal System Elimination System (NPDES) or State Disposal System (SDS) permit effluent limitations or, in the case of superfund and hazardous waste sites impacting surface waters, cleanup requirements or goals. In this regulatory context standards can have a direct economic impact on dischargers if the water quality standards, rather than minimum technology-based treatment requirements, determine the need for treatment. Standards often determine effluent limitations when receiving streams provide little or no dilution for the discharge.

In practice, the setting of effluent limitations and cleanup goals is a site-specific process as part of the permit or remedial evaluation process. Therefore, the examination of potential costs is best done using actual permits or sites as examples.

All eight of the proposed standards started as site-specific criteria, developed under part 7050.0218, specifically to set a permit limitation or to assess the need for remedial action for a particular facility or site. Most site-specific criteria have been used subsequently at other locations. In fact, the number of times the criteria have been used at new locations is one of the parameters used to select which criteria should be promulgated as standards. When the Agency requests the use of a criterion at a new location, the criterion is reviewed for applicability at the new site. The review looks at such questions as local water quality characteristics that might mitigate or enhance toxicity, local endangered or very sensitive species, and other factors that could justify raising or lowering the original criterion. However, rarely does the site-specific review result in a change to the original criterion. Thus, the original criteria are likely to be applied in the future at new locations without change. Under this scenario there will be no additional costs to the regulated community caused by the promulgation of the new standards because the site-specific criteria that would be used at a new location will very likely be the same as the statewide standards once the latter are promulgated. The treatment or cleanup costs would be the same because the goal is the same. Examples include the Kluver sanitary landfill and the Dakhue landfill sites where the same criteria, originally developed for another site, were used to assess the need for remedial action.

The situation described above will be true in many instances and no additional costs will be incurred. However, permittees that have limitations based on treatment technology for any pollutants for which standards are being proposed, additional costs are a possibility, if the proposed standards would result in lower effluent limitations. To assess possible costs, example permits or remedial actions containing limitations or cleanup goals for the proposed eight new standards are discussed below.

1) Herbicides

The Huntting Elevator near Lansing was the site of bulk storage and transfer of agricultural pesticides. Over the years the soil and ground water at this site became contaminated with herbicides including alachlor and atrazine. The contaminated ground water was moving toward an unnamed tributary of the Cedar River. The alachlor and atrazine criteria were developed for this site, and this is the only location where these criteria have been applied. Huntting Elevator is the first site involving ground water contaminated with agricultural pesticides that the Agency has dealt with. A complete Superfund investigation was done, in part, due to the lack of knowledge of the fate of pesticides in ground water at the time of the investigation.

Possibly due to better storage and handling of the pesticides on site, the ground water herbicide concentration levels have dropped to acceptable concentrations. As such, no further remediation or treatment is required and only monitoring is being done at the Huntting Elevator site.

The Minnesota Department of Agriculture (MDA) normally handles agricultural cleanup activities in Minnesota and they have dealt with several chemical spill sites. To date, the MDA has not had to pump out contaminated ground water for treatment and discharge into a surface water. Land application of contaminated soil and water, a treatment technology which enhances the natural degradation of the chemicals, has been the method used by MDA to remediate these sites.

Due to their wide spread use in agriculture, herbicides are a concern as a component of nonpoint source pollution (runoff) from agricultural lands. Atrazine has been found in Minnesota's surface waters in many locations (see page 65 of this document) but not in concentrations above the proposed standard of 3.4 (Class 2A and 2Bd) or 10 ug/l (Class 2B). If the concentrations of alachlor or atrazine were to exceed the proposed standards in a surface water due to nonpoint source runoff, mitigation would be through the voluntary adoption of Best Management Practices (BMPs) in the affected watershed. Voluntary BMPs are being implemented through education, cost sharing and other programs to reduce a broad range of pollutants in runoff including pesticides of all kinds. BMPs specifically to minimize atrazine in runoff have been developed by the MDA. Implementation of BMPs will be a cooperative effort between the MDA, the Agency, the Soil Conservation Service, and local land owners.

The Agency does not foresee any additional costs incurred by the promulgation of the alachlor and atrazine standards.

2) Metals

Effluent limitations for iron, manganese, cobalt are found in some NPDES permits, particularly those associated with the mining industry. Also, the criteria for these metals have been used in to evaluate several ground water contamination sites.

a) Iron

A technology-based effluent limitation of 1000 ug/l as a monthly average and 2000 ug/l as a daily maximum, for dissolved iron, are commonly put into NPDES permits for mine pit dewatering discharges. Three such permits will be examined as examples of the impact of the proposed standards on potential costs to these permittees.

The iron effluent limitations are specified as dissolved iron, whereas the proposed iron standards are stated as total iron. Total iron is all the iron dissolved or suspended in an unfiltered sample. Dissolved iron is the truly dissolved iron plus the suspended iron that will pass through a very fine filter. The Agency recognizes the inconsistency of having "total" standards and "dissolved" effluent limitations. Conceptually, a permittee could be in compliance with their permit limitation of 1000 ug/l dissolved iron and still exceed a background-based standard of 1000 ug/l total iron in the receiving stream (see discussion of the forms of iron in water on page 67 of this document). In this situation, if the permittee is in compliance with the permit effluent limitation, they would not be considered out of compliance due to a calculated or even measured exceedance of the standard in the receiving stream. The Agency would need to evaluate whether or not a permit modification is needed (see part 7050.0210, subpart 17). Allowance for the difference between total and dissolved would be part of the follow up analysis.

The Agency is not aware of any data that quantifies the ratio of total versus dissolved iron in effluents or natural waters. The Agency believes that the discrepancy between the water quality standard and effluent limitation is not an insurmountable problem, but do agree that total and dissolved analyses on the same sample are needed. The issue of whether to define metal standards as total, dissolved, or some other form, is very complex and needs a through review. This issue has recently become an important issue within the EPA, as well.

US Steel Corporation, Minntac (Permit No. MN 0052493)

The active Minntac taconite open pit mine near Mountain Iron has several permitted dewatering discharges. This example will focus on two outfalls, 030 and 060, both discharging to Kinney Creek. Kinney Creek is a designated trout stream (Section 11, T 58 N, R 19 W). The proposed iron chronic standard for Class 2A waters is 221 ug/l. As mentioned above, the iron limitation in the current permit is 1000 ug/l as monthly average.

Assuming Kinney Creek has a design low flow (7Q10) of zero, the discharger would normally be required to meet the chronic standard at the end of the pipe. If US Steel Corp. was given an effluent limitation of 221 ug/l, presumably additional treatment costs would be incurred. However, the Agency would not propose an effluent limitation of 221 ug/l because background concentrations of iron exceed this value. The Agency does not have iron data specifically for Kinney Creek, but it does have data for several watersheds in the iron range and north shore areas. These data are summarized in Table 10.

Table 10. Iron Concentrations in ug/l from Representative Watersheds

Station	mean	St.dev.	CV*	Max value	N	mean +2 St.dev.
East Swan R. near Hibbing	995	1014	1.02	4100	31	3023
St. Louis R. near Zim	831	564	0.68	3000	32	1959
Beaver R. near Beaver Bay	824	475	0.58	2600	35	1774
Miss. R. near Blackberry	276	134	0.49	580	32	544

*CV means coefficient of variation which is the standard deviation (St.dev.) divided by the mean. The larger the CV, the more variability in the data.

Limited data for other streams closer to Mountain Iron such as East Swan Creek southeast of Hibbing, Penobscott Creek near Hibbing, and West Two River near Iron Junction show iron values similar to those for the first three stations listed above. Iron concentrations appear to be lower in the Mississippi River watershed.

Part 7050.0170 allows the Agency to use the natural background as the standard when the natural concentrations exceed the standard. In applying the natural background as the standard, the Agency has accounted for natural variability in surface water concentrations, when there was adequate data to characterize the variability. The Agency uses a concentration near the high end of the range of values since high values occur naturally. This approach recognizes that occasional high values are a normal part of the natural system, whereas use of an average value, for example, sets up an unreasonable situation in which the standard would be exceeded about half the time. In the past the Agency has used the mean plus two standard deviations as a standard based on natural background. The mean plus two standard deviations approximates the 95 percentile value in the range of all values.

In a different context, the Agency has used a 95th percentile value of natural concentrations (e.g., roughly equal to the fifth highest value out of 100 values) to characterize background conditions. The 95th percentile is used to define natural background concentrations for assessing nondegradation to surface waters. Also, the use of a value which approximates a 95th percentile value as an effluent limitation is consistent with the common compliance strategy that a facility may be out of compliance about five percent of the time due to factors outside the control of operators.

Mean values plus two standard deviations for two rivers in the iron range area (the first two in Table 10.) are well above the current technology-based effluent limitation of 1000 ug/l.

While use of a 95 percentile value has precedence, it may not be appropriate in all cases. As stated above, the mean plus two standard deviations is comparable to the 95th percentile value; but this is true for data that are normally distributed. It appears that iron concentrations may not be normally distributed (mean values are consistently higher than median values). Exhibit T51. If the data are skewed toward the higher values, as appears to be the case for iron, using the mean plus two standard deviations in some situations may not be protective. However, the means plus one standard deviation (about equal to the 67th percentile) for the first three rivers in Table 10 are above 1000 ug/l as well.

In the situation of the Minntac discharge to Kinney Creek, while the Agency has no data for Kinney Creek, it is reasonable to assume that the iron concentrations in Kinney Creek will be similar to that of the surrounding watersheds. Effluent limitations based on the available background data, taking into account known variability, would not be lower than the current technology based limitations. Therefore, it is the conclusion of the Agency that there will be no additional cost to US Steel Corp. at Minntac as a result of the proposed iron standard. The Agency does not anticipate any cost savings as a result of the proposed standard either because the technology-based limitation will still be used.

Cyprus Northshore Mining Corporation (Permit No. MN 0055301)

Cyprus Mining Corp. (formally Reserve Mining) discharges from the large tailings basin at Milepost 7 to the Beaver River. The Beaver River is a tributary to Lake Superior, and, like Kinney Creek, is a designated trout stream. But unlike Kinney Creek, iron data are available for the Beaver River. Table 10. Also, the Beaver River may have a 7Q10 greater than zero, although in a situation where the background concentration potentially controls the quality of the discharge, knowing the 7Q10 is not critical.

The mean iron concentrations in the Beaver River plus one and two standard deviations are 1299 and 1774 ug/l, respectively. The discussion for Minntac regarding the use of the background levels as the standard (limitation) applies equally well to Cyprus Northshore, and no costs to Cyprus will result from the adoption of the iron standard.

The fact that the downstream lake is an Outstanding Resource Value Water may warrant being more protective in assessing the natural variability, but the outcome would be the same (i.e. no additional costs) because of the high natural levels of iron in the Beaver River.

LTV Steel/Erie Corporation. (Permit No. MN 0042579)

The LTV Steel Dunka pit near Babbitt discharges mine pit water to several non-trout waters (Class 2B). The most active of these discharges is to the Dunka River. These discharges have the technology-based limitation of 1000 ug/l as dissolved iron that was discussed above. No additional costs will be incurred by LTV because the proposed Class 2B standard of 1245 ug/l is less stringent than the technology-based limitation.

In addition to the mining permits, iron limitations are found in some permits for peat mining operations, coal fired steam electric generating plants (boiler blowdown or boiler cleaning water), and some contaminated ground water pump and treat operations. For example Michigan Peat (Permit # MN0055662) and Minnesota Sphagnum, Inc. (Permit # MN0057428) have monthly average total iron limitations of 300 ug/l or the natural background, whichever is lower. NSP Prairie Island (Permit # MN0004006) and Austin Utilities (Permit # MN0025810), for example, have daily maximum limitations of 1000 ug/l total iron for some types of discharges. The St. Louis Park (Reilly Tar Site) permit (# MN0045489) for the pumping, treatment and discharge of contaminated ground water to Minnehaha Creek has an iron limitation of 1000 ug/l as a quarterly average. All of the receiving waters in these examples are Class 2B waters and the proposed standard of 1245 ug/l will not increase costs for these dischargers.

b) Manganese

The St. Louis Park (Reilly Tar) permit mentioned above has a manganese limitation of 1000 ug/l as a quarterly mean. The proposed Class 2B standard is 491 ug/l. Since Minnehaha Creek provides no dilution at low flow (7Q10) conditions, reducing the manganese limitation to 491 or to background levels may be required. A review of the 1991 and 1992 discharge monitoring reports (DMR) for this facility indicates manganese effluent values in the range of 600 to 1300 ug/l. No monitoring data for manganese is available for Minnehaha Creek. Data from a nearby watershed, Elm Creek at Champlin, has a mean manganese concentration of 236 ug/l. Assuming a coefficient of variation of 0.8, the mean plus two standard deviations would be 614 ug/l. This is below the quarterly mean effluent limitation of 1000 ug/ in the current permit. Agency staff has reviewed the current St. Louis Park treatment system to determine if it can meet the proposed manganese standard, or if additional treatment may be needed.

The current treatment system is designed to remove iron and the organic contaminants in the ground water. The system was built in 1990 and consists of a potassium permanganate (KMnO4) feed system to oxidize the manganese and iron, a static in-line mixer to mix the KMnO4 with the ground water, a single sand filter to remove the manganese and iron precipitates, and, finally, two activated carbon filters units in series for removal of organic contaminants. The purpose of manganese and iron removal in the current system is to prevent precipitates of these metals from fouling the carbon filters.

The review of this system and the DMRs indicates that it is not functioning well, and the current manganese effluent limitation of 1000 ug/l is occasionally exceeded. Agency staff believe that some modifications to the system would produce an effluent in compliance with the current limitations and the proposed new manganese standard. Ironically, influent monitoring indicates that the raw ground water has an average manganese concentration of about 370 ug/l, which is below the proposed standard. The KMnO4 addition and the operational problems are adding manganese to the current effluent in excess of the proposed

standard. However, the need to remove iron remains, in order to keep the carbon filters from becoming plugged. Agency staff suggests the following three options, with associated costs, to correct the current problems and to meet the proposed manganese standard.

(1) Replacement of the Existing Sand Filter Media with Greensand.

It may be possible to meet the standards by simply replacing the sand filter medium with a commercial greensand. Greensand is a naturally occurring sodium-aluminum silicate available commercially. Iron and manganese is oxidized and the precipitate is filtered out. Usually KMnO4 is fed continuously to the influent to recharge the greensand. An additional sand filter may be needed to assure compliance with standards. The costs outlined below include a second sand filter.

Capital Costs - $50,000 for one additional dual media - gravity filter, sized at 4 gpm/ft2, including pump and backwash equipment.

Operation and Maintenance (O&M) Costs - estimated to be about $1,500 per year

(2) Use of an Alternative Oxidant.

The use of an alternative oxidant, such as chlorine dioxide (ClO2), to oxidize the manganese and iron would solve the manganese carry over problem. An additional filter may be needed.

Capital Costs - $50,000 for the ClO2 generator plus feed equipment - automated - flow proportioned. This amount does not include a second filter.

O&M Costs - $4,000 per year total, chemical costs about $1,500 per year; O&M for ClO2 system should be about the same as the current O&M for the KMnO4 system.

(3) Aeration for Iron Removal

Oxygen will oxidize manganese and iron. A one horse power compressor would be adequate, but reaction time with oxygen is slower and 1,100 cubic foot holding tank would be needed.

Capital Costs - estimated to be $20,000 or less.

O&M Costs - Estimated to be about $1,000 per year, which would be a savings over the existing O&M costs.

Because the existing system is not consistently meeting the manganese effluent limitations in the current permit, and some improvements may be needed to correct these problems, it is difficult to isolate the costs attributable only to meeting the proposed manganese standard. As indicated, most of what is needed, in terms of buildings, piping, pumps, filters, etc., to meet the current and proposed standards is already in place. The total projected costs to correct the current problems and to meet the proposed manganese standard are not prohibitive. In fact, the less expensive alternatives could represent a cost savings to St. Louis Park over the long term.

Other permits such as those for the peat mining operations and mine pit dewatering permits have no manganese limitation, but they may require monitoring for manganese.

c) Cobalt

Cobalt is not a commonly encountered pollutant and the only permit containing a cobalt limitation is the LTV Steel/Erie Corporation permit for the Dunka pit discharges. The cobalt criterion was developed for this permit. The chronic criterion is 5 ug/l which is the same as the proposed chronic standard for Class 2B waters.

The source of cobalt and other trace metals in the Dunka pit is the lean copper-nickel ore which overlies the taconite. The lean ore has been removed and stock piled. Leachate from the stock piles contains concentrations of metals, including cobalt, that exceed applicable standards before treatment. The LTV Dunka permit contains limitations for these leachate seeps as well as limitations for mine pit dewatering.

Most pit water is discharged to the Dunka River, a Class 2B water. The cobalt limitation for this discharge is the same as the criterion and the proposed chronic standard, 5 ug/l. Because they are the same, no increased costs will result from the promulgation of this standard.

The cobalt limitation for the stock pile leachate discharges in the LTV permit is 50 ug/l. This limitation is based on a site-specific determination of the chronic criterion for the Dunka seeps, based on the very high total hardness concentrations in the seep water. Toxicity data for cobalt indicate that total hardness can mitigate cobalt toxicity, as is true for other trace metals (although the data are not complete enough to support a hardness dependent standard). Under part 7050.0222, subpart 8 of the rule, the same site-specific considerations can be applied to a site-specific modification of the proposed standard as were used to determine the site-specific criterion of 50 ug/l. Therefore, no additional costs are anticipated due the the promulgation of the cobalt standard.

d) Antimony and Thallium

The Agency found only monitoring requirements and no effluent limitations for antimony and thallium in permits. Promulgation of the proposed standards will not result in increased costs.

A few municipalities have monitoring requirements for some of the metals for which standards are being proposed, but none has a limitation for these metals. Municipalities will not incur any costs due to the proposed new metal standards.

3) Other Organics

a) Naphthalene

The proposed naphthalene standard was developed as a site-specific criterion for the Harvest States site. Harvest States is a grain elevator complex along the Mississippi River in St. Paul. Soil and

ground water on the site are contaminated with naphthalene. This site is unusual in that naphthalene is the only contaminant found in the ground water. Naphthalene is normally associated with other Polynuclear Aromatic Hydrocarbons (PAHs). Monitoring at the site shows that naphthalene concentrations are low enough that no pump out and treatment of the ground water is needed to protect the Mississippi River. The City of St. Paul removed the contaminated soil, mixed wood chips and fertilizer with it, and then thinly spread it on vacant land to allow natural degradation of the naphthalene. This remediation was carried out for reasons other than the removal of naphthalene.

Naphthalene is normally associated with other PAHs found at such sites as petroleum refineries, coal gasification facilities, wood treatment processes, and coking operations. Naphthalene is one of the easiest of the PAHs to remove when cleaning contaminated soils and ground water, and is removed along with the other PAHs normally present. No additional costs are anticipated as a result of the promulgation of the statewide naphthalene standard.

The Water Quality Division has a naphthalene effluent limitation of 50 ug/l (daily maximum) in a general NPDES permit used for a variety of dischargers likely to contain petroleum products. An example is the permit for the Simson Station-West in St. Cloud. They are pumping and treating ground water contaminated by a leaky under ground tank. Discharge is to the Sauk River. The proposed chronic standard for naphthalene is 81 ug/l. Since this is a higher value than the current effluent limitation of 50 ug/l, no additional costs are expected for dischargers that have this generalized permit.

4) Monitoring Costs

The addition of eight new standards may result in a very small increase in monitoring costs to permittees in the future. Presence of a standard in the rule might enter into the decision as to whether or not to have the permittee monitor for that pollutant. Relatively few dischargers monitor for any of these eight chemicals now, and most of the limited monitoring done is for iron. The analytical costs, as charged by the Minnesota Department of Health analytical laboratory, are shown below as an example of the cost to analyze these chemicals.

Chemical	Cost per Analysis in $
Alachlor and Atrazine	173
Antimony	43
Cobalt	63
Iron	26
Manganese	25
Naphthalene	369
Thallium	43

The monitoring frequency will not be increased for those dischargers that currently monitor for iron, or the other chemicals listed above, as a result of adopting the new standards. Thus, there should be no cost impact on these dischargers due to monitoring.

As the Agency staff review new discharge requests or remedial actions there is a small possibility that monitoring will be required that would not have been required prior to the promulgation of the standards. There is no way of knowing how many new situations will be reviewed by the Agency and how many of these will involve the need to monitor for these eight chemicals. But, assuming 100 analyses are required for each of the eight chemicals over the next year and five percent of the 100 analyses is a result of adding the standards to the rule, the total analytical cost would be $ 74,200 and $3,710 would be attributable to the proposed new standards. This "worst case" analysis illustrates that any increase in monitoring costs due to these proposed standards will be small.

e. Updating nine current aquatic life standards for the following toxics: Arsenic, Benzene, Bromoform, Endosulfan, Fluoranthene, Hexachlorobenzene, Nickel, Pentachlorophenol, and Vinyl chloride.

The Agency is proposing to update nine of the standards currently in part 7050.0220, subpart 3. Five of the nine proposed updated standards are less stringent than the current standards. No additional treatment costs will be incurred as a result of these changes. On the contrary, it is conceivable that some cost savings might result from raising these standards, but the Agency has not attempted to quantify possible savings.

The proposed updated standards for arsenic, bromoform, endosulfan and pentachlorophenol are more stringent than the current standards. Of these, arsenic and pentachlorophenol (PCP) are the most likely to result in increased treatment costs. No permits have limitations for bromoform or endosulfan.

1) Arsenic

The Hanna Mining Research Center permit (Permit # MN0020249) has an arsenic limitation of 40 ug/l (monthly average). The wastewater treatment for this research facility is a pond that discharges to Pickerel Creek, a designated trout stream. The proposed Class 2A arsenic chronic standard is 2.0 ug/l, which, assuming no dilution at 7Q10 flow, would be this facility's new effluent limitation when the permit is reissued. This pond has not discharged in five years, and the single arsenic monitoring value from the pond is less than 2 ug/l. It is unlikely this facility would incur any additional costs due to the proposed arsenic standard, if it continues to operate as it has over the last five years.

The Agency is not aware of other permits with arsenic limitations. Several permittees are required to monitor for arsenic. For example, the pumpout and treatment of contaminated ground water at the Ironwood landfill (Advance Transformer, permit # MN0053589), the quarry dewatering permit for Kraemer and Sons, Inc. (permit # MN0002224), and Minnesota Power at Cohasset (permit # MN0001007) monitor for arsenic but have no arsenic limitations. The Agency does not anticipate any increased costs due to the proposed change in the arsenic standard.

2) Pentachlorophenol

The Agency has reviewed the permits that have a pentachlorophenol (PCP) effluent limitation and believes there will be no additional treatment costs, but there is a possibility of modest additional operation and maintenance costs to some dischargers. The Champion International Corporation and Western Lake Superior Sanitary District discharges are used as examples to illustrate the potential costs.

Champion International Corporation (Permit # MN0056537) in Cass Lake operates a pumpout system to remove PCP from contaminated ground water due to former wood preservation activities on this site. Treatment is with granulated activated carbon at a maximum discharge rate of 200 gallons per minute (0.45 cubic feet per second). The limitation in the permit is 8 ug/l as a daily maximum. The discharge is to a channel connecting Pike Bay to Cass Lake which is a Class 2B water. The proposed updated Class 2B standard is 5.5 ug/l (assuming the mean pH of Pike Bay is 6.96 or greater, which is likely). Because no dilution is granted, the new effluent limitation would be 5.5 ug/l.

A review of the discharge monitoring reports for 1988 through 1992 (the record contains some gaps) shows two monthly values above their detection limit of 5 ug/l. A value of 9 and 7 ug/l were reported for January, 1990 and March, 1991, respectively. All other values reported were less than 5 ug/l (one sample per month). Since an effluent limitation of 5.5 ug/l is nearly the same as the detection limit of 5 ug/l in this case, compliance would be based on concentrations remaining below detection.

The granulated activated carbon filtration (GAC) system in place now at Cass Lake represents the best available treatment technology, and additional treatment should not be needed. However, the possibility of a lower effluent limitation in the future (from 8 to 5.5 ug/l) may mean some increase in operational and maintenance (O&M) costs to Champion in order for them to be assured of compliance with the potential lower limitation. With the exception of the single exceedance of the current limitation noted above and the measured value of 7 ug/l, PCP effluent concentrations have been below the 5 ug/l detection limit over the last five years. Thus, any increase in O&M costs should not be great.

The Agency believes additional costs could result from one or both of the two following situations:

Shorter "life span" of the carbon filters. Briefly, the three GAC units in series are monitored for rotation or replacement by measuring the PCP concentrations between units two and three. When the PCP concentration reaches 100 ug/l or above, replacement or rotation of the filters is needed some time in the following two or three months to prevent PCP break through in the final effluent. With a lower effluent limitation the threshold for filter change may be lower; and, over time, filters will be replaced more frequently, resulting in greater cost.

Lower detection level monitoring. The second possible additional cost is the use of an analytical procedure that provides a lower detection limit. The advantage of a lower detection limit to the company and the Agency would be, 1) to not have to use the detection limit as the compliance limit, 2) to have better data on exactly what the concentration of PCP is in the effluent, and 3) that compliance with a lower effluent limitation might be achieved without additional O&M costs. By providing more precise analytical results in the operational range of interest in this case (1 to 8 ug/l), a lower detection level method might show the current system is capable of consistently meeting a lower limitation when a less precise method, such as the one in use now, might not. This is because monitoring experience has shown that chemical concentrations at or just below the detection level for a given analytical method are often reported as higher than the true concentrations.

Gas chromatography with mass spectrometric detection (GC/MS) can achieve a detection limit of about 1 ug/l. This method costs $286.00 at the MDH analytical laboratory.

The advantages of a lower detection level method would be weighed against the added analytical cost, and the potential greater O&M costs if the latter is selected as the means to meet a potential lower limitation.

A more detailed examination of the treatment system and its operation, together with discussions with Company representatives and their consultants, will be carried out to determine the relative costs and the most cost effective option, or combination of options, given the proposed lower PCP standard.

Western Lake Superior Sanitary District (WLSSD) operates a large waste water treatment plant in Duluth. This 43.6 million gallon per day plant treats the sanitary waste from Duluth and surrounding communities and waste from Potlatch Corporation in Cloquet. WLSSD has a PCP effluent limitation of 11.6 ug/l as a daily maximum. This limitation is based on the acute toxicity of PCP at the low pH of the WLSSD discharge. The acute value used is an older PCP criterion and is slightly lower than the Final Acute Value (FAV) in the current rule (11.6 vs. 13.4 ug/l). The toxicity-based FAV and maximum standards are not proposed for change. Therefore, there will be no change to the PCP limitation for WLSSD and no costs incurred.

The Agency believes that the current permittees with PCP limitations will not have to provide additional treatment and will not incur additional treatment costs. Some costs may result if a discharger's limitation is reduced and they exceed the new limitation more frequently. Costs to possible future dischargers can not be determined, but any future discharger should have to provide BAT, independent of the standard.

f. Reclassifications.

For the purposes of the discussions relating to economic impacts, the proposed major amendments to the rule which deal with use reclassifications and ORVW designations can be divided into the following four groupings:

1) Class 1 Domestic Consumption classification
2) Outstanding Resource Value Waters
3) Class 2B waters reclassified as Class 2A waters
4) Class 7 reclassifications

Each grouping change will be discussed in greater detail as follows:

1) Class 1C Reclassification

In order to update the listing of surface waters in Minn. Rules pt. 7050.0470 used for domestic consumption purposes, the Agency is proposing to classify 18 surface water bodies as Class 1C waters. The waters proposed for this designation have been identified by the MDH as surface water source supplies for either community, noncommunity, or noncommunity, nontransient public water supply systems.

The present use classifications assigned to these waters are Class 2B, 3B, 4A, 4B, 5 and 6 class waters. By designating these waters for domestic consumption purposes, they will be classified as Class 1C, 2Bd, 3B, 4A, 4B, 5 and 6 class waters. With the addition of the class 1C designation, and the accompanying 2Bd classification, applicable water quality standards for these waters will be based on both the primary and secondary drinking water standards, as well as the aquatic life standards as specified in Minn. Rules pt. 7050.0222, subp. 3. Except for the total coliform bacteria and the turbidity standards, the primary and secondary drinking water standards will apply to these waters in their untreated state should they be designated as Class 1C waters.

The proposed Class 1C use classification of these waters does not impact the MDNR water appropriation permitting process nor does it affect the requirements of Minn. Rules ch. 4720, the Minnesota Department of Health rule dealing with public water supplies. By designating these waters as Class 1C waters, the Agency will evaluate and assign appropriate effluent limits for discharges to these waters so as to provide protection of their identified drinking water use.

Community Public Water Systems

The following four (4) mine pit lakes serve as community public water supply sources for the respective municipalities:

Canton Mine Pit Lake at Biwabik
Corsica Mine Pit Lake at McKinley
Fraser Mine Pit Lake at Chisholm
Missabe Mountain Mine Pit Lake at Virginia

These mine pit lakes have served and are projected to continue to serve as drinking water supply sources for these communities.

The proposed Class 1C use classification of these waters is a recognition of this fact and since there are no permitted discharges to these mine pit lakes, there are no identifiable economic impacts that result from the assignment of this use classification to these waters. Runoff from areas surrounding these mine pit lakes will continue to be managed through the implementation of best management practices to minimize the impacts associated with land erosion and other nonpoint source pollutant contributions.

Special monitoring requirements are contained in a permit issued to Minnesota Aquafarms, Inc. and Iron Range Aquafarms, Inc. which requires monitoring on a monthly basis of two sampling stations within Fraser Lake and twice monthly sampling of the untreated Chisholm public water supply intake from Fraser Lake (NPDES/SDS Permit No. MN0058190, Exhibit C 56). Minnesota Aquafarms, Inc. and Iron Range Aquafarms, Inc. operate an aquaculture fish production facility in the Sherman mine pit lake adjacent to the Fraser. This permit also contains a special requirement specifying that "The Permittee shall not construct, add fish, or conduct other activities in Fraser Lake, with the exception of maintenance feeding operations and fish removal operations for the trout present in the lake on June 28, 1988. " Exhibit C 56, Part I.C.5. This restriction remains applicable so long as the Fraser Lake is used as a drinking water source. At least in the near term, the city of Chisholm plans to use the Fraser Lake as its sole source of drinking water. Exhibit C 57.

Noncommunity Public Drinking Water Supplies

There are two wastewater treatment facilities (WWTF) that impact Lake Vermilion, a public water supply source for eight (8) noncommunity public water systems. The first WWTF discharge is from the Tower-Breitung Water and Sewage Commission facility and the second discharge is from the Boise Forte Reservation WWTF.

The city of Tower and the Breitung Water and Sewage Commission operate a wastewater stabilization pond facility which discharges on a controlled basis to a tributary to the East Two Rivers, NPDES permit number MN0056618. East Two Rivers flows to Lake Vermilion. The nearest noncommunity water supply system is located approximately 17 miles "down-lake" from this wastewater effluent discharge. While it is the policy of the MPCA to require year-round disinfection of sewage wastewater that is discharged within 25 miles upstream of a drinking water supply withdrawal, stabilization pond facilities can generally meet the fecal coliform effluent limitation of 200 org./100 ml without having to be chlorinated or disinfected through some other process. A review of the discharge monitoring reports for this facility have shown that the fecal coliform levels in the effluent have consistently been well below the 200 org./100 ml limit. Therefore, no additional treatment costs are anticipated as a result of the proposed Class 1C classification.

The Boise Fort Reservation WWTF currently discharges at an average effluent flow rate of approximately 0.015 MGD. Two facility upgrade options are being considered, a pond treatment facility with a controlled discharge, and a mechanical treatment facility with a continuous discharge of approximately 0.108 MGD.

If the pond treatment option is chosen, no additional costs are anticipated as a result of the Class 1C designation for the same reasons discussed previously for the Tower-Breitung discharge.

If the mechanical treatment facility operation is selected, year-round disinfection would be required. This would extend the period of required disinfection from eight (8) months to twelve (12) months. Assuming chlorination of the wastewater is the chosen method for disinfection at the upgraded facility, chemical costs for extending the disinfection requirement by four (4) months would be approximately $600 per year. This cost estimate includes the chemical costs for the chlorine and for the sulfur dioxide used to de-chlorinate the wastewater in order to meet the total residual chlorine effluent limitation.

Noncommunity, Nontransient Public Water Supplies

Four (4) mine pit lakes that have been identified as noncommunity, nontransient public water supplies are being proposed for Class 1C use classification. These mine pit lakes serve the following respective mining operations:

Enterprise Mine Pit Lake, Inland Steel Mining Company
Morton and Scranton Mine Pit Lakes, Hibbing Taconite Company
Mountain Iron Mine Pit Lake, USX

These waters are designated by the Minnesota Department of Health as public water supplies since they serve as sources of drinking waters for at least 25 of the same persons over six months per year. As noted in earlier discussions, the Scranton Mine Pit Lake, under existing water elevations, is part of a much larger surface water body encompassing the Hull-Rust-Mahoning-Scranton-Susquehana mining complex.

In addition to surface runoff from surrounding lands and ground water seepage to these mine pit lakes, these waters also receive mine pit dewatering discharges from active and/or non-active mining operations. As with the mine pit lakes utilized by the four communities discussed earlier under the section on community public water supplies, the Agency encourages the use of Best Management Practices (BMPs) in mining areas to minimize and control erosion. The Agency also recommends that special care is taken in the use of chemical dust suppressants, lubricants, fuels, drilling fluids, oils, fertilizers, explosives and blasting agents in the mining areas so to minimize their impact on surface and ground waters. Utilization of applicable BMPs has been and will continue to be the Agency's focus for storm water runoff and erosion control measures for flows from mining areas. While the designation of the four mine pit lakes as Class 1C waters will not result in a change in this management approach additional costs may be incurred due to increased implementation of BMPs if additional management controls are needed to protect the drinking water source.

The assignment of this use classification does have the potential to result in additional monitoring costs relative to discharges of process wastewater and dewatering flows from active mining areas that impact

these drinking water supply sources. Historically, the Agency has viewed some of these mine pit lakes within the boundaries of the permitted facility which receive process wastes and dewatering discharges from active mining areas as being part of the mining operation. Dewatering discharges from these particular mine pit lakes which discharge to waters of the state were permitted through the NPDES/SDS permitting process. Recognizing that drinking water supply is an existing use of these waters, the Agency will establish monitoring requirements, and if appropriate, set effluent limits on discharges to these waters so as to protect for the drinking water use.

The cost estimates for this additional monitoring are separated into two categories. The first category includes monitoring of the process and active mine dewatering discharges discharging into the proposed Class 1C mine pit lakes at the time of permit renewal. Parameters and parameter groupings to be analyzed include the following.

INORGANICS: aluminum, arsenic, antimony, barium, beryllium, boron, cadmium, chromium, cobalt, copper, fluoride, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, tin, titanium, zinc, nitrate + nitrite, nitrite, ammonia, total organic nitrogen, total phosphorus, sulfate and chloride

ASBESTOS

VOCs: benzene, vinyl chloride, carbon tetrachloride, 1,2-dichloroethane, trichloroethylene, 1,1-dichloroethylene, 1,1,1-trichloroethane, and para-dichlorobenzene

SYNTHETIC ORGANICS: glyphosate, herbicides (CH), base-neutrals, and carbamates

GENERAL CHEMISTRY/BACTERIOLOGICAL: total suspended solids, biochemical oxygen demand, chemical oxygen demand, total organic carbon, surfactants, fecal coliform, color

OIL AND GREASE

Based on analytical cost estimates from the Minnesota Department of Health, total costs per sample for the above noted parameters and parameter groupings is $2,975 per sample.

The second category of discharge parameters monitored on a semi-monthly basis include: ammonia, nitrate + nitrite, nitrite, chloride, total suspended solids, turbidity, pH, color, oil and grease, dissolved iron

The analytical costs for these parameters is estimated to be $194 per sample. Additional parameters may also be added to this list of parameters to be measured on a semi-monthly basis depending on the results of the monitoring for the parameters in category one as described above.

As an example, USX (NPDES/SDS permit #MN0052493) may be required to monitor two additional monitoring stations as a result of the Class 1C designation of the Mountain Iron mine pit lake. The monitoring stations

would be established to monitor the mine pit dewatering discharges from the eastern portion of the West Minntac mine and the western portions of the East Minntac mine. Additional parameter analyses would be required at a monitoring station already being sampled by USX. This station, identified in the permit as monitoring station 950, has been established to monitor surface flow of non-sewage wastewater from the Minntac and Pilotac Plant Areas on the south side of the Laurentian Divide. Over the life of the five-year permit, estimated added monitoring costs resulting from the Class 1C classification would be approximately $78,800.

Inland Steel Mining Company has indicated that it is currently pursuing an in-pit tailings disposal option where they intend to pump tailings into their depleted Minorca Pit rather than their current tailings basin Exhibit C 58. As the Minorca Pit fills with tailings, process water would have to be pumped out of the pit. This excess water would be pumped to the Sauntry and Enterprise Mine Pit Lakes. Once the dewatering of the Minorca Mine Pit begins, the company indicates that it would no longer use water from the Enterprise Mine Pit Lake for domestic consumption purposes and is therefore requesting that the Enterprise Mine Pit Lake not be classified as a Class 1C water pending approval of the proposed in pit tailings disposal proposal.

Agency staff has discussed this request with a company representative and have indicated that it will continue to include the Enterprise Mine Pit Lake as a Class 1C water based on its existing use as a drinking water source supply. As the plans and environmental reviews of the proposed in-pit tailings disposal option progress, and the company provides a schedule for the cessation of use of the Enterprise for drinking water purposes, the Agency will re-evaluate the need for continuing to propose this mine pit lake as a Class 1C water. The Agency anticipates that these discussions and submissions of information could occur prior to or during the public hearings on the proposed rule amendments.

In conclusion, the proposed Class 1C classification of these mine pit lakes will not necessarily result in additional treatment costs, but will result in some additional monitoring costs related to process waste discharges and dewatering discharges from mining operations that are discharged to these drinking water public supply sources.

2) Outstanding Resource Value Waters

The Agency is proposing to assign the ORVW designation to waters within the Falls Creek SNA and to 37 calcareous fens. Since the lands contained within the boundaries of the Falls Creek SNA are owned by the state, there are no identified economic impacts resulting from the proposed ORVW designation. There is a designated trout stream which flows through the SNA, portions of which lie outside the SNA boundaries. This trout stream is identified as Unnamed Stream (Falls Creek) in T.32, R. 19, 5.6,7; T.32, R.20, S.1, 12. Proposed discharges to the designated trout stream or its tributaries outside the boundaries of the SNA would be assessed and controlled in part through the provisions of Minn. Rules pt. 7050.0180, subp. 9. There are no permitted discharges

to these upstream segments at this time, nor is the Agency aware of any proposed discharges to these waters, so no economic impacts are anticipated because of this designation.

Due to their dependency on sustaining ground water flows of certain chemical and physical characteristics, calcareous fens have the potential for being impacted not only from discharges of wastewaters, but from other land use activities occurring on surrounding lands as well. The Agency is not aware of any existing or proposed discharges to the calcareous fens proposed for ORVW designation, therefore there are no identified costs to permittees as a result of this designation.

Economic impacts, however, may be realized by persons proposing certain land use activities that have the potential to impact calcareous fens. As noted in earlier discussions, the major threats to calcareous fens come from ditching, drainage and filling operations related to agricultural activities, commercial development, gravel mining activities and highway construction. Economic impact analysis relating to any of these activities and their potential impact to calcareous fens, can only be accomplished on a site specific basis. Attempts to quantify a general dollar amount associated with mitigative actions or avoidances in connection with any of these activities is almost impossible to do.

Some or all of these costs may be incurred by persons proposing an action which could degrade or impact a calcareous fen whether or not these calcareous fens are designated as ORVWs. These economic impacts may be realized as a result the Agency's Section 401 Water Quality Certification process that is already in existence, or the MDNR calcareous fen management plan in Minn. Stat. sec. 103G.223. Also, these economic impacts may be realized as a result of the added level of protections afforded calcareous fens through certain provisions of the Wetland Conservation Act, Minn. Stat. sec. 103G.223.

3) Class 2B Waters reclassified as Class 2A Waters

The Agency is proposing to list and incorporate by reference the trout waters identified by the MDNR that are listed pursuant to MDNR Commissioner's Order No. 2450. Streams and lakes identified under this order are proposed by the Agency to be classified as Class 2A cold water fisheries. Since the last time the commissioner's orders were incorporated into chapter 7050, changes made to the trout stream order have resulted in some added waters, some deletion of certain waters, and changes in the designated reaches of existing trout streams. The extension of the trout stream designations for Union Creek, Wadena County and Hay Creek, Goodhue County has the potential to impact two dischargers to these stream segments. The economic impacts resulting from this designation are discussed as follows.

Union Creek, Wadena

The city of Wadena operates a mechanical wastewater treatment facility (WWTF) designed to treat an influent flow of 0.750 MGD. The discharge from this facility is to Union Creek, which is tributary to the Leaf

River. In the existing Minn. Rules ch. 7050, Union Creek is designated as a trout stream upstream of the WWTF outfall. The MDNR trout stream designation has been extended down to Union Creek's confluence with the Leaf River. The city is currently discharging into a Class 2B segment of Union Creek. This same segment is being proposed for Class 2A reclassification by the Agency based on the latest commissioner's order for trout streams.

Instream standards for un-ionized ammonia and dissolved oxygen in Class 2A waters are more restrictive than they are for Class 2B waters. In general, this change in use classification would result in the assignment of more restrictive effluent limitations for WWTFs discharging to these waters. The assignment of these effluent limits would occur either at the time of permit reissuance or through the modification of the existing permit in effect at the time the water use classification change becomes effective.

The Wadena WWTF recently underwent a $3.2 million upgrade based on effluent limitations set to insure maintenance of the Class 2B instream water quality standards. As a result of this recent upgrade, the 1992 discharge monitoring reports indicate that this facility is currently meeting the limits applicable for a discharge to Union Creek based on maintenance of Class 2A instream standards. Options open to the city would include agreeing to the assignment of the more restrictive effluent limitations included in a modified NPDES/SDS permit, or request a variance to the Class 2A standards for ammonia and dissolved oxygen. If such a variance were submitted by the city and granted by the Agency, a likely condition of the variance would be instream monitoring both above and below the WWTF outfall. The parameters to be analyzed include ammonia nitrogen, dissolved oxygen, pH, and temperature. Estimated analytical costs to the city to meet the proposed instream monitoring requirements would be $2,500 over a five-year permit period.

Hay Creek, S.B. Foot Tanning Company and the city of Red Wing

S.B. Foot Tanning Company and the city of Red Wing operate a wastewater treatment facility that discharges into Hay Creek, a tributary to the Mississippi River. The principle activity of this facility is the processing of leather by re-tanning and leather finishing operations into shoe upper leather at a permit rate of approximately 130,000 pounds of raw product per day. Noncontact cooling water is also discharged from this facility to Hay Creek.

The trout stream designation of Hay Creek has been extended down to its confluence with the Mississippi River. S.B. Foot Tanning Company presently discharges to a Class 2B segment of the creek, but with the adoption of the latest MDNR Commissioner's Order for trout streams, this particular segment of the creek is proposed for Class 2A classification. The instream water quality standards for un-ionized ammonia will go from the present Class 2B standard of 0.04 mg/l to a Class 2A standard of 0.016 mg/l if this proposed reclassification becomes effective.

In order to meet this more restrictive un-ionized ammonia standard, facility upgrades and/or operational modifications may be necessary. The information needed to evaluate what additional treatment needs, if

any, would be required is not available at this time. Agency staff and S.B. Foot Tanning Company staff are cooperatively working on collecting this needed information. It is the intent of the Agency to submit an exhibit into the hearing record which provides an economic analysis of the projected costs which may be incurred by the company as a result of this proposed classification change.

4) Class 7 Reclassifications

Six waters are being proposed for Class 7 reclassification. In general, the assignment of this use classification will result in a net cost savings to the communities that discharge to these waters. The Class 7 use classification change applicable to the unnamed ditch at New Auburn and County Ditch No. 42 at McGregor will not result in any substantial cost savings for these cities with their present mode of wastewater treatment. It will, however, afford these cities greater operational flexibility in the timing of their controlled discharges.

Although not quantified, significant cost savings are projected for the city of Rogers and the Gaylord/M.G. Waldbaum facilities should their respective receiving waters be reclassified as Class 7 limited resource value waters. Some of these costs savings, however, are off-set by the instream monitoring requirements specified in the Gaylord/M.G. Waldbaum NPDES/SDS permit. These instream monitoring requirements are imposed in order to assure that the downstream Class 2B standards applicable for the North Branch Rush River are maintained.

g. Miscellaneous rule modifications. There are several minor amendments to Minn. Rules 7050 which serve to clarify current requirements, define undefined terms, update references to other rules and orders, provide consistent language and correct spelling and grammar. These changes are noted in the introduction of this document, Part I, section B, scope of proposed revisions, Minor Subjects, items 1, 4-16, 18-20, and 22-23. These changes will have no increased impact on economic factors for regulated communities.

B. Public Bodies.

Minn. Stat. sec. 14.11, subd. 1 (1992) requires the Agency to provide an estimate of the total cost associated with implementing the proposed amendments, if it is estimated that the total cost to all local public bodies exceeds $100,000 in either of the first two years following adoption of the rules. The Agency has reviewed all the proposed changes and determined that the changes which could potentially, directly or indirectly, increase costs to public bodies are, 1) the establishment of specific use classifications and standards for wetlands, 2) the eight proposed new aquatic life standards for toxics, and 3) the nine updated aquatic life standards for toxics.

1. Wetlands.

As discussed under the review of economic impacts expected from the proposed wetland amendments, only about 40 of the 600 permitted municipalities currently discharge to wetlands. There will be no

increased costs to the existing discharges over the next two years because their effluent limitations should already reflect the level of treatment needed to protect the wetland. Also, it is extremely unlikely that any municipality proposing a new or expanded discharge will incur any increased costs over the next two years given, 1) the unlikely event that the Agency will receive very many requests for new or expanded discharges to wetlands over the next two years, and 2) the fact that, if there are such requests, the unlikely event that treatment costs would be different as a result of these amendments as compared to what is required now. Thus, it seems very unlikely that municipalities will incur costs in excess of $100,000 in each of the next two years. It is determined that there will be minimal, if any, increased costs to discharges as a result of the proposed wetland amendments.

2. Proposed new Standards for Eight Toxics.

The review of the few municipal permits that contain limitations for any of the eight pollutants for which new standards are proposed shows no economic impact to municipalities; the $100,000 cap will not be exceeded.

3. Proposed Updated Nine Standards.

Of the nine updated standards, the new standards for arsenic and pentachlorophenol (PCP) have the potential to increase treatment costs. However, only the Western Lake Superior Sanitary District (WLSSD) permit has a limitation for PCP (none has a limitation for arsenic). WLSSD will not incur any additional costs due to the proposed PCP standard as discussed earlier; therefore, the $100,000 cap will not be exceeded.

The Agency has reviewed the potential costs to municipalities from the other parts of the rule being revised, such as the designation of new calcareous fens as Outstanding Resource Value Waters, the addition of narrative biocriteria, and the designation of certain mine pit lakes as Class 1C waters, and believes that municipalities will not incur $100,000 in costs in either of the next two years due to these proposed changes.

C. Small Business

Minn. Stat. sec. 14.11 subd. 2 (1992) requires the Agency to consider several factors that may reduce the potential impacts on small business when promulgating new or amending existing rules. The factors are:

1. The establishment of less stringent compliance or reporting requirements for small businesses;
2. the establishment of less stringent schedules or deadlines for compliance or reporting requirements for small businesses;
3. the consolidation of simplification of compliance or reporting requirements for small businesses;
4. the establishment of performance standards for small business to replace design or operational standards required in the rule; and
5. the exemption of small businesses from any or all requirements of the rule.

The standards and conditions in ch. 7050 are applicable to all dischargers regardless of size. Also, the EPA requires compliance with permit limitations for all dischargers. Likewise, the amendments being proposed by the Agency at this time, the wetland classifications and standards, the new and updated Class 2 standards, the other classification changes, biocriteria, etc., are statewide in their scope. The regulatory implications of these statewide standards are best defined when they are applied in a site-specific situation. For this reason, it is difficult to address the particular needs of one segment of the regulated community when promulgating such generally applicable standards. However, the Agency has the flexibility, and will use this flexibility, to address points one through four listed above on a case-by-case basis through the NPDES or SDS permit, the certification process, and through the enforcement process.

The permit and certification process provides the flexibility to tailor requirements to the size and resources of the permittee. For example, monitoring requirements in a permit for a small business can be scaled back to minimize the cost burden to the small business.

In taking enforcement action against a small business not in compliance with their permit, the Agency has considerable flexibility and discretion to, for example, reduce reporting requirements and adjust compliance schedules to minimize the cost burden to the small business while still achieving the Agency's primary function of protecting the environment.

Item number 5 above is best addressed through the variance process as outlined in part 7050.0190 and Minn. Rules part 7000.0700. In assessing the merits of a request for a variance from a water quality standard or effluent limitation, the Agency staff will consider the particular economic condition and vulnerability of the small business when making its recommendation to the Agency Board to grant or deny the variance.

D. Agricultural lands

Minn. Stat. sec. 17.83 (1992) requires the Agency to notice and describe in the SONAR any "direct or substantial impact" the proposed rule might have on agricultural land in the state. This requirement in also identified in Minn. Stat. sec. 14.11, subd. 2 (1992). The two areas being revised that might impact agricultural lands are the proposed narrative standards for wetlands, and the numerical water quality standards for atrazine and alachlor.

1. Classifications and standards for wetlands.

The proposed narrative standards, which essentially clarify existing Agency authority, will protect wetlands from point and nonpoint sources of pollution and physical alterations. Marginal or seasonal wetlands in agricultural lands (Type 1) can still be cultivated when conditions permit, as is the case now. This will not change as a result of these amendments. The process of mitigation or replacement if a wetland is physically altered will follow the same process currently in place.

These regulatory procedures do not have the effect of substantially restricting the agricultural use of the land.

2. Class 2 numerical standards for atrazine and alachlor.

Two of the eight proposed new standards are for the herbicides, atrazine and alachlor, which are commonly used to control weeds on agricultural lands. It is conceivable that the standards may encourage reductions in the use of these herbicides through alternative weed control practices, or reductions in runoff through the voluntary adoption of BMPs consistent with nonpoint source programs. However, the proposed standards will not substantially restrict the agricultural use of the land, nor will they take agricultural land out of production.

In conclusion, the proposed rules do not involve the acquisition, permitting, leasing, or funding for agricultural land.

VI. TECHNICAL ADVISORY COMMITTEE

As required by Minn. Stat. sec. 115.54 (1992), the Agency must consider the advice of the Technical Advisory Committee (TAC) when adopting or revising its rules concerning wastewater treatment. The TAC has had difficulty in the past two years in achieving a quorum for its meetings. Therefore, with the advice of the Chair and some members of the committee, the Agency has provided the TAC with rule language and information by mail. The TAC chair will call a meeting as necessary, or poll the committee for comments on the rule. No special concerns have been identified by the TAC as of the date of this SONAR, and the Agency anticipates receipt of their comments and advice prior to adopting the revisions to this rule.

VII. LIST OF WITNESSES, EXHIBITS AND ACRONYMS

A. Witnesses

In support of the need and reasonableness of the proposed amendments to the rule, the following Agency staff helped prepare this statement of need and reasonableness and will be available to explain the proposed amendments and answer questions at the rulemaking hearing.

1. David Maschwitz: aquatic life standards for toxics, drinking water standards and certain minor amendments.

2. Dann White: aquatic life standards for toxics.

3. Howard Markus: water quality standards for wetlands.

4. Gerald Blaha: outstanding resource value water designation for calcareous fens and scientific and natural areas; limited resource value water reclassifications; and certain minor amendments.

5. Patricia Bailey: biological criteria and use classifications.

6. Mary Knudsen: discharges from dredge disposal facilities.

7. Greg Gross: amendments in general.

8. Dave Belluck: Atrazine.

B. Exhibits

In support of the need for and reasonableness of the proposed rules, the following exhibits will be entered into the hearing record by the Agency.

Exhibit Number	Document
	B = Exhibits concerning biocriteria
B1	Rankin, E.T. and C.O, Yoder. 1990. A comparison of aquatic life use impairment detection and its causes between an integrated, biosurvey-based environmental assessment and its water column chemistry subcomponent. Appendix I-Ohio 1990 305(b).
B2	U.S. Environmental Protection Agency. 1990. Biological criteria national program guidance for surface waters. EPA/440-5-90-004. Office of Water, U.S. Environ. Prot. Agency, Washington, D.C.
B3	U.S. Environmental Protection Agency. 1992. Procedures for initiating narrative biological criteria. EPA/822-B-92-002. Office of Water, U.S. Environ. Prot. Agency, Washington, D.C.
B4	Plafkin, J.L. et al. 1989. Rapid bioassessment protocols for use in streams and rivers : benthic macroinvertebrates and fish. Chapter 8.3. EPA/444/4-89-001. Office of Water, U.S. Environ. Prot. Agency, Washington, D.C.
B5	Plafkin, J.L. et al. 1989. Rapid bioassessment protocols for use in streams and rivers : benthic macroinvertebrates and fish. Chapter 7.2 EPA/444/4-89-001. Office of Water, U.S. Environ. Prot. Agency, Washington, D.C.
	C = Exhibits concerning classifications of waters
C1	Falls Creek Scientific and Natural Area Project Evaluation report, Minnesota Department of Natural Resources.
C2	Element Abstract for Calcareous Fen Plant Communities. Natural Heritage Program, Minnesota Department of Natural Resources.
C3	Calcareous Fen Locations and Ownership in Minnesota Index. Minnesota Department of Natural Resources. February 17, 1993.
C4	Calcareous Fens in Minnesota Element Occurrence Record. Minnesota Department of Natural Resources.

C5 Seminary fen, 75 (T.116, R.23, S.35) site map.

C6 Barnesville Moraine fen, 44 (T.137, R.44, S.18) site map.

C7 Barnesville WMA fen, 43 (T.137, R.44, S.18) site map.

C8 Felton Prairie fen, 48 (T.142, R.45, S.31) site map.

C9 Felton Prairie fen, 53 (T.141, R.46, S.24) site map.

C10 Haugtvedt WPA North Unit fen, 54 (T.137, R.44, S.28, 29) site map.

C11 Holden 1 West fen, 3 (T.110, R.18, S.1) site map.

C12 Red Wing fen, 72 (T.113, R.15, S.21) site map.

C13 Houston fen, 62 (T.104, R.6, S.26) site map.

C14 Ottawa Bluffs fen, 56 (T.110, R.26, S.3) site map.

C15 Tamarac River fen, 71 (T.157, R.46, S.2) site map.

C16 Viking fen, 68 (T.155, R.45, S.18) site map.

C17 Viking fen, 70 (T.155, R.45, S.20) site map.

C18 Viking Strip fen, 69 (T.154, R.45, S.4) site map.

C19 Lost Timber Prairie fen, 13 (T.105, R.43, S.2) site map.

C20 Agassiz-Olson WMA fen, 17 (T.146, R.45, S.22) site map.

C21 Faith Prairie fen, 15 (T.144, R.43, S.26) site map.

C22 Faith Prairie fen, 16 (T.144, R.43, S.35) site map.

C23 Green Meadow fen, 14 (T.145, R.45, S.35, 36) site map.

C24 High Forest fen, 12 (T.105, R.14, S.14, 15) site map.

C25 Sanders East fen, 65 (T.153, R.44, S.7) site map.

C26 Sanders East fen, 74 (T.153, R.44, S.7) site map.

C27 Sanders fen, 64 (T.153, R.44, S.18, 19) site map.

C28 Chicog Prairie fen, 39 (T.148, R.45, S.28) site map.

C29 Kittleson Creek Mire fen, 55 (T.147, R.44, S.6, 7) site map.

C30 Blue Mounds fen, 1 (T.124, R.39, S.15, 14) site map.

C31 Lake Johanna fen, 4 (T.123, R.36, S.29) site map.

C32 Swedes Forest fen, 8 (T.114, R.37, S.19, 20) site map.

C33 Swedes Forest fen, 9 (T.114, R.37, S.22, 27) site map.

C34 Cannon River Wilderness Area Fen, 73 (T.111, R.20, S.22) site map.

C35 Anna Gronseth Prairie fen, 47 (T.134, R.45, S.15) site map.

C36 Anna Gronseth Prairie fen, 49 (T134, R.45, S.10) site map.

C37 Anna Gronseth Prairie fen, 52 (T.134, R.45, S.4) site map.

C38 Rothsay Prairie fen, 46 (T.136, R.45, S.33) site map.

C39 Rothsay Prairie fen, 50 (T.135, R.45, S.15, 16) site map.

C40 Rothsay Prairie fen, 51 (T.135, R.45, S.9) site map.

C41 Yellow Medicine fen, 30 (T.115, R.46, S.18) site map.

C42 Waterbodies Proposed for Class 1C, Domestic Consumption, Designation; Minnesota Department of Health summary sheets and accompanying maps.

C43 Aerial photo of Scranton Mine Pit Lake showing portions of the Hull-Rust-Mahoning-Scranton-Susquehanna Complex. 1989 Hibbing Public Utilities Annual Report cover page.

C44 Comment letters and records of oral comments regarding the proposal to classify mine pit lakes, being used as public water supply sources, as Class 1C waters.

C45 Rogers Stream Assessment Survey.

C46 Gaylord/M.G. Waldbaum Stream Assessment Survey.

C47 McGregor Stream Assessment Survey.

C48 New Auburn Stream Assessment Survey.

C49 Wyoming Stream Assessment Survey.

C50 Boise Cascade at International Falls Stream Assessment Survey.

C51 Fairmont Stream Assessment Survey.

C52 March 1992 Stream Reclassification Request from the City of Fairmont.

C53 Agency response to Fairmont's March 1992 Stream Reclassification Request.

C54 Minnesota Department of Natural Resources comment letter dated September 30, 1992, with a request to remove Outstanding Resource Value Waters designation from six lake trout lakes.

C55 Minnesota Department of Natural Resources Commissioner's Order No. 2450, Minnesota Rules part 6262.0400, subparts 3 to 5. State Register, Monday 22 June 1992, pages 2902 through 2928.

C56 NPDES/SDS Permit No. MN0058190, Iron Range Aquafarms, Inc.; Minnesota Aquafarms, Inc., dated July 26, 1988.

C57 Letter from the Mayor, City of Chisholm, dated September 24, 1992, regarding Fraser Mine Pit Lake.

C58 Letter from Inland Steel Mining Company, dated April 1, 1993, regarding Enterprise Mine Pit Lake proposed Class 1C classification.

F = Exhibits concerning feedlot issues

F1 U.S. Department of Agriculture. 1982. An evaluation system to rate feedlot pollution potential. ISSN 0193-3787. Agricultural Research Service, U.S. Department of Agriculture, Peoria, Illinois.

F2 Martel, C.J. et al. 1982. Development of a rational design procedure for overland flow systems. A-2076/342. Cold Regions Research & Engineering Laboratory, U.S. Army Corps of Engineers.

G = Exhibits concerning general rulemaking issues

G1 Notice to Solicit Outside Opinion, State Register, Monday 24 February 1992, Volume 16, Number 35, page 1958.

G2 Comments received during February 25, 1992 Period of Solicitation of Outside Opinions.

G3 Notice to Solicit Outside Opinion, State Register, Monday 31 August 1992, Volume 17, Number 9, page 449.

G4a Letter introducing the Chapter 7050 revision issues, dated September 10, 1992.

G4b Mailing list for September 10, 1992 letter introducing revision issues.

G5a Letter concerning effort to adopt eight new statewide toxic standards, date September 10, 1992.

G5b Mailing list for September 10, 1992 letter concerning eight new toxic standards.

G6a Letter concerning reclassification to Class 1C for public drinking water sources, dated September 11, 1992.

G6b Mailing list for September 11, 1992 letter concerning reclassification of public drinking water sources.

G7 Revision subject fact sheets.

G8 Comments received during September 1, 1992 Period of Solicitation of Outside Opinions.

G9 Order of Hearing.

G10 Certificate of Agency Board's Authorizing Resolution.

G11a Notice of Hearing mailed to persons registered with the Agency in accordance with Minn. Stat. sec. 14.14, subd. 1a (1992).

G11b Certification of Agency Mailing List.

G11c Affidavit of Mailing.

G12 Notice of Hearing as published in the State Register.

G13a Notice of Hearing published in newspapers in accordance with Minn. Stat. sec. 115.44, subd. 7, item (a) (1992).

G13b Newspaper publication list for Notice of Hearing.

G14a Notice of Hearing sent to municipalities in accordance with Minn. Stat. sec. 115.44, subd. 7, item (b) (1992).

G14b Mailing list for Notice of Hearing sent to municipalities.

T = Exhibits concerning toxicity issues

T1. MPCA. Minnesota loose leaf folder of aquatic life standards and data summaries for the eight proposed standards.

T2. Geiger, D.L., S.H. Poirier, L.T. Brooke, and D.J. Call, eds. (1986) Acute toxicities of organic chemicals to fathead minnows (Pimephales promelas), V. 3. Center for Lake Superior Environmental Studies, University of Wisconsin-Superior, Superior, WI. AQUIRE Ref. #12858.

T3. Call, D.J., L.T. Brooke, R.J. Kent, S.H. Poirier, M.L. Knuth, P.J. Shubat, and E.J. Slick (1984) Toxicity, uptake, and elimination of the herbicides alachlor and dinoseb in freshwater fish. J. Environ. Qual. 13(3):493-498. AQUIRE Ref. #10635. Along with a record of a telephone call with Dr. Dan Call dated May 13, 1992.

T4. Do'Icheva, L.A. (1978) Experimental poisoning of carp fingerlings (Cyprinus carpio L.) with the herbicidal preparation lassagrin (alachlor). Vet. Med. Nauki 15(4):108-113. AQUIRE Ref. #5376.

T5. Johnson, W.W. and M.T. Finley (1980) Handbook of acute toxicity of chemicals to fish and aquatic invertebrates. Resour. Publ. 137. Fish Wildlife Service, U.S.D.I., Washington, D.C. AQUIRE Ref. #666.

T6. USEPA. (1986) Water quality advisory alachlor. Office of Water Regulations and Standards, Criteria and Standards Division, Washington, D.C. March 1986.

T7. Brooke, L.T., D.J. Call, S.H. Poirier, C.A. Lindberg, and T.P. Markee (1986) Acute toxicity of antimony III to several species of freshwater organisms. Center for Lake Superior Environmental Studies, University of Wisconsin-Superior, Superior, WI.. August 1986.

T8. Kimball, G.L. (1978) The effects of lesser known metals and one organic to fathead minnows (Pimephales promelas) and Daphnia magna. Manuscript.

T9. Spehar, R.L. (1987) U.S. EPA, Duluth, MN. (Memorandum to C. Stephan, U.S. EPA, Duluth, MN. August 27.). In: (Draft) Ambient aquatic life water quality criteria for antimony (III). USEPA Office of Research and Development, Environmental Research Laboratories, Duluth, MN; Narragansett, RI. August 30, 1988.

T10. USEPA. (1986) Water quality advisory atrazine. Office of Water Regulations and Standards, Criteria and Standards Division, Washington, D.C. March 1986.

T11. Forney, D.R. and D.E. Davis (1981) Effects of low concentrations of herbicides on submersed aquatic plants. Weed Science 29:667-685.

T12. Forney, D.R. (1980) Effects of atrazine on Chesapeake Bay aquatic plants. Masters thesis. Auburn University, Auburn, Alabama. August 26, 1980.

T13. Gunkel, G. and B. Streit (1980) Mechanisms of bioaccumulation of a herbicide (atrazine, s-triazine) in a freshwater mollusc (Ancylus fluviatilis Mull.) and a fish (Coregonus fera Jurine). Water Res. 14:1573-1584. AQUIRE Ref. #6494.

T14. Isensee, A.R. (1976) Variability of aquatic model ecosystem-derived data. Intern. J. Environ. Stud. 10:35-41. AQUIRE Ref. #682.

T15. Heisig-Gunkel,G. and G. Gunkel (1982) Distribution of a herbicide (atrazine, s-triazine) in Daphnia pulicaria: A new approach to determination. Arch. Hydrobiol. Suppl. 59(4):359-376.

T16. Biesinger, K.E. and G.M. Christensen (1972) Effects of various metals on survival, growth, reproduction, and metabolism of Daphnia magna. J. Fish. Res. Bd. Canada 29:1691-1700. AQUIRE Ref. #2022.

T17. Pentreath, R.J. (1973) The accumulation from sea water of 65Zn, 54Mn, 58Co, and 59Fe by the thornback ray, Raja clavata L. J. Exp. Mar. Biol. Ecol. 12(3):327-334. AQUIRE Ref. #2133.

T18. Boutet, C. and C. Chaisemartin (1973) Specific toxic properties of metallic salts in (Austroprotamobius pallipes pallipees) and (Orconectes limnosus). C.R. Soc. Biol. (Paris) 167(12):1933-1938. AQUIRE Ref. #5421.

T19. Buikema, A.L., Jr., C.L. See, and J. Cairns, Jr. (1977) Rotifer sensitivity to combinations of inorganic water pollutants. OWRT Project A-071-VA, VA Water Resour. Res. Center Bull. No. 92, Blacksburg, VA. AQUIRE Ref. #2059.

T20. Hughes, J.S. (1973) Acute toxicity of thirty chemicals to striped bass (Morone saxatilis). Louisiana Dept. Wildl. Fish. 318-343-2417. July 1973. AQUIRE Ref. #2012.

T21. Decker C. and R. Menendez (1975) Acute toxicity of iron and aluminum to brook trout. Proc. W. VA. Acad. Sci. 46(2):159-167. AQUIRE Ref. #6115.

T22. Martin, T.R. and D.M. Holdrich (1986) The acute lethal toxicity of heavy metals to peracarid crustaceans (with particular reference to fresh-water asellids and gammarids). Water Res. 20(9):1137-1147. AQUIRE Ref. #11972.

T23. England, R.H. and K.B. Cumming (1971) Stream damage from manganese strip-mining, pp. 399-418. In: Proc. 25th Annual Conf. Strip-mining Assoc., Assoc. Game and Fish Comm., Virginia Polytechnic Institute and State University, Blacksburg, VA.

T24. Edminsten, G.E. and J.A. Bantle (1982) Use of Xenopus laevis larvae in 96-hour, flow-through toxicity tests with naphthalene. Bull. Environm. Contam. Toxicol. 29:392-399.

T25. Moles, A., S. Bates, S.D. Rice, and S. Korn (1981) Reduced growth of coho salmon fry exposed to two petroleum components, toluene and naphthalene, in fresh water. Trans. Am. Fish. Soc. 110:430-436. AQUIRE Ref. #15191.

T26. DeGraeve, G.M., R.G. Elder, D.C. Woods, and H.L. Bergman (1982) Effects of naphthalene and benzene on fathead minnows and rainbow trout. Arch. Environm. Contam. Toxicol. 11:487-490. AQUIRE Ref. #15131.

T27. USEPA. (1980) Ambient water quality criteria for naphthalene. Office of Water Regulations and Standards, Criteria and Standards Division, Washington, D.C. EPA 440/5-80-059. October 1980.

T28. Smith, R.L. and B.R. Hargreaves (1983) A simple toxicity apparatus for continuous flow with small volumes: demonstration with mysids and naphthalene. Bull. Environ. Contam. Toxicol. 30:406-412. AQUIRE Ref. #10449.

T29. Korn, S., D.A. Moles, and S.D. Rice (1979) Effects of temperature on median tolerance limit of pink salmon and shrimp exposed to toluene, naphthalene, and Cook Inlet crude oil. Bull. Environm. Contam. Toxicol. 21:521-525. AQUIRE Ref. #5030.

T30. Rodgers, J.H., Jr., K.L. Dickson, and M.J. DeFoer (1983) Bioconcentration of lindane and naphthalene in bluegills (Lepomis macrochirus), pp. 300-311. In: W.E. Bishop, R.D., Cardwell, and B.B Heidolph, eds. Aquatic Toxicology and Hazard Assessment: Sixth Symposium, ASTM STP 802, American Society for Testing and Materials, Philadelphia. AQUIRE Ref. #10172.

T31. Melancon, M.J., Jr. and J.J. Lech (1978) Distribution and elimination of naphthalene and 2-methylnaphthalene in rainbow trout during short- and long-term exposures. Arch. Environm. Contam. Toxicol. 7:207-220. AQUIRE Ref. #999.

T32. Belluck, D.A. (1993) Atrazine hydro-bio-geo-chemical cycling in the environment. Minnesota Pollution Control Agency report. January 1993.

T33. USEPA. (1992) EPA news-notes. Office of Water, Washington, D.C. EPA-841-N-92-009. November-December 1992.

T34. Trotter, D.M., A Baril, M.P. Wong, R.A. Kent (1990) Canadian water quality guidelines for atrazine. Environment Canada, Inland Waters Directorate, Water Quality Branch, Ottawa, Ontario. Scientific Series No. 168.

T35. USEPA. (1992) CFR 141 and 142. National Primary drinking water regulations; synthetic organic chemicals and inorganic chemicals; final rule. Federal Register, Vol. 57, No. 138. July 17, 1992. pp. 31776-31849.

T36. USEPA. (1988) (Draft) Ambient aquatic life water quality criteria for antimony (III). Office of Research and Development, Environmental Research Laboratories, Duluth, MN; Narragansett, RI. August 30, 1988.

T37. Caldwell, R.S., E.M. Caldarone, and M.H. Mallon (1977) Effects of a saltwater-soluble fraction of Cook Inlet crude oil and its major aromatic components on larval stages of the dungeness crab, Cancer magister Dana. pp. 210-220. In: D.A. Wolfe, ed. Fate and Effects of Petroleum Hydrocarbons in Marine Ecosystem and Organisms, Pergamon Press, NY. AQUIRE #5035.

T38. Dawson, G.W., A.L. Jennings, D. Drozdowski, and E. Rider (1975/77) The acute toxicity of 47 industrial chemicals to fresh and saltwater fishes. J. Hazardous Materials 1:303-318.

T39. Buccafusco, R.J., S.J. Ells, and G.A. Blanc (1981) Acute toxicity of priority pollutants to bluegill (Lepomis macrochirus). Bull. Environm. Contam. Toxicol. 26:446-452. AQUIRE Ref. #5590.

T40. Maschwitz, D.E. (1993) Guidelines for the development of water quality criteria for toxic substances. Minnesota Pollution Control Agency. January 1990, revised February 1993.

T41. USEPA. (1980) Ambient water quality criteria for thallium. Office of Water Regulations and Standards, Criteria and Standards Division, Washington, D.C. EPA 440/5-80-074. October 1980.

T42. LeBlanc, G.A. (1980) Acute toxicity of priority pollutants to water flea (Daphnia magna). Bull. Environm. Contam. Toxicol. 24:684-691. AQUIRE Ref. #5184.

T43. LeBlanc, G.A. and J.W. Dean (1984) Antimony and thallium toxicity to embryos and larvae of fathead minnows (Pimephales promelas). Bull. Environ. Contam. Toxicol. 32(5):565-569. AQUIRE Ref. #10427.

T44. Brown, B.T. and B.M. Rattigan (1979) Toxicity of soluble copper and other metal ions to Elodea canadensis. Environ. Pollut. 20:303-314.

T45. Zitko, V. and W.V. Carson (1975) Accumulation of thallium in claims and mussels. Bull. Environm. Contam. Toxicol. 14(5):530-533.

T46. Zitko, V., W.V. Carson, and W.G. Carson (1975) Thallium: occurrence in the environment and toxicity to fish. Bull. Environm. Contam. Toxicol. 13(1):23-30.

T47. Minnesota Department of Health (1991) Recommended allowable limits for drinking water contaminants. Section of Health Risk Assessment, Release No. 3. January 1991.

T48. Table 1. Proposed Water Quality Standards for Class 2 Waters.

T49. Stratton, G.W. (1984) Effects of the herbicide atrazine and its degradation products, alone and in combination, on phototrophic microorganisms. Arch. Environ. Contam. Toxicol. 13:35-42.

T50. USEPA. (1976) Iron, pp. 78-81. In: Quality criteria for water. U.S. Environmental Protection Agency, Washington, D.C. July 1976.

T51. Graphs showing background Iron and Manganese Concentrations in Major Watersheds in Minnesota.

T52. Thurston, R.V., R.C. Russo, C.M. Fetterolf, Jr., T.A. Edsall, and Y.M. Barber, Jr., eds. (1979) Iron, pp. 121-125. In: A review of the EPA red book: quality criteria for water. American Fisheries Society, Water Quality Section, Bethesda, Md. April 1979.

T53. U.S. Geological Survey (1970) pp. 114-126. In: Study and interpretation of the chemical characteristics of natural water. 2nd. edition. Geological Survey Water-Supply Paper 1473.

T54. Letter to the MPCA from Elizabeth Wattenburg of the Minnesota Department of Health along with a table updating the reference doses and cancer potency slopes for 27 current standards and the eight proposed standards. Dated September 17, 1992.

T55. Updated table showing the determination of Human health-based aquatic life criteria.

T56. MPCA (1993) Revisions to the summary sheets of toxicity and human health data for the nine proposed updated standards. January 1993.

T57. Niimi, A.J. and C.Y. Cho (1983) Laboratory and field analysis of pentachlorophenol (PCP) accumulation by salmonids. Water Res. 17(12):1791-1795.

T58. Human Health-Based Aquatic Life Criteria For The Proposed Standards.

T59. Toxicity-Based Aquatic Life Criteria For The Proposed Standards.

T60. Determination Of The Final Bioaccumulation Factors For The Proposed Standards.

T61. USEPA. (1992) Introduction to water quality-based toxics control for the NPDES program. Office of Water, Washington, D.C. EPA 831-S-92-002. March 1992.

T62. Draft Minnesota Rules chapter 4717, Health risk limits rule. Minnesota Department of Health. January 11, 1993.

T63. MPCA. (1989) Assessment of mercury contamination in selected Minnesota lakes and streams. Report to the legislative commission on Minnesota resources. Executive summary. Water Quality Division.

W = Exhibits concerning wetland issues

T64. U.S. EPA. (1992) Code of Federal Regulations, Title 40, part 141, subparts B and G, and part 143.

W1. Magner, J. and S. Alexander. 1991. The Minnesota River Basin: A hydrogeologic overview. MPCA Report.

W2. Leach, J. and J. Magner. 1992. Wetland drainage impacts within the Minnesota River Basin. Currents 2(2): 3-10.

W3. U.S. E.P.A. 1990. Water quality standards for wetlands: National guidance. EPA 440/S-90-011.

W4. MPCA Wetland Standards Advisory Group roster - 1991.

W5. Exhibit W5 does not exist.

W6. Wetland Water Quality Standards Coordination meeting roster - November 1991.

W7. May 1992 meeting handout package.

W8. Exhibit W8 does not exist.

W9. Exhibit W9 does not exist.

W10. Minnesota Rules Chapter 8420 - Rules related to the Wetland Conservation Act Chapter 354.

W11. The Statement of Need and Reasonableness for Chap. 354 - 1992.

W12. Izaak Walton League letter to MPCA dated September 29, 1992 re draft water quality standards.

W13. Minnesota Power letter to MPCA dated September 29, 1992 re draft water quality standards.

W14. National Audubon Society letter to MPCA dated September 30, 1992 re draft water quality standards.

W15. Project Environment Foundation letter to MPCA dated September 30, 1992 re draft water quality standards.

W16. U.S. Dept. of the Interior Fish & Wildlife Service letter to MPCA dated September 30, 1992 re draft water quality standards.

W17. U.S. EPA Region 5 letter to MPCA dated November 9, 1992 re draft water quality standards.

W18. MPCA response to U.S. EPA dated November 24, 1992.

W19. Johnston, C. 1989. Human impacts to Minnesota wetlands. J. Mn Acad. Sci. 55(1):120-124.

W20. Kadlec, J. 1986. Effects of flooding on dissolved and suspended nutrients in small diked marshes. Can. J. Fish Aq. Sci. 43:1999-2008.

W21. Winter, T. 1988. A conceptual framework for assessing cumulative impacts on the hydrology of nontidal wetlands. Environ. Manage. 12(5): 605-620.

W22. 1987 MPCA Statement of Need and Reasonableness for MN Rules Chap. 7050.

W23. MN DOT letter to MPCA dated September 29, 1992 re draft water quality standards.

W24. Peterson Environmental Consulting, Inc. letter to MPCA dated October 14, 1992 re draft water quality standards.

W25. MN Association of Wheat Growers letter to MPCA dated September 30, 1992 re draft water quality standards.

W26. State of Minnesota Executive Order 91-3 directing state departments and agencies to follow a "no-net loss" policy in regard to wetlands.

W27. Memorandum of Agreement between the EPA and the Dept. of the Army concerning the determination of mitigation under the Clean Water Act Sect 404(b)(1) guidelines, dated February 6, 1990.

W28. U.S. EPA April 1989 memorandum re EPA guidance on preparation of 401(b)(1) alternatives analysis pursuant to 40 CFR 230.10(a).

W29. Gregory, S., F. Swanson, W. McKee, and K. Cummins. 1991. An ecosystem perspective of riparian zones. BioScience 41(8): 540-551.

W30. van Vuuren, W. and P. Roy. 1990. Social and private returns from wetland preservation. AWRA(ITWRI) April: 553-563.

W31. Shaw, S. and C. Fredine. 1971. Wetlands of the United States. U.S. Dept. of the Interior, Fish and Wildlife Service Circular 39. 67 pp.

W32. Tiner, R., Jr. 1984. Wetlands of the United States: Current status and recent trends. U.S. Dept. of the Interior, Fish and Wildlife. 59 pp.

W33. Johnston, C., N. Detenbeck, and G. Niemi. 1990. The cumulative effect of wetlands on stream water quality and quantity. A landscape approach. Biogeochemistry 10: 105-141.

W34. Landers, J. and B. Knuth. 1991. Use of wetlands for water quality improvement under the USEPA Region V Clean Lakes Program. Environ. Manage. 15(2): 151-162.

W35. Hemond, H. and J. Benoit. 1988. Cumulative impacts on water quality functions of wetlands. Environ. Manage. 12(5): 639-653.

W36. Brinson, M. 1988. Strategies for assessing the cumulative effects of wetland alteration on water quality. Environ. Manage. 12(5): 655-662.

W37. Marble, A. and M. Gross. 1984. A method for assessing wetland characteristics and values. Landscape Planning 11:1-17.

W38. Whigham, D., C. Chitterling, and B. Palmer. 1988. Impacts of freshwater wetlands on water quality: A landscape perspective. Environ. Manage. 12(5): 663-671.

W39. MPCA memorandum re Wetland Sediment "Value". 1990.

W40. Bedford, B. and E. Preston. 1988. Developing the scientific basis for assessing cumulative effects of wetland loss and degradation on landscape functions: Status, Perspectives, and Prospects. Environ. Manage. 12(5): 751-771.

W41. Childers, D. and J. Gosselink. 1990. Assessment of cumulative impacts to water quality in a forested wetland landscape. J. Environ. Qual. 19: 455-464.

W42. Risser, P. 1988. General concepts for measuring cumulative impacts on wetland ecosystems. Environ. Manage. 12(5): 585-589.

W43. Preston, E. and B. Bedford. 1988. Evaluating cumulative effects on wetland functions: A conceptual overview and generic framework. Environ. Manage. 12(5): 565-583.

W44. Lee, L. and J. Gosselink. 1988. Cumulative impacts on wetlands: Linking scientific assessments and regulatory alternatives. Environ. Manage. 12(5): 591-602.

W45. Hirsch, A. 1988. Regulatory context for cumulative impact research. Environ. Manage. 12(5): 715-723.

W46. Excerpts from Clean Water Act Sect 404(f)(1)&(2) Exemptions 40 CFR 232.3 - Activities not requiring permits.

W47. Memorandum for the field - US EPA & US Dept. of the Army re Clean Water Act Sect 404 regulatory program and agricultural activities. 1990.

W48. NSP letter to MPCA dated September 30, 1992 re draft water quality standards.

W49. Restoration and creation information re wetlands.

W50. Griswold, T. 1990. Wetland protection under Section 404 of the Clean Water Act: An enforcement paradox. San Diego Law Review 27: 139-181.

W51. Minnesota Farm Bureau letter dated December 31, 1992 re draft water quality standards.

W52. Ransel, K. and E. Meyers. 1988. State water quality certification and wetland protection: A call to awaken the sleeping giant. Virginia J. Natur. Resour. Law 7:339-379.

W53. The Wetland Conservation Act of 1991, chapter 354.

W54. MN PCA Guidance matrix for wetland assessment.

W55. Wetland designated uses and significant physical impacts.

W56. Siegel, D. 1988. Evaluating cumulative effects of disturbance on the hydrologic function of bogs, fens, and mires. Environ. Mgmt. 12(5): 621-626.

W57. Wilcox, D. and J. Meeker. 1992. Implications for faunal habitat related to altered macrophyte structure in regulated lakes in northern Minnesota. Wetlands 12(3): 192-203.

W58. U.S. EPA Office of Water (A-104F). Wetlands and 401 Certification. April, 1989.

W59. MPCA Section 401 Water Quality Certification conditional waiver and denial examples.

C. ACRONYMS

The following acronyms appear within the text of the SONAR.

ACR	Acute to Chronic Ratio
Agency	Minnesota Pollution Control Agency
BAF	BioAccumulation Factor
BCF	BioConcentration Factor
BMP	Best Management Practice
BPT	Best Practicable Technology
(C)	the chemical is considered Carcinogenic
CC	Chronic Criterion
CFR	Code of Federal Regulations
CS	Chronic Standard
CWA	Clean Water Act (federal)
DMR	Discharge Monitoring Report
DO	Dissolved Oxygen
EC50	Effect Concentration
EPA	U.S. Environmental Protection Agency
exp ()	the base e antilogarithm of the expression in the parenthesis

FAV	Final Acute Value
GAC	Granulated Activated Carbon
GC/MS	Gas Chromatograph/Mass Spectrometer
GMAV	Genus Mean Acute Value
HEAST	Health Effects Assessment Summary Table
HRL	Health Risk Limit
IBI	Index of Biotic Integrity
IRIS	Integrated Risk Information System
LC50	Lethal Concentration
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDH	Minnesota Department of Health
MDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
MS	Maximum Standard
NOAEL	No Observed Adverse Effect Level
NPDES	National Pollutant Discharge Elimination System
NSP	Northern States Power
O&M	Operation and Maintenance
ORVW	Outstanding Resource Value Waters
PAH	Polynuclear Aromatic Hydrocarbon
q1*	potency slope
RAL	Recommended Allowable Limit
RfD	Reference Dose
RSC	Relative Source Contribution factor
(S)	secondary drinking water standard
SDS	State Disposal System
SNA	Scientific and Natural Area
SONAR	Statement Of Need And Reasonableness
TAC	Technical Advisory Committee
TCAAP	Twin City Army Ammunition Plant
TH	Total Hardness
TON	Threshold Odor Number
TSS	Total Suspended Solids
UAA	Use Attainability Analysis
USGS	U.S. Geological Survey
WCA	Wetland Conservation Act
WET	Whole Effluent Toxicity
WWTF	WasteWater Treatment Facility
7Q10	the lowest seven-day mean flow with a once in ten year recurrence interval

VIII. CONCLUSION

Based on the foregoing, the proposed revisions to Minn. Rules ch. 7050 are both needed and reasonable.

Dated: April 27 1993

Charles W. Williams
Commissioner

CITY OF ELGIN
120 2nd AVE SE
Elgin, MN 55932
P: 507-876-2291 F: 507-876-2451

September 12, 2013

Katrina Kessler, P.E.
Water Assessment and Environmental Information Section Manager
Environmental Analysis and Outcomes Division
MPCA
520 Lafayette Road
North St. Paul, Mn 55155

Dear Katrina,

The North Fork of the Whitewater River runs through the City of Elgin. Many years ago, it was classified as a Class 7 river because of the active sewer system running near it. In 1984, the City joined in a cooperative agreement with the City of Plainview creating the Plainview/Elgin Sanitary District. In July of 1988, Elgin went on line with the system with all sewage being pumped to the treatment plant in Plainview. Use of the Elgin plant was discontinued at that time and was ultimately demolished.

I have attached pages 17-18 of Elgin's Wellhead Protection Plan that gives case to having The river reclassified.

The North Fork of the Whitewater River is a valuable resource for our city and we would ask your consideration of reclassifying the North Fork of the Whitewater River making it the viable fishing stream.

Thank you.

Rich Hall
Mayor

Att.

nitrogen provide the greatest contributions to the groundwater and the well is partially related to proximity to the well and the amount of loading occurring. Also soil types and the underlying geology play a factor. MDH Nitrate Probability Map for Wabasha County http://www.health.state.mn.us/divs/eh/water/swp/nitrate/probmapping.html and the NRCS Sensitive Soils map of the DWSMA generated from the soils data can suggest areas that are more susceptible to nitrogen loading.

The water quality concerns for Well 4 and to a lesser extent Well 5 are caused by naturally occurring minerals in the aquifers, primarily iron. This water quality issue is the main reason why Well 4 is not a primary well. The only way to reduce the iron is through treating the water prior to distribution.

Well 2 that draws water from the Jordan has been highly productive. The Minnesota Department of Natural Resources State Water Use Data System (SWUDS) database indicates the permitted volume for the city of Elgin is 48.0 million gallons per year (MGY). SWUDS indicates that water use over the ten years period 2000-2010 ranged from 22.5 MGY to 28.4 MGY. Elgin has not seen a substantial increase in water use and is well within their permit limits. The city of Elgin is the only high capacity water user in the DWSMA and there has been no problems regarding obtaining enough water.

C. The Land and Groundwater Uses in the Drinking Water Supply Management Area

The primary land use in the DWSMA is row crop agriculture. There are several features of the landscape that could limit the further expansion of this use in the DWSMA. These features as indicated in the Land Capability Classifications include soils that occasionally flood and areas with significant slopes. There are also restrictions on further development in these same areas. The floodplain and shoreland ordinances dictate what can be developed in the floodplain and shoreland areas. In addition, the Wabasha County Shoreland Ordinance has a requirement to maintain perennial vegetation within 50 feet of public water. Both streams are public waters. The only major land use change anticipated in the next several years is the area south of Elgin that will be converted from row crops to an outdoor sports facility complex.

The Whitewater River watershed has been a focus of attention among state and local natural resources agencies because of the high natural resource and recreational value of the surface waters and land within the watershed. Working

with agricultural producers to increase the use of best management practices has been ongoing for several years through the Whitewater River Watershed Partnership, the NRCS PL 566 programs and other grant funded activities. This has and could in the future provide incentives for agricultural producers in the DWSMA to adopt nitrogen best management practices. However, the stretch of the North Fork of the Whitewater River through Elgin is classified by MPCA as limited resource value water which implies that this stretch of stream does not support aquatic life or recreation. This designation, it is believed came about as a result of a request to MPCA by the City of Elgin when the city was looking at a nearby wastewater discharge site. The change would have allowed for higher effluent discharge limits. Because the city now sends their wastewater to Plainview-Elgin Sanitary District facility in Plainview, the classification is no longer needed. Although the classification may not have any direct influence on the way lands are managed in the area, City staff indicates that the stream does support aquatic life including trout and is used by residents for fishing. With efforts of natural resource agencies working in the Whitewater River watershed, it would be symbolic to have the stream reclassified to show the area's importance for protection for surface water as well as wellhead protection.

The City of Elgin is the largest groundwater user in the DWSMA. Based on well logs it can be thought that the majority of private wells in the DWSMA are probably in the Jordan or Prairie du Chien aquifers. These private wells serve rural residential properties and in a few cases also are used for watering livestock. There are no other high capacity wells in the DWMSA and based on existing information it is doubtful there would be in the near future. It is also unlikely that water uses would change significantly.

7050.0405 PETITION BY OUTSIDE PARTY TO CONSIDER ATTAINABILITY OF USE.

Subpart 1. **Petition.** Any person may present evidence to the agency that a beneficial use assigned to a water body in this chapter does not exist or is not attainable and petition the agency to consider a reclassification of that water body under Minnesota Statutes, section 14.09. Outside parties must submit written evidence in support of the petition to the commissioner that includes:

A. the name and address of the petitioner;

B. the name, location, and description of the water body;

C. the specific designated use or uses that do not exist or are unattainable in the water body and the reasons they do not exist or are unattainable;

D. the reasons the current use classification is causing harm, unnecessary expense, or other hardship to the petitioner; and

E. any additional supporting evidence including, but not limited to, water quality, hydrological, and other relevant data; pictures; testimony of local residents; survey results; and resolutions or actions by local organizations or governmental entities.

Subp. 2. **Disposition of petition.** Upon receiving a petition, the commissioner has 60 days to reply in writing and indicate a plan for disposition of the petition. The commissioner may request additional information from the petitioner if the request is considered incomplete, in which case the commissioner has 60 days to reply after the additional information is received and the petition is complete. If the commissioner finds that the evidence submitted supports a review of the designated uses, a use attainability analysis must be commenced within six months of the commissioner's reply to the complete petition. The petition becomes part of the use attainability analysis. If the commissioner finds that the use attainability analysis supports a change in use classification, the commissioner shall propose the change through rulemaking.

Statutory Authority: *MS s 115.03; 115.44; L 2005 1Sp1 art 2 s 151*

History: *31 SR 1168*

Published Electronically: *April 1, 2008*

smith partners PLLP

Old Republic Title Building
400 South Second Avenue, Suite 1200
Minneapolis, MN 55401
(612) 344-1400 tel
(612) 344-1550 fax
www.smithpartners.com
www.waterlaws.com

MINNESOTA DRAINAGE LAW ANALYSIS AND EVALUATION

FINAL REPORT

Louis N. Smith
Charles B. Holtman

August 15, 2011

With technical assistance from:

Houston Engineering Inc.

I&S GROUP *One* firm - start to finish™

EOR water ecology community

Dr. Steve Taff
Department of Applied Economics
University of Minnesota

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND

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APPENDICES

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

I. INTRODUCTION AND OVERVIEW

The glacial landscape of Minnesota is the land of 10,000 lakes, a few more wetlands, and a good deal of high groundwater. The state's past and continuing prosperity would not be possible without the ability to make productive use of land by drainage. Roads, settlements, agriculture all have relied, and will continue to rely, extensively on the ability to manage surface and groundwaters through systems of ditch and tile.

But we also have come to appreciate more with time the benefits of protecting our wet environments, the places where ground and surface waters meet. Our recognition grows of the benefits of preserving these areas, both economic and non-economic -- the "ecological services" that these areas provide.

Certainly it is not unusual to encounter competing public values, nor is it unusual that these values may be challenging to reconcile, particularly through the imperfect instrument of the laws. It is good public policy to pause periodically and assess how we are doing.

The LCCMR commissioned this study to analyze Minnesota drainage laws and related economic and environmental considerations, and to explore alternative strategies that would best protect both the state's surface waters and the rights of property owners to make beneficial use of their land through drainage. Such a study requires strong engagement of stakeholders in order to develop creative, integrated solutions to natural resource protection and productive land use.

We established a study advisory committee composed of individuals from diverse backgrounds and expertise. (A list of the study advisory committee members appears at Appendix A.) Many committee members are also members of the Drainage Work Group that advises the Minnesota Board of Water and Soil Resources; we added other advisory committee members to provide for additional perspectives. We exceeded our study's commitments to advisory committee meetings and regional forums. We convened the study advisory committee nine times, from December 2009 through May 2011. We also presented this study to the Minnesota Association of Watershed Districts annual meeting in 2009 and 2010; three times to the Drainage Work Group; and to the Red River Watershed Management Board in June 2011.

This study presents an overview of the drainage code and related water resource laws; identifies critical issues where potential conflicts between the drainage code and other laws create barriers to successful resource protection; and identifies three prototypical demonstration scenarios to inform the study's analysis of these critical issues. This process -- building on a legal review, identification and analysis of critical issues, and exploration of demonstration scenarios – provided the foundation for us to pursue the policy recommendations through a number of review sessions with the study advisory committee and other forums.

Our recommendations may be summarized as follows:

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- Give drainage authorities more tools and resources for watershed-based planning.

- Give drainage authorities more tools and resources to implement projects with integrated drainage, flood control, conservation and water quality benefits.

- Better integrate effects on wetlands and water quality into drainage authority decisions about drainage system work.

- Provide drainage authorities with more clarity in legal authority to address drainage system alignment, grade, cross section, and hydraulic capacity of bridges and culverts for multipurpose design of drainage system establishment, improvement, or repair.

- Extend the authority to establish a locally based wetland regulatory framework under a CWPMP to public water wetlands.

- Create replacement alternatives within a CWPMP for a landowner causing wetland impact who may not have a high-valued replacement option on site.

- Coordinate USACE Section 404 jurisdiction with a watershed-based CWPMP or other implementing framework.

- Integrate MnDOT right-of-way, other state-managed lands and local road authority activities within a CWPMP framework.

- Foster reliability of CWPMP outcomes through coordination of local land use authority and wetland regulatory authority.

Our policy recommendations are presented in detail at Section V of this report, and include both pertinent findings and specific recommended actions. More detailed draft legislation to implement these recommendations is included at Appendix A.

We intend for these recommendations to provide tools for the legislature or local authorities to make policy choices in how best to integrate drainage and natural resource management. Accordingly, the recommendations are the product of robust discussion, but not complete consensus. The recommendations are the responsibility of the authors, and reflect a judgment that they have adequate support among diverse stakeholders to be worthy of consideration.

While the responsibility of making policy recommendations has been assumed by the authors, we must express our gratitude to the members of the study advisory committee, many of whom devoted countless hours to study and deliberation of these issues. We are also grateful for the technical assistance with the demonstration scenarios provided by three engineering firms, Houston

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Engineering, Inc., I & S Group, and EOR, as well as the economic analysis provided by Dr. Steve Taff. The quality of the work presented here is certainly stronger as a result of their participation.

We hope this study provides useful information to the Legislature, and we look forward to continued discussion of the recommendations.

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II. LEGAL REVIEW

The Minnesota Drainage Code must be understood in the context of many water – related statutes. This section of the report surveys the drainage code and related state and federal wetland conservation laws. The section concludes with an assessment of this legal framework and suggests several ways in which its approach to reconciling public interests in drainage and conservation may not be optimal

A. Authority to Establish and Maintain Public Drainage Systems

The drainage law is a means by which a number of adjoining landowners, with relative efficiency, can construct, maintain and equitably share costs for a drainage and conveyance system across multiple parcels of land. The legal framework to accomplish this within the State of Minnesota has not changed very much since 1883, when county commissioners first were authorized to accept petitions and establish public drainage systems. Laws 1883, c. 108. Under this framework, system alignment and dimensions are determined, landowner benefits and damages are estimated by disinterested "viewers," and the county commissioners – and now in many cases watershed district boards of managers – judge whether net benefit will result from the proposed work. If so, assessments are certified to the county auditor and work proceeds. The drainage law prescribes procedures for constructing and expanding drainage systems, performing work on system outlets, and system maintenance.

The relationship of drainage system management and conservation reflects an evolution, over 100 years, of legislative thinking about the public interest in the state's surface waters. This history reflects an evolving legislative judgment about where the boundary lies as between the private "right" to drainage and the public "right" to the natural condition of surface waters, and therefore about how the costs of conservation should be allocated as between landowners and the general public. In recent decades federal law has created a second regulatory overlay. As we will see, the legal framework tends to presume that where drainage and conservation goals intersect, one or both must be compromised, and the framework tends to undermine opportunities to achieve both goals.

B. Evolution of Public Interest in Waters

Already in 1867, it was a misdemeanor to drain a meandered lake, with a fine of as much as five thousand dollars. Laws 1867, c. 40. In 1883, county commissioners were authorized to allow the draining of "shallow, grassy, meandered lakes under four feet in depth" with the concurrence of all riparian landowners. Laws 1883, c. 139. Forty-two years later, the legislature restricted this authority by prohibiting the drainage of any meandered lake without state approval. Laws 1925, c. 415, §2. The state department of conservation was created in 1931, Laws 1931, c. 186, and in 1933 the state's authority to consent to drainage was given to the conservation commissioner. Laws 1933, c.312, §1.

Separately, the legislature's view of those waters meriting protection on behalf of the citizens of Minnesota – designated as "public waters" – was evolving and expanding. As early as 1897, the

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legislature designated as public waters meandered lakes larger than 160 acres and deep enough to support beneficial uses "such as fishing, fowling and boating." Laws 1897, c. 257. In 1937, the "public waters" designation was extended to all streams and lakes, meandered or not, that were "navigable in fact." Laws 1937, c. 468. Then in 1946, this protection was extended to all streams, lakes and other waterbodies "navigable in fact" that provided "substantial beneficial use." 1947 Laws, c. 142. This is the first instance in which the legislature included certain wetlands within the definition of public waters.

In 1955, the legislature enacted the Watershed Act, providing for the creation of watershed districts. Laws 1955, c. 799. Raymond Haik, one of the key drafters of the act, has explained that one of its important goals was to provide for a special purpose local unit of government that could protect wetlands and other water resources in parallel with local drainage authorities (R. Haik, September 30, 2009). While the legislature provided for the establishment of watershed districts for conservation purposes and to protect and improve water quality, it also authorized watershed districts to "improve stream channels for drainage," and "reclaim or fill wet and overflowed land." Minn. Stat. §103D.201, subd. 1, 2(2) and (3).

The new law gave watershed districts the authority "[t]o take over when directed by the district court or county board all judicial and county drainage systems within the district, together with the right to repair, maintain and improve the same." Laws 1955, c. 799, §10(11). But the role of drainage authority was confused by further language providing for watershed districts to construct, improve and repair systems essentially at the direction of the county board or district court, with the latter continuing to exercise the decisionmaking role. Id., §32. Four years later, the legislature clarified that on transfer of authority from the county board or district court, a watershed district would assume all drainage authority powers. Laws 1959, c. 240, §1.

In 1957, the legislature defined the state interest in public waters:

> Subject to existing rights all waters in streams and lakes within the state which are capable of substantial beneficial public use are public waters subject to the control of the state. The public character of water shall not be determined exclusively by the proprietorship of the underlying, overlying , or surrounding land or on whether it is a body or stream of water which was navigable in fact or susceptible of being used as a highway for commerce at the time this state was admitted to the union.

Laws 1957, c. 502. This statement of policy announced that the state's interest in its surface waters did not derive solely from its ownership interest in adjacent land or the bed of the waterbody, nor did it depend on the specific public use of the waterbody for navigation. It endorsed an interest as broad as the "beneficial uses" to which the surface water might be put. At the same time, the status of wetlands was somewhat confused by their omission from the scope of the declaration.

Over this same period consideration of conservation values in drainage proceedings gradually was expanding. The 1937 law expanding "public waters" to all streams and lakes navigable-in-fact also prohibited any change to the "course, current, or cross-section" of any such water without the conservation commissioner's approval. Laws 1937, c. 468, §5.

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Wetlands not considered "lakes" first received protection in drainage proceedings in 1955, when the legislature mandated that conservation values be weighed by drainage authorities in deciding whether to establish, improve or repair drainage systems. The drainage code was amended to require the drainage authority to duly consider "conservation of soil, water, forests, wild animals, and related natural resources, and … other public interests affected" in deciding whether to authorize work on a drainage system. Laws 1955, c. 681, §1. This language remains in the drainage code today. Minn. Stat. §103E.015, subd. 2. It has been supplemented by a further directive to consider conservation interests before construction of any new drainage system, system lateral or improvement, or outlet. Minn. Stat. §103E.015, subd. 1. However, its impact is limited. While a drainage authority might be encouraged to consider these conservation values, the Minnesota Supreme Court has confirmed that judicial enforcement of this exhortation is limited. Titrud v. Achterkirch, 298 Minn. 68, 213 N.W.2d 408 (1973).

In the 1970's there was much legislative interest to advance the cause of the environment. The Minnesota Environmental Rights Act (MERA) was enacted, empowering citizens to challenge any action threatening "pollution, impairment or destruction" of natural resources. Laws 1971, c. 952. Two years later, the Minnesota Environmental Policy Act (MEPA), mirroring the 1969 National Environmental Policy Act, established requirements for environmental review of significant undertakings. Laws 1973, c. 412. Both of these laws remain. In their broad compass, they apply to drainage system work.

More specifically, the decade of the 1970's was a time of intense, and at times complicated, activity by the state legislature and the Department of Natural Resources to refine the category of "public waters" and decide how the interest in protecting these waters should be reflected in drainage proceedings.

In 1973, the legislature returned to the 1957 declaration finding all streams and lakes serving beneficial public uses to be public waters, and expanded it to encompass all "waters of the state," itself broadly defined to include wetlands. (This adjustment established consistency with the 1946 legislation, chapter 146, cited above.) Laws 1973, c. 315, §§2-4. This legislation, importantly, also codified for the first time a long definition of "beneficial public purposes," which included flood management, conservation purposes such as water quality and wildlife habitat protection, and recreational uses such as hunting, fishing and boating. Laws 1973, c. 315, §§2-4.

Three years later, the legislature directed the Department of Natural Resources to inventory and designate as public waters waterbodies serving a "material beneficial public purpose." Laws 1976, c. 83, §7. The administrative challenge of assessing the "beneficial purpose" of each individual waterbody across the state for the purpose of public waters designation, the consequences of that designation, and the resulting discontent of landowners and county boards led the legislature in 1979 to replace the "beneficial purpose" criterion with a set of more objective definitions. Specifically, wetlands to be designated as public waters would now be defined as "types 3, 4 and 5 wetlands, as defined in U.S. Fish and Wildlife Service Circular No. 39 (1971 edition) … which are ten or more acres in size in unincorporated areas or 2-1/2 or more acres in incorporated areas." Laws 1979, c. 199, §3. This remains the definition of public waters wetlands. Minn. Stat. §103G.005, subd. 15a.

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The 1979 law also specifically exempted from the DNR permit requirement drainage system work in watercourses when accomplished in accordance with the drainage code. Laws 1979, c. 199, §15. The effect of this exemption was substantially dampened in 1985, when the drainage code was amended to require DNR approval for any action that would drain a public water. Laws 1985, c. 172, §2. While a formal permit is not required, there is little practical difference between DNR "approval" and a DNR "permit."

In 1991, the legislature decided that the beneficial public uses of wetlands were not restricted to the category of wetlands defined as "public waters wetlands" in the 1979 legislation, and adopted the Minnesota Wetland Conservation Act (WCA). The WCA regulates draining and fill impacts to all wetlands, which are defined as lands possessing, under normal circumstances, the three attributes of hydrology, hydric soils and hydric vegetation. Laws 1991, c. 354, art. 6, §6. The legal framework is similar to that for reviewing proposed impacts to public waters: permission to drain or fill must be obtained from the implementing agency based on a "sequencing analysis" showing that the wetland impact cannot be avoided and has been minimized. If, as a result of this analysis, wetland impact is allowed, lost acreage and wetland functions must be replaced elsewhere. However, the implementing agency is not the DNR, but the local city, town, county or watershed district, and the details of the review process diverge. The WCA includes specific exemptions for work on existing drainage systems, including: (a) maintenance that does not drain wetlands in existence for more than 25 years; (b) work subject to Section 404 of the Clean Water Act but exempted by the U.S. Army Corps of Engineers (USACE) from the permit requirement; and (c) certain work authorized under a Section 404 general permit.

C. **Federal Regulation of Fill in Wetlands**

Parallel federal regulation came into being in 1972. Section 404 of the National Water Pollution Control Act (NWPCA) prohibited placing fill or dredged materials in "waters of the United States" without a permit from the USACE. As defined in the NWPCA and the implementing rules of the USACE and U.S. Environmental Protection Agency, these waters include natural and artificial tributaries of navigable waters, and thus encompass many public ditch systems in artificial or altered natural channels. Similar to state law, Section 404 requires that the placing of fill or dredged material be justified and that the area and impact on waterbody functions be replaced elsewhere.

Although Section 404 applies only to filling activity and not to the removal of sediments or obstructions from ditches, such activities often involve the incidental movement or redeposit of sediments within the channel or spoils placement within jurisdictional areas adjacent to the channel. The 1977 amendments to the NWPCA, also known as the Clean Water Act (CWA), added Section 404 exceptions for incidental fill from drainage ditch maintenance activity. In addition, the CWA authorized the USACE to allow smaller-scale impacts through the expedited mechanism of a "general permit."

Relying on this authority, USACE general permit RGP-03-MN applies to actions such as structure maintenance, stream and wetland restoration, and minor discharges of fill or dredged material. Impacts must be avoided where possible and, except for minor discharges, impact area and functions must be replaced. In addition, present general permit GP-001-MN authorizes all work subject to and authorized by the DNR. Under GP-001-MN, standard conditions require that the

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work be performed with care, but the impact need not be justified and there is no replacement requirement beyond that imposed by the DNR.

D. **Allocating Costs to Conserve Wetlands**

When the legislature directed that public waters be inventoried and designated, it declared that the public should bear the cost of protecting these waters. That is, it obligated the DNR, on receipt of a request to drain a waterbody, to offer to purchase drainage rights (permanently or for a term of years) from the landowner. However, if the offer were made and the landowner declined, the waterbody could be drained only pursuant to DNR approval and only if the public water were "replaced by a waterbasin which will have equal or greater public value." Laws 1976, c. 83, §8.

Legislation in 1979 also directed that if maintenance of an established public drainage system would drain a wetland owned by the state, the public should bear the cost to protect the wetland without interfering with the proper function of the drainage system. Laws 1979, c. 199, §11. See also Laws 1985, c. 172, §52 (the state shall manage certain publicly owned wetlands to avoid interference with drainage proceedings for outlets).

In 1987, the legislature repealed the requirement that the DNR offer to compensate a landowner in exchange for the yielding of the public water wetland drainage right. Laws 1987, c. 357, §20. Since that time, a landowner has had no legal right to drain a public water wetland except pursuant to DNR approval and with replacement.

In that year the legislature also took a small step to adjust how drainage system maintenance costs are allocated. The drainage code was amended to provide that drainage benefit determinations should discount for the likelihood that lands within the benefited area could not be drained due to state and federal regulatory constraints. Laws 1987, c. 239, §74.

Finally, WCA as enacted in 1991 authorized landowner compensation from the Board of Water and Soil Resources if WCA conditions made the proposed action "unworkable or not feasible." Compensation was established by statute as "50 percent of the average equalized estimated market value of agricultural property in the township as established by the commissioner of revenue at the time application for compensation is made." Laws 1991, c. 354, art. 6, §17. A 1994 amendment established alternative compensation at 50 percent of "the assessed value per acre of the parcel containing the wetland, based on the assessed value of the parcel as stated on the most recent tax statement." However, in exchange for compensation, the landowner was required to convey to the BWSR a permanent conservation easement on the land. Laws 1994, c. 627, §10. The compensation formula was further adjusted two years later. Compensation claims under this statute have been very few.

Alongside the traditional regulatory approach, the Minnesota legislature long has offered mechanisms for landowners to voluntarily preserve wetlands for conservation purposes in exchange for some form of compensation: by authorizing public acquisition of land or easements, offering term agreements or granting tax benefits for preserved lands.

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As early as 1925, legislation authorized the game and fish commissioner to acquire land for hunting grounds and game refuges. 1925 Laws, c. 419. In 1951, federal funds were made available to acquire wetlands for state wildlife management areas. In 1953, a tax reduction was extended to those who preserved marshland as wildlife habitat area. 1953 Laws, c. 688. Similar laws followed concerning public acquisition of wildlife areas, 1957 Laws, c. 644, and scientific and natural areas, Laws 1969, c. 470.

In 1976, the legislature, piggybacking on an earlier-enacted federal law, enacted a "water bank" program under which landowners would protect wetlands under 10-year contracts with the state. Laws 1976, c. 83. The year 1979 saw the legislature establishing tax credits for wetlands. Other state and federal programs, enacted since that time and still operating, offer landowner payments in exchange for term agreements to maintain wetlands. The 1991 legislation enacting WCA also established programs to create wetland preserves and wetland preservation areas with willing landowners and authorized programs to work with such landowners on wetland establishment and restoration.

E. **Summary of Legal Framework and Potential Shortcomings**

With this long and complex legislative history, it may be helpful to attempt a succinct summary of the current basic legal framework to reconcile public drainage and wetland conservation. Drainage systems may be constructed, expanded and maintained via procedures that have been generally in place for a century. The drainage authority may approve a new system, new lateral, improvement or system outlet if it finds that the benefits to affected lands exceed the costs and that public interests will not be disserved. It may repair and maintain these systems largely as it judges to be in the interest of landowners benefited by the system, again subject to consideration of public interests.

If this drainage activity would involve wetland fill, drain a wetland or otherwise alter its hydrology, it is first subject to a sequencing analysis. Here, it must be shown that wetland impact cannot be avoided, and that the impact is minimized. Any impact that cannot be avoided must be reduced or eliminated over time or, ultimately, replaced withwetland acreage and biological function elsewhere. By statute, replacement must achieve "no net loss" in wetland public value, as that term is defined at Minnesota Statutes §103B.3355. Where an impact may be substantial or affected wetlands have particularly high value, the drainage authority or the wetland regulatory body may forbid the activity.

- If the affected wetland is a "public waters wetland" as defined at Minnesota Statutes §103G.005 (Type 3, 4 or 5 wetland of at least 10 acres within an unincorporated area or 2.5 acres within an incorporated area), the DNR will review wetland impacts.

- If the wetland does not meet this definition, wetland impacts will be reviewed by the local land use authority or watershed district.

- Separately, if the wetland is within a navigable water, or pursuant to federal law has a sufficient hydrologic connection to such a water, and if fill or dredged material will be placed within it, the USACE will review as well.

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Some drainage system activities, primarily maintenance of existing systems that continue to provide a reasonable level of beneficial drainage, enjoy exemptions from wetland conservation requirements.

All drainage activities also are subject to general environmental standards. These include Minnesota Statutes §103E.015, which directs the drainage authority to consider environmental and other public interests in deciding to proceed with drainage system work; 33 CFR 320.4, authorizing the USACE to engage in a broad "public interest review" during Section 404 permitting; the Minnesota Environmental Rights Act (MERA), under which a public or private plaintiff can challenge a proposed activity as an environmental impairment; and the Minnesota and National Environmental Protection Acts (MEPA, NEPA), which can impose extensive environmental analysis requirements before work may occur.

While this regulatory framework may be procedurally clear, the rules reconciling public drainage and wetland conservation are less well-developed on the allocation of benefits and costs resulting from regulatory decisions. Generally, those who will benefit from the construction or improvement of a drainage system must bear the cost to maintain or replace wetland values under applicable regulations. Conversely, except where a system has fallen extensively out of repair, impacts to wetlands from system maintenance are excused and measures to protect wetlands from those impacts generally fall to the general public. Similarly, landowners that choose to forego otherwise operable drainage of their lands may obtain compensation for doing so from a number of state and federal programs by means of term contracts or permanent easements.

The survey of legal history suggests several ways in which the legal framework to reconcile public interests in drainage and conservation may not be optimal.

First, we are still working largely with a framework enacted in 1883. At that time, the circumstances for which drainage systems needed to account were relatively simple. It could be assumed that stakeholders, fairly uniformly, would consider drainage to be beneficial. Accordingly, feasibility and cost were pretty much the only relevant questions. In addition, drainage and conveyance needs were defined almost exclusively by agricultural land use, and not by urban stormwater management needs or conservation management regimes. Finally, broader social interests, such as those in water quality and wildlife habitat, were not prominent. The evolution of our land uses, the continued drainage needs and advancement of drainage practices, and current legislative judgments on natural resources conservation all are factors that might recommend adjusting the legal framework.

Second, the present laws governing public drainage and wetland/water quality protection are the result of legislative actions accumulated over the course of more than a century. As a result, the legal framework is not perfectly joined, addresses some aspects in piecemeal fashion, and contains unresolved ambiguities.

Finally, the laws reflect basically two means to mediate drainage and wetland conservation interests. Either (a) the drainage authority establishes an uneasy compromise, in which neither interest is fully realized; or (b) the public at large pays to reserve, for conservation, lands that otherwise could benefit both private and public interests through productive use. It is in the interest of all concerned to identify alternative outcomes.

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Beyond merely updating the legal framework to address gaps and ambiguities, it will be even more valuable to discover potential legislative changes to allow both drainage and conservation goals to be better realized. It is important also to recognize that these drainage/conservation judgments now apply to settings that may range from agricultural, to suburban residential, to a mix of land uses served by a single public system.

Increasingly, conditions exist that allow for "win-win" solutions:

- A more comprehensive understanding continues to develop concerning the effects of non-point pollution and hydraulic forces on water quality.
- There is an ever-improving capacity to model and refine hydrologic systems and to evaluate flooding, hydraulic and water quality impacts of those systems.
- Settlement patterns and social values continue to evolve, calling on hydrologic systems to serve multiple land uses and beneficial uses encompassing the functional and the ecological.
- Innovation increases the choices for on- and off-line techniques to incorporate water quality practices into conveyance systems.
- A diversity of drainage authority funding mechanisms allows the costs of hydrologic/conveyance systems to be accurately matched to the varied benefits these systems provide.

Three prior acts of the Legislature foreshadow this direction toward more successful and comprehensive realization of drainage and conservation goals:

In 1991, Minnesota Statutes §103E.701 was amended to state: "Repair of a drainage system may include the preservation, restoration, or enhancement of wetlands; wetland replacement under section 103G.222; and the realignment of a drainage system to prevent drainage of a wetland." Laws 1991, c. 354, art. 10, §2.

Several years thereafter, §103E.011, subdivision 5, was added to affirm that drainage authorities could apply funding mechanisms within their authority other than benefits-based assessments to fund that portion of drainage system work consisting of wetland preservation or restoration, creation of water quality improvements or flood control. Laws 2000, c. 488, art. 3, §27.

And, in 1996, section 103G.2243 was added to the WCA authorizing implementing agencies to create comprehensive wetland protection and management plans (CWPMPs). Laws 1996, c. 463, §33. CWPMPs rest on an assessment of local hydrology and ecology, allow wetland management to be tailored to local conditions, and enable the benefits and impacts of regulatory decisions to be considered on a subwatershed rather than site basis.

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These legislative measures reflect a new approach in which hydrologic system design, sensitive to the watershed setting, can integrate drainage and conservation goals to provide effective drainage for productive use of land while preserving higher-valued ecological resources.

In order to pursue this new approach in greater detail, we turn next to a more detailed identification and analysis of critical legal or policy issues where drainage and resource protection goals conflict.

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III. CRITICAL ISSUES

The authors worked with the study advisory committee and gained input from the Drainage Work Group, the Minnesota Association of Watershed Districts, and the Water Policy Team for the Water Resources Sustainability Framework to identify key issues for this study. From this process, the following five issues emerged as the most critical:

A. Conservation Drainage

"Conservation drainage" is a term of recent coinage that may have different meanings to different people. Here, we use it to refer broadly to structures and techniques incorporated within the drain water collection and conveyance system specifically to manage flows and reduce transport of sediment and pollutants. Conservation drainage includes features such as buffer strips, culvert sizing for temporary in-system storage, side inlet sediment filtration and flow controls, contour tiling and two-stage ditch profile design. Conservation drainage also includes methods to isolate wetlands from drained lands, such as ditch realignment and wetland outlet controls.

These methods reflect how drainage system design and retrofit increasingly integrates ecological concerns. As these methods are shown to be reliable and cost-effective, they bridge the gap between the traditional poles of drainage and wetland preservation. This integration, of course, was foreign when the drainage code was enacted. Therefore, there are questions about the circumstances under which a drainage authority may mandate the incorporation of conservation drainage features into drainage systems. There are also questions about whether the tools exist to incorporate these features and allocate the cost of their installation and maintenance appropriately. Who should pay for their installation and maintenance? Are they a cost of the drainage system, to be included in calculating whether a drainage project should proceed and to be paid by assessing benefited lands? Or do they operate to protect resources benefitting the public, so that they are appropriately funded on a regional, watershed or statewide basis?

With the use of conservation drainage methods, efficiency losses in drainage systems are accepted in order to gain meaningful public conservation and water quality benefits. However, drainage code standards typically reflect a world of absolutes. For example, a drainage authority may approve the impoundment of water within a public system only if it finds that the impoundment "will not impair the utility of the ditch or deprive affected land owners of its benefit." Minn. Stat. §103E.227, subd. 3.

Drainage practitioners traditionally have worked within a grey area in applying this standard. Proposed actions may affect channel elevations under certain precipitation events but not others, or may affect the frequency or duration of elevated water in limited ways. Realigning a ditch may affect drainage, but only very near the realigned section. Conservation drainage, however, is different in that it reflects an actual intent to adjust drainage system hydrology. Accordingly, if these methods are to be explicitly incorporated into the drainage code, the existing standards need to be carefully examined and adjusted, as necessary, to articulate the extent of impact they may have on drainage system function.

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When public drainage systems are constructed and operated so that water resources simultaneously are conserved, sound legislation will afford ditch authorities judgment as to how costs are distributed among lands benefited by a drainage system and the broader publics benefited by conservation. Ditch authorities must have the authority to allocate costs fairly; they also must have the statutory ability to do so.

A fairly recent amendment to Minnesota Statutes §103E.011 authorizes a drainage authority to

> accept and use funds from sources other than, or in addition to, those derived from assessments based on the benefits of the drainage system for the purposes of wetland preservation or restoration or creation of water quality improvements or flood control.

This language, however, refers essentially to grant funds. In itself, it does not create a mechanism for a drainage authority to raise funds by means other than assessing benefited lands. It is important that drainage authorities, whether counties, joint county boards or watershed districts, can raise revenues in a way that allows costs to be allocated consistent with legislatively enunciated policies.

Finally, conservation drainage practices may trigger requirements that may not be appropriate and that could create obstacles to their use. For example, a two-stage channel likely would require that channel banks be regraded, which in turn would require that benefits of the ditch system be redetermined on a parcel basis. Minn. Stat. §103E.715, subd. 6. It is important that additional right-of-way to implement conservation design practices can be acquired efficiently and fairly. However, redetermination of benefits is an administratively burdensome process that would preclude the innovation in most cases. At the federal level, moving soils or incorporating structural features within a conveyance may constitute "filling" requiring permit review under Section 404. It is important that state laws and rules be reviewed for unintended impediments to incorporating beneficial practices. The USACE should be engaged to do the same with respect to its Section 404 program.

B. Subwatershed-Based Planning/Permitting

The subwatershed-based approach uses science and planning to minimize conflicts between water resource conservation and productive use of land. The resource management authority must understand hydrologic and ecologic function within the drainage area. It must identify the areas of substantial ecologic value and the drivers of ecologic health within the subwatershed. And it must understand present and future land uses within the area and the infrastructure needs those uses will prompt.

The goal is both productive use and preservation of hydrologic/ecologic function within the planning area. Implementation occurs through permitting rules (and, ideally, consistent local land use ordinances) that allow for productive land use in locations suited to it and, by mandate or incentive, preserve valued water resources and their function. The subwatershed-based approach also offers more predictability as to permitting outcomes.

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This approach is contrasted with the traditional regulatory framework that looks only at the single parcel proposed for use or development. This narrow focus normally ensures that a conflict between drainage and wetland conservation cannot be resolved. At the same time, it offers no guarantee that the level of protection afforded the resource will correspond with its function within, and value to, the hydrologic and ecologic systems of which it is a part.

Both state and federal wetland laws provide a framework for the subwatershed-based approach.

- The WCA gives BWSR the authority to approve comprehensive wetland protection and management plans (CWPMPs) that establish alternative wetland impact standards set on an area-wide basis. Minn. Stat. §103G.2243; see Minn. Rules 8420.0830.

- Under Section 404 and published USACE regulatory guidance, the USACE may approve Special Area Management Plans that authorize wetland impacts on the basis of a plan and related assurances providing for wetland functions to be replaced and preserved on an area basis.

These tools were not created specifically for areas served by public drainage systems. But they can be used in this context to establish a predictable regime in which a drainage system and the productive land uses that it serves can be maintained.

To facilitate the use of subwatershed-based approaches, we would address specific features of existing authorities that can make the process to obtain approval of subwatershed-based regulatory programs prohibitively time- and resource-consuming, or that stand as obstacles to gaining the most value from these approaches. This effort primarily would concern wetland statutes and regulations, the drainage code less so. As a specific example, the CWPMP statute now applies only to regulating impacts to WCA wetlands and not public waters wetlands. It may be possible to extend this approach to include public waters wetland impacts without legislative action. As another example, a CWPMP framework may be upset by a change in the designation of WCA implementing agency for the area in question.

More substantial obstacles exist at the federal level. One obstacle, for example, is the USACE's limited willingness to forego the required "alternatives analysis" required for project-specific applications. If the alternatives analysis, and the risk of a USACE finding that it does not justify the proposed action, still await each landowner after a SAMP is in place, then the SAMP does not carry nearly as much regulatory certainty as it might. In addition, the cost of performing this analysis reduces the value of a SAMP approach. This and similar issues rest on the fact that while the USACE has established the SAMP vehicle and continues to advance the watershed-based approach in policy documents, permit review still remains almost entirely ensconced within a regulatory framework with a traditional, parcel-specific focus. There is room within federal law to make progress on these matters, but ultimately there are likely to be limits on the extent to which these approaches can be facilitated without changes to that law or to USACE policies adopted at a national level.

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C. Updating Definitions and Use of Terms "Benefits" and "Damages" in the Drainage Code

Key to operation of the drainage code are the benefits and damages that will accrue to specific parcels from drainage system work. The determination of drainage benefits and damages plays three roles in the drainage code:

- First, it is used to judge whether a proposed action will be of overall net benefit, a finding that is a prerequisite to approval by the drainage authority.

- Second, the original determination of net benefit from drainage system construction is a ceiling onsubsequent assessments and expenditures for work on the system.

- Third, it determines how assessments will be apportioned among properties benefited by the drainage system.

The two terms are not found in the general definitions section of the drainage code, Minnesota Statutes §103E.005. Rather they are defined by treatment within the body of the code itself. E.g., Minn. Stat. §103E.315 (describing on what viewers may base benefits determinations and how damages may be calculated). Accordingly, definitions are not comprehensive and are augmented by (uncodified) practices of viewers and court decisions. Practitioners are aware of artifacts within the code that stand in the way of rational drainage system management. For example, a drainage authority may not authorize repair work requested by petition if the cost of that work will exceed the benefits "determined in the original drainage system proceeding." Minn. Stat. §103E.715, subd. 4. A spending limit based on benefits determined a century ago and not adjusted for inflation may not allow for necessary and reasonable work. In summary, revisiting and adjusting the definitions and uses of "benefits" and "damages" under the code likely would have general benefit.

More specifically with respect to wetland conservation, the benefits and damages that drainage authorities must weigh to decide whether drainage system work should be authorized are articulated in the code almost exclusively (apart from state-owned lands, see Minn. Stat. §103E.025) as private benefits and damages accruing to landowners within the drainage area. Benefits and damages to public resources are absent from consideration. See, e.g., Minn. Stat. §103E.315, subds. 5, 6, 8. Indeed, where the code does define public benefit, it does so in a way that may strike the present-day reader as incomplete:

> "Public benefit" includes an act or thing that tends to improve or benefit the general public, either as a whole or as to any particular community or part, including works contemplated by this chapter, that drain or protect roads from overflow, protect property from overflow, or reclaim and render property suitable for cultivation that is normally wet and needing drainage or subject to overflow.

Minn. Stat. §103E.005, subd. 27.

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Drainage authorities are mandated by Minnesota Statutes §103E.015 to consider conservation and other public values as well. However, the statute does not require the effect on these values to be quantified; the amount of "consideration" to be given is left to drainage authority discretion and generally is, at most, supplemental to the "hard numbers" of private benefits and damages.

With drainage and wetland laws both in play, the legislature is delegating to drainage authorities the responsibility to manage public drainage systems to achieve outcomes that best reconcile the public interests in drainage and wetland conservation. The decision making standards prescribed by the legislature therefore should provide for these interests to be fully considered together. Further, drainage management is evolving – or mandated - toward incorporating conservation drainage and other mitigating practices in drainage work. Accordingly, the decision making framework must allow drainage authorities to adjudge when these practices are required, and to what extent, and how their incorporation will affect project benefits, costs and parcel-based assessments.

Integrating water resource benefits and damages into drainage authority decision making is of course easier said than done. Wetlands, in particular, provide numerous functions with public (and private) value, including floodwater retention, water quality treatment, flow dissipation, wildlife habitat, groundwater recharge and economic uses. Upstream drainage systems can disrupt wetland ecology through sediment and pollutant delivery, channel erosion and hydrologic disruption caused by changes from the natural hydrograph. However, how proposed work will affect these phenomena may be very difficult or costly to assess technically and nearly impossible to quantify precisely in terms of monetized public benefit or damage. Nevertheless, an updated approach to defining "benefits" and "'damages"' in the drainage code can help greatly to integrate drainage and conservation goals.

D. Anticipating the Evolution of the Total Maximum Daily Load (TMDL) Program

Typically, work in public drainage systems is not subject to regulatory oversight for water quality and, therefore, does not incorporate measures specifically to limit water quality impacts. Over time, the Total Maximum Daily Load (TMDL) program is likely to change this situation.

The TMDL program, under the federal Clean Water Act, requires the MPCA to identify waters in the state that are not meeting water quality standards, identify pollutant sources contributing to this condition, and determine pollutant load reductions needed to bring the waterbody into compliance with the standards. Then, for each TMDL, the MPCA requires an implementation plan identifying specific actions to be taken to achieve the needed load reductions. For impaired watercourses or receiving waters that are within or downstream of a public drainage system, the drainage system likely is contributing to the pollutant load.

Presently, this process does not tend to result in legally binding obligations on pollutant sources for two reasons. First, implementation plans tend to be general. They identify categories of activity contributing pollutants to the impaired waterbody and categories of actions that can help to reduce pollutant load. Typically, they don't identify specific sources or assign specific pollutant reductions to those sources.

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Second, means to reduce pollutant load identified in implementation plans are not legally binding until they are incorporated into another, legally binding vehicle. Under its stormwater permitting program, the MPCA requires that measures identified in a TMDL implementation plan as applicable to a person or entity subject to a stormwater permit be incorporated into the permit. Drainage authorities that qualify as municipal separate storm sewer systems (MS4s) - those that own or manage stormwater conveyances within certain urban and urbanizing areas named by the MPCA - operate under general stormwater permits and therefore must incorporate load reduction measures as legally binding permit terms. However, for drainage authorities that are not MS4s (most outstate authorities), there is no such vehicle at present.

As TMDL implementation matures, it is likely that implementation plans will become more specific, and that the MPCA will create other vehicles for identified reductions to be imposed in a legally binding way on sources. If this occurs, then the regulatory regime in which drainage authorities operate will become somewhat more complicated and the additional regulatory burdens may need to be addressed within the drainage code.

A drainage authority operates a public drainage system. With respect to activities on the land that drains to the system, the drainage authority's role is limited to enforcing, where it applies, the requirement to maintain a vegetated buffer strip adjacent to the ditch. Minn. Stat. §103E.021, subd. 4. Otherwise, it does not control or regulate activities on the land. At most, in very limited ways and indirectly, the code provides incentives for landowners to limit pollutant movement into a system. E.g., Minn. Stat. §103E.315, subd. 6 (drainage authority may base a parcel's benefits on the sediment it contributes to the system). Actions within the system and this limited enforcement authority certainly can reduce loads to an impaired downstream waterbody. However, much of the load that a drainage channel conveys is best controlled by practices on the land.

Drainage authorities, such as watershed districts, counties or joint county boards, possess other police powers and often use those powers to regulate, outside of the drainage code, activity that may affect ditch systems. However, ordinances or rules typically are focused on protecting the physical integrity of the system by limiting actions that may cause bank erosion or channel instability. To our knowledge, the legal authority and willingness of ditch authorities to use their police powers to regulate adjacent lands for water quality purposes are untested.

As the TMDL program evolves, the MPCA could drive this question by imposing TMDL implementation plan obligations on drainage authorities and looking to those authorities to exercise jurisdiction over land-based activities contributing to pollutant loads carried by the drainage system. There is precedent for this in the obligations that the MPCA general permit imposes on MS4s to regulate stormwater impacts by private landowners within MS4 boundaries.

If there is a legislative desire to anticipate this evolution, the broadest question is whether a drainage authority, as the manager of a part of the state's surface water system, should be legally empowered to secure pollutant load reductions from lands draining to its system. If so, there are choices about the form this may take, ranging from regulation, to the use of financial penalties in assessing landowners for system maintenance and environmental compliance measures, to the authority to work with and provide financial incentives to landowners to improve practices.

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More narrowly, if TMDL implementation does follow this trajectory, the drainage code will need to address how a drainage authority will consider water quality obligations that are a condition of drainage work in assessing the benefits and costs of the work, and how the cost of meeting those obligations will be paid. And it will need to provide the tools that drainage authorities need to allocate those costs fairly to those who should pay them.

A drainage authority's role in implementing a TMDL is further complicated by the fact that the drainage system will drain road right-of-way and lands within one or more municipalities, both under the control of units of government that independently may be MS4 stormwater permittees. Or, this overlapping jurisdiction may allow a drainage authority to simplify its role. Instead of expanding the role of ditch authorities to include responsibility for activities on the land, ditch authorities could look to its road authorities to act under their MS4 permits, and to its municipalities to use their traditional land use authorities to reduce pollutant discharge into the drainage system.

By its assessment structure or structure of charges, a drainage authority could create incentives for municipalities to manage land uses to this end. A model for this exists in the drainage code: project benefits for land within an incorporated area, as well as maintenance costs for systems that serve as municipal stormsewer outlets, may be assessed against the municipality and left for the municipality to apportion among its property owners (Minn. Stat. §§103E.315, subdivision 2; 103E.411).

E. Ensuring Regulatory Requirements are Clear, Consistent and Appropriate

Oversight of drainage system activity for the purpose of wetland conservation occurs primarily through DNR regulation of impacts to public waters wetlands and WCA regulation of impacts to other wetlands. Public water wetlands, characterized more by open and standing water and more susceptible to being meandered, were recognized earlier in the state's history for the public benefits they provide. However, with our present understanding of surface water systems, we no longer presume that a public water wetland is by that fact alone of greater public importance or benefit than a wetland regulated under the WCA.

That these two wetlands fall under the jurisdiction of different regulatory bodies has its explanation in history but perhaps now lacks a compelling scientific rationale. This was implicitly recognized in 2000, when the DNR and local units of government that implement WCA were authorized to shift regulatory jurisdiction between each other. Laws 2000, c. 382, §17. This was intended principally to enhance efficiency and consistency where a proposed activity affects both public water and WCA wetlands.

DNR reviews potential public water wetland impacts under Minnesota Rules Chapter 6115 and less formal policies. WCA wetland impacts are reviewed by local government units pursuant to Board of Water and Soil Resources rules at Minnesota Rules Chapter 8420. The approach in both cases is similar, but there are differences in the details. Also, because DNR review relies to a greater degree on uncodified agency policies, it can be somewhat less predictable.

In addition, the Minnesota Pollution Control Agency (MPCA) reserves the right to exercise parallel authority over wetland impacts. Minn. Rules 7050.0186. And, as noted, if fill or a structure is to be placed in a channel or tile system, there may be USACE jurisdiction under Section 404. It should be

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mentioned, as well, that local land use authorities and watershed management organizations also retain ordinary police power authority to regulate impacts to wetlands under local rules and ordinances. Finally, work in drainage systems for the purpose of wetland conservation may trigger regulatory thresholds under federal water quality permitting by virtue of broad or ambiguous jurisdictional language in federal statutes and regulations. The MPCA implements this permit program by delegation from the U.S. Environmental Protection Agency.

Thus, wetland impacts are subject to the oversight of several different units of government under different statutes and rules. This introduces complexity into an effort to remove legal barriers to reconcile drainage and wetland conservation. To the extent that statutes, rules or policies should be adjusted to remove barriers, it means that several different regulatory authorities need to be engaged, and preferably to adopt similar regulatory approaches.

We have noted the potential value of adjusting the definitions of "benefits" and "damages" under the drainage law to incorporate benefits and damages to public wetland resources that would result from the proposed work. This is important both so that: (a) drainage authority decisions incorporate all relevant benefits and costs; and (b) costs are allocated fairly, as among benefited landowners and as between landowners and the general public. Predictability and consistency among regulatory authorities is important here as well.

The Minnesota legislature, of course, does not have authority over the USACE and its application of federal law under Section 404. However, there is active coordination among the USACE and state authorities, illustrated by a recent memorandum of agreement between the USACE and BWSR agreeing on activities qualifying as wetland impact mitigation and the amount of credit given for those activities. The USACE has within its Section 404 authority a substantial flexibility to facilitate approaches discussed in this report. A process that engages the USACE in developing consistent standards and procedures could be productive for both state and federal regulatory review.

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IV. DEMONSTRATION SCENARIOS

After a review of the drainage code, related water resource laws, and critical issues where the drainage code and potential conflicts with other laws create barriers to successful resource protection, the next step for this study was to identify three prototypical demonstration scenarios. The tension between drainage and conservation goals arise in particular land use settings. The study advisory committee assisted in identifying and developing three scenarios in which to explore these issues further:

SCENARIO A: Rural agricultural drainage system improvements

- aging drainage system;
- improvements in capacity needed;
- redetermination of benefits issues;
- need to analyze costs and benefits in different terms;
- private drainage, lands later brought into system;
- need to explore alternative funding mechanisms.

SCENARIO B: Rural agricultural drainage system and TMDL

- drainage system viewed as pollutant loading source;
- exploring conservation drainage alternatives;
- explore alternative funding mechanisms
- need for early engagement

SCENARIO C: Developing watershed

- beyond single parcel to subwatershed planning;
- comprehensive wetland protection & management;
- identifying high value wetlands, isolation from drainage system;
- integrating drainage system maintenance, improvements.

A. RURAL AGRICULTURAL DRAINAGE SYSTEM IMPROVEMENTS

Agricultural land owners in the Red River Valley have experienced ongoing flooding problems that jeopardize agricultural production and building sites. The flooding also causes temporary ponding on a county highway during larger storm events. The upper reach of the drainage system has an old meandering low-flow channel, and there has been a history of sloughing side slopes.

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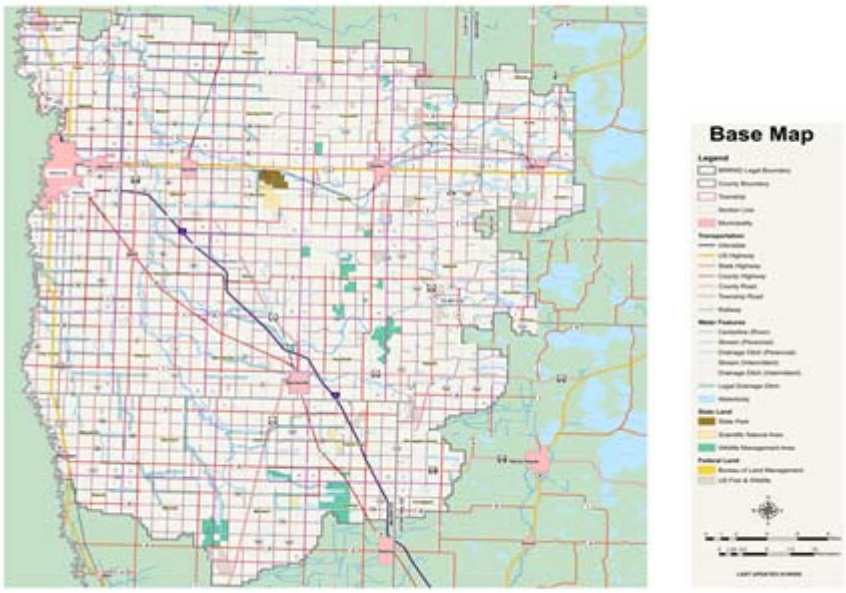
Bison Creek Watershed District



The land owners petitioned the local drainage authority, the Bison Creek Watershed District, to improve and extend Judicial Ditch 5, Branches 2, 3, and 5. All of the land owners along the proposed improvement and extension of Branches 2, 3, and 5 have signed the petition.

The watershed district's preliminary survey of Branch 2, 3, and 5 shows that the grade line of the ditch is nearly flat, that several culverts at the county highway crossing may be undersized, and that fallen trees and brush also impede the flowage in the drainage system. The proposed work would excavate Branch 2, 3, and 5, and extend each of them by another 0.5 mile or more to create a gradeline of at least 0.05% or steeper. Grass buffer strips 16.5 feet wide on each side of the ditch will be established along the entire length of Branches 2, 3, and 5.

The BCWD Engineer's report explores several possible alternatives to the proposed improvement and extension of Branches 2, 3, and 5, including detention of flood waters by resizing culverts, creating new detention basins, and restoring previously drained wetlands. A local chapter of Water for Waterfowl, a conservation organization, has appeared at several meetings to promote the wetland restoration concept. The District Engineer determined that all of these alternatives were less feasible or cost-effective.

The BCWD Engineer prepared a detailed survey report and plans from the proposed improvement and extension of Branches 2, 3, and 5, and submitted them to the Minnesota Board of Soil and Water Resources (BWSR) for an advisory report. The BWSR provided advisory comments, noting that the proposed new culverts and ditch channel capacity seem larger than necessary. The BWSR report also suggests that a two-stage ditch design, consistent with the characteristics of natural streams, would potentially result in reduced erosion and sedimentation, reduced nitrate loads, and also reduced ditch maintenance. A low flow channel designed for a two year return period, and a

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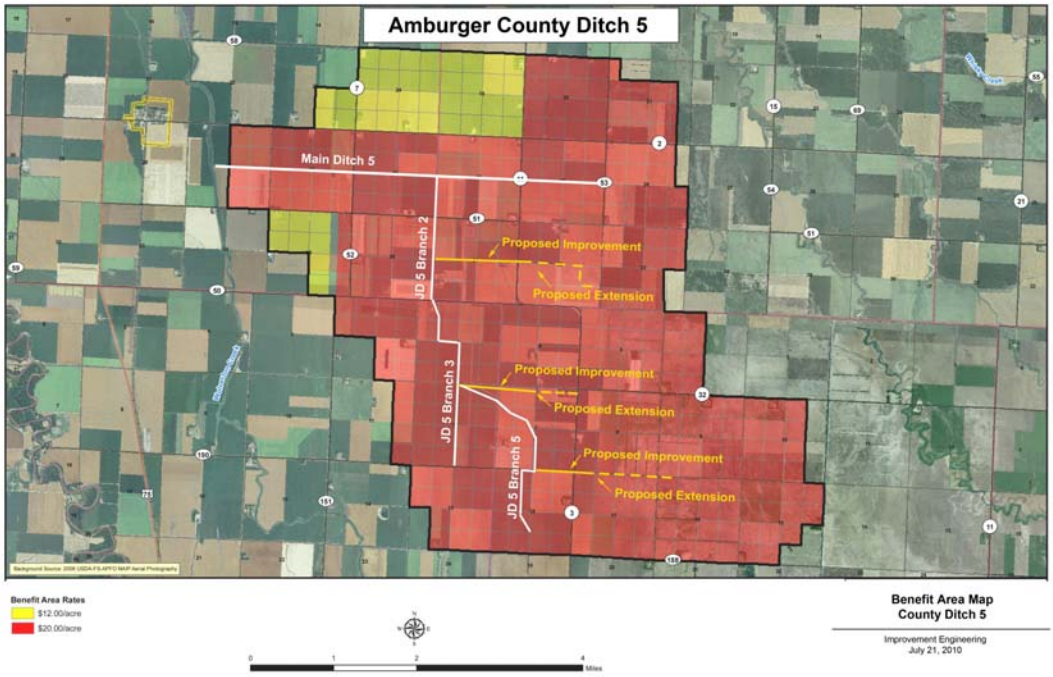
bench placed at that elevation, would manage most of the drainage volume, while the overall ditch could be designed for a five year or greater return period. BWSR also suggests that culvert sizing could be evaluated further to provide more management of downstream peak flows, while still providing adequate drainage in the affected area.



The BCWD Watershed Management Plan includes goals to reduce or alleviate damage caused by floodwaters, to administer and maintain public drainage systems, to protect and improve water quality, to reduce erosion and promote sedimentation management, and to cooperate with other governmental partners to pursue these goals. The BCWD Engineer and Board of Managers recognize that that the BWSR suggestions are consistent with these water management goals of the District, and also have technical merit. County highway improvements are also planned in the future, and the District is exploring how the road work may relate to the drainage project.

Nevertheless, the District is concerned that the conservation drainage suggestions from the BWSR could involve greater cost, or could reduce the efficiency of the drainage system. Some members of the Board of Managers are concerned that the petitioning land owners will strongly object to bearing these increased costs for what they perceive to be the same drainage benefits as the more traditional plan. One of the land owners has also pointed out that erosion and sediment is a much larger problem that involves more than just the owners along Branches 2, 3, and 5.

There are two additional motivations for conservation measures:

- The Red River Watershed Management Board has adopted a retention strategy to achieve 20% reduction in peak flow for the main stem of the Red River, and each

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watershed has a corresponding target reduction; accordingly, the RRWMB has encouraged the BCWD to incorporate retention in this project;

- The Red River Center for Environmental Urgency has brought lawsuits in the past to challenge drainage projects that in their view have adverse environmental impacts; the RRCEU is more recently a collaborator to help find comprehensive solutions; here, the RRCEU is encouraging the BCWD to incorporate retention, conservation drainage, and wetland restoration into the project; the RRCEU also presses for a more rigorous evaluation of the overall environmental impacts of the project and points to the goals of the BCWD plan for further support.

Following further deliberation, the BCWD explores how to incorporate the following additional conservation measures:

- 300 acre retention area, part of which is a wetland restoration that provides both retention and habitat benefits;
    - Perpetual Easement Costs: Straight RIM: $2,000 – $3,000 / acre (say $2,300/acre median); RIM/WRP: $2,500 - $3,700 / acre (median $2,900/acre)
    - Wetland Area Restoration Costs: $600 - $1,000 / acre (use toward the lower side for larger wetland restoration area)
    - Upland Area Restoration Costs: $300 - $400 / acre
- Two stage ditch construction in upper 10% of system; and
- Culvert sizing work in tandem with road authorities and near retention site.

The BCWD also identifies that there are multiple potential funding sources appropriate for these various project elements, as reflected in the following table:

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

Project Element	**Est. Cost**	**Funding Sources**
Drainage improvements:	1,150,000	Drainage System (DS)
Upper watershed retention basin: and wetland restoration		Watershed Dist/DS
300 acre easement @ $2,600/acre	780,000	
150 acre wetl restor. @ $600/acre	90,000	
150 acre upland rest. @ $300/acre	45,000	
Two stage ditch sections;	40,000	Watershed Dist/DS
Road crossing improvements:	190,000	Road authorities
TOTAL:	2,295,000	

The integrated project combining drainage and retention yields multiple benefits, including peak runoff reduction and pollutant loading reduction. See Houston Engineering Inc. Memorandum of June 23, 2011, Appendix B, and Dr. Steve Taff, Economic Value Assessment, Appendix D.

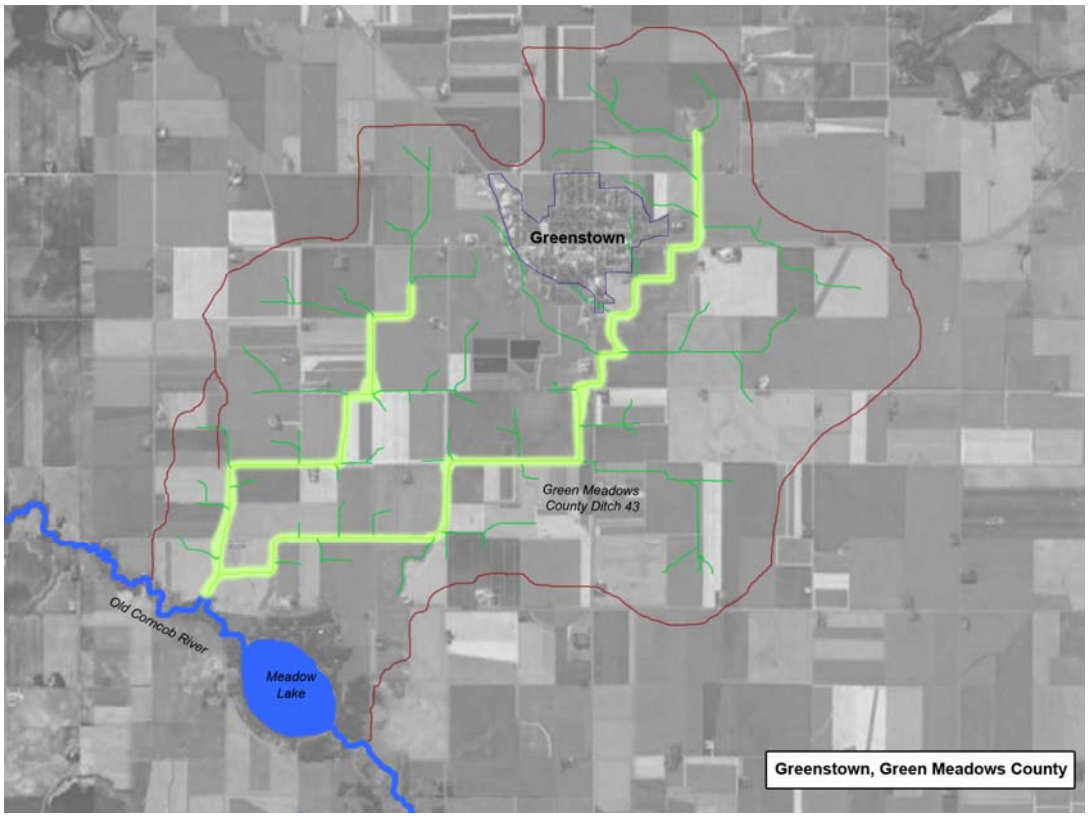
Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

B. RURAL AGRICULTURAL DRAINAGE SYSTEM AND TMDL

Green Meadows County Ditch 43 drains nearly 7,000 acres of gently rolling hills. Ditch 43 constructed originally in 1919, is primarily a tiled system with an open ditch outlet. The ditch discharges into the Old Corncob River, which in turn is a tributary to the Minnesota River.

The land use in this watershed is mostly agricultural. The City of Greenstown is the county seat and is located in the center of the county. The Ditch 43 system has been altered significantly within Greenstown, as portions of the ditch are now either in practical terms abandoned or integrated into the city storm sewer system. The City's storm sewers discharge at several points into the drainage system, and its wastewater treatment lagoons also discharge into Ditch 43. As Greenstown population has grown, the volume of water discharging into Ditch 43 has steadily increased.

Most of the tiled sections of Ditch 43 are now in poor condition and in need of replacement. A number of agricultural land owners in the upper watershed of Ditch 43 are concerned with persistent flooding and crop loss problems. The Natural Resources Conservation Service (NRCS) guidelines generally indicate a minimum drainage coefficient of 0.75 inches per day for field crops in this area, but the existing drainage coefficients are in the range of 0.20 to 0.40 inches per day. The land owners have filed a petition with the Green Meadows County Board of Commissioners, which serves as the drainage authority, for an improvement to the Ditch 43 system in order to provide drainage capacity at the 0.75 inches per day recommended coefficient.



Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

At the lower portion of the watershed, the Old Corncob River drains into Meadow Lake. Meadow Lake has an active lakeshore homeowner's organization which has helped cabin owners with milfoil problems. A number of Greenstown residents own cabins or fish on Meadow Lake, and they are increasingly concerned about water quality. Many of the septic systems around the lake are outdated. Both Meadow Lake and the Old Corncob River are in the state's impaired waters list. Meadow Lake is impaired for nutrients, and the Old Corncob River is impaired for nutrients and turbidity.

As the TMDL process has begun for the Old Corncob River and Meadow Lake, several other organizations have become involved. Physicians Hunting Pheasants and Doctors for Healthy Ducks are two nonprofit sportsmen's groups which have joined with the Meadow Lake Association to advocate for water quality improvements. They have encountered a fair amount of initial conflict with the Corngrowers Guild and Soybean Society over the nature and causes of water pollution in the lake and river. The water quality advocates are also very concerned that the petition to improve the capacity of Ditch 43 will only make things worse.

Marilyn Goodheart is the local conservationist with the Green Meadows County Soil and Water Conservation District. She has worked for many years with farmers in the county to find cost sharing funds for small conservation projects. She has discussed the Ditch 43 improvement project with many of them, identifying water storage, two stage ditch sections, and other conservation measures that could be incorporated into the project. Most landowners, though, feel that it would be unfair for them to pay the assessments to cover these elements. They tell her that they expect to pay for the costs of improved drainage, but even in a good year, the price of corn doesn't pay them enough to justify bearing the costs of conservation measures, 'just so some fellows from Minneapolis can come hunt ducks once a year in Green Meadows County.'

Improvement & Repair Proceeding I: Traditional Approach

The Green Meadows County Board of Commissioners, acting as the Ditch 43 drainage authority, accepted the improvement petition from the landowners, and directed the Engineer to examine the drainage system and make an improvement report. The Board also noted that some of the proposed work would involve repair to the existing drainage system and therefore directed the Engineer, Charlie Bronson, to identify and allocate the costs of repair to be assessed against the owners of the entire system, and the costs of improvement to the owners benefited by the improvement. The Board also appointed viewers to assess benefits and damages.

The Engineer's Report briefly considered the "environment and land use" criteria of Section 103E.015, and concluded that the proposed work would not result in appreciable adverse impacts. The Board proceeded to hold a first a preliminary and then later a final public hearing on the Engineer's Report and the Viewers' Report. The Department of Natural Resources sent an advisory report that identified some concerns with potential impacts of the project and also highlighted opportunities for conservation measures for which Marilyn Goodheart had been advocating.

While the landowners continued to express their ardent support for the drainage improvements and repairs, the project became a source of big controversy in Green Meadows County. The Meadow

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

Lake Association and the other conservation groups lobbied to get state agencies more involved in analyzing the project. Some advocates were talking about somehow using the TMDL process to "stop the Ditch 43 project."

Rodney Strong, the Chair of the County Board, told the crowd gathered for the public hearing that" it doesn't take a genius to see when you have a mess on your hands." He said that, as a farmer himself, he saw the need for drainage improvements, but it seemed like a good idea to pause on the project and see if there would be any chance of a compromise. At Chair Strong's suggestion, the Board tabled the matter for 60 days. He asked Marilyn Goodheart and the county ditch inspector, Greg Ostensen, to get a group together and see if they could come up with a different approach.

General Principles: Commissioner Strong's Wise Counsel

The next morning, Rodney Strong invited Marilyn Goodheart, Greg Ostensen, and Charlie Bronson to the local café for breakfast. He told them that he was getting tired of all of the drainage controversies, he was convinced it was time to try something new and different, and that he wanted the best work that Marilyn, Greg, and Charlie could provide. Commissioner Strong said he would give them some broad principles to work from:

1. *Green Meadows County's economy depends on agriculture.* We need drainage, and we need the drainage repairs and improvements to provide for productive lands, or 'there'll be hell to pay come next election.'

2. *We need to fix the pollution problem for Old Corncob River and Meadow Lake.* We can't argue with the fact that the river and lake are polluted. We need to restore water quality for ourselves, our children, and our grandchildren. And if we don't, sooner or later, some environmental group or state agency is going to make us do it anyway.

3. *We need a plan for the drainage system and the watershed.* The only way we can have drainage and address water pollution is with a good watershed plan that accounts for agricultural land uses, growth at the City of Greenstown, and the needs of natural resources.

4. *Find a way to spread the costs fairly.* You give me a plan that provides for drainage and clean water. Come up with some good ideas on how to pay for it without pinching either the drainage landowners or the general public too much.

5. *Don't confine yourselves to existing law.* What I want most of all is a good plan. We can either find some good drainage lawyers, or better yet, our Green Meadows County legislators are very influential at the Capitol. They can help us with any changes in the law that we need.

Marilyn, Greg, and Charlie told Commissioner Strong that these principles all sounded nice, but he was asking them to "pull a rabbit out the hat." Commissioner Strong took a long sip of coffee, and thought a moment. "Look, I know I'm pushing you folks hard," he said. "But I have been on the County Board for 32 years. I'm really tired of all of the drainage fights. Before I leave office, we're

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going to come up with a better way to do business, and I am counting on you to help me to do that."

"And if you can't, you better say so right now, and I'll go find me someone who is up to the job." Commissioner Strong gave them two weeks to do some homework, and report back.

The New Plan: Combining Conservation and Drainage Improvements

Marilyn, Greg, and Charlie sure enough did their homework and came back to Commissioner Strong with a plan to combine the drainage repairs and improvements with other conservation and water quality measures. The Engineer developed cost estimates for the various project elements, and they developed a basic framework to guide the funding:

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

Project Element	**Est. Cost**	**Funding Sources**
Drainage repairs:	575,000	Drainage System
Drainage improvements:	210,000	Drainage System
Upper watershed storage basins:	250,000	City SWU/County/DS
Two stage ditch sections;	40,000	County SWU/DS
In-channel sediment storage;	30,000	County SWU/DS
Native grass buffers - open ditch:	30,000	County SWU/DS
Road crossing improvements:	190,000	Road authorities
TOTAL:	1,325,000	

Funding Notes

1. Benefitted landowners should be assessed for the costs of the repair and improvement as appropriate, and also for a contribution, say 10%, of the conservation measures.

2. The upper watershed storage basins are largely to manage impacts from City stormwater, and should be funded through a municipal storm water utility.

3. A "County Stormwater Utility" would likely require legislation, but would create a means of funding the conservation measures. Assessments in this utility could be based on phosphorus contribution from predominant land use types, or estimated volume of runoff. [Many technical details to address here.]

4. A system of incentives should be created for both city and rural land owners to reduce volume of runoff from their property and receive a corresponding credit to reduce assessment.

5. The TMDL could inform the development of the storm water utility in terms of allocating the phosphorus loading to different general sources within the watershed.

6. Assume that state grants may be available but are competitive and thus cannot be counted on as funding sources.

Again, an integrated project combining drainage and conservation measures yields multiple benefits, including significant pollutant loading reduction. See I & S Group Report of May 2011, Appendix C, and Dr. Steve Taff, Economic Value Assessment, Appendix D.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

C. DEVELOPING WATERSHED

1. Background

Eddson County lies at the eastern edge of the metropolitan area. Dander Township was settled in the 1880's and initially was dominated by row cropping and grazing. Between 1900 and 1918, Eddson County constructed a system of public ditches and tile to drain the lower part of the watershed. The system, with a number of private outlets, had mixed success in the peaty sands characterizing this area. The public system is known as Eddson County Ditch (ECD) 8 and outlets into Eddson Creek. **Figure 1** is a map of the area showing the ECD 8 alignment.

There is evidence of ditching and tiling activity on ECD 8 during wet periods over the next fifty years, on private lands and within the public system. Agricultural activity evolved over time to predominantly pasturing, haying and sod production. Homes were built on 40-acre lots. The drainage system continued to provide a measure of beneficial drainage. However, maintenance largely ceased apart from occasional work by the drainage authority to remove deadfall and debris, repair sloughing and localized tile failure, and clean out culverts under public and private ditch crossings.

Scattered urbanization began in the early 1980's, mostly at the top of the system in what was now incorporated as the City of Cosego. A number of parcels were platted and developed in two- and five-acre lots. With Interstate 24 nearby, the area became attractive to urban homeowners looking for lower land costs. The population of Cosego grew to almost 10,000, and in 2002 the Metropolitan Council programmed extension of a regional wastewater interceptor for construction in 2009-10. Property values in Cosego continued to rise and commercial developers eyed the larger parcels in the township visible from I-24.

With the crash of the economy, development largely stopped. When growth inevitably resumes, it may be more moderate. Replacement of less intensive land uses by residential and commercial development may follow a much more gradual trajectory. But the communities would like to be prepared.

The Eddson Creek Watershed District (ECWD) is the drainage authority for ECD 8. It also levies *ad valorem* taxes for water quality and conservation projects, issues permits for development, and is the governmental authority implementing the Minnesota Wetland Conservation Act within both communities.

2. The Land

The lower watershed is rich in surface water resources. The Dander Wildlife Management Area contains a 118-acre Type 3/4 wetland favored by hunters and birders. There are a variety of wetland types following the watershed gradient, with interspersed uplands and isolated depressional wetlands

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in the glacial landscape. Many wetland acres were partly or entirely drained for agriculture, but many have reestablished themselves and others could be restored. **Figure 2** shows wetland and soils conditions within the watershed.

As the watershed rises moderately toward Cosego, there is less water on the landscape but the soils become tighter and less well drained. The ECWD is concerned about downgradient flooding as the higher land develops. Also, it sees a potentially rich wetland resource in the lower watershed that retains high-functioning areas and restoration potential. This resource is at risk of being further fragmented and degraded with development and increased stormwater flows from higher areas. The interstate bisects this area. When the economy improves, local legislators' pressure for interstate access will intensify. Access design within this wet landscape would be challenging.

Several agricultural landowners in the lower part of the system wanted ECD 8 to be cleaned out to reestablish the drainage system as constructed. Development in Cosego, at the upper end of the drainage system, has increased the amount of stormwater flowing into the system and the peak rates of flow. The landowners believed that their lands were taking longer to dry out after rains and that this was due to greater demands on the system from the urban development above. They feared this would only worsen as Cosego continues to develop.

Also, they were hopeful that the economy would rebound in time for their land to serve as their "retirement fund." They wanted to establish the right to as much upland as possible in anticipation of a renewed development interest in their lands.

However, if ECD 8 were excavated to the same depth and dimensions as originally constructed, there would be substantial drainage of the Dander WMA and drainage of other wetlands within or near the system. Many of these wetlands were drained in the earlier part of the 1900's, after the system was constructed and contributing lands were ditched by farmers. But over the course of the past 50 years, the absence of diligent maintenance caused the hydraulic efficiency of the system to decrease. As a result, these surface water features reestablished themselves.

At the same time, extensive peaty inclusions in the area soils raised questions about how predictable the drainage effect of a repair would be within this flat, scattered wetland terrain. And this, in turn, raised another question. Proposed impacts on wetlands, either draining them or filling them for development, would need to go through regulatory review. Some impacts would be subject to review under WCA. Impacts to wetlands qualifying as public waters would require Department of Natural Resources approval. Also, the U.S. Army Corps of Engineers might have authority over some wetland impacts under Section 404 of the Clean Water Act. Given the uncertainty as to how the landscape would respond to an ECD 8 repair, permit review also carried the risk of a complicated technical debate and an uncertain outcome. Questions, then, about the ability to clean out the drainage system, how successful it would be in creating developable upland, and the timing of regulatory approvals suggested that the market value of these lands for development might not be quite what the landowners would like to think.

Finally, local conservationists were concerned about fragmentation of ecological resources in this part of Eddson County. There was fear that property owners would force a drainage repair with substantial wetland impacts and that as development occurred, fragmented wetlands would be filled

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to allow for development sites to be created. Conservationists had allies in the MnDNR and the local chapter of Ducks Unlimited, which were concerned about impacts on the Dander WMA and surrounding habitat.

3. Repair Proceeding I: Conventional Repair

To undertake a repair, the drainage authority first must make certain findings. In short (and a bit oversimplified), owners of lands originally assessed to build ECD 8 may obtain a repair if the economic benefit to their lands from the repair would exceed the cost of the work (Minn. Stat. §103D.715). Because environmental compliance costs are paid by the landowners, the cost of the work includes the cost to replace drained wetlands under state and federal laws.

The ECWD suspected that landowners would have a right to repair. Systemwide repair, just to allow consistent flow through the system, could improve soil moisture conditions without greatly affecting wetlands or triggering large compliance costs. Further, given the transitioning land use, the higher land value for development was likely to justify any repair that would add even modestly to buildable upland.

However, for several reasons the ECWD did not believe a repair proceeding would be the best way to sort out the drainage situation in the subwatershed:

- First, the ECWD could foresee the administrative costs and challenges of a repair proceeding. Assessing landowners' legal right to a repair would begin with the original elevation, dimensions and profile of ECD 8. But the original construction records were incomplete. It was clear that over the course of a century, the ditch was deepened and widened in places, but available records didn't show that the drainage authority approved the work. Without drainage authority approval, these improvements didn't legally "count" and only confused the ability to ascertain the as-constructed baseline.

- Second, under drainage law the cost of the repair would be assessed to benefited landowners in the same proportions as the assessment for the original construction. In 1912, land at the top of ECD 8 required the drainage least and was assessed the least. However, much of that land long had been subdivided. Now it benefitted substantially, by virtue of the need for developed parcels to move water quickly. It seemed clear that in advance of the repair project, the ECWD would need to retain viewers to redetermine the allocation of benefits as among all lands served by ECD 8. This would be an expensive process and would require valuing benefits for agricultural lands, urbanized lands and lands presently in agriculture but likely to be valued for development in the near future.

- Third, additional development in the upper part of the watershed would mean more water moving through ECD 8 and the Dander WMA. The system was designed, 100 years ago, to drain regular, lower-magnitude rainfall events from cultivated soils. However, a system serving urban development needs to manage peak events such as the five-year, 10-year and 100-year events from an area with a high proportion of hard surface. The ECWD

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recognized that ECD 8 was not designed to do this, and that even with a cleanout, the system was limited in its ability to serve urban development.

- Finally, a repair could reinstate beneficial drainage for less-intensive agricultural uses within the lower part of the watershed. But it was not an optimal tool for landowners seeking development value for their land. In conjunction with private tiling, a repair could reduce soil moisture adjacent to system inlets by efficiently conducting away water from ordinary precipitation events. But the original system was not designed to reduce the 100-year flood elevation within a larger contiguous area that determines the footprint of developable land. A repair, then, would benefit continued agricultural use in the lower part of the system, but would be only of limited value for future, more intensive uses of the land.

Ultimately, a repair petition (Minn. Stat. §103E.715) was filed with the ECWD by several landowners in the lower part of the watershed. As required, the ECWD Board of Managers directed its engineer to prepare a repair report showing the repairs and their estimated cost.

The engineer's task was to assess how excavating the ditch to its original depth and dimensions would affect the drainage of adjacent lands, and how much it would cost to do the work. There would be the cost of the excavation itself and the disposal of the dredged sediments. But there also was the uncertain cost to replace wetland resources drained by the maintenance.

WCA and Section 404 both include exemptions that allow wetland to be drained in the process of maintaining public drainage systems:

- Under WCA, type 3, 4 and 5 wetlands that have existed for 25 years may not be drained without replacement, but all other wetlands may. (Cultivated lands also may be drained as well; this exemption did not apply within the ECD 8 subwatershed.) Any wetland meeting the criteria for a "public water" (Type 3, 4 or 5 wetland, at least 2.5 acres in size within Cosego or 10 acres in size within Dander Township, Minn. Stat. §103G.005, subd. 15a) is protected by the DNR and may not be drained without replacement.

- Section 404 also allows wetlands to be drained without replacement, provided the draining is the result of ongoing work on a regularly maintained drainage system. Once wetlands are reestablished within a system in which maintenance has lapsed, they may not again be drained without replacement.

Further, the ECWD could realign the system in places (Minn. Stat. §103E.701, subd. 6). This could reduce drainage of adjacent wetlands and the accompanying cost to replace them. But this would reduce the amount of beneficial drainage, increase construction cost and require additional right-of-way from private landowners. In Eddson County, the ECWD was looking at replacement costs of about $35,000 per wetland acre, reflecting recent payments for banked wetland credits in the county. Alternatively, the ECWD could negotiate with landowners for flowage rights and construct replacement wetland on its own. It would do this most readily by disabling private tiling.

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The second challenge faced by the engineer was to fix the bottom elevation and cross-sectional profile of the ditch channel as it was originally constructed. The engineer obtained core samples of soils beneath the channel bottom and did field work to locate survey benchmarks referenced in the 100-year-old engineer's report. This work cost a fair sum, and some of the evidence was ambiguous, but the engineer felt that its reconstruction of the original system dimensions had a reasonable foundation.

However, any repair that might affect the level of a public water requires that both the DNR and the county conservation district agree on the repair depth (Minn. Stat. §103E.701, subd. 2). At the same time, the public waters law says that if the state owns a public waters wetland on or adjacent to the drainage system, it is responsible for any work needed to protect the wetland while allowing the system to function (Minn. Stat. §103G.225). The ECWD thought that the DNR's financial interest, combined with pressure from its wildlife habitat constituency, might affect its position on an acceptable repair depth. The law was not clear on what happens if there is not consensus on the repair depth; impasse was a possibility.

One additional uncertainty remained. For all of the above reasons, the engineer was certain that a full repair, returning the system to its as-constructed dimensions, could not be justified by the ECWD Board of Managers. He expected, on the other hand, that less extensive work would still improve drainage to an extent and could be cost-justified. However, the statute (Minn. Stat. §103E.701, subd. 1) defines "repair" as a restoration of the system to its original conditions. The ECWD and its engineer were not certain that they had the authority under the petition process to evaluate anything other than a full repair to the original grade and dimensions.

Nonetheless, in addition to a repair to the original grade and profile, the engineer evaluated a second approach. This approach would involve moderate removal of sediment and obstructions sufficient to establish a flow gradient through the system, but without causing impact to wetlands and triggering the substantial replacement cost for that impact. The engineer estimated repair costs by assuming that the DNR would accept a very limited lowering of the Dander WMA or would provide funds to realign some 500 feet of channel to avoid that effect.

Finally, the ECWD faced questions of fairness in how repair costs would be paid. Under the drainage law, costs are paid by benefited landowners in proportion to assessment of the original costs of construction. Original benefits were determined 100 years ago based entirely on the impact of drainage on cultivation. Lands in the lower part of the watershed benefited most and were assessed at higher rates. However, the system now was serving as a stormsewer system for many smaller developed lots on higher ground in Cosego. Further, the Dander WMA and other wetland resources were providing hunting and recreational benefits to many folks from outside of the subwatershed and regionally. More broadly, some argued that preserving the ecosystem served a wide public interest and should be supported by state funds from the DNR or otherwise. This raised the question of whether it was fair to impose all of the costs to preserve these resources on the properties benefited by the drainage system.

4. Outcome: Conventional Repair

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

The engineer's modeled outcome of the conventional repair is depicted in **Figure 3**. The wetland impacts and repair costs are included in **Tables 1 and 2**.

The cost of this repair, encompassing an average two-foot depth of excavation through the system, is an estimated $5.57 million. This cost includes a measure of crossing repairs and replacements, with private crossings an expense of the system and public crossings the responsibility of the road authorities. On top of this cost is the cost to replace non-exempt wetland acres. Some 135.2 acres would be drained, and another 12.5 acres partly drained, under the WCA exemption and would not require replacement. However another 232.5 acres of non-exempt Type 3, 4 and 5 wetlands would be partly drained and would require replacement. The replacement cost for this acreage is estimated at $8.14 million.

As **Figure 3** shows, the result of this expense would be to drain or reduce moisture on corridors in proximity to ditch or tile. With inclusions of poorly drained soils throughout the lower part of the watershed, the width of these corridors will vary. Private pattern tiling will extend the scope of drainage for agricultural use, but will not support upland assembly for large-parcel development. As **Figure 3** shows, floodplain will remain distributed throughout the lower watershed absent very aggressive pattern tiling that would not function to control groundwater for more intensive land uses. Therefore, this repair would be compromised in its capacity to enhance land value for development. If an interchange is built at I-24, no WCA exemption will apply and MnDOT will be subject to WCA requirements to explore alignments that limit wetland impacts and replacement obligations.

The conventional repair, further, risked getting caught up in procedural complexity and disagreement.

First, a redetermination of benefits would be needed before the cost of the work could be assessed. The Board of Managers would need to assess relative benefits as between municipal users at the top of the system and agricultural users at the bottom. Determining benefits for development on uncertainly drained lower lands could be contentious. Further, as a result of the redetermination, land for vegetated buffer strips along the ditch would need to be acquired at substantial administrative and potentially legal cost (Minn. Stat. §103E.021).

Second, the conventional repair as modeled would partially drain several public waters wetlands including the Dander WMA wetland. The DNR would be likely to object and disagreement on repair depth could preclude the work or delay it for some time.

5. Outcome: Limited Repair

The engineer's modeled outcome of the limited repair is depicted in **Figure 4**. The wetland impacts and repair costs for this alternative are shown as well in **Tables 1 and 2**.

The limited repair carries a proportionately reduced excavation cost, estimated here at half the material and half the cost of the conventional repair. The repair is defined as that which would provide the greatest extent of positive flow without draining non-exempt wetlands. Therefore, there

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would be no wetland replacement cost. Compared to some $13.71 million for the conventional repair, the cost for the limited repair is estimated at just $2.79 million.

In addition, the limited repair was more likely to avoid objection from the DNR and hunting and conservation interests.

However, as **Figure 4** shows, the moderate effectiveness of the conventional repair, particularly for a transition to more intensive land use in the lower watershed, would be even more compromised by the limited repair. The lateral effect of the cleanout would be more narrow, resulting in less fully drained land and a slightly larger urban-area floodplain, as compared with the conventional repair. This approach also would not help to reconcile the conflict between development and resource protection lurking at the site of the I-24 interchange.

6. Repair Proceeding II: Watershed-Based Management

After receiving the engineer's report, the ECWD Board of Managers paused to ponder the bigger picture. Under a 100-year-old law, it had begun a proceeding limited to the question about how deep to dig a 100-year-old ditch. But the uses of the land and the needs to be served were more complicated now.

An urbanized area at the top of the system was sending storm runoff into the system much more quickly, with little discharge at other times. With further growth, this feature of the watershed's hydrology would be accentuated. It made more sense to control those peaks than to design a conveyance system that would be large enough to contain them but, as a result, would be oversized most of the time. At the bottom of the system, there was a need to manage soil moisture for agricultural use. But there also was a future in which what the conveyance system really would need to do would be to define the 100-year-floodplain and protect land above it by maintaining groundwater separation. All of this, at the same time, recognizing the ecological and other public benefits of the shallow water-land interface.

The Board of Managers asked for further study of the ECD 8 subwatershed to understand how water moves through the watershed and how this could fit with both productive use of the land and the watershed's ecological health.

The engineer modeled watershed hydrology. This included surface flow (hydrologic model), groundwater flow to the drainage system (lateral effect model), and flow within ECD 8 itself from its private segments to its outlet at Eddson Creek (hydraulic model). The engineer did this for present conditions, and also for a future scenario in which both the lower and upper parts of the subwatershed were built out for their planned land uses.

At the same time, the engineer assessed wetlands and areas of former wetland within the watershed for the extent to which they contributed or, with restoration, could contribute to the functioning of the hydrologic system. The engineer used a wetland method approved by the Minnesota Board of Water and Soil Resources to evaluate the wetlands' capacity to:

- Retain flood waters and stormwater

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

- Augment low flows
- Trap and assimilate sediments and nutrients
- Provide aquatic, riparian and plant habitat
- Serve public recreation purposes including hunting, fishing and wildlife viewing

(Minn. Stat. §103B.3355.)

Some areas of wetland or restorable wetland were identified as highly valued for their role in the ecologic and hydrologic systems within the watershed. Others were isolated or quite degraded without sound restoration potential. These were identified as less functional. **Figure 2** is a simplified depiction of the results of the wetland functional assessment.

This inventory and assessment was the foundation for a comprehensive wetland protection and management plan (CWPMP). This is an alternative watershed-based regulatory approach authorized under Minnesota Statutes §103G.2243. Under this statute, the ECWD could replace the standard WCA rules at Part 8420 with a tailored set of rules to manage wetland impacts within the defined watershed encompassing the drainage system.

In place of "standard-issue" replacement requirements under the regular WCA rules, the ECWD could fashion rules with incentives to avoid impacts to higher-value wetland resources and to replace impacts to other wetlands in a way that would enhance those resources. In addition, the drainage system alignment also could be adjusted to avoid sensitive wetland/groundwater areas and better serve developable areas (Minn. Stat. §103E.701, subd. 6). The Board of Managers felt that if this approach were coordinated with local zoning and the development intentions of landowners, the system could be managed to:

- Provide the "targeted" drainage needed to consolidate upland and enhance the development value of the lower lands, and

- Allow the ECWD and landowners to collaborate in restoring and preserving higher-value wetland resources where they are best situated in the landscape.

The engineer started from the "limited repair" scenario in the engineer's report. This scenario reflected the most extensive drainage system repair that would provide a net benefit to landowners and so, in theory, be legally approvable. Therefore it constituted the drainage baseline that landowners could expect under conventional drainage law. The ECWD's intent was to define its outcomes and develop its rules in a way that would demonstrate economic benefit to landowners, improved tax base, and an enhanced wetland resource through the use of a CWPMP.

During this time, ECWD staff coordinated with planners for Eddson County as the zoning authority for Dander Township and township officials. This allowed the ECWD to better understand development plans for the lower subwatershed, and gave input to the county and township about guiding development and programming roads to avoid sensitive areas. Any adjustments to the comprehensive land use plans of these authorities would need to be consistent with the Metropolitan Council's plans for wastewater service to Cosego.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund
as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

As the ECWD engineer worked with staff to develop a framework, several questions emerged:

- The location of wetland impact and an opportunity to protect or restore high-quality wetland might not co-exist on the same parcel. It would be important to have a mechanism by which a property owner causing wetland impact could contribute to enhancement of high-quality resources even when those resources were located on another property.

  The ECWD considered several ways to do this. In its rule, it could allow wetland replacement credits to be created and "banked" by a landowner, and allow another landowner to purchase them in a private transaction. However, within this single subwatershed there might not be a sufficient "market" and credits might not be available in a timely way. It could collect a fee from a property owner lacking an on-site replacement opportunity and use the funds to perform wetland work itself, by agreement with another property owner or by using eminent domain to acquire flowage rights. Or, the zoning authorities - Eddson County and the City of Cosego - could adopt ordinances allowing development rights to be transferred between parcels. This would allow for owners of higher-valued wetlands to host more extensive protection and restoration efforts and be compensated by increased development value on other lands.

- With CWPMP authority, the ECWD could customize an approach to managing impacts to WCA wetlands. However, the DNR would keep all of its existing jurisdiction in regulating impacts to the Dander WMA wetland and the other public waters wetlands. There was no guarantee that the DNR would agree to the watershed-based regulatory approach of the CWPMP. Also, although it was rarely exercised, the Minnesota Pollution Control Agency held its own authority to regulate wetland impacts (Minn. Rules 7050.0186).

  As far as the ECWD could tell, the public waters wetlands within the watershed could be managed consistent with the CWPMP. The DNR could waive jurisdiction over those wetlands so that they would be treated like WCA wetlands under the CWPMP (Minn. Rules 8420.0105, subp. 2.E). Or, the DNR could adopt a parallel framework for impacts to public waters wetlands consistent with the CWPMP. But this second approach might require a rulemaking process just for the purpose of the ECD 8 watershed.

  Without one of these steps, there would be less ability to separate development and resource areas. Also the CWPMP would be less predictable due to ambiguity in the public waters laws and the DNR's discretion in applying them. The law seemed to make the DNR responsible (at state cost) to take any steps to protect a public waters wetland from draining due to ditch repair (Minn. Stat. §103G.225). However, that would be the case only for public water wetlands on or "adjacent" to ECD 8 (an undefined term) and might or might not apply to wetlands affected by a realigned section of ditch. It also was unclear whether the DNR could require wetland replacement for any impact to a public water wetland subject to this statute.

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This was made even more ambiguous by a statute that provides for the drainage authority to compensate the state for any "taking" of land or water area owned by the state (Minn. Stat. §103E.025). Finally, it was unclear whether the DNR could simply prohibit any repair action that might drain a public waters wetland (Minn. Stat. §103E.701, subd. 2).

- The CWPMP also did not in any way affect federal wetland requirements under Section 404. The ECWD did not know to what extent the USACE would be able or willing to adopt a watershed-based framework consistent with the CWPMP.

  The ECWD was aware of the USACE policy allowing for the creation of Special Area Management Plans (SAMPs). Similar to the CWPMP, a SAMP rests on understanding wetland resources on a hydrologic system basis. Section 404 permit requirements then can be customized to allow for development while protecting important wetland resources. However, the Section 404 regulations require an applicant to evaluate alternative development approaches to avoid the proposed wetland impacts. Typically, this cannot be done until a particular development goal is articulated for a specific parcel. The SAMP works best for a defined area where the zoning authority is steering development. The ECWD was working for strong integration between the CWPMP and the long-range comprehensive land use plans of Eddson County and Cosego, but neither of these zoning authorities intended to drive the market and neither had the resources for the intensive planning exercise the SAMP might require.

  Short of creating a SAMP, in a couple of cases the St. Paul District had coordinated with a watershed district to establish a consistent scheme to measure wetland impacts and credit wetland replacement. The ECWD thought that if the USACE were willing to accept the science underlying the CWPMP, it might agree to a consistent regulatory framework that would help reduce the uncertainty of duplicate regulation. This, in turn, would help preserve the "predictability" valued by landowners under the CWPMP.

- Finally, under WCA, a state agency self-regulates as to wetland impacts on land it controls (Minn. Stat. §103G.005, subd. 10e). If MnDOT were to expand I-24 or construct an access affecting the wetland area, the agency would self-regulate for those impacts and they would not be managed under the CWPMP framework.

Ultimately, the ECWD adopted a CWPMP and a set of wetland rules to implement it. By varying replacement ratios, the rules created a strong incentive to limit impacts to higher-value wetland areas and encouraged replacement for impacts to focus on enlarging and enhancing those areas. The rule required replacement to be within the watershed and gave credit for stormwater peak retention measures such as biofiltration in the upper watershed. The ECWD engaged the USACE and got informal but written concurrence in the replacement framework of the CWPMP rule.

The rule also created a framework for banking credits, although the ECWD Board of Managers was skeptical that this would see much activity. In addition, the rule allowed property owners without access to higher-valued wetland replacement opportunities to pay a fee equal to replacement cost into a fund the ECWD would use to perform wetland protection and restoration work itself.

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The Board of Managers then had the engineer review the repair scenarios. The engineer revised the alternative repair scenario to include two realigned sections to limit wetland drawdown and create larger contiguous upland areas for development. This was the scenario adopted by the Board.

The ECWD now had a framework for the watershed that gave consideration to several sets of interests. It provided drainage system benefits by establishing a repair regime to maintain flow through the system while both creating incentives to manage peak flows in the upper watershed and using floodplain storage to accommodate those flows. It established a wetland management framework that would allow for drainage system realignment and selective wetland fill as lower-watershed uses shifted from agriculture to large-parcel development. And it recognized the public benefits of a healthy wetland resource and created incentives to protect and enhance the resource.

In part, the ECWD would implement the CWPMP by maintaining the drainage system and replacing the wetland loss caused by system maintenance. The CWPMP otherwise would be implemented as urban development in the upper watershed and large-parcel development in the lower watershed progressed. Developers would aggregate upland and wetland resources in pursuit of development plans and would limit peak flow increases in the system by retaining water in the upper watershed for replacement credit. The ECWD could make further choices, in its discretion, to spend funds on independent wetland restoration activities within aggregated wetland resource areas. State funds might be available as well, for example for realignments to avoid impacts to public waters wetlands.

The Board of Managers quickly concluded that it would not be appropriate to require landowners assessed for ECD 8 to fund all of these activities. Further, it determined that its activities to maintain the drainage system for these multiple purposes would be administratively simpler to fund by way of a utility charge system rather than through special assessments under the drainage law. Accordingly, it elected to use several revenue mechanisms:

- A water management district bounding all parcels draining into ECD 8 was created (Minn. Stat. §103D.729). Annual charges would be collected against these properties for all repair and maintenance work on ECD 8 including wetland replacement costs. The Board of Managers determined a methodology to split costs among the developed areas of Cosego and the less intensively used lower watershed parcels.

- The ECWD also planned to charge the upper watershed more specifically for the cost of retention above ECD 8 not accomplished by developers' actions for replacement credit. It intended to work with Cosego and, preferably, allow Cosego to assume responsibility for retention using stormwater charges or development fees.

- Concluding that broader public benefits were involved, the Board also established a policy to use watershed-wide *ad valorem* funds for a part of the wetland preservation work required to minimize impacts from the repair. Other ecosystem work would be funded by landowners as regulatory compliance during development.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund
as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

- Finally, the Board of Managers remained uncertain as to the role the DNR would play or the funds it would provide for public waters wetland protection, but any funding would be used to offset local property taxation.

7. Outcome: Watershed-Based Approach

The modeled outcome of the watershed-based approach in shown in **Figure 5.** Wetland impacts and cost estimates for this approach are included in **Tables 1** and **2**.

The watershed-based plan preserves the hydraulic efficiency of ECD 8 at the same level as the limited repair. This is done by utilizing wetland and floodplain storage within expanded wetland corridors and thereby reducing the need to excavate channel materials. The rules establish expectations that allow for isolated, lower-value wetlands within the lower watershed to be filled.

Initially, agricultural lands in the lower watershed were able to continue existing uses by virtue of basic limited repair of the lower system. As property owners transitioned those lands to large-parcel development, they were able to take advantage of replacement ratios in the rules to fill depressional wetlands and replace filled-wetland acres and function. In exchange, wetland and adjacent vegetated buffer within the designated higher-valued corridors were augmented. MnDOT approached interchange construction similarly.

The CWPMP at core is a wetland regulatory structure. The structure creates flexibility that allows drainage capacity to be maintained and allows for land use and development in conjunction with protecting the wetland resource. Beyond the regulatory structure, however, and by virtue of the understanding of watershed hydrology that is the foundation of the watershed-based approach, land use and water management decisions can be better integrated. Stormwater conveyance and peak management needs for the urban area can reflect an understanding of the capacity for natural systems downgradient to assimilate peak flows and nutrients. The city, the watershed district and other public bodies with capital funding can work with landowners to address localized flooding and enhance ecologic resources.

Figure 5 denotes substantial ditch realignments in two locations to circumvent large public waters wetlands, including within the Dander WMA. This is driven by the incentive to limit compliance costs and to avoid administrative delay or impasse. Of the $2.81 million watershed-based approach in **Table 2** for "Compliance & Conservation," $1.99 million represents the cost of these realignments. However, it also is a means to improve the ecologic values of the wetland systems (and, consequently, their public recreational values) by separating these wetlands more decisively from the drainage system.

Table 1 indicates 148.3 acres of impact to exempt wetlands under the watershed-based approach. This reflects CWPMP implementation as shown in **Figure 5**, where the impacts largely result from wetland filling and draining in the process of development by property owners and MnDOT. Much of this wetland impact in fact may not be exempted because it will not be the necessary result of drainage system repair; however, the cost of replacement will be a private or road authority cost, and not a cost to the drainage system. It will be undertaken as a voluntary development decision.

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Table 2 includes a column titled "Urban Peak Management." This column denotes costs that will be incurred by the City of Cosego and developers to build stormwater retention facilities sufficient to maintain peak runoff rates for the 100-year event under the city's build-out. This cost is reduced to the extent peak flow can be managed in downstream natural systems without ecologic impact. This capacity depends on the attributes of the system in question. Under the watershed-based approach, the ECWD is in a much better position to evaluate this opportunity and to help reduce public costs for runoff management.

Similarly, while some wetland systems release phosphorus into surface waters that flow through them, others can be effective nutrient uptake systems. **Table 2** includes an "Avoided Stormwater Management" column showing a potential benefit of $2.56 million for the watershed-based approach. This number reflects the added flowed-wetland acreage under CWPMP implementation and the assumption of average phosphorus assimilation capacity for those wetlands. This number reflects the potential avoided infrastructure costs for water quality treatment that may be required under a Total Maximum Daily Load, nondegradation requirement or other regulatory obligation for the City of Cosego.

This scenario, and the costs reviewed above, are wholly illustrative. Each watershed - its hydrologic systems and land use needs - will be unique. The chief characteristics of the watershed-based approach are: (a) the foundational understanding of watershed hydrology and land uses and (b) the back-end flexibility to use regulation and capital/project funding to reduce conflicts and optimize both economic and ecologic outcomes. Essential to this is a range of funding authorities that can allow the drainage authority to allocate costs in accordance with benefits. In this scenario, this includes owners of agricultural lands, property owners within the urban area, and the broader publics benefitting from the recreational and ecologic properties of a well-managed hydrologic system.

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FIGURES

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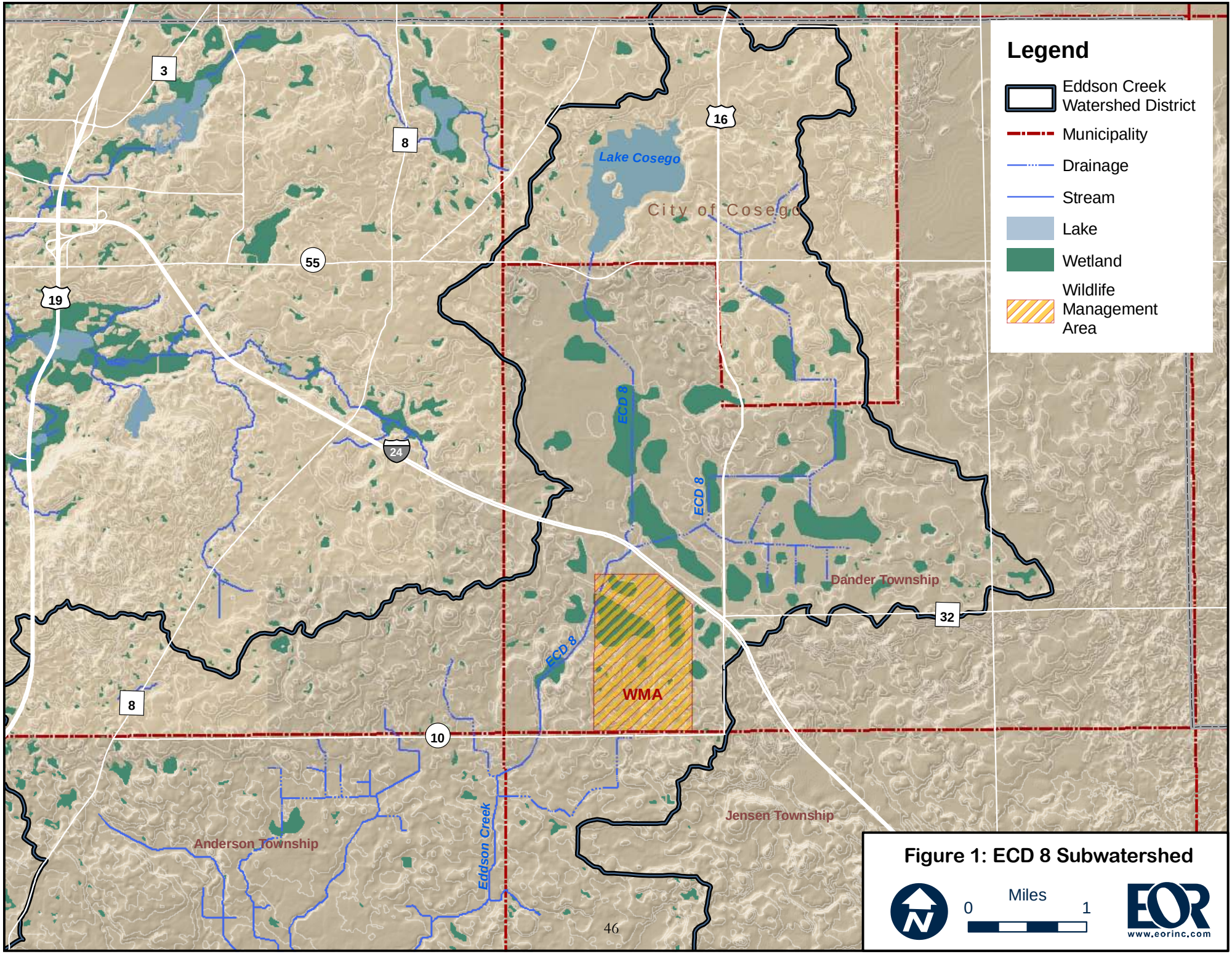
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Municipality
Drainage
Stream
Lake
Wetland
Wildlife Management Area
Lake Cosego
City of Cosego
ECD 8
ECD 8
ECD 8
WMA
Dander Township
Jensen Township
Anderson Township
Eddson Creek
3
8
16
55
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Figure 1: ECD 8 Subwatershed
Miles
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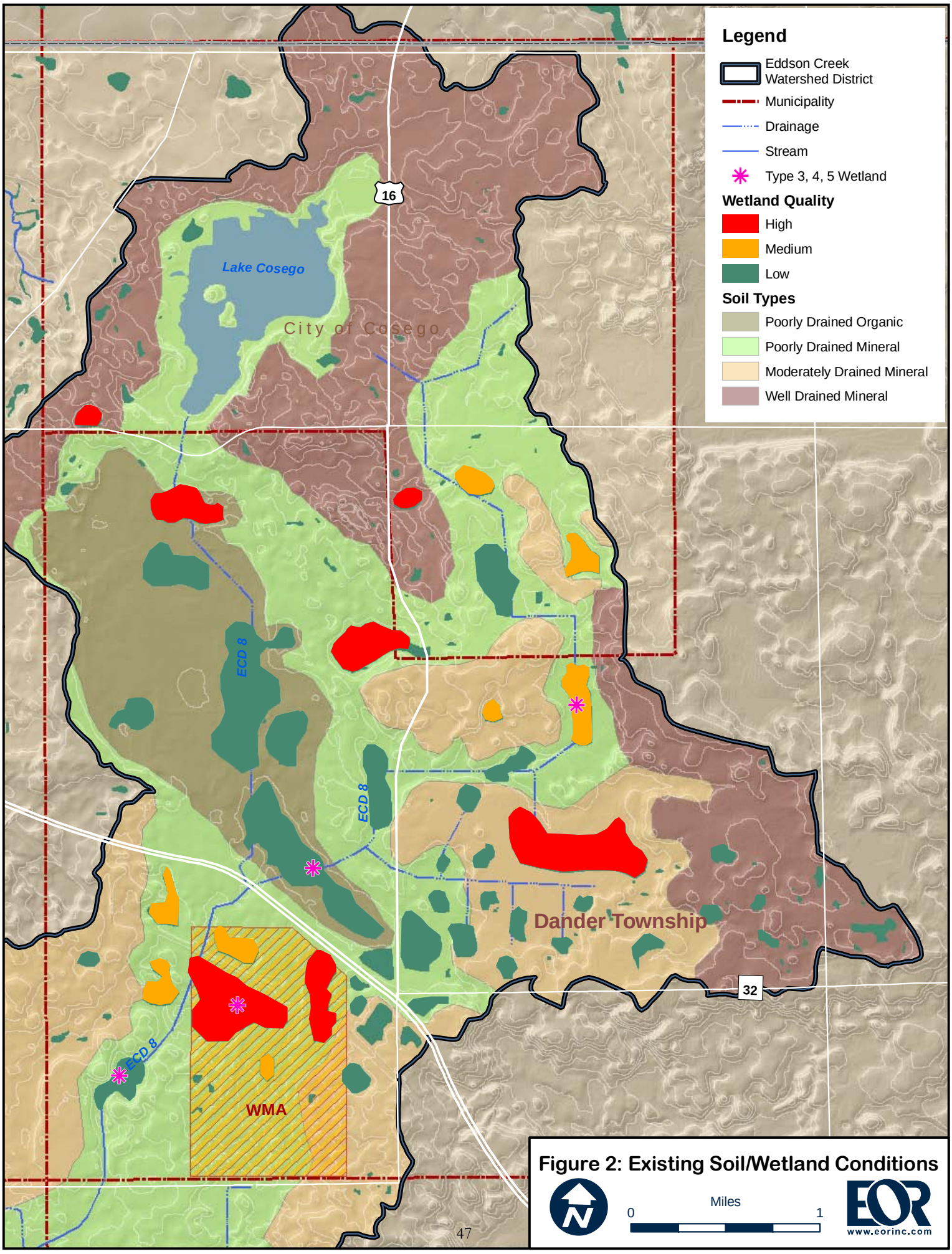

Figure 2: Existing Soil/Wetland Conditions

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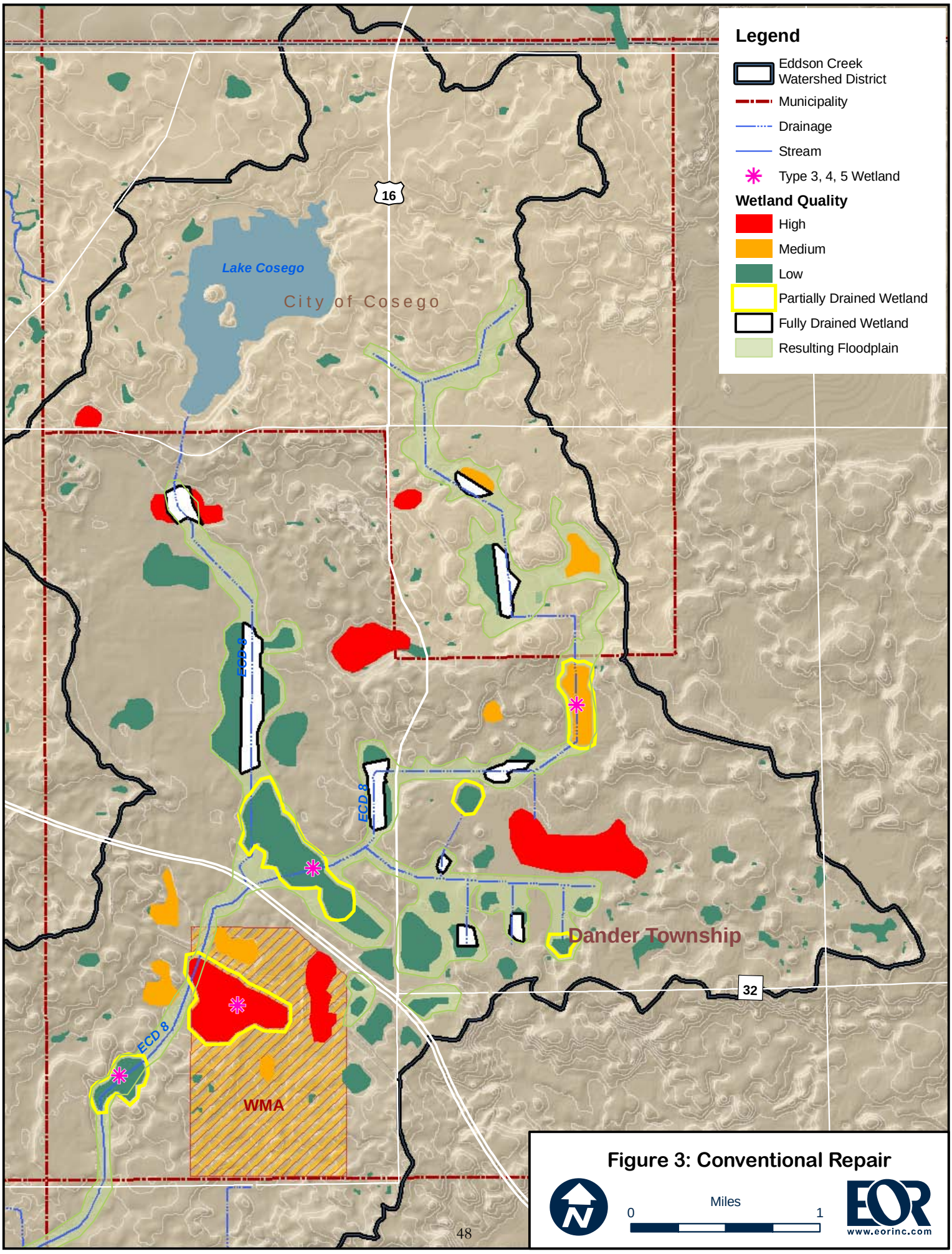

Figure 3: Conventional Repair

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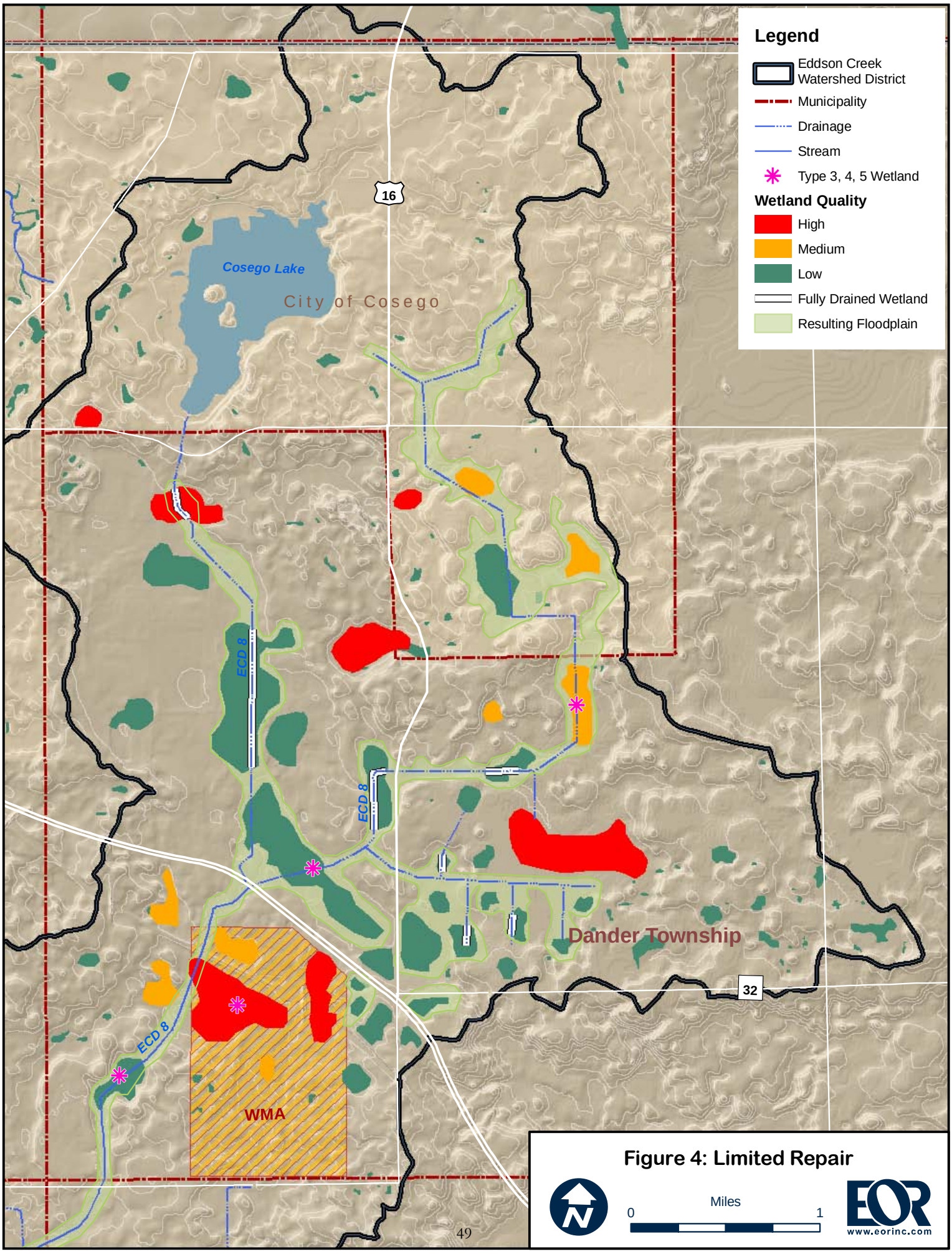

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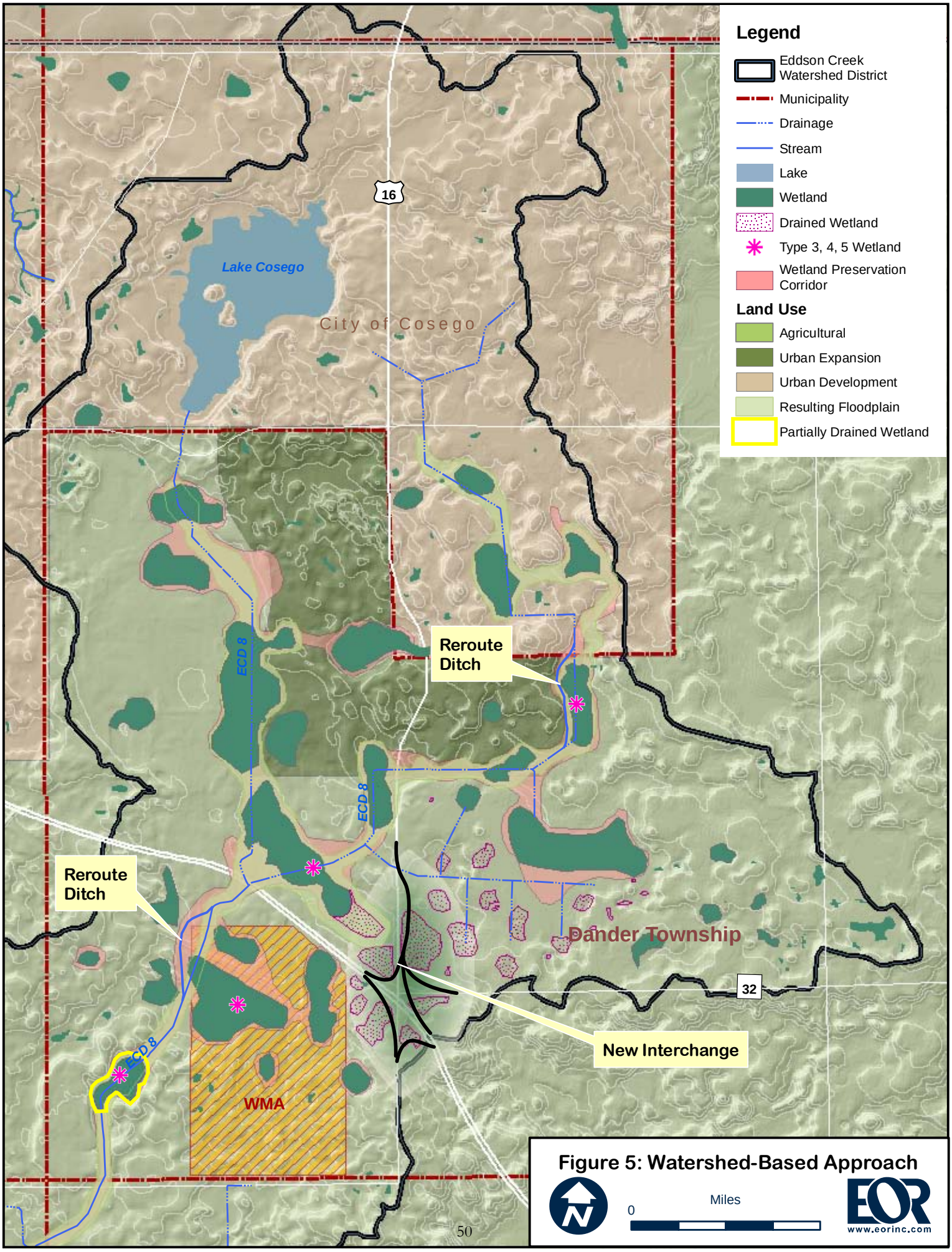

Figure 5: Watershed-Based Approach

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TABLES

Scenario C – Table 1

WATER RESOURCE IMPACTS for REPAIR ALTERNATIVES (acres)			
	EXEMPT WETLANDS[1]		NON-EXEMPT WETLANDS[2]
	DRAINED or FILLED	PARTLY DRAINED[3]	PARTLY DRAINED[3]
CONVENTIONAL REPAIR	135.2	12.5	232.5
LIMITED REPAIR	24.5	0	
WATERSHED-BASED APPROACH	148.3[4]	0	23.5

NOTES

[1] Wetlands that may be drained without replacement obligation under a Wetland Conservation Act statutory exemption.

[2] Public waters wetlands or Wetland Conservation Act type 3, 4, 5 wetlands for which replacement is required.

[3] Partial drainage causing no loss of acreage but loss of wetland resource function. Impact acreage assumed as 50% of partly drained surface area.

[4] Impact acres predominantly from private development upland aggregation rather than drainage system repair.

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Scenario C – Table 2
COST of REPAIR ALTERNATIVES

	DRAINAGE SYSTEM REPAIR	URBAN PEAK MANAGEMENT[1]	AVOIDED STORM WATER MANAGE-MENT[2]	COMPLIANCE & CONSERVATION[3]
CONVENTIONAL REPAIR	$5.57 Million	$2.73 Million	--	$8.14 Million
LIMITED REPAIR	$2.79 Million	$2.83 Million	--	$0
WATERSHED-BASED APPROACH	$0.82 Million	$2.57 Million	($2.56 Million)	$2.81 Million[4]

NOTES:

[1] Facilities that would need to be constructed on or adjacent to upper ECD 8 to provide adequate capacity for urban peak flow management for build-out under City of Cosego comprehensive land use plan. A part of this cost would be defrayed by the capacity of the downgradient wetland/floodplain to absorb peak flows without ecologic deterioration.

[2] Avoided cost of water quality basins that would accompany build-out under City of Cosego comprehensive land use plan due to runoff assimilation capacity of downgradient wetland resources. This cost savings would be for water quality benefits beyond those afforded by peak management (retention) facilities.

[3] For watershed-based approach, includes system reconfiguration (reroutes) to limit wetland impact and replacement cost.

[4] This cost does not include replacement costs for draining or filling of exempt wetland. Much of this impact will not be exempt but will not be a cost of the drainage system. It will be borne by property owners and MnDOT in voluntary action to aggregate upland for development.

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V. RECOMMENDATIONS

Based on the legal review, analysis of critical issues, and exploration of demonstration scenarios, the study team developed the following legal and policy recommendations. The study advisory committee reviewed and refined multiple drafts of the recommendations, and comments from larger group presentations were incorporated as well.

We intend for these recommendations to provide tools for the legislature or local authorities to make policy choices in how best to integrate drainage and natural resource management. Accordingly, the recommendations are the product of robust discussion, but not complete consensus. The recommendations are the responsibility of the authors, and reflect a judgment that they have adequate support among diverse stakeholders to be worthy of consideration.

Several of the recommended actions include *"options to consider."* The authors deem these options to be worthy of further consideration by policy makers, but at this time either lack essential stakeholder support or require further discussion with affected agencies or parties.

Recommendations #1 – 4 address drainage and watershed management, and Recommendations #5-9 address drainage and wetlands management.

DRAINAGE AND WATERSHED MANAGEMENT

Minnesota's drainage laws should be updated to embrace a multipurpose watershed-based approach. Consistent with the legislature's finding in Minnesota Statutes §103A.212 that the state's water resources should be managed from the watershed perspective, the drainage law can integrate more with the other purposes of water policy, such as water conservation, water pollution, preservation and management of wildlife, soil conservation, public recreation, forest management, and municipal planning. A watershed-based approach to managing drainage systems can reduce conflict between public interests in drainage and conservation, and promote more cost effective outcomes. In a developed or developing area, this approach also can provide a framework to reconcile conflict among multiple land uses, limit public and private costs to maintain conveyance systems, and improve conservation outcomes.

RECOMMENDATION #1: Give drainage authorities more tools and resources for watershed-based planning.

Findings: Watershed-based management and regulation may require a significant up-front investment in engineering and scientific study. The cost of such study may not be justifiable in traditional terms to the landowners in the drainage system, particularly if the outcome is not known. If the risk of bearing the cost falls only on the drainage petitioner, and if benefits of the approach are not fully captured by benefitted lands, disincentives to use the approach are created.

Recommended actions:

a. Enact incentives for drainage systems to be included in a watershed-based plans through coordination of existing comprehensive plan, local water management plan, watershed

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management plan and Total Maximum Daily Load implementation plan processes; provide for BWSR performance-based grants (including from Legacy Funds) and a coordination process to eliminate duplication; include incentives for counties to use existing authority to transfer this responsibility to watershed districts where locally preferred and feasible.

b. Enact specific statutory authority in Minnesota Statutes chapter 103D for watershed districts and chapter 103B for counties to provide drainage authorities watershed and subwatershed ad valorem levy and utility charge authorities for the purpose of watershed-based drainage system planning where not otherwise funded by water planning process of chapter 103B. Clarify that the Minnesota Statutes §103B.311 county water planning process must specifically include drainage systems.

c. Specify in Minnesota Statutes chapter 103E that cost of multipurpose watershed-based planning is not to be borne solely by benefitted properties in drainage system.

d. Provide statutory confirmation in Minnesota Statutes §103E.011, subdivision 5, that watershed-based planning activities of drainage authority are eligible for external sources of grant funding.

e. Require that watershed-based plans for drainage systems assess drainage system impacts on water quality, volume and flooding and include prioritized projects to address the same while preserving essential drainage capacity.

RECOMMENDATION #2: Give drainage authorities more tools and resources to implement projects with integrated drainage, flood control, conservation and water quality benefits.

Findings: A drainage authority must be able to allocate implementation costs of multipurpose watershed-based management fairly. Watershed districts can use an ad valorem levy or a stormwater utility to fund these needs, but where a county is the drainage authority and there is no watershed district, funding options may be more constrained. The absence of an appropriate funding mechanism may impose costs in a way that creates a disincentive to act or in a way that creates stakeholder opposition to a watershed-based approach. As a result, a drainage authority seeking to implement a watershed-based approach to projects with multiple benefits may be hampered in its access to timely and equitable implementation funding.

Recommended actions:

a. Establish ad valorem levy authority for watershed districts (in chapter 103D) and counties (in chapter 103B) to help pay for outcomes of watershed-based management plans.

b. Establish subwatershed ad valorem levy authority for watershed districts/counties (chapters 103D/103B) to pay for subwatershed-wide outcomes of watershed-based

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management plans; codify subwatershed units as special taxing districts (Minnesota Statutes §275.066).

c. Establish stormwater utility charge authority for watershed-based system management by counties (chapter 103B) where no watershed district exists to serve as the drainage authority.

d. Create process in Minnesota Statutes chapter 103E to move all or part of a drainage system repair to a utility-based charge system under drainage authority control.

Options to consider:

e. Provide drainage authorities the option to assess the system costs of drainage work with consideration of benefitted-parcel contribution to increasing or decreasing environmental compliance costs.

RECOMMENDATION #3: Better integrate effects on wetlands and water quality into drainage authority decisions about drainage system work.

Findings: Under the drainage code, drainage authority decisions require a quantitative weighing of benefits and costs to property owners but only general consideration of "public benefits," a term that itself is ill-defined in the law. Decisions that best reconcile public interests in drainage and in wetland/water quality protection are served by better integration of those interests in the decisionmaking process. However, public benefits and costs from wetland and water quality impacts are difficult to measure and quantify, and a requirement to do so would be premature.

Recommended actions:

a. Require that engineer's reports for drainage projects and repairs under Minnesota Statutes §§103E.245, 103E.285, 103E.705 and 103E.715 evaluate impacts of proposed work on wetlands, flow conditions, and pollutant transport and means of reducing impacts consistent with drainage system requirements.

b. Clarify that Minnesota Statutes §103E.015, subdivision 2, directing the drainage authority to consider "public utility, benefit or welfare," applies to drainage system repair.

c. Refine the definition of "public benefit" in Minnesota Statutes §103E.005 to include public values of wetlands, downgradient water quality, protection of natural geomorphology, downgradient channel stability, and protection of public infrastructure. Include a definition of "public cost" to refer to the loss of public benefit.

d. (Non-legislative) Foster work to further the understanding of drainage system impacts on wetlands, flow conditions and pollutant transport, and to further the means quantify and value those impacts cost-effectively.

RECOMMENDATION #4: Provide drainage authorities with more clarity in legal authority to address drainage system alignment, grade, cross section, and hydraulic capacity

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of bridges and culverts for multipurpose design of drainage system establishment, improvement, or repair.

Findings: Watershed-based approaches to drainage system projects, repairs and retrofits tend to involve multiple design characteristics and challenges. Under the drainage law, theextent of permissible localized impacts to drainage efficiency from realignment or reconfiguration is uncertain. Often records are insufficient to establish "official" alignment, dimensions and grade of drainage systems established many years ago. Without official alignment, dimensions and grade to serve as a baseline, evaluating proposed realignment or reconfiguration for actual and legal impacts is problematic. Field investigation to establish official alignment and grade is expensive and can be inconclusive.

Recommended actions:

a. Amend consolidation statute (§103E.801) to establish process to "officially designate" drainage system after investigation.

b. Amend realignment/impoundment/repair statutes (§§103E.227, 103E.701) to define range of permissible impacts on hydraulic efficiency (general or localized) when implementing statutes.

c. Provide for mechanisms to allocate costs of technical work for system redesignation and realignment proceedings in same manner as indicated in Recommendations #1 and #2, above.

d. Clarify that a drainage authority may direct that the engineer's report include multiple purposes in design of a drainage project or repair, so long as these purposes are consistent with the applicable watershed-based management plan and approved by the drainage authority.

DRAINAGE AND WETLANDS MANAGEMENT

RECOMMENDATION #5: Extend the authority to establish a locally based wetland regulatory framework under a CWPMP to public water wetlands.

Findings: Technical evaluation and planning can integrate WCA and public water wetlands, but WCA LGU has no authority to manage and regulate public waters in accordance with CWPMP except through case-by-case DNR waiver of jurisdiction. Landowner benefits in the form of expectations/certainty are undermined by preservation of full DNR regulatory prerogative. Benefits of clear, efficient process are undermined by ambiguous Minnesota Statutes §103E.701 language concerning DNR approval of repair. Drainage authority ability to fairly allocate management costs is complicated by uncertainty over the statutory cost to protect public water wetlands affected by drainage system (e.g., §103G.225).

Recommended actions:

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a. Clarify DNR authority under Minnesota Statutes §§103G.2243 and 103G.245 to (i) programmatically waive jurisdiction to WCA LGU under CWPMPs and (ii) establish a parallel CWPMP framework by agreement with the LGU.

b. Establish an efficient administrative process with record review under Minnesota Statutes §103E.701 to involve DNR in determination of repair depth when public waters may be affected.

c. Revisit Minnesota Statutes §103G.225 and related statutes for clear legislative articulation of when the public shall bear the cost to protect public waters against the impacts of lawful drainage work.

Options to consider:

d. Collapse DNR public water wetland regulatory authority into WCA program by removing public waters wetlands from the purview of Minnesota Statutes §103G.245 and including them under WCA jurisdiction.

RECOMMENDATION #6: Create replacement alternatives within a CWPMP for a landowner causing wetland impact who may not have a high-valued replacement option on site.

Findings: A CWPMP will incorporate incentives to replacement wetlands within particular areas of the watershed to enhance overall wetland value. As a result, certain landowners may be situated with access to higher-valued restoration options and others may not. CWPMP potential is diminished if a landowner is forced to a lower-valued replacement option.

Recommended actions:

a. State authority in Minnesota Statutes §103G.2243 for WCA LGU to establish and manage own watershed-based wetland replacement bank under CWPMP.

b. Affirm in Minnesota Statutes §103G.2243 that a WCA LGU, notwithstanding land use law concerning exactions, may: (i) collect fees in lieu of replacement provided fees are used to create or purchase replacement credits meeting CWPMP requirements; and (ii) require as condition of replacement plan approval that a property owner dedicate an easement allowing public resource restoration work.

Option to consider:

c. Authorize WCA LGU to provide in CWPMP for replacement credit for other water resource benefits including improvements with respect to flow conditions, habitat, pollutant generation and pollutant transport.

RECOMMENDATION #7: Coordinate USACE Section 404 jurisdiction with a watershed-based CWPMP or other implementing framework.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

Findings: A conflicting federal regulatory framework can preclude CWPMP outcomes. The USACE's reserved regulatory prerogative under Section 404 of the Clean Water Act can undermine the benefits of a CWPMP by reducing the CWPMP's ability to deliver more certainty in permitting time and outcome. The alternatives analysis requirement under Section 404 adds to CWPMP cost concerns and undermines certainty in permitting time and outcome that are important benefits of a watershed-wide approach.

Recommended actions:

a. (Non-legislative) Further BWSR coordination with USACE to align Section 404 permitting with CWPMPs, including: (i) readier USACE use of programmatic permits, (ii) USACE consideration of "sector-specific" programmatic permits for drainage system maintenance, and (iii) consistent standards and procedures for fee-in-lieu programs.

Options to consider:

b. Enhance tools and resources for WCA LGU and land use authority to collaborate in developing and implementing CWPMP.

c. Direct and facilitate DNR pursuit of delegated Section 404 authority (with BWSR and Department of Agriculture cooperation per §103G.127) for CWPMP areas.

d. Coordinate Minnesota Pollution Control Agency §401review with CWPMP.

RECOMMENDATION #8: Integrate MnDOT right-of-way, other state-managed lands and local road authority activities within a CWPMP framework.

Findings: State agencies may affect higher-valued wetlands or disrupt protected corridors contrary to CWPMP goals. Local road impacts in higher-valued resource areas will be subject to CWPMP disincentives but replacement activity may be outside of plan area and not contribute to desired CWPMP outcomes.

Options to consider:

a. Provide that WCA provision naming state agency as LGU for state-managed lands may be qualified within a CWPMP area by (i) constraints on replacement wetland location as feasible and (ii) authority of LGU to require fee in lieu of replacement outside of CWPMP area.

b. Provide that road replacement under WCA may be qualified within a CWPMP area by (i) constraints on replacement wetland location as feasible and (ii) authority of LGU to require fee in lieu of replacement outside of CWPMP area.

RECOMMENDATION #9: Foster reliability of CWPMP outcomes through coordination of local land use authority and wetland regulatory authority.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

Findings: The local land use authority may regulate wetland impacts under local ordinances and inconsistently with the CWPMP framework. The identity of the WCA LGU may shift after CWPMP investment has been completed, and a new LGU may not be committed to the CWPMP framework and expectations created. Property owner collaboration in a CWPMP framework rests on the reliability of created expectations. Early coordination enhances commitment to framework over intended duration of CWPMP implementation.

Options to consider:

a. State in Minnesota Statutes §103G.2243 that CWPMP rule preempts inconsistent wetland regulation by local land use authority.

b. Affirm authority and enhance capacity for local land use authorities to use area-based rather than site-based approaches to planning and development regulation.

c. *Allow metro area land use authorities to revise comprehensive land use plans under CWPMP framework without Metropolitan Council approval, consistent with broader density parameters set by Council.*

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

APPENDIX A

DRAFT LEGISLATION TO IMPLEMENT RECOMMENDATIONS

RECOMMENDATION #1: Provide drainage authorities with more tools and resources for watershed-based planning.

Findings: Watershed-based management and regulation may require a significant up-front investment in engineering and scientific study. The cost of such study may not be justifiable in traditional terms to the landowners in the drainage system, particularly if the outcome is not known. If the risk of bearing the cost falls only on the drainage petitioner, and if benefits of the approach are not fully captured by benefitted lands, disincentives to use the approach are created.

Recommended actions:

a. Enact incentives for drainage systems to be included in watershed-based plans through coordination of existing comprehensive plan, local water management plan, watershed management plan and Total Maximum Daily Load implementation plan processes; provide for BWSR performance-based grants (including from Legacy Funds) and a coordination process to eliminate duplication; include incentives for counties to use existing authority to transfer this responsibility to watershed districts where locally preferred and feasible.

103B.101 BOARD OF WATER AND SOIL RESOURCES.

Subdivision 14. **Local water management coordination.**

The Board of Water and Soil Resources, by resolution, may adopt policies or orders that allow a comprehensive plan, local water management plan, watershed management plan or total maximum daily load implementation plan adopted and approved according to this chapter and chapters 103C, 103D, and 114D to serve as substitutes for one another. To the extent practical, the board shall incorporate a watershed approach and promote the inclusion of public drainage systems in such plans. The board shall work with local government stakeholders to foster mutual understanding and develop recommendations for local water management and related state water management policy and programs. The board may convene informal working groups or work teams to develop information, education, and recommendations.

103B.3369 LOCAL WATER RESOURCES PROTECTION AND MANAGEMENT PROGRAM.

Subdivision 5. **Financial assistance**.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

A base grant may be awarded to a county that provides a match utilizing a water implementation tax or other local source. A water implementation tax that a county intends to use as a match to the base grant must be levied at a rate determined by the board. ~~The minimum amount of the water implementation tax shall be a tax rate times the adjusted net tax capacity of the county for the preceding year. The rate shall be the rate, rounded to the nearest .001 of a percent, that, when applied to the adjusted net tax capacity for all counties, raises the amount of $1,500,000. The base grant will be in an amount equal to $37,500 less the amount raised by the local match. If the amount necessary to implement the local water plan for the county is less than $37,500, the amount of the base grant shall be the amount that, when added to the match amount, equals the amount required to implement the plan. For counties where the tax rate generates an amount equal to or greater than $18,750, the base grant shall be in an amount equal to $18,750.~~ The board may award performance-based grants to local units of government that are responsible for implementing elements of applicable portions of watershed management plans or local water management plans adopted and approved according to this chapter or chapter 103C or 103D. The board may award performance-based grants to local units of government to carry out total maximum daily load (TMDL) implementation plans as defined in section 114D.15 if the board has reviewed and approved the TMDL implementation plan, as requested by a local unit of government, according to the procedures for approving comprehensive plans, watershed management plans, or local water management plans in this chapter or chapter 103C or 103D. The board may award performance-based grants to drainage authorities to complete watershed-based plans for public drainage systems, and to facilitate the transfer, pursuant to section 103D.335, subd. 15, to a watershed district of all joint county or county drainage systems within the watershed district, together with the right to repair, maintain, and improve them.

b. Enact specific statutory authority in Minnesota Statutes chapter 103D for watershed districts and chapter 103B for counties to provide drainage authorities watershed and subwatershed ad valorem levy and utility charge authorities for the purpose of watershed-based drainage system planning where not otherwise funded by water planning process of chapter 103B. Clarify that the Minnesota Statutes §103B.311 county water planning process must specifically include drainage systems.

103B.311 COUNTY WATER PLANNING AND MANAGEMENT.

Subdivision 1.**County duties.**

Each county is encouraged to develop and implement a local water management plan. Each county that develops and implements a plan has the duty and authority to:

(1) prepare and adopt a local water management plan that meets the requirements of this section through section 103B.315;

(2) review water and related land resources plans and official controls submitted by local units of government to assure consistency with the local water management plan; and

(3) exercise any and all powers necessary to assure implementation of local water management plans.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

Subdivision 4.**Water plan requirements.**

(a) A local water management plan must:

(1) cover the entire area within a county;

(2) address water problems in the context of watershed units and groundwater systems;

(3) be based upon principles of sound hydrologic management of water, effective environmental protection, and efficient management;

(3a) identify public drainage systems, including existing dams and control structures within those systems, and assess their effect on the hydrologic and hydraulic characteristics of the watershed units in which they are situated, including impacts on water quality, water volumes transported and flooding;

(4) be consistent with local water management plans prepared by counties and watershed management organizations wholly or partially within a single watershed unit or groundwater system; and

(5) the local water management plan must specify the period covered by the local water management plan and must extend at least five years but no more than ten years from the date the board approves the local water management plan. Local water management plans that contain revision dates inconsistent with this section must comply with that date, provided it is not more than ten years beyond the date of board approval. A two-year extension of the revision date of a local water management plan may be granted by the board, provided no projects are ordered or commenced during the period of the extension.

(b) Existing water and related land resources plans, including plans related to agricultural land preservation programs developed pursuant to chapter 40A, must be fully utilized in preparing the local water management plan. Duplication of the existing plans is not required.

103B.325 CONSISTENCY OF LOCAL PLANS AND CONTROLS WITH THE LOCAL WATER MANAGEMENT PLAN.

Subdivision 1.**Requirement.**

Local units of government other than watershed districts and watershed-based organizations formed for the joint exercise of powers under section 471.59 shall amend existing water and related land resources plans and official controls as necessary to conform them to the applicable, approved local water management plan following the procedures in this section.

Subdivision 3.**Revision and implementation.**

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

Local units of government other than watershed districts and watershed-based organizations formed for the joint exercise of powers under section 471.59 shall revise existing plans and official controls to conform them to the recommendations of the county board and shall initiate implementation of the revised plans and controls within 180 days after receiving the recommendations of the county board, or 180 days after resolution of an appeal, whichever is later.

103B.335 TAX LEVY AUTHORITY.

Subdivision 1.**Local water planning and management.**

(a) The governing body of any county~~, municipality, or township~~ may levy a tax in an amount required to implement sections 103B.301 to 103B.355.

(b) The governing body of any county may establish a special taxing district in the same manner as set forth in 103B.331, subdivision 4, to pay the cost to prepare a local water management plan under 103B.311 and implement watershed-based elements of that plan.

(c) The governing body of any county may establish a water management district or districts in any territory within the county not within the boundaries of a watershed district, if provided for by the local water management plan, for the purpose of collecting revenues and paying the costs of projects implemented under watershed-based elements of a local water management plan. The plan shall describe with particularity the territory or the area to be included in the water management district, the amount of the necessary charges, the methods used to determine charges, the basis for determining that the charges are just and equitable, and the length of time the water management district will remain in force. The water management district may be dissolved by the procedure prescribed for the establishment of the water management district. Ten days prior to a hearing or decision on projects implemented under this section, the county shall provide notice to the city or town within the affected area. The city or town receiving notice shall submit to the governing body concerns relating to project implementation. The governing body shall consider the concerns of the city or town in its decision on the project.

103D.905 FUNDS OF WATERSHED DISTRICT.

Subdivision 9.**Project tax levy.**

(a) In addition to other tax levies provided in this section or in any other law, a watershed district may levy a tax:

(1) to pay the costs of projects undertaken by the watershed district which are to be funded, in whole or in part, with the proceeds of grants or construction or implementation loans under sections 103F.701 to 103F.761;

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

(2) to pay the principal of, or premium or administrative surcharge, if any, and interest on, the bonds and notes issued by the watershed district pursuant to section 103F.725; or

(3) to repay the construction or implementation loans under sections 103F.701 to 103F.761.

Taxes levied with respect to payment of bonds and notes shall comply with section 475.61.

(b) A watershed district may levy a tax for payment of costs incurred in preparing a watershed management plan under section 103D.401 and implementing projects in that plan.

(c) A watershed district may establish a special taxing district to pay the cost to prepare a watershed management plan under 103D.401 and to implement watershed-based elements of that plan. The county auditor must be notified of a new special taxing district by July 1 in order to be effective for taxes payable in the following year.

c. Specify in Minnesota Statutes chapter 103E that cost of multipurpose watershed-based planning is not to be borne solely by benefitted properties in drainage system.

103E.011 DRAINAGE AUTHORITY POWERS.

Subdivision 1.**Generally.**

The drainage authority may make orders to:

(1) construct and maintain drainage systems;

(2) deepen, widen, straighten, or change the channel or bed of a natural waterway that is part of the drainage system or is located at the outlet of a drainage system;

(3) extend a drainage system into or through a municipality for a suitable outlet; ~~and~~

(4) construct necessary dikes, dams, and control structures and power appliances, pumps, and pumping machinery as provided by law; and

(5) prepare and adopt watershed-based plans for drainage systems, including an assessment of drainage system impacts on water quality, volume, and flooding, as well as prioritized projects to address such impacts while preserving essential drainage capacity, provided that the cost of preparing such plans shall not be paid solely by assessments based on the benefits of the drainage system.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

d. Provide statutory confirmation in Minnesota Statutes §103E.011, subdivision 5, that such watershed-based planning activities of drainage authority are eligible for external sources of grant funding.

103E.011 DRAINAGE AUTHORITY POWERS.

Subdivision 5.**Use of external sources of funding.**

Notwithstanding other provisions of this chapter, a drainage authority may accept and use funds from sources other than, or in addition to, those derived from assessments based on the benefits of the drainage system for the purposes of watershed-based planning for the drainage system, wetland preservation or restoration, or creation of water quality improvements or flood control. The sources of funding authorized under this subdivision may also be used outside the benefited area but must be within the watershed of the drainage system.

e. Require that watershed-based plans for drainage systems assess drainage system impacts on water quality, volume and flooding and include prioritized projects to address the same while preserving essential drainage capacity.

(See also recommended action 1.c, above, for statutory revision to effect recommended action 1.e.)

103D.401 WATERSHED MANAGEMENT PLAN.

Subdivision 1.**Contents.**

(a) The managers must adopt a watershed management plan for any or all of the purposes for which a watershed district may be established. The watershed management plan must give a narrative description of existing water and water-related problems within the watershed district, possible solutions to the problems, and the general objectives of the watershed district. The plan must identify public drainage systems and assess their effect on the hydrologic and hydraulic characteristics of the watershed units in which they are situated, including impacts on water quality, water volumes transported and flooding. The watershed management plan must also conform closely with watershed management plan guidelines as adopted and amended from time to time by the Board of Water and Soil Resources.

(b) The watershed management plan may include a separate section on proposed projects. If the watershed district is within the metropolitan area, the separate section of proposed projects or petitions for projects to be undertaken according to the watershed

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management plan is a comprehensive plan of the watershed district for purposes of review by the Metropolitan Council under section 473.165.

RECOMMENDATION #2: Provide drainage authorities with more tools and resources to implement projects with integrated drainage, flood control, conservation and water quality benefits.

Findings: A drainage authority must be able to allocate implementation costs of multipurpose watershed-based management fairly. Watershed districts can use an ad valorem levy or a stormwater utility to fund these needs, but where a county is the drainage authority and there is no watershed district, funding optionsmay be more constrained. The absence of an appropriate funding mechanism may impose costs in a way that creates a disincentive to act or in a way that creates stakeholder opposition to a watershed-based approach. As a result, a drainage authority seeking to implement a watershed-based approach to projects with multiple benefits may be hampered in its access to timely and equitable implementation funding.

Recommended actions:

a. **Establish ad valorem levy authority for watershed districts (in chapter 103D) and counties (in chapter 103B) to help pay for outcomes of watershed-based management plans.**

b. **Establish subwatershed ad valorem levy authority for watershed districts/counties (chapters 103D/103B) to pay for subwatershed-wide outcomes of watershed-based management plans; codify subwatershed units as special taxing districts (Minnesota Statutes §275.066).**

c. **Establish stormwater utility charge authority for watershed-based system management by counties (chapter 103B) where no watershed district exists to serve as the drainage authority.**

(In addition to the following, see recommended action 1.b, above, for statutory revisions to effect recommended actions 2.a, 2.b and 2.c.)

275.066 SPECIAL TAXING DISTRICTS; DEFINITION.

For the purposes of property taxation and property tax state aids, the term "special taxing districts" includes the following entities:

(1) watershed districts under chapter 103D;

(2) sanitary districts under sections 115.18 to 115.37;

(3) regional sanitary sewer districts under sections 115.61 to 115.67;

(4) regional public library districts under section 134.201;

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(5) park districts under chapter 398;

(6) regional railroad authorities under chapter 398A;

(7) hospital districts under sections 447.31 to 447.38;

(8) St. Cloud Metropolitan Transit Commission under sections 458A.01 to 458A.15;

(9) Duluth Transit Authority under sections 458A.21 to 458A.37;

(10) regional development commissions under sections 462.381 to 462.398;

(11) housing and redevelopment authorities under sections 469.001 to 469.047;

(12) port authorities under sections 469.048 to 469.068;

(13) economic development authorities under sections 469.090 to 469.1081;

(14) Metropolitan Council under sections 473.123 to 473.549;

(15) Metropolitan Airports Commission under sections 473.601 to 473.680;

(16) Metropolitan Mosquito Control Commission under sections 473.701 to 473.716;

(17) Morrison County Rural Development Financing Authority under Laws 1982, chapter 437, section 1;

(18) Croft Historical Park District under Laws 1984, chapter 502, article 13, section 6;

(19) East Lake County Medical Clinic District under Laws 1989, chapter 211, sections 1 to 6;

(20) Floodwood Area Ambulance District under Laws 1993, chapter 375, article 5, section 39;

(21) Middle Mississippi River Watershed Management Organization under sections 103B.211 and 103B.241;

(22) emergency medical services special taxing districts under section 144F.01;

(23) a county levying under the authority of section 103B.241, 103B.245, or 103B.251;

(24) Southern St. Louis County Special Taxing District; Chris Jensen Nursing Home under Laws 2003, First Special Session chapter 21, article 4, section 12;

(25) an airport authority created under section 360.0426; ~~and~~

(26) any other political subdivision of the state of Minnesota, excluding counties, school districts, cities, and towns, that has the power to adopt and certify a property tax levy to the county auditor, as determined by the commissioner of revenue; and

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

(27) any special taxing district created to prepare and implement a local water management plan or watershed management plan under section 103B.231, 103B.311 or 103D.401.

d. Create process in Minnesota Statutes chapter 103E to move all or part of a drainage system repair to a utility-based charge system under drainage authority control.

103E.725 COST OF REPAIR.

(a) All fees and costs incurred for proceedings relating to the repair of a drainage system, including inspections, engineering, viewing, and publications, are costs of the repair and must be assessed against the property and entities benefited.

(b) Notwithstanding any other provision of this chapter, the drainage authority may pay for costs of repair by imposition of just and equitable charges and, if a watershed district, may certify charges to the counties with territory within the drainage system for collection by the counties.

(c) Charges may be fixed on the basis of:

(1) drainage benefits conferred;

(2) use of system conveyance capacity;

(3) contribution to repair cost or frequency by virtue of sediment contributed;

(4) contribution to increasing or decreasing environmental compliance costs; or

(4) any other equitable basis including any combination of clauses (1) to (4).

(d) When charges have been appropriated to the repair cost, no charge shall be deemed unreasonable by virtue of the fact that the repair work to be financed has not been commenced or completed, if proceedings for it are taken with reasonable dispatch and the work, when completed, may be expected to have a value reasonably commensurate with the charges.

RECOMMENDATION #3: Better integrate effects on wetlands and water quality into drainage authority decisions about drainage system work.

Findings: Under the drainage code, drainage authority decisions require a quantitative weighing of benefits and costs to property owners but only general consideration of "public benefits," a term that itself is ill-defined in the law. Decisions that best reconcile public interests in drainage and in wetland/water quality protection are served by better integration of those interests in the decisionmaking process. However, public benefits and costs from wetland and water quality impacts are difficult to measure and quantify, and a requirement to do so would be premature.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

Recommended actions:

a. Require that engineer's reports for drainage projects and repairs under Minnesota Statutes §§103E.245, 103E.285, 103E.705 and 103E.715 evaluate impacts of proposed work on wetlands, flow conditions, and pollutant transport and means of reducing impacts consistent with drainage system requirements.

103E.245 PRELIMINARY SURVEY AND PRELIMINARY SURVEY REPORT.

Subdivision 2.**Limitation of survey.**

The engineer shall restrict the preliminary survey to the drainage area described in the petition, except that to secure an outlet the engineer may run levels necessary to determine the distance for the proper fall of the water and to evaluate the impact of the proposed drainage project on the environmental and land use criteria in section 103E.015, subdivision 1. The drainage authority may have other areas surveyed after:

(1) giving notice by mail of a hearing to survey additional areas, to be held at least ten days after the notice is mailed, to the petitioners and persons liable on the petitioners' bond;

(2) holding the hearing;

(3) obtaining consent of the persons liable on the petitioners' bond; and

(4) ordering the additional area surveyed by the engineer.

Subdivision 4.**Preliminary survey report.**

The engineer shall report the proposed drainage project plan or recommend a different practical plan. The report must give sufficient information, in detail, to inform the drainage authority on issues related to feasibility, and show changes necessary to make the proposed plan practicable and feasible including extensions, laterals, and other work. If the engineer finds the proposed drainage project in the petition is feasible and complies with the environmental and land use criteria in section 103E.015, subdivision 1, the engineer shall include in the preliminary survey report a preliminary plan of the drainage project showing the proposed ditches, tile, laterals, and other improvements, the outlet of the project, the watershed of the drainage project or system, and the property likely to be affected and its known owners. The plan must show:

(1) the elevation of the outlet and the controlling elevations of the property likely to be affected referenced to standard sea level datum, if practical;

(2) the probable size and character of the ditches and laterals necessary to make the plan practicable and feasible;

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

(3) the character of the outlet and whether it is sufficient;

(4) the probable cost of the drains and improvements shown on the plan;

(5) all other information and data necessary to disclose the practicability, necessity, and feasibility of the proposed drainage project;

(6) consideration of the drainage project under the environmental and land use criteria in section 103E.015, subdivision 1, including impacts of proposed work on wetlands, flow conditions, and pollutant transport in sufficient detail to evaluate these impacts as far downgradient as they are reasonably discernable and to advise the drainage authority of means of reducing the impacts consistent with the conveyance needs of the drainage system; and

(7) other information as ordered by the drainage authority.

103E.285 DETAILED SURVEY REPORT.

Subdivision 10.**Other information on practicability and necessity of drainage project.**

Other data and information to inform the drainage authority of the practicability and necessity of the proposed drainage project must be made available including a comprehensive examination and the recommendation by the engineer regarding the environmental and land use criteria in section 103E.015, subdivision 1, including impacts of proposed work on wetlands, flow conditions, and pollutant transport in sufficient detail to evaluate these impacts as far downgradient as they are reasonably discernable and to advise the drainage authority of means of reducing the impacts consistent with the conveyance needs of the drainage system.

103E.705 REPAIR PROCEDURE.

Subdivision 3.**Drainage inspection report.**

For each drainage system that the board designates and requires the drainage inspector to examine, the drainage inspector shall make a drainage inspection report in writing to the board after examining a drainage system, designating portions that need repair or maintenance of the permanent strips of perennial vegetation and the location and nature of the repair or maintenance. The board shall consider the drainage inspection report at its next meeting and may repair all or any part of the drainage system as provided under this chapter after due consideration of public benefits and costs pursuant to section 103E.015, subdivision 2. The permanent strips of perennial vegetation must be maintained in compliance with section 103E.021.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

103E.715 PROCEDURE FOR REPAIR BY PETITION.

Subdivision 2.**Engineer's repair report.**

If the drainage authority determines that the drainage system needs repair, the drainage authority shall appoint an engineer to examine the drainage system and make a repair report. The report must show the necessary repairs, the estimated cost of the repairs, and all details, plans, and specifications necessary to prepare and award a contract for the repairs. The report also will include an assessment of public benefits and costs pursuant to section 103E.015, subdivision 2, at a level of detail corresponding to the scope of the repair and sufficient to advise the drainage authority of means of reducing public costs consistent with the conveyance needs of the drainage system. The drainage authority may give notice and order a hearing on the petition before appointing the engineer.

Subdivision 4.**Hearing on repair report.**

(a) The drainage authority shall make findings and order the repair to be made if it finds the repair justified after due consideration of public benefits and costs pursuant to section 103E.015, subdivision 2, and:

(1) it determines from the repair report and the evidence presented that the repairs recommended are necessary for the best interests of the affected property owners; or

(2) the repair petition is signed by the owners of at least 26 percent of the property area affected by and assessed for the original construction of the drainage system, and it determines that the drainage system is in need of repair so that it no longer serves its original purpose and the cost of the repair will not exceed the total benefits determined in the original drainage system proceeding.

(b) The order must direct the auditor and the chair of the board or, for a joint county drainage system, the auditors of the affected counties to proceed and prepare and award a contract for the repair of the drainage system. The contract must be for the repair described in the repair report and as determined necessary by the drainage authority, and be prepared in the manner provided in this chapter for the original drainage system construction.

b. Clarify that Minnesota Statutes §103E.015, subdivision 2, directing the drainage authority to consider "public utility, benefit or welfare," applies to drainage system repair.

103E.015 CONSIDERATIONS BEFORE DRAINAGE WORK IS DONE.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

Subdivision 2.**Determining public utility, benefit, or welfare.**

In any proceeding to establish a drainage project, in determining the scope of any repair, or in the construction of or other work affecting a public drainage system under any law, the drainage authority or other authority having jurisdiction over the proceeding must give proper consideration to conservation of soil, water, forests, wild animals, and related natural resources, and to other public benefits and costs, together with other material matters as provided by law in determining whether the project will be of public utility, benefit, or welfare.

c. Refine the definition of "public benefit" in Minnesota Statutes §103E.005 to include public values of wetlands, downgradient water quality, protection of natural geomorphology, downgradient channel stability, and protection of public infrastructure. Include a definition of "public cost" to refer to the loss of public benefit.

103E.005 DEFINITIONS.

Subdivision 24a. **Public cost**.

"Public cost" refers to a loss of public benefit and includes but is not limited to an act or thing that degrades public values of wetlands, water quality, channel stability, natural channel geomorphology or public infrastructure.

Subdivision 27.**Public welfare or public benefit.**

"Public welfare" or "public benefit" includes an act or thing that tends to improve or benefit the general public, either as a whole or as to any particular community or part, including works contemplated by this chapter that drain or protect roads from overflow, protect property from overflow, or reclaim and render property suitable for cultivation that is normally wet and needing drainage or subject to overflow; and works that enhance public values of wetlands, water quality and channel stability and protect natural geomorphology and public infrastructure.

d. (Non-legislative) Foster work to further the understanding of drainage system impacts on wetlands, flow conditions and pollutant transport, and to further the means quantify and value those impacts cost-effectively.

(No legislative text.)

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

RECOMMENDATION #4: Provide drainage authorities with more clarity in legal authority to address drainage system alignment, grade, cross section, and hydraulic capacity of bridges and culverts for multipurpose design of drainage system establishment, improvement, or repair.

Findings: Watershed-based approaches to drainage system projects, repairs and retrofits tend to involve multiple design characteristics and challenges. Under the drainage law, the extent of permissible localized impacts to drainage efficiency from realignment or reconfiguration is uncertain. Often records are insufficient to establish "official" alignment, dimensions and grade of drainage systems established many years ago. Without official alignment, dimensions and grade to serve as a baseline, evaluating proposed realignment or reconfiguration for actual and legal impacts is problematic. Field investigation to establish official alignment and grade is expensive and can be inconclusive.

Recommended actions:

a. Amend consolidation statute (§103E.801) to establish process to "officially designate" drainage system after investigation.

103E.801 CONSOLIDATION OR DIVISION OF DRAINAGE SYSTEMS.

Subdivision 1a. **Authority to designate alignment and cross-section**.

If after diligent inquiry a drainage authority finds that records establishing alignment and cross-section of a public drainage system as constructed and thereafter legally modified are incomplete, it may by order designate an alignment and cross-section that it finds to be most reasonably supported by existing records and evidence. The drainage authority's designation may provide for hydraulic continuity from points of terminus to the system outlet and may make a finding of continuous channel right-of-way adequate for that purpose. This designation will not interrupt prescriptive occupation.

Subdivision 2.**Initiation of action.**

The consolidation,-division or designation may be initiated by the drainage authority on its own motion or by any party interested in or affected by the drainage system filing a petition. If the system is under the jurisdiction of a drainage authority, the petition must be filed with the auditor. If the system is under the jurisdiction of a watershed board, the petition must be filed with the secretary of the board.

Subdivision 3.**Hearing.**

(a) When a drainage authority or watershed board directs by resolution or a petition is filed, the drainage authority in consultation with the auditor or secretary shall set a time

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and location for a hearing. The auditor or secretary shall give notice by publication to all persons interested in the drainage system.

(b) The drainage authority may consolidate or divide drainage systems, by order, if it determines that the division of one system into two or more separate systems, the consolidation of two or more systems, the transfer of part of one system to another, or the attachment of a previously abandoned part of a system to another system:

(1) is consistent with the redetermination of the benefited areas of the drainage system;

(2) would provide for the efficient administration of the drainage system; and

(3) would be fair and equitable.

(c) An order to consolidate or divide drainage systems does not release property from a drainage lien or assessment filed for costs incurred on account of a drainage system before the date of the order.

(d) A final drainage authority order designating the alignment and cross-section of a public drainage system constitutes the official system profile. A finding of system right-of-way in such an order is a defense to a trespass claim and will be given due weight in any subsequent court proceeding to establish the existence or nature of a property encumbrance.

b. Amend realignment/impoundment/repair statutes (§§103E.227, 103E.701) to define range of permissible impacts on hydraulic efficiency (general or localized) when implementing statutes.

103E.227 IMPOUNDING, REROUTING, AND DIVERTING DRAINAGE SYSTEM WATERS.

Subdivision 1.**Petition.**

(a) To conserve and make more adequate use of our water resources or to incorporate wetland or water quality enhancing elements as authorized by Minnesota Statutes §103E.011, subdivision 5, a person, public or municipal corporation, governmental subdivision, the state or a department or agency of the state, the commissioner of natural resources, and the United States or any of its agencies, may petition to impound, reroute, or divert drainage system waters for beneficial use.

(b) If the drainage system is under the jurisdiction of a county drainage authority, the petition must be filed with the auditor of the county. If the drainage system is under the jurisdiction of a joint county drainage authority, the petition must be filed with the county having the largest area of property in the drainage system, where the primary drainage system records are kept, and a copy of the petition must be submitted to the auditor of

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each of the other counties participating in the joint county drainage authority. If the system is under the jurisdiction of a watershed district, the petition must be filed with the secretary of the district. The auditor of an affected county or the secretary of a watershed district must make a copy of the petition available to the public.

(c) The petition must contain the location of the installation, concept plans for the proposed project, and a map that identifies the areas likely to be affected by the project.

(d) The petition shall identify the sources of funds to be used to secure the necessary land rights and to construct the project and the amount and rationale for any drainage system funds requested.

(e) The petitioner or drainage authority must also acquire a public waters work permit or a water use permit from the commissioner of natural resources if required under chapter 103G.

Subdivision 3.**Procedure to establish project.**

(a) After receiving the petition and bond, if required, the drainage authority must appoint an engineer to investigate the effect of the proposed installation and file a report of findings.

(b) After filing of the engineer's report, notice must be given and a public hearing held as provided in section 103E.261.

(c) If at the hearing it appears from the engineer's report and other evidence presented that the project will be of a public or private benefit and that it will not substantially impair the utility of the drainage system or substantially deprive an affected land owner of its benefit without that land owner's consent, the drainage authority shall make an order modifying the drainage system, to include the amount, if any, of drainage system funds approved for the project at the discretion of the drainage authority, and issue an order authorizing the project.

103E.701 REPAIRS.

Subdivision 1.**Definition.**

The term "repair," as used in this section, means to restore all or a part of a drainage system as nearly as practicable to the same condition as originally constructed and subsequently improved, including resloping of ditches and leveling of waste banks if necessary to prevent further deterioration, realignment to original construction if necessary to restore the effectiveness of the drainage system, and routine operations that may be required to remove obstructions and maintain the efficiency of the drainage system. "Repair" also includes:

(1) incidental straightening of a tile system resulting from the tile-laying technology used to replace tiles;

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(2) replacement of tiles with the next larger size that is readily available, if the original size is not readily available; and

(3) incorporation within a drainage system of a measure to limit the wetland or water quality impacts of the repair, provided that any increase in hydraulic efficiency from the measure is local and insubstantial.

Subdivision 6.**Wetland restoration and water quality protection.**

Repair of a drainage system may include the preservation, restoration, or enhancement of wetlands; wetland replacement under section 103G.222; the realignment of a drainage system to prevent drainage of a wetland; and the incorporation of measures to reduce channel erosion and otherwise reduce pollutant transport within the channel and receiving waters.

c. Provide for mechanisms to allocate costs of technical work for system redesignation and realignment proceedings in same manner as indicated in Recommendations #1 and #2, above.

(See Recommended Actions 1 and 2 for statutory language to effect Recommended Action 4.c.)

d. Clarify that a drainage authority may direct that the engineer's report include multiple purposes in design of a drainage project or repair, so long as these purposes are consistent with the applicable watershed-based management plan and approved by the drainage authority.

103E.011 DRAINAGE AUTHORITY POWERS.

Subdivision 5.**Incorporation of wetland and water quality protection; Use of external sources of funding.**

A drainage authority may incorporate into public drainage systems measures to reduce the wetland and water quality impacts of such systems as identified in the engineer's report or as otherwise specified in an adopted watershed-based plan of a watershed district or county. Notwithstanding other provisions of this chapter, a drainage authority may accept and use funds from sources other than, or in addition to, those derived from assessments based on the benefits of the drainage system for the purposes of wetland preservation or restoration or creation of water quality improvements or flood control. The funding authorized under this subdivision may be used outside the benefited area but within the watershed of the drainage system.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

RECOMMENDATION #5: Extend to public waters wetlands the authority to establish a locally based wetland framework under a CWPMP.

***Findings*:** Technical evaluation and planning can integrate WCA and public water wetlands, but WCA LGU has no authority to manage and regulate public waters in accordance with CWPMP except through case-by-case DNR waiver of jurisdiction. Landowner benefits in the form of expectations/certainty are undermined by preservation of full DNR regulatory prerogative. Benefits of clear, efficient process are undermined by ambiguous Minnesota Statutes §103E.701 language concerning DNR approval of repair. Drainage authority ability to fairly allocate management costs is complicated by uncertainty over the statutory cost to protect public water wetlands affected by drainage system (e.g., §103G.225).

a. Clarify DNR authority under Minnesota Statutes §§103G.2243 and 103G.245 to (i) programmatically waive jurisdiction to WCA LGU under CWPMPs and (ii) establish a parallel CWPMP framework by agreement with the LGU.

103G.2243 LOCAL COMPREHENSIVE WETLAND PROTECTION AND MANAGEMENT PLANS.

Subdivision 2.**Plan contents.**

A comprehensive wetland protection and management plan may:

….

(5) incorporate the terms of a general permit issued by the commissioner governing work in public waters within the plan area .

103G.245 WORK IN PUBLIC WATERS.

Subdivision 3.**Permit application.**

Application for a public waters work permit must be in writing to the commissioner on forms prescribed by the commissioner. The commissioner may issue a state general permit to a governmental subdivision or to the general public for classes of activities having minimal impact upon public waters under which more than one project may be conducted under a single permit. Activities conducted within the framework of a comprehensive wetland protection and management plan approved by the Board pursuant to Minnesota Statutes §103G.2243 may constitute a class of activities for the purpose of this subdivision.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

b. Establish an efficient administrative process with record review under Minnesota Statutes §103E.701 to involve DNR in determination of repair depth when public waters may be affected.

103E.701 REPAIRS.

Subdivision 2.**Repairs affecting public waters.**

Before a repair is ordered, the drainage authority must notify the commissioner if the repair may affect public waters. If the commissioner disagrees with the repair depth or cross-section, the engineer, a representative appointed by the director, and a soil and water conservation district technician must jointly determine the repair depth and cross-section using soil borings, field surveys, and other available data or appropriate methods. This determination shall define the limit of the repair unless within 30 days of receipt the drainage authority or commissioner initiates a contested case proceeding under sections 14.57 to 14.66. In such a proceeding, the administrative law judge shall decide permitted repair depth on the basis of a preponderance of the evidence but shall give substantial weight to the determination. The report of the administrative law judge constitutes a final decision in the case, as provided in section 14.62, subdivision 4. Costs for determining the repair depth beyond the initial meeting of the representatives and for the administrative proceeding must be shared equally by the drainage system and the commissioner. The determined repair depth must be recommended to the drainage authority. The drainage authority may accept the joint recommendation and proceed with the repair.

c. Revisit Minnesota Statutes §103G.225 and related statutes for clear legislative articulation of when the public shall bear the cost to protect public waters against the impacts of lawful drainage work.

(Statutory language is not offered here, as this recommendation requires a legislative policy decision concerning how the cost to protect public waters from impacts of drainage system work should be allocated as between the drainage system and the public.)

RECOMMENDATION #6: Create replacement alternatives within a CWPMP for a landowner causing wetland impact who may not have a high-valued replacement option on site.

Findings: A CWPMP will incorporate incentives to replacement wetlands within particular areas of the watershed to enhance overall wetland value. As a result, certain landowners may be situated with access to higher-valued restoration options and others may not. CWPMP potential is diminished if a landowner is forced to a lower-valued replacement option.

Recommended actions:

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

a. State authority in Minnesota Statutes §103G.2243 for WCA LGU to establish and manage own watershed-based wetland replacement bank under CWPMP.

103G.2243 LOCAL COMPREHENSIVE WETLAND PROTECTION AND MANAGEMENT PLANS.

Subdivision 2.**Plan contents.**

A comprehensive wetland protection and management plan may:

(1) provide for classification of wetlands in the plan area based on:

(i) an inventory of wetlands in the plan area;

(ii) an assessment of the wetland functions listed in section 103B.3355, using a methodology chosen by the Technical Evaluation Panel from one of the methodologies established or approved by the board under that section; and

(iii) the resulting public values;

(2) vary application of the sequencing standards in section 103G.222, subdivision 1, paragraph (b), for projects based on the classification and criteria set forth in the plan;

(3) vary the replacement standards of section 103G.222, subdivision 1, paragraphs (f) and (g), based on the classification and criteria set forth in the plan, for specific wetland impacts provided there is no net loss of public values within the area subject to the plan, and so long as:

(i) in a 50 to 80 percent area, a minimum acreage requirement of one acre of replaced wetland for each acre of drained or filled wetland requiring replacement is met within the area subject to the plan; and

(ii) in a less than 50 percent area, a minimum acreage requirement of two acres of replaced wetland for each acre of drained or filled wetland requiring replacement is met within the area subject to the plan, except that replacement for the amount above a 1:1 ratio can be accomplished as described in section 103G.2242, subdivision 12; ~~and~~

(4) in a greater than 80 percent area, allow replacement credit, based on the classification and criteria set forth in the plan, for any project that increases the public value of wetlands, including activities on adjacent upland acres; and

(5) establish a bank for replacement credits generated and to be applied within the plan area and administered by the local government unit under terms specified in the plan.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

b. Affirm in Minnesota Statutes §103G.2243 that a WCA LGU, notwithstanding land use law concerning exactions, may: (i) collect fees in lieu of replacement provided fees are used to create or purchase replacement credits meeting CWPMP requirements; and (ii) require as condition of replacement plan approval that a property owner dedicate an easement allowing public resource restoration work.

103G.2243 LOCAL COMPREHENSIVE WETLAND PROTECTION AND MANAGEMENT PLANS.

Subdivision 2.**Plan contents.**

A comprehensive wetland protection and management plan may:

(1) provide for classification of wetlands in the plan area based on:

(i) an inventory of wetlands in the plan area;

(ii) an assessment of the wetland functions listed in section 103B.3355, using a methodology chosen by the Technical Evaluation Panel from one of the methodologies established or approved by the board under that section; and

(iii) the resulting public values;

(2) vary application of the sequencing standards in section 103G.222, subdivision 1, paragraph (b), for projects based on the classification and criteria set forth in the plan;

(3) vary the replacement standards of section 103G.222, subdivision 1, paragraphs (f) and (g), based on the classification and criteria set forth in the plan, for specific wetland impacts provided there is no net loss of public values within the area subject to the plan, and so long as:

(i) in a 50 to 80 percent area, a minimum acreage requirement of one acre of replaced wetland for each acre of drained or filled wetland requiring replacement is met within the area subject to the plan; and

(ii) in a less than 50 percent area, a minimum acreage requirement of two acres of replaced wetland for each acre of drained or filled wetland requiring replacement is met within the area subject to the plan, except that replacement for the amount above a 1:1 ratio can be accomplished as described in section 103G.2242, subdivision 12; and

(4) in a greater than 80 percent area, allow replacement credit, based on the classification and criteria set forth in the plan, for any project that increases the public value of wetlands, including activities on adjacent upland acres;

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(5) provide that a fee may be paid to the local government unit in lieu of replacement under terms providing for the fee to be used to increase wetland values within the plan area and to reasonably reflect the cost of replacing the wetland values being lost; and

(6) require as a condition of replacement plan approval that a property owner dedicate the right to manage hydrologic and vegetative conditions within priority wetland and associated upland areas; there must be an essential nexus between the dedication and the public purpose sought to be achieved by the dedication and the burden of the dedication must bear a rough proportionality to the need created by the proposed activity.

RECOMMENDATION #7: Coordinate USACE Section 404 jurisdiction with a watershed-based CWPMP or other implementing framework.

Findings: A conflicting federal regulatory framework can preclude CWPMP outcomes. The USACE's reserved regulatory prerogative under Section 404 of the Clean Water Act can undermine the benefits of a CWPMP by reducing the CWPMP's ability to deliver more certainty in permitting time and outcome. The alternatives analysis requirement under Section 404 adds to CWPMP cost concerns and undermines certainty in permitting time and outcome that are important benefits of a watershed-wide approach.

Recommended actions:

a. (Non-legislative) Further BWSR coordination with USACE to align Section 404 permitting with CWPMPs, including: (i) readier USACE use of programmatic permits, (ii) USACE consideration of "sector-specific" programmatic permits for drainage system maintenance, and (iii) consistent standards and procedures for fee-in-lieu programs.

(No statutory change.)

RECOMMENDATION #8: Integrate MnDOT right-of-way, other state-managed lands and local road authority activities within a CWPMP framework.

Findings: State agencies may affect higher-valued wetlands or disrupt protected corridors contrary to CWPMP goals. Local road impacts in higher-valued resource areas will be subject to CWPMP disincentives but replacement activity may be outside of plan area and not contribute to desired CWPMP outcomes.

(No statutory change.)

RECOMMENDATION #9: Foster reliability of CWPMP outcomes through coordination of local land use authority and wetland regulatory authority.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

Findings: The local land use authority may regulate wetland impacts under local ordinances and inconsistently with the CWPMP framework. The identity of the WCA LGU may shift after CWPMP investment has been completed, and a new LGU may not be committed to the CWPMP framework and expectations created. Property owner collaboration in a CWPMP framework rests on the reliability of created expectations. Early coordination enhances commitment to framework over intended duration of CWPMP implementation.

(No statutory change.)

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

APPENDIX B

TECHNICAL INFORMATION – HOUSTON ENGINEERING

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund
as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

MEMO

(External Correspondence)

HoustonEngineering Inc.

To: Louis Smith, Smith Partners

From: Greg Bowles, P.E.
Nancy Stowe, P.E.

Date: June 23, 2011

Cc: File Project No. 117261-001

Subject: Scenario A - Wetland Restoration Hydrologic and Nutrient Removal Analysis

Introduction

Agricultural land owners in the Red River Valley have experienced ongoing flooding problems that jeopardize agricultural production, building sites and cause temporary flooding of roadways during larger storm events. Feasible methods of flood control are being considered which will provide future flood protection, as well as benefit to habitat. Scenario A is a hypothetical scenario that was created to investigate how a drainage system might be modified to provide flood control and environmental benefits through wetland restoration. It seems important to note that the function of a drainage system is the drainage of land for agricultural production. Drainage systems can of course also provide some flood control benefit, but normally the open channel of a drainage system is design to convey a much smaller (usually less than 10-year and often less) runoff event than an open channel designed for flood control purposes (usually a 100-year event). Field surface drainage is designed for event smaller conveyance.

The purpose of this analysis is to estimate the hydrologic and nutrient removal benefits of a hypothetical wetland restoration area constructed as a component of a "fictitious" or idealized public drainage system. Several assumptions were necessary to define the watershed and for sizing the wetland restoration area. Agricultural areas typically have ditch drainage systems, and one method of creating a wetland restoration area is to construct an impoundment across the ditch system (i.e., on channel rather than off-channel). For the purposes of analyzing Scenario A, the impoundment was assumed to be on-channel and create a wetland restoration surface area of 75 acres that has an average normal pool depth of 2 feet and an additional bounce of 1 foot resulting from runoff from the 10-year, 24-hour return period event. The wetland restoration is further assumed to be designed with 225 acres of upland buffer corresponding to a 3:1 upland area to wetland area ratio. The drainage area to the wetland restoration area is assumed to be 1,875 acres (3 sq. mi.) corresponding to a 25:1 drainage area to wetland area ratio.

Methodology

Hydrologic models for existing and for proposed conditions (after the wetland restoration) were completed for the 2-year (2.20 inches), 10-year (3.40 inches) and the 100-year (5.00 inches), 24 hour storm events using a HydroCAD model. The model was created assuming the runoff from the entire 1,875 acre drainage area flows to the restored wetland area via sheet flow, shallow concentrated flow, and channelized flow through a ditch system. The slope of the terrain within this drainage area is assumed to be very flat and have a slope of 2 feet per mile. This terrain slope was used in calculating a time of concentration of 543 minutes which was used in

the existing and proposed model. Soil within the Red River Valley is assumed to be type B soil for agricultural lands and type C soil for the upland buffer area surrounding the wetland restoration area. The entire 1,875 acre existing watershed was modeled with a curve number (CN) of 78 (row crop, straight row, good, HGC B). The proposed watershed was modeled with a composite CN of 78 which included 1,500 acres using a CN of 78 (row crop, straight row, good, HGC B), 225 acres using a CN of 71 (meadow, non-grazed, HGC C) and 75 acres using CN of 98 (water surface). The wetland restoration impoundment was designed as a two stage 70-foot long weir (first stage) to allow for a bounce of one foot for the 10-year, 24 hour storm event, and a 200-foot long weir (second stage) to allow for a bounce of 1.4 feet in the 100-year, 24 hour storm event. This bounce criteria of one foot for the 10-year, 24 hour storm event is commonly used by Ducks Unlimited in their wetland restoration designs. Modeling analysis assumed the normal water elevation of the wetland restoration area is the same elevation as the outlet elevation of the impoundment and that there is free discharge downstream. If the scenario included a downstream channel that controlled the flow, the peak runoff rate reduction would be less than the modeled results. The hydrologic model results of existing and proposed conditions are shown in **Table 1**.

Pollutant loading and removal for the hypothetical watershed and restored wetland was performed using version 3.4 of the P8 model – Program for Predicting Polluting Particle Passage thru Pits, Puddles, & Ponds (http://wwalker.net/p8). It was used to estimate the total suspended sediment (TSS), total phosphorus (TP), and total kjeldahl nitrogen (TKN) components of the long-term mass balance.

In order to understand the long-term variability in pollutant loading in the watershed, a 50-year (1961 to 2010) model simulation was carried out. The P8 model requires user input relative to local precipitation and temperature, watershed characteristics, water quality parameters, and treatment device geometry. Hourly precipitation and daily temperature data were obtained at the Minneapolis-St. Paul airport, as it has sufficient data to perform long-term model simulations since the percent of the load removed is primarily of interest. As in the HydroCAD model, the impervious fraction in the watershed was assumed zero, and a CN of 78 was applied. The wetland was assumed to provide 150 AF of permanent pool and 75 AF of flood pool and have a 70-foot long weir as an outlet. The wetland was modeled as a pond in the P8 model and assigned a particle removal scale factor of 3 to account for the effects of vegetation on particle removal rates. Since the wetland was modeled as an on-channel pond, there was no pollutant removal assumed for the upland buffer area.

The simulated weighted average annual pollutant loads, as well as the removal occurring in the hypothetical restored wetland, as predicted by the P8 model, are shown in **Table 2.**

Results

Peak existing and proposed runoff rates for the 2-, 10- and 100-year, 24 hour storm events are shown below.

Table 1 – HydroCAD Modeling Results for Scenario A

Storm Event	Existing Peak Runoff Rates Before Wetland Restoration	Proposed Peak Runoff Rates after Wetland Restoration	Peak Runoff Rate Reduction (%)
2-YR Runoff Event (cfs)	99	63	36%
10-YR Runoff Event (cfs)	246	179	27%
100-YR Runoff Event (cfs)	483	433	10%

Model assumptions:

- Drainage area of 1,875 acres
- Type B soils in agricultural area and type C soil within the wetland buffer area
- CN value = 78 for row crop (straight, good), 71 for meadow (non-grazed), 98 for restoration water surface
- Time of Concentration = 543 minutes (65 min. sheet flow, 250 min. shallow concentrated flow and 228 min. channel flow)
- Slope of terrain is flat (2'/mile)
- Wetland restoration pool has surface area of 75 acres, live storage of 1' and dead storage of 2'.
- Wetland restoration outlet is a two stage outlet with a width of 70 feet and 200 feet. The outlet is sized for a 1' bounce at the 100-year, 24 hour storm event and a 1.4' bounce at the 100-year event.
- Normal water elevation of the wetland restoration area is the same elevation as the outlet elevation of the impoundment.

The results indicate the wetland restoration area will create a peak runoff reduction of 36% for the 2-year, 27% for the 10-year, and 10% for the 100-year, 24 hour storm events. The results also indicate that the wetland restoration area will not change the peak flood volume for this particular scenario. The percentage reductions have not been converted to stage and the change in the area inundated. Therefore an estimate of the area protected by adding storage is not possible.

Table 2 - P8 Modeling Results for Scenario A (based on 50-year period of record)

	Loading Before Wetland Restoration Treatment (lbs/yr)	Loading After Wetland Restoration Treatment (lbs/yr)	Removal (lbs/yr)	Removal Percent (%)
Total Suspended Solids (TSS)	168,294	65,345	102,949	61%
Total Phosphorus (TP)	523	353	170	32%

Total Nitrogen (TKN)	2,331	1,669	662	28%

Model assumptions:

- Drainage area of 1,875 acres
- Minneapolis-St. Paul precipitation records
- No impervious area
- Weir discharge coefficient - 2.66
- Particle Removal Factor = 3 (recommended for vegetation)
- Otherwise P8 defaults

APPENDIX C

TECHNICAL INFORMATION – I & S GROUP

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund
as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

INTRODUCTION

Green Meadows County Ditch No. 43 (***"Ditch 43"***) is located within Green Meadows County near the City of Greenstown and generally flows from south to northeast eventually draining into the Old Corncob River. The contributing watershed to Ditch 43 contains primarily of agricultural land usage and also drains most of the City of Greenstown. Ditch 43 was originally constructed in 1919 and has undergone improvements as recently as 1975. Additional improvements to Ditch 43 are currently under construction and will provide increased conveyance and water quality benefits through the use of grass buffers lining the ditch, two stage ditch, and two (2) detention ponds. These improvements are outlined in ***Figure 1***.

This analysis details the anticipated pollutant removals for three contaminants as a result of the improvements to Ditch 43. Namely, the pollutants studied are Total Suspended Solids (***"TSS"***), Total Phosphorus (***"TP"***), and Total Nitrogen (***"TN"***).

METHODOLOGY

Based on data obtained from the Nation Urban Runoff Program, existing agricultural pollutant loading was determined for TSS, TP, and TN. From an article titled "Pollution From Urban Storm Water Infiltration", existing urban concentrations for TSS, TP, and TN were determined for urban runoff. These values are empirical and represent only an estimation of typical values given the source of the runoff.

Because the treatment practices are deemed either a storm water pond or vegetative filter, the Minnesota Stormwater Manual was referenced to determine the expected percent removal of TSS, TP, and TN for these particular treatments. From these percent removals, an anticipated treated pollutant concentration was determined and the annual pollutant removal was calculated accordingly.

Due to the nature of the data collected from the National Urban Runoff Program, the only contributing factor to the amount of pollutant generated from the adjoining land use was the number of acres treated by the particular BMP; i.e. existing/future flows generated via modeling were unnecessary to compute the annual pollutant removal. Using this data, the annual pollutant removals for the Surge Pond, Two Stage Ditch, and Grass Buffers were calculated.

The estimated urban runoff concentrations determined from "Pollution From Urban Storm Water Infiltration" was provided in a format which necessitated hydrologic and hydraulic modeling. As such, two (2) 6-month storm events were simulated and an annual volume of water passing through the City Pond was obtained and used to compute the annual pollutant removal by the City Pond.

The theoretical Total Maximum Daily Limit (***"TMDL"***) that could be imposed on the system at the downstream end of the future ditch was determined utilizing two (2) 6-month storm events and the existing/treated pollutant concentrations. The flows and concentrations were routed throughout the treatment system and the resulting pollutant concentrations were established at the downstream end of the project. This result represents the lowest TMDL that could be imposed before additional treatment practices would need to be implemented.

ENVIRONMENTAL OUTPUTS

For the described treatment practices, TSS, TP, and TN removals were estimated given the anticipated annual rainfall. These removals were determined for the City Pond, Surge Pond, Two Stage Ditch, and Grass Buffer treatments.

City Pond

The City Pond ultimately treats most of the storm water runoff generated by the City of Greenstown. Approximately 295 acres of land characterized as urban and producing 12 ac-ft annual rainfall runoff drains into this basin. Based on empirical data, it is estimated that the storm water runoff entering the pond possesses a TSS concentration 65 mg/L, TP concentration 0.350 mg/L, and TN concentration 2.0 mg/L. Upon treatment of the storm water, it is anticipated that the TSS, TP, and TN concentrations will be reduced to 10 mg/L, 0.175 mg/L, and 1.4 mg/L, respectively, as outlined in ***Table 1***. The subsequent annual removal of pollutants by the City Pond is 1775 lbs. TSS, 5.7 lbs. TP, and 19.4 lbs. TN, as described in ***Table 2***.

Surge Pond

The Surge Pond treats storm water runoff generated by the portion of the watershed south of the Surge Pond. Included in this runoff are the previously treated flows from the City Pond. In determination of the contaminant removal, the flows treated by the City Pond were not included. Approximately 1395 acres of land classified as agriculture and producing 95 ac-ft annual rainfall runoff empties into the Surge Pond. It is estimated that the storm water runoff entering this pond possesses a TSS concentration 8.5 lbs/ac-yr, TP concentration 0.035 lbs/ac-yr, and TN concentration 14 lbs/ac-yr. Upon treatment of the storm water, it is anticipated that the TSS, TP, and TN concentrations will be reduced to 1.3 lbs/ac-yr, 0.018 lbs/ac-yr, and 9.8 lbs/ac-yr, respectively, as outlined in ***Table 1***. The subsequent annual removal of pollutants by the Surge Pond is 10,045 lbs. TSS, 23.7 lbs. TP, and 5,860 lbs. TN, as described in ***Table 2***.

Two Stage Ditch

The Two Stage Ditch treats storm water runoff generated by the portion of the watershed generally within the center of the catchment. Included in this runoff are the previously treated flows from the City Pond and Surge Pond. As was the case previously, the determination of the contaminant removal neglected the flows treated by the City Pond and Surge Pond. Approximately 260 acres of additional land classified as agriculture and producing 60 ac-ft annual rainfall runoff empties into the Surge Pond. It is estimated that the storm water runoff entering this portion of the ditch possesses a TSS concentration 8.5 lbs/ac-yr, TP concentration 0.035 lbs/ac-yr, and TN concentration 14 lbs/ac-yr. Upon treatment of the storm water, it is anticipated that the TSS, TP, and TN concentrations will be reduced to 1.3 lbs/ac-yr, 0.018 lbs/ac-yr, and 9.8 lbs/ac-yr, respectively, as outlined in ***Table 1***. The subsequent annual removal of pollutants by the Two Stage Ditch is 1,880 lbs. TSS, 4.5 lbs. TP, and 1,095 lbs. TN, as described in ***Table 2***.

Grass Buffers

The Grass Buffers treat storm water runoff generated by the portion of the watershed generally at the downstream portion of the catchment. Included in this runoff are the previously treated flows from the City Pond, Surge Pond, and Two Stage Ditch. The determination of the contaminant removal neglected the flows previously treated by other methods. Approximately 330 acres of additional land classified as agriculture and producing 2,250 ac-ft annual rainfall runoff passes through the portion of Ditch 43 containing Grass Buffers. Important to note, because the Grass Buffers are only capable of treating overland flow, a vast majority of the runoff generated in this area goes untreated. This is due to much of the runoff being captured by field drainage tile and routed to Ditch 43 without treatment. As such, only 300 feet of the portion of land adjacent to Ditch 43 extending out from the ditch was included as part of the treated calculation. It is estimated that the storm water runoff entering this portion of the ditch possesses a TSS concentration 8.5 lbs/ac-yr, TP concentration 0.035 lbs/ac-yr, and TN concentration 14 lbs/ac-yr. Upon treatment of the storm water, it is anticipated that the TSS, TP, and TN concentrations will be reduced to 1.9 lbs/ac-yr, 0.018 lbs/ac-yr, and 9.1 lbs/ac-yr, respectively, as outlined in ***Table 1***. The subsequent annual removal of pollutants by the Grass Buffers is 345 lbs. TSS, 0.9 lbs. TP, and 255 lbs. TN, as described in ***Table 2***.

TOTAL MAXIMUM DAILY LIMITS

The system of storm water treatments utilized throughout the drainage ditch results in TSS, TP, and TN concentrations of 20 mg/L, 0.154 mg/L, and 1.73 mg/L, respectively, before the confluence with the Old Corncob River. In the event that a TMDL were imposed on this waterway, the treated water emerging from the pond and grass buffer treatment system will not exceed the TMDL provided the following:

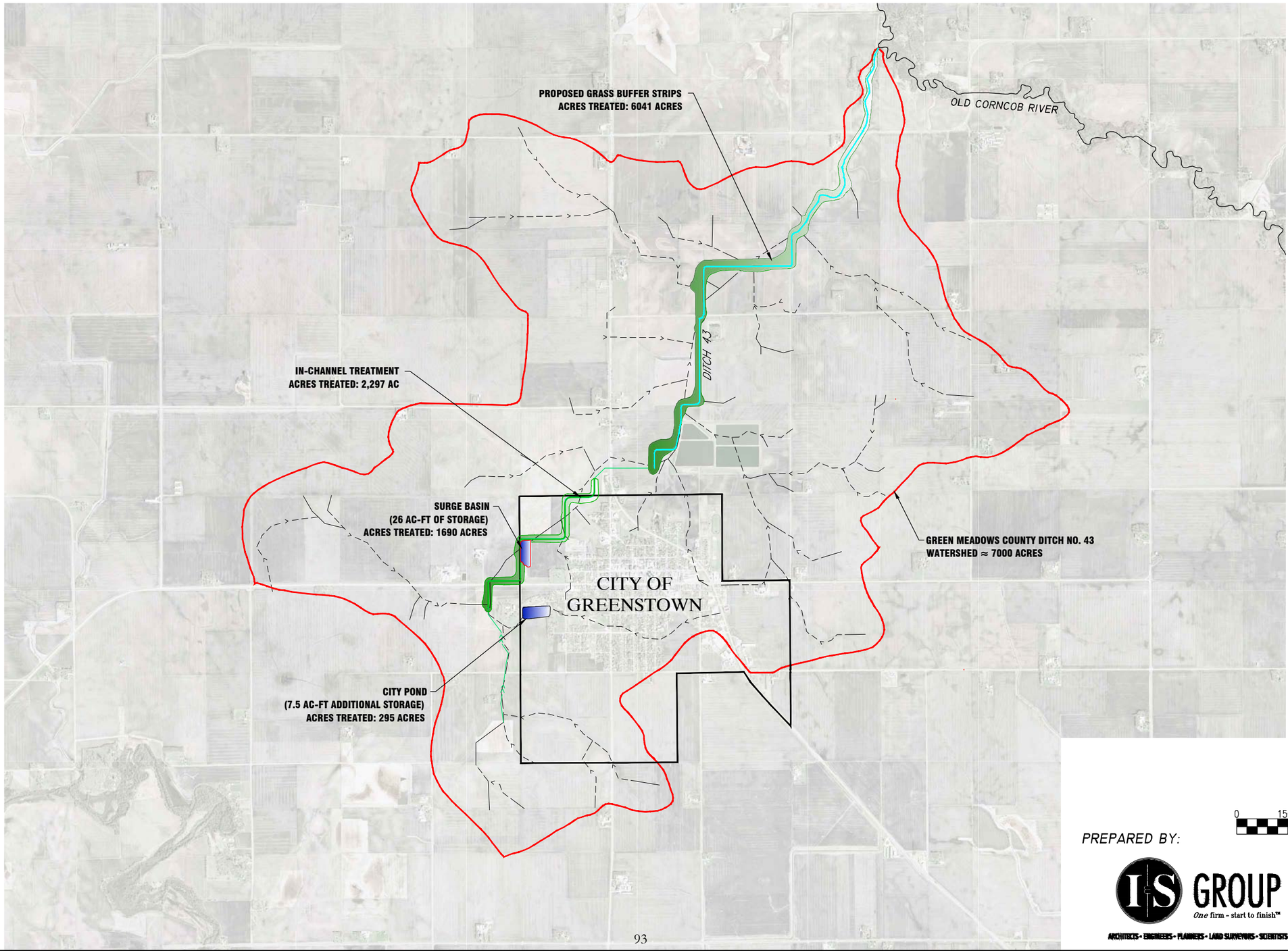
- TSS TMDL ≥ 20mg/L

- TP TMDL ≥ 0.154 mg/L
- TN TMDL ≥1.73 mg/L

If a TMDL was imposed for a particular pollutant below the concentrations listed, additional treatment measures would need to be implemented to ensure compliance.

FIGURE 1. GREEN MEADOWS COUNTY DITCH NO. 43 IMPROVEMENTS

GREEN MEADOWS COUNTY, MINNESOTA



PREPARED BY:

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Scale:

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TABLE 1
GREEN MEADOWS COUNTY DITCH NO. 43
ESTIMATED WATER QUALITY POLLUTANT CONCENTRATIONS BEFORE/AFTER TREATMENT

Pollutant Concentration Summary						
Treatment*	**Total Suspended Solids Concentration Before Treatment (lbs/ac-yr)**	**Total Suspended Solids Concentration After Treatment (lbs/ac-yr)**	**Total Phosphorus Concentration Before Treatment (lbs/ac-yr)**	**Total Phosphorus Concentration After Treatment (lbs/ac-yr)**	**Total Nitrogen Concentration Before Treatment (lbs/ac-yr)**	**Total Nitrogen Concentration After Treatment (lbs/ac-yr)**
City Pond**	65**	10**	0.35**	0.175**	2.0**	1.4**
Surge Pond***	8.5	1.3	0.035	0.018	14.0	9.8
Two Stage Ditch***	8.5	1.3	0.035	0.018	14.0	9.8
Grass Buffers***	8.5	1.9	0.035	0.018	14.0	9.1

*Treatment removal efficiency based on the Minnesota Stormwater Manual.

**Existing pollutant concentrations based on research by Mikkelsen et al. published in 1994.
Pollutant removal derived from the volume of water produced by two simulated six-month rainfall events.
Concentrations listed in mg/L.

***Existing pollutant concentrations based on data collected as part of the National Urban Runoff Program.

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TABLE 2
GREEN MEADOWS COUNTY DITCH NO. 43
ESTIMATED WATER QUALITY POLLUTANT REMOVAL PER YEAR

Pollutant Removal Summary					
Treatment*	**Watershed Area (ac.)**	**Total Flow Treated (ac-ft)**	**Estimated Total Suspended Solids Removal (lb.)**	**Estimated Total Phosphorus Removal (lb.)**	**Estimated Total Nitrogen Removal (lb.)**
City Pond**	295	12	1,775	5.7	19.4
Surge Pond***	1,395	95	10,045	23.7	5,860
Two Stage Ditch***	260	60	1,880	4.5	1,095
Grass Buffers***	330	2,250	345	0.9	255

*Treatment removal efficiency based on the Minnesota Stormwater Manual.

**Existing pollutant concentrations based on research by Mikkelsen et al. published in 1994.
Pollutant removal derived from the volume of water produced by two simulated six-month rainfall events.

***Existing pollutant concentrations based on data collected as part of the National Urban Runoff Program.

APPENDIX D

ECONOMIC ANALYSIS

June 29, 2011
To: Louis Smith, Smith Partners
From: Steven J. Taff

Assessing the total economic value of drainage improvement projects

My task was to think through a relatively transparent and practical procedure to assign total economic values to the agronomic and environment services affected by a given drainage improvement project—Scenarios A and B in the LCCMR project. To an economist, "total economic value" is the sum of monetized changes in all service flows. This is in contrast to "market value," which captures only that money value of actual transactions. Total economic value is one way economists attempt to capture the cost of "externalities," those effects of an action that aren't considered by economic actors (acting under a strict financial calculus) in their decisions.

To properly estimate total economic value, we require valuations for both market and the extra-market impacts of an action. The former is usually simpler, because there exists both a history of market prices and an apparatus for deciding upon "proper" market prices for many activities. In the case of drainage improvements, the Engineering Report and the Viewers' Report (available only for Scenario B) both assign economic values to the market effects of the proposed improvement, using techniques accepted in both professional and judicial circles.

To estimate the value of non-marketed effects, such as changes in water quality or in wildlife habitat, economists have developed a range of tools that can elicit peoples' implicit valuations about these changes. This presupposes, however, that we have at hand a complete set of measures of the physical changes in the environment: how much more water pollution, how much less habitat. These physical measures are not commonly obtained in engineering or viewers' reports. Consequently, for the present effort, we asked the engineers to estimate these numbers.

A drainage project, by its nature, is expected to change both the timing and volume of water flows through the system by changing the retention capacity of various lands through the system.

In Scenario A, the water quality improvement measures include a large retention basin, part of which will be restored to wetland, and a two-stage ditch structure in the upper reaches of the watershed. In Scenario B, the improvement measures consist of increasing the size of the receiving ditch and, simultaneously, retarding the rate of flow by installing intervening surge ponds. In addition, Scenario B calls for increasing the size of buffer areas along the ditch.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

In both scenarios, the retention basin/ponds can be thought of as a change in land use—modeled here as a change from cropland to wetland or grassland. The two-stage ditch, by its design, also results in land use changes by reducing cropland and increasing buffer strips and the bench of the ditch itself. The retention basin/ponds, in retarding the flow of water, are expected to have certain pollution reduction effects, notably in the removal of Nitrogen, Phosphorus, and suspended solids from the system. The buffer areas in Scenario B, by intercepting overland flows, will also reduce these pollutants to some extent. All land use changes will have carbon sequestration impacts.

In the attached models, I work through all these calculations for Scenarios A and B independently, making use of the engineering reports (for both) and the viewers' report for the latter, as well as project advisory team members' suggestions. The result is a complete set of measured physical changes in each system: water flow, pollutant levels, land use changes, and crop production (which is covered in acquisition costs).

In each scenario, I calculate the magnitude distribution of total costs and benefits of the proposed drainage system improvements without and with "water quality improvements," which term I use as shorthand for all changes in environmental services.

To assign dollar values to each of the services, I make use of existing literature on the economics of environmental services and of on-going research in these areas. None of my work creates "new numbers;" rather, it arrays dispersed information in a framework that can be used to assess drainage improvement projects from a perspective wider than is traditional.

I calculate the change in total economic value (for the agronomic and environmental services measured here) of adding water quality improvement measures to a drainage project already proposed. This way, we can compare the costs of these additional measures to their benefits. Not all environmental services are measured here, so the total benefits I estimate are not complete: they could be lower but would likely be higher than that I report, if we were to obtain physical measures of additional environmental services (in a subsequent effort).

Differences between the two arrays are thus the costs and benefits of the water quality improvements themselves.

Assumptions:

Many of the elements in the spreadsheet are self-evident, and specific items are commented. Here are a few that are common to both scenarios:

Project Life: 25 years (consistent with that implicit in Viewers' Report for Scenario B and applied also to Scenario A)

Discount/Interest rate: 5% (consistent with that assumed in the Viewers' Report for Scenario B and applied also to Scenario A). Used in annualizing one-time capital costs. As is customary in

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these reports, all values are in current (2010) dollars. Because inflation is assumed to affect all activities equally over time, it does not have to be explicitly modeled.

Drainage improvements: Project engineers say that drainage improvements without water quality improvements stuff would be "more expensive". I assume 10% more than the amount shown in the Engineering Report for both scenarios. These costs are allocated to the benefitted owners in the system. I treat all local governments as system owners, because benefits are assigned to them in the Viewers' Report.

Drainage repairs: This expenditure is what is needed to keep the system going at its *original* (pre-improvement) design level. These costs are paid by all owners in the system.

Upper watershed storage basins (Scenario B only): I assume that none of the proposed drainage or water quality improvements affect the pollution dispersion capacity of the city's wastewater treatment plant.

Viewers' Report

While I show a summary of the Viewers' Report for Scenario B (both for the Improvements and for the associated Redetermination) for reference, the current version of the model does not make use of most of these numbers. Scenario A does not have a viewers' report. Only the overall benefits estimated with and without the water quality improvements enter into our final calculations. Ron Ringquist, advisory group member, estimates a 5-10% increase in benefits for the WITH situation, because the water quality improvements increase drainage efficiency at upper end of the system. I assume this increase is 10% for both scenarios.

Environmental services

Houston and I&S provide estimates of changes in Phosphorus, suspended solids, Nitrogen, and land cover for the addition of the water quality improvements to their respective drainage plans. I converted their estimates to standard international weights, because the economic values for unit changes of these environmental services are generally in such units. I credit all estimated changes to the water quality improvement portion of the projects.

The Houston report estimates changes in peak flow for Scenario A, but we lack a ready total economic value estimate for changes in this parameter. Instead, for Scenario A, I estimate the economic value of the reduction in flood damages, based on a very approximate value of flood damages associated with a 100-year event in that watershed. I assume that the wetland restoration portion of the retention basin will qualify as "wetlands" and that the entire basin will provide carbon sequestration benefits because of land use change. Wetland habitat values are already captured in the wetland value.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

The I&S report estimates changes in peak flow and peak elevation for Scenario B, we do not have to put a dollar value on them because the project is designed to have identical flow and elevation values with and without the water quality improvements. I assume that both surge ponds will qualify as "wetlands" and that both the ponds and the buffer areas will provide carbon sequestration benefits because of land use change. The buffer areas will also provide habitat benefits. Wetland habitat values are already captured in the wetland value.

Unit value of environmental services

I make use of existing unit values, localized to southern or western Minnesota where possible. Although these numbers are known to be widely variable, but I report only point estimates here. The spreadsheet permits subsequent users to enter different values, if known/asserted.

Phosphorus: In forthcoming work by Pennington and Dalzell (pers. comm.), Phosphorus reductions are estimated to be "worth" $274/kg. This number is probably the most uncertain of all of those used in the present report, but it is similar to that used in Kovacs et al.

Suspended sediments: Hanson and Ribaudo suggests $6-7/ton of avoided sediment in water bodies in this area.

Carbon sequestration: I use $62/Mg, the 33% level for the distribution of avoided carbon release through land use change from Tol.

Nitrogen: In forthcoming work by Pennington and Dalzell (pers. Comm.), Nitrogen reductions from changing crop land to grass land are estimated to be $2/kg. This is similar, on average, to that used in Kovacs et al.

Wetlands: I use Brander et al. fresh water marsh median value, adjusted to 2010 dollars.

Habitat: I use the average cost (in 2010 dollars) of Minnesota DNR Scientific and Natural Area purchase costs, from Kovacs et al.

Value of environmental series from water quality improvements

Each of the changes in physical flows estimated by the engineers are multiplied by the unit values discussed above to give estimated annual economic value of the changes in the flow of environmental services created by the water quality improvement additions to the drainage project. In Scenario A, Phosphorus and flood damage reduction are the largest environmental service values. In Scenario B, Nitrogen and Phosphorus values are dominant.

Distribution of costs

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

This section of the model summarizes and annualizes the initial cost arrays, breaking them down into two classes of payers: system owners (which class includes local governments) and the broader public. In Scenario B nearly all the costs are to be paid by system owners, while in Scenario A the State is a major financial participant. These costs—and measured drainage and environmental benefits—could have been broken down into a finer mesh of recipients (such as lake owners, hunters, taxpayers, etc.), but such detail was beyond the scope of this project.

Annual change from water quality improvement

Here I simply group all calculated *annual* costs and benefits from adding the water quality improvements to the drainage project. For Scenario B, the system owners pay $13,750 (including the cost reduction in the drainage project itself) and non-local public entities pay $2,700. Everyone, including system owners, gains $12,404 in increased environmental services. For Scenario A, the values are $1,925 *less* for system owners, $42,975 for non-local entities, and $53,915 for environmental services.

Recommendations

To add information to the drainage authority's decision context, the State might consider requiring a few additional elements to the engineering report. These could be made consistent and routine by standardizing some of the numbers and procedures to be used.

I further suggest that all engineering reports, in addition to the current practice of estimating changed peak levels and flows at the outlet, be required also to calculate changes in pollutants (Nitrogen, Phosphorus, and suspended solids) and a change matrix in land use (X acres from crop to grass, Y acres from grass to ponds, etc.). The specific calculation protocols could be developed through a statewide body such as the Drainage Work Group, which is already in operation. The result would be similar to the attached spreadsheet table Environmental Services, described above.

At the same time, the State should develop, through the Drainage Work Group, a "standard environmental service unit value" schedule similar to that used in the attached spreadsheet, adjusted for regional conditions.

The Engineer's specific project estimated environmental services changes could then be combined with the official State unit values for the locality to come up with a total economic value for environmental services provided by the proposed project. This number would then be available to the drainage authority and to the State in the consideration of drainage system improvement proposals.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund
as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

References

Brander, L.M., R.J.G.M. Florax, and J. E. Vermaat. The Empirics of Wetland Valuation: A Comprehensive Summary and a Meta-Analysis of the Literature. Environmental & Resource Economics (2006) 33: 223–250.

Hansen, L. and M. Ribaudo. Economic Measures of Soil Conservation Benefits: Regional Values for Policy Assessment. USDA Economic Research Service, Technical Bulletin Number 1922. September 2008.

Kovacs, K.F., D. Pennington, B. Keeler, D. Kessler, J. O. Fletcher, S. Polasky, and S. J. Taff. Return on Investment in Conservation: An Economic Analysis of Ecosystem Services from Land Acquisitions by the Minnesota Department of Natural Resources. A report to the Trust for Public Land. December 21, 2010.

Tol, R.S.J. 2009. The economic effects of climate change. Journal of Economic Perspectives 23(2): 29–51.

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

Scenario A

watershed size	38,400
all prices in 2010 dollars	
project life	25
discount rate	0.05

Engineer's report

drainage without conservation measures

	improvement owners	non-government system owners	city	county	township	total system owners	lakeshore owners	lake users	state	public total	TOTAL
drainage repairs						-				-	-
road crossing improvements				190,000		190,000				-	190,000
drainage improvements	1,265,000					1,265,000				-	1,265,000
retention area easements						-				-	-
wetland restoration extra cost						-				-	-
upland restoration extra cost						-				-	-
two-stage ditch sections						-				-	-
TOTAL	1,265,000	-	-	190,000	-	1,455,000	-	-	-	-	1,455,000
annual payment	63,250	-	-	9,500	-	72,750	-	-	-	-	72,750

drainage with conservation measures

	improvement owners	non-government system owners	city	county	township	total system owners	lakeshore owners	lake users	state	public total	TOTAL
drainage repairs						-				-	-
road crossing improvements				171,000		171,000				-	171,000
drainage improvements	1,150,000					1,150,000				-	1,150,000
retention area easements	78,000					78,000			702,000	702,000	780,000
wetland restoration extra cost	9,000					9,000			81,000	81,000	90,000
upland restoration extra cost	4,500					4,500			40,500	40,500	45,000
two-stage ditch sections	4,000					4,000			36,000	36,000	40,000
TOTAL	1,245,500	-	-	171,000	-	1,416,500	-	-	859,500	859,500	2,276,000
annual payment	62,275	-	-	8,550	-	70,825	-	-	42,975	42,975	113,800

Environmental services

		quantity of environmental service (at outlet)		
		drainage without conservation measures	drainage with conservation measures	change from without to with (calculated)
TMDL	Phosphorus (kg/yr)	230.5	155.9	75
	suspended solids (t/yr)	81.2	31.5	50
non TMDL	Carbon sequestration (Mg/yr)	-	77	77
	Nitrogen (kg/yr)	1,026.8	735.9	291
	wetlands (acres)	-	75.0	75
	habitat (acres)	-	225.0	225
non-environment externality	peak flow (cfs)	483.0	433.0	50.0

Unit value of environmental services

TMDL	Phosphorus $/kg	274
	suspended solids $/ton	7
non TMDL	Carbon sequestration $/Mg	62
	Nitrogen $/kg	2
	wetlands $/acre/yr	61
	habitat $/acre/yr	20
non-environment externality	peak flow $/cfs	

pennington crop to prairie

mean SS $/a/y	5.42	mean P $/a/y	71.7
mean SS t/a/y	0.828	mean P kg/a/y	0.262
SS $/t	6.5	P $/kg	273.7
mean C $/a/y	15.8	mean N $/a/y	
mean C Mg/a/y	0.256	mean N kg/a/y	
C $/t	61.7	N $/kg	#DIV/0!

Value of environmental services from conservation measures

		change from without to with conservation measures
TMDL	Phosphorus	20,400
	suspended solids	326
non TMDL	Carbon sequestration	4,740
	Nitrogen	570
	wetlands	4,573
	habitat	4,556
non-environment externality	flood damamge	18,750
TOTAL		53,915

single-event flood damage	187,500
percent reduction in peak flow	0.1

	drainage without conservation measures			drainage with conservation measures			changed without to with conservation measures		
Annual expenditures	**owners**	**public**	**TOTAL**	**owners**	**public**	**TOTAL**	**owners**	**public**	**TOTAL**
drainage repairs	-	-	-	-	-	-	-	-	-
road crossing improvements	9,500	-	9,500	8,550	-	8,550	(950)	-	(950)
drainage improvements	63,250	-	63,250	57,500	-	57,500	(5,750)	-	(5,750)
retention area easements	-	-	-	3,900	35,100	39,000	3,900	35,100	39,000
wetland restoration extra cost	-	-	-	450	4,050	4,500	450	4,050	4,500
upland restoration extra cost	-	-	-	225	2,025	2,250	225	2,025	2,250
two-stage ditch sections	-	-	-	200	1,800	2,000	200	1,800	2,000
TOTAL EXPENDITURES	72,750	-	72,750	70,825	42,975	113,800	(1,925)	42,975	41,050

annual change from conservation measures	
drainage improvement costs to system owners	(6,700)
cost of water quality improvements to system owners	4,775
cost of water quality improvements to non-local public entities	42,975
environmental services	53,915

Scenario B

all prices in 2010 dollars	
project life	25
discount rate	0.05

Engineer's report

drainage without water quality improvements

	drainage improvement owners	non-government system owners	city	county	township	total system owners	lakeshore owners	lake users	state	public total	TOTAL
drainage repairs		575,000				575,000				-	575,000
road crossing improvements				190,000		190,000				-	190,000
drainage improvements	231,000					231,000				-	231,000
upper watershed storage basins						-				-	-
two-stage ditch sections						-				-	-
in-channel sediment storage						-				-	-
native grass buffers--open ditch						-				-	-
TOTAL	231,000	575,000	-	190,000	-	996,000	-	-	-	-	996,000
annual payment	11,550	28,750	-	9,500	-	49,800	-	-	-	-	49,800

drainage with water quality improvements

	drainage improvement owners	all system owners	city	county	township	total system owners	lakeshore owners	lake users	state	public total	TOTAL
drainage repairs		575,000				575,000				-	575,000
road crossing improvements				190,000		190,000				-	190,000
drainage improvements	210,000					210,000				-	210,000
upper watershed storage basins	25,000		125,000	100,000		250,000				-	250,000
two-stage ditch sections	4,000			36,000		40,000				-	40,000
in-channel sediment storage	3,000					3,000			27,000	27,000	30,000
native grass buffers--open ditch	3,000					3,000			27,000	27,000	30,000
TOTAL	245,000	575,000	125,000	326,000	-	1,271,000	-	-	54,000	54,000	1,325,000
annual payment	12,250	28,750	6,250	16,300	-	63,550	-	-	2,700	2,700	66,250

Viewers report

Improvement	"market impact"	improvement rate	"benefit value"	acres/feet	"potential benefits"	"gross benefits"	system average efficiency rate	"net benefits to landowners"	
township								904	
city									
county								419	
state								1,638	
road benefits								2,961	
city									
a	2,480.0	0.6	1,488.00	100	248,000	148,800	0.17	25,198	0.17
b	2,100.0	0.85	1,785.00	167	350,700	298,095	0.17	50,481	
c	815.0	0.9	733.50	1,087	885,905	797,315	0.17	135,020	
d	375.0	0.9	337.50	361	135,375	121,838	0.17	20,632	
e (tile)	1.5	0.9	1.35	3,450	5,175	4,658	0.17	789	
land benefits								232,121	

total benefits from drainage improvements	235,082
total benefits from drainage improvements with conservation measures	258,590

Redetermination	"market impact"	improvement rate	"benefit value"	acres/feet	"potential benefits"	"gross benefits"	system average efficiency rate	"net benefits to landowners"	
township								20,113	
city									
county								54,660	
state								66,504	
road benefits								141,277	
city					1,285,000	858,000	0.79	678,544	
a	2,480.0	0.6	1,488.00	215	533,200	319,920	0.79	253,007	0.79
b	2,100.0	0.85	1,785.00	511	1,073,100	912,135	0.79	721,356	
c	815.0	0.9	733.50	3,366	2,743,290	2,468,961	0.79	1,952,562	
d	375.0	0.9	337.50	881	330,375	297,338	0.79	235,147	
e (tile)	1.5	0.9	1.35	118,900	178,350	160,515	0.79	126,942	
land benefits								3,967,558	
total benefits FROM REPAIRS								4,108,835	

Environmental services

		quantity of environmental service (at outlet)			
		drainage without conservation measures	drainage with conservation measures	change from without to with (calculated)	change from without to with (I&S)
TMDL	Phosphorus (kg/yr)			16	16
	suspended solids (t/yr)			7	7
non TMDL	Carbon sequestration (Mg/yr)			9	
	Nitrogen (kg/yr)			3,279	3,279
	wetlands (acres)			7.0	7.0
	habitat (acres)			29.9	29.9
non-environment externality	peak flow (cfs)	747.0	747.0	-	
	peak elevation (feet)	986.3	986.3	-	

Unit value of environmental services

TMDL	Phosphorus $/kg	274
	suspended solids $/ton	7
	Carbon sequestration $/Mg	62
non TMDL	Nitrogen $/kg	2
	wetlands $/acre/yr	61
	habitat $/acre/yr	20
non-environment externality	peak flow $/cfs/yr	
	peak elevation $/ft/yr	

pennington crop to prairie

mean SS $/a/y	5.42	mean P $/a/y	71.7
mean SS t/a/y	0.828	mean P kg/a/y	0.262
SS $/t	6.5	P $/kg	273.7

mean C $/a/y	15.8	mean N $/a/y	
mean C Mg/a/y	0.256	mean N kg/a/y	
C $/t	61.7	N $/kg	#DIV/0!

Value of environmental services from water quality improvements

		change from without to with conservation measures
TMDL	Phosphorus	4,320
	suspended solids	46
	Carbon sequestration	582
non TMDL	Nitrogen	6,427
	wetlands	424
	habitat	605
non-environment externality	peak flow	-
	peak elevation	-
TOTAL		12,404

	drainage without conservation measures			drainage with conservation measures			changed without to with conservation measures		
Annual expenditures	**owners**	**public**	**TOTAL**	**owners**	**public**	**TOTAL**	**owners**	**public**	**TOTAL**
drainage repairs	28,750	-	28,750	28,750	-	28,750	-	-	-
road crossing improvements	9,500	-	9,500	9,500	-	9,500	-	-	-
drainage improvements	11,550	-	11,550	10,500	-	10,500	(1,050)	-	(1,050)
upper watershed storage basins	-	-	-	12,500	-	12,500	12,500	-	12,500
two-stage ditch sections	-	-	-	2,000	-	2,000	2,000	-	2,000
in-channel sediment storage	-	-	-	150	1,350	1,500	150	1,350	1,500
native grass buffers--open ditch	-	-	-	150	1,350	1,500	150	1,350	1,500
TOTAL EXPENDITURES	49,800	-	49,800	63,550	2,700	66,250	13,750	2,700	16,450

annual change from water quality improvement	
drainage improvement costs to system owners	(1,050)
drainage improvement benefits to system owners	1,175
net cost of water quality improvements to system owners	14,800
cost of water quality improvements to non-local public entities	2,700
environmental services	12,404

APPENDIX E

STUDY ADVISORY COMMITTEE

Name	Affiliation
Ray Bohn	Minnesota Association of Watershed Districts
Gary Botzek	Minnesota Conservation Federation
Mark Dittrich	Minnesota Department of Agriculture
Les Everett	University of Minnesota Water Resources Center
Warren Formo	Minnesota Agriculture Water Resources Coalition
Annalee Garletz	Minnesota Association of Counties
Ron Harnack	Red River Watershed Management Board
Al Kean	Minnesota Board of Water and Soil Resources
Rick Moore	MSU-Mankato Water Resources Center
Lance Ness	Minnesota Fish & Wildlife Legislative Alliance
Ron Ringquist	Minnesota Viewers Association
Doug Thomas	Comfort Lake Forest Lake Watershed District
Henry Van Offelen	Minnesota Center for Environmental Advocacy

Meeting	Date	Agenda
1	12-14-09	Problem Statement; Critical Issues Identification
2	7-21-10	Legal Review; Critical Issues Analysis
3	9-9-10	Scenario A Development
4	10-14-10	Scenario B, Scenario C Development
5	11-30-10	Scenario B Development; Scenario C Policy Issues
6	2-18-11	Scenario C, Analysis
7	3-31-11	Scenario B, Preliminary Economic Analysis
8	5-6-11	Scenario B, Economic Analysis; Scenario A
9	5-26-11	Draft Recommendations

Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund
as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

NUMERICAL WATER QUALITY STANDARDS FOR MINNESOTA CLASS 2 WATERS; FOR THE PROTECTION OF AQUATIC LIFE AND HUMAN HEALTH (DRINKING WATER AND RECREATIONAL USE)

All units are in micrograms per liter: µg/L (parts per billion) unless noted otherwise.

CHEMICAL	STANDARDS					
	Class 2A			Class 2Bd		
	CS	MS#	FAV	CS	MS#	FAV
Acenaphthene	20	56	112	20	56	112
Acetochlor	3.6	86	173	3.6	86	173
Acrylonitrile (c)	0.38	1140	2281	0.38	1140	2281
Alachlor (c)	3.8	800	1600	4.2	800	1600
Aluminum, total	87	748	1496	125	1072	2145
Ammonia, un-ionized	16	none	none	40	none	none
Anthracene	0.035	0.32	0.63	0.035	0.32	0.63
Antimony	5.5	90	180	5.5	90	180
Arsenic, total	2.0	360	720	2.0	360	720
Atrazine	3.4	323	645	3.4	323	645
Benzene (c)	5.1	4487	8974	6	4487	8974
Biological standards (Indices of Biological Integrity)	See Minn. R. 7050.0222; Other than Tiered Aquatic Life Use standards within stream types, biological standards are not comparable in terms of stringency					
Bromoform	33	2900	5800	41	2900	5800
Cadmium, total *	1.1	3.9	7.8	1.1	33	67
Carbon Tetrachloride (c)	1.9	1750	3500	1.9	1750	3500
Chlordane (c)	0.000073	1.2	2.4	0.00029	1.2	2.4
Chloride mg/L	230	860	1720	230	860	1720
Chlorine, total residual	11	19	38	11	19	38
Chlorobenzene (Monochlorobenzene)	20	423	846	20	423	846
Chloroform (c)	53	1392	2784	53	1392	2784
Chlorpyrifos	0.041	0.083	0.17	0.041	0.083	0.17
Chromium III, total *	207	1735	3469	207	1735	3469
Chromium VI, total	11	16	32	11	16	32
Cobalt	2.8	436	872	2.8	436	872

Color value Pt/Co	30	none	none		none	none	none
Copper, total *	9.8	18	35		9.8	18	35
Cyanide, free	5.2	22	45		5.2	22	45
DDT (c)	0.00011	0.55	1.1		0.0017	0.55	1.1
1,2-Dichloroethane (c)	3.5	45050	90100		3.8	45050	90100
Dieldrin (c)	0.0000065	1.3	2.5		0.000026	1.3	2.5
Di-2-ethylhexyl phthlate (bis--)(DEHP)	1.9	none	none		1.9	none	none
Di-n-octyl phthalate	30	825	1650		30	825	1650
Endosulfan	0.0076	0.084	0.17		0.029	0.28	0.56
Endrin	0.0039	0.09	0.18		0.016	0.09	0.18
Escherichia (E.) coli	see Minn. R. 7050.0222						
Ethylbenzene	68	1859	3717		68	1859	3717
Eutrophication	See Minn. R. 7050.0222; eutrophication standards are regionalized; however there is no difference between standards for warm and cold water eutrophication standards.						
Fluoranthene	1.9	3.5	6.9		1.9	3.5	6.9
Heptachlor (c)	0.00010	0.26	0.52		0.00039	0.26	0.52
Heptachlor Epoxide (c)	0.00012	0.27	0.53		0.00048	0.27	0.53
Hexachlorobenzene (c)	0.000061	none	none		0.00024	none	none
Lead, total *	3.2	82	164		3.2	82	164
Lindane (BHC-gamma) (c)	0.0087	1.0	2.0		0.032	4.4	8.8
Mercury, total in water	0.0069	2.4	4.9		0.0069	2.4	4.9
Mercury, total in edible fish, mg/kg	0.0002	none	none		0.0002	none	none
Methylene Chloride (c) (Dichloromethane)	45	13875	27749		46	13875	27749
Metolachlor	23	271	543		23	271	543
Naphthalene	65	409	818		81	409	818
Nickel, total *	158	1418	2836		158	1418	2836
Oil	500	5000	10000		500	5000	10000
Oxygen, dissolved, mg/L (as a daily minimum)	7	none	none		5	none	none
Parathion	0.013	0.07	0.13		0.013	0.07	0.13
Pentachlorophenol (PCP) **	0.93	9.1	18		1.9	9.1	18

pH minimum, standard units	6.5	none	none		6.5	none	none
pH maximum, standard units	8.5	none	none		9.0	none	none
Phenanthrene	3.6	32	64		3.6	32	64
Phenol	123	2214	4428		123	2214	4428
Polychlorinated biphenyls, total (c)	0.000014	1.0	2.0		0.000029	1.0	2.0
Radioactive materials (see 7050.0222)	see Minn. R. 7050.0222						
Selenium, total	5.0	20	40		5.0	20	40
Silver *	0.12	2.0	4.1		1.0	2.0	4.1
Temperature (see 7050.0222)	see Minn. R. 7050.0222						
1,1,2,2-Tetrachloroethane (c)	1.1	1127	2253		1.5	1127	2253
Tetrachloroethylene (c)	3.8	428	857		3.8	428	857
Thallium	0.28	64	128		0.28	64	128
Toluene	253	1352	2703		253	1352	2703
Toxaphene (c)	0.00031	0.73	1.5		0.0013	0.73	1.5
1,1,1-Trichloroethane	329	2957	5913		329	2957	5913
1,1,2-Trichloroethylene (c)	25	6988	13976		25	6988	13976
2,4,6-Trichlorophenol	2.0	102	203		2.0	102	203
Total Suspended Solids (see 7050.0222)	see Minn. R. 7050.0222						
Vinyl Chloride (c)	0.17	none	none		0.18	none	none
Xylene (total m,p and o)	166	1407	2814		166	1407	2814
Zinc, total *	106	117	234		106	117	234
Disclaimer							
The water quality standards listed in this table are a subset of all the standards applicable to waters of the state, and they should not be used without consulting							
Minn. Rules Chapter 7050 for the complete and official listing of all standards applicable to waters of the state.							
Footnotes, Explanation of Terms and Abbreviations							
CS = Chronic Standard (Most stringent standard to protect aquatic life or human health)							
MS = Maximum Standard (aquatic life based only)							

MS# = CS x 100 (IF the MS is more than 100x the CS, the MS is replaced by 100x the CS; this is to limit high concentrations of a toxic pollutant to levels closer to the CS that has to be met in/outside the effluent mixing zone)
FAV = Final Acute Value (aquatic life based only; see Minn. R. 7050.0222 for details)
Class 2A = Cold water fisheries and aquatic community (supports trout and salmon); also protected as a source of drinking water
Class 2Bd = Cool or warm water fisheries and aquatic community; also protected as a source of drinking water
(c) = Chemical is assumed to be a human carcinogen
*Standard varies with ambient total hardness; values shown are for a total hardness of 100 mg/L
**Standard varies with ambient pH; values shown are for a pH of 7.0