DECISION DOCUMENT FOR THE APPROVAL OF MINNESOTA'S 2010 SECTION 303(d) LIST

The U.S. Environmental Protection Agency has conducted a complete review of Minnesota's 2010 Section 303(d) list and supporting documentation and information. Based upon this review, EPA has determined that Minnesota's list of water quality limited segments (WQLS) still requiring total maximum daily loads (TMDLs) meets the requirements of Section 303(d) of the Clean Water Act (CWA or the Act) and EPA's implementing regulations. Therefore, EPA hereby approves Minnesota's 2010 303(d) list. The statutory and regulatory requirements, and EPA's review of Minnesota's compliance with each requirement, are described in detail below.

I. Statutory and Regulatory Background

A. Identification of Water Quality Limited Segments for Inclusion on the Section 303(d) List

Section 303(d)(1) of the Act directs States to identify those waters within their jurisdiction for which effluent limitations required by Section 301(b)(1)(A) and (B) are not stringent enough to implement any applicable water quality standard, and to establish a priority ranking for such waters, taking into account the severity of the pollution and the uses to be made of such waters. The Section 303(d) listing requirement applies to waters impaired by point and/or nonpoint sources, pursuant to EPA's long-standing interpretation of Section 303(d).

EPA regulations provide that States do not need to list waters where the following controls are adequate to implement applicable standards: (1) technology-based effluent limitations required by the Act, (2) more stringent effluent limitations required by State or local authority, and (3) other pollution control requirements required by State, local, or federal authority.[1]

B. Consideration of Existing and Readily Available Water Quality-Related Data and Information

In developing Section 303(d) lists, States are required to assemble and evaluate all existing and readily available water quality-related data and information, including, at a minimum, consideration of existing and readily available data and information about the following categories of waters: (1) waters identified as partially meeting or not meeting designated uses, or identified as threatened in the State's most recent Section 305(b) report; (2) waters for which dilution calculations or predictive modeling indicate nonattainment of applicable standards; (3) waters for which water quality problems have been reported by governmental agencies, members of the public, or academic institutions; and (4) waters identified as impaired or threatened in any

[1] 40 CFR §130.7(b)(1).

Section 319 nonpoint assessment submitted to EPA.[2] In addition to these minimum categories, States are required to consider any other data and information that is existing and readily available. EPA's 1991 Guidance for Water Quality-Based Decisions describes categories of water quality-related data and information that may be existing and readily available.[3] While States are required to evaluate all existing and readily available water quality-related data and information, States may decide to rely or not rely on particular data or information in determining whether to list particular waters.

In addition to requiring States to assemble and evaluate all existing and readily available water quality-related data and information, EPA regulations at 40 CFR §130.7(b)(6) require States to include, as part of their submissions to EPA, documentation to support decisions to rely or not rely on particular data and information and decisions to list or not list waters. Such documentation needs to include, at a minimum, the following information: (1) a description of the methodology used to develop the list; (2) a description of the data and information used to identify waters; and (3) any other reasonable information requested by the Region.[4]

C. Priority Ranking

EPA regulations codify and interpret the requirement in Section 303(d)(1)(A) of the Act that States establish a priority ranking for listed waters. The regulations at 40 CFR §130.7(b)(4) require States to prioritize waters on their Section 303(d) lists for TMDL development, and also to identify those WQLSs targeted for TMDL development in the next two years.[5] In prioritizing and targeting waters, States must, at a minimum, take into account the severity of the pollution and the uses to be made of such waters.[6] As long as these factors are taken into account, the Act provides that States establish priorities. States may consider other factors relevant to prioritizing waters for TMDL development, including immediate programmatic needs, vulnerability of particular waters as aquatic habitats, recreational, economic, and aesthetic importance of particular waters, degree of public interest and support, and State or national policies and priorities.[7]

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[2] 40 CFR §130.7(b)(5).
[3] Guidance for Water Quality-Based Decisions: The TMDL Process, U.S. EPA Office of Water, 1991, Appendix C (hereafter, EPA's 1991 Guidance).
[4] 40 CFR §130.7(b)(6).
[5] 40 CFR §130.7(b)(4).
[6] CWA Section 303(d)(1)(A).
[7] 57 FR 33040, 33045 (July 24, 1992); see also EPA's 1991 Guidance.

II. Analysis of Minnesota's Submission

On March 30, 2010, Minnesota submitted to EPA the State's final draft TMDL list, plus supporting documentation. The submittal received by EPA included the following:

- Submittal letter, March 30, 2010
- Final Draft MPCA 2010 303(d) List cover page, February 4, 2010
- Three (3) copies of the final draft TMDL list, February 4, 2010
- Guidance Manual for Assessing the Quality of Minnesota Surface Waters for Determination of Impairment: 305(b) Report and 303(d) List 2010 Assessment Cycle
- Inventory of all impaired waters, February 4, 2010
- New to list in 2010, January 11, 2010
- Changes, initial to final draft, no date
- New to inventory in 2010, January 11, 2010
- New removals from the 2010 Inventory, no date
- De-listings from the inventory, January 11, 2010
- 2010 Hg TMDL additions to Appendix A, January 11, 2010
- Public participation materials including
    - 2010 TMDL List Response Summary
    - Public comments received
    - Responses to comments
    - Copies of data solicitation efforts
    - Copies of mass mailings
    - Public notice announcements
    - Attendance sheets from public meetings

On April 6, 2010, EPA received an electronic mail message transmitting an additional public comment letter and State response that were not included in the March 30, 2010 submittal. In today's decision, the State's submittals of March 30 and April 6 and other supporting information are collectively referred to as the "2010 Submittal." All of this information is compiled in EPA's record for this decision.

EPA has reviewed Minnesota's 2010 submittal, and has concluded that the State developed its Section 303(d) list in compliance with Section 303(d) of the Act and 40 CFR §130.7. EPA's review is based on its analysis of whether the State reasonably considered existing and readily available water quality-related data and information, and reasonably identified water quality-limited segments. EPA has reviewed the State's description of data, information considered, and

the Minnesota Pollution Control Agency's (MPCA) 2010 Methodology[8] for identifying waters. EPA concludes that Minnesota properly assembled and evaluated existing and readily available data and information, including data and information relating to categories of waters specified at 40 CFR §130.7(b)(5). EPA also concludes that Minnesota provided an acceptable rationale for not relying on particular existing and readily available water quality-related data and information as a basis for listing waters on the 303(d) list.

EPA has also determined that the State properly listed waters with nonpoint sources causing or expected to cause impairment, consistent with Section 303(d) of the Act and EPA guidance. Section 303(d) lists are to include all WQLSs still needing TMDLs, regardless of whether the source of the impairment is a point and/or nonpoint source. EPA's long-standing interpretation is that Section 303(d) applies to waters impacted by point and/or nonpoint sources. In *Pronsolino v. Marcus*, the 9th Circuit for the Northern District of California held that Section 303(d) of the CWA authorizes EPA to identify and establish TMDLs for waters impaired by nonpoint sources.

EPA's approval of Minnesota's 2010 303(d) list extends to water bodies as identified in Table 1 of this decision with the exception of those waters that are within Indian Country. EPA is taking no action to approve or disapprove the State's list with respect to those waters that are within Indian Country. EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under Section 303(d) for those waters.

A. Identification of Water Quality-Limited Segments for Inclusion on Section 303(d) List

1. Minnesota's 2010 303(d) list

Minnesota uses an integrated report to fulfill the reporting requirements of Sections 305(b) and 303(d) of the Act. Since the 2002 listing cycle, EPA has encouraged states to integrate their 305(b) report and their 303(d) list. EPA has recommended five reporting categories where the various categories represent varying levels of use attainment. Minnesota has chosen to use the recommended five categories with the addition of several subcategories. Minnesota's 2010 integrated report includes the following categories.[9]

Integrated Report Category	Description
1	all designated uses are met and no use threatened
2	some uses are met; no use threatened; insufficient data to assess other uses

[8] *Guidance Manual for Assessing the Quality of Minnesota Surface Waters for Determination of Impairment: 305(b) Report and 303(d) List, 2010 Assessment Cycle* (October 2009).
[9] 2010 Methodology at 28-29.

3A	no data or information to determine if any use is attained
3B	data available and generally indicate nonsupport of use but insufficient data and information to determine impairment
3C	data available but no available assessment tool
3D	data are available and generally indicate support of use but insufficient data and information to assess for placement in category 1 or 2
3E	data available but insufficient data and information to determine level of support or impairment
4A	impaired or threatened but all needed TMDLs completed
4B	impaired or threatened but no TMDL needed because standards expected to be attained in near future
4C	impaired or threatened but no TMDL required because impairment not caused by a pollutant
4D	Impaired or threatened but no TMDL anticipated because data suggests impairment solely result of natural sources
5A	Impaired or threatened by multiple pollutants and no approved TMDLs
5B	Impaired or threatened by more than one pollutant and at least one pollutant has been addressed by an approved TMDL or at least one impairment is included in category 4
5C	Impaired or threatened by one pollutant and no approved TMDL

The general process used by Minnesota to develop the 2010 integrated report starts with the collection and assessment of readily available data and information. Following guidelines established in MPCA's 2010 Methodology an assessment of use support for individual water body units is made.

The water body unit used for river system assessments is the river reach. A river reach typically extends from one significant tributary river to another or from the headwaters to the first significant tributary. River reaches are typically less than 20 miles in length. A river reach may be further divided into two or more assessment reaches when there is a change in use classification or when there is a significant morphological feature. The Unites States Geological Survey (USGS) eight digit hydrologic unit code plus a three digit reach code comprise the River ID# used to identify a specific river reach being assessed. MPCA relies on the Minnesota Department of Natural Resources' Bulletin 25 to provide an identification code to lakes and wetlands. Bulletin 25 provides a unique identification number to all lakes greater than 10 acres. A 6-digit code is assigned to each lake. A 2-digit suffix is added as a basis for defining distinct bays in a lake. Together, the 6-digit code and 2-digit suffix comprise the Lake or Wetland ID#.[10] Throughout the remainder of this decision the term assessment unit is used generally to refer to any river or lake identified with a River ID# or a Lake/wetland ID# in Minnesota's 2010 submittal and on Minnesota's 2010 303(d) list.

[10] 2010 Methodology at 21-22.

Once an assessment has been completed, the water body is placed into one of the five categories described in the table above. Category 4 and 5 waters represent the inventory of impaired waters in Minnesota. Category 5 waters represent those impaired waters requiring TMDLs, i.e., Minnesota's 303(d) list. EPA is approving the waters identified in Table 1 of this decision as Minnesota's 2010 303(d) list.

2. Methodology

EPA's regulations at 40 CFR §130.7(b)(6) require, among other things, that states provide documentation to support their decisions to list or not list waters including a description of the methodology used to develop the list. Minnesota's 2010 submittal included MPCA's 2010 Methodology. MPCA's 2010 Methodology defines the data and information requirements needed to assess and determine if a water is meeting its designated beneficial use(s). The 2010 Methodology also establishes thresholds that indicate impairment for various categories of pollutants. MPCA developed its methodology for the 2002 listing cycle and has subsequently modified the methodology with each listing cycle. As with prior versions of their methodology, the State made the 2010 Methodology available to the public through MPCA's website beginning on or about September 24, 2009. No public comments specific to Minnesota's 2010 Methodology were received.

Minnesota rules identify seven beneficial uses for which surface waters in Minnesota are protected. These beneficial uses are assigned the following use class numbers:

Class 1: Drinking water
Class 2: Aquatic life and recreation
- Class 2A: cold water fisheries, trout waters
- Class 2Bd: cool and warm water fisheries (protected for drinking water use)
- Class 2B: cool and warm water fisheries (not protected for drinking water use)
- Class 2C: indigenous fish and associated aquatic community
- Class 2D: wetlands

Class 3: Industrial use and cooling
Class 4: Agricultural use
Class 5: Aesthetics and navigation
Class 6: other uses
Class 7: Limited resource value waters

All surface waters in Minnesota are considered either a Class 2 or Class 7 water. Unless classified as a Class 7 water, surface waters in Minnesota are protected for aquatic life and recreation (Class 2). MPCA's 2010 Methodology defines protection of aquatic life and recreation as, *"the maintenance of healthy, diverse, and successfully reproducing populations of aquatic organisms, including invertebrates as well as fish. Protection of recreation for all*

surface waters, except wetlands and limited resource value waters means the maintenance of conditions suitable for swimming and other forms of water recreation. Recreation in wetlands means boating and other forms of aquatic recreation for which they may be usable (this does not preclude swimming if that use is suitable)."[11] Limited resource value waters (Class 7) are not fully protected for aquatic life. These waters have a very limited aquatic and fish community mostly due to lack of water, lack of habitat, or extensive physical alterations. Both Class 2 and 7 waters are also protected for Classes 3, 4, 5 and 6. In most situations, water quality standards applicable to Class 2 waters are the most stringent,[12] therefore, Minnesota's assessments usually consider water quality standards applicable to Class 2 waters. Use supports assessed by Minnesota include aquatic life, aquatic consumption and aquatic recreation. Aquatic life use support assessments consider protection of the organisms that reside in the surface waters while aquatic consumption use support assessments consider protection of the consumers of the aquatic life. Aquatic recreation use support is assessed for the protection of recreation in surface waters.[13]

In 2010 Minnesota began assessments of surface waters designated as Class 7.[14] Class 7 waters are protected to allow secondary body contact use, to preserve the groundwater for potable water supply, and to protect aesthetic qualities of the water.[15] Also in 2010 Minnesota began assessments of some Class 1 waters.[16] All ground waters in Minnesota are protected as a source of drinking water, however, only select surface waters are protected as a source of drinking water.[17] In the past, assessment of Class 1 surface waters and ground waters were outside the scope of Minnesota's assessment methodologies. However, the State has recognized a trend of increasing nitrate concentrations in Minnesota streams, therefore, Minnesota's 2010 Methodology does include assessment of Class 1B and Class 1C[18] surface waters based on exceedances of the nitrate nitrogen Class 1 drinking water consumption standard.[19] Table 2 of this decision identifies the assessment units added in 2010 by the State to the 303(d) list as a result of these two additional types of assessments.

Minnesota's process of assessment is a two-part process. The first part, the pre-assessment of data, is an automated assessment of chemical, physical, and biological data. During the pre-assessment process all data is screened for minimum data requirements, appropriate periods of

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[11] 2010 Methodology at 4.
[12] 2010 Methodology at 1-2 and 5.
[13] 2010 Methodology at 29.
[14] 2010 Methodology at 2, 5, 59.
[15] 2010 Methodology at 59.
[16] 2010 Methodology at 2, 5, 48-49.
[17] 2010 Methodology at 5.
[18] See 7050.0221 Specific Water Quality Standards for Class 1 Water of the State; Domestic Consumption, subp.3 and subp. 4 for description of Class 1B and Class 1C.
[19] 2010 Methodology at 48-49.

record, and impairment thresholds. The second part of the assessment process is the review of the results of the automated pre-assessment by the professional judgment teams. Professional judgment teams are formed for each basin. The professional judgment teams can be comprised of assessment professionals from MPCA and other monitoring entities, regional MPCA basin coordinators, and monitoring staff from organizations whose data are used in assessments. The professional judgment teams review the pre-assessment results, consider other sources of existing and readily available data that were not considered during the pre-assessment, review how data are used and interpreted, and determine if available outside data were used appropriately. Additionally, the professional judgment teams may consider the magnitude, duration and frequency of exceedances, timing of exceedances, natural occurring conditions that may affect pollutant concentrations and toxicity, weather and flow conditions, and changes in the watershed that may have changed water quality. After consideration of readily available data and information before them, the professional judgment teams make impairment recommendations. All professional judgment decisions are recorded on a Professional Judgment Group Transparency Form.[20] Appendix D of Minnesota 2010 Methodology included four examples of transparency forms. Actual transparency forms can be found on MPCA's website.[21] MPCA makes the final impairment decision considering the outcomes of the pre-assessment and the professional judgment team review.

As previously stated in this decision, Minnesota assesses aquatic life, aquatic consumption, and aquatic recreation use (Class 2) supports along with assessments of Class 7 surface waters and Class 1B and Class 1C surface waters. Minnesota's 2010 Methodology sets forth the specific assessment methods used by the State when determining if these use supports are attained. EPA recognizes that water quality criteria have three elements: magnitude, duration, and frequency of exceedance. Minnesota's 2010 Methodology sets forth specific information about how these three elements were considered by the State in development of Minnesota's 2010 303(d) list. EPA finds that Minnesota's use of its 2010 Methodology supports the reasonable identification of WQLS. The following discussion briefly explains the data requirements, information considered, and impairment thresholds used in Minnesota's assessments as described in Minnesota's 2010 Methodology. Section XV of Minnesota's 2010 Methodology also provides tabular summaries of the data requirements and thresholds used by the State in their assessments.

The 2010 Methodology sets forth methods for assessing surface waters based on the following:

numeric standards for the protection of aquatic life;

numeric and narrative standards for the protection of human health: drinking water and aquatic consumption;

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[20] 2010 Methodology at 24-26.

[21] 2010 Methodology at 26 and http://www.pca.state.mn.us/index.php/water/water-types-and-programs/minnesotas-impaired-waters-and-tmdls/assessment-and-listing/tmdl-water-quality-assessment.html.

numeric standards for protection of aquatic recreation;
numeric standards for the protection of limited resource value waters; and
narrative standards.

Assessment of Surface Waters Based on Numeric Standards for Protection of Aquatic Life

Assessment based on numeric standards for protection of aquatic life consider protection of the aquatic community from the direct harmful effects of toxic substances, and protection of human and wildlife consumers of fish and other aquatic organisms which include toxicity –based chronic numeric standards and conventional pollutant standards. Minnesota's 2010 Methodology establishes data requirements and thresholds for pollutants that have toxicity-based chronic numeric standards. Two types of data are used in these toxicity-based assessments: water chemistry and biological data. Pre-assessments consider both chemistry and biological data.[22] Pollutants which have toxicity-based numeric standards most often included in MPCA's assessments include trace metals, un-ionized ammonia and chloride. Sections VII.A.1. and VII.A.2. in Minnesota's 2010 Methodology explain the applicable Class 2 numeric water quality standards, data requirements and impairment thresholds considered in these toxicity-based numeric standard assessments. In general, for the assessment of pollutants with toxicity-based numeric standards five data points are needed within a 3 year period in the most recent 10 years with 2 or more exceedances of the chronic standard.[23] The State also assesses conventional pollutants with numeric standards and water quality characteristics which typically include low dissolved oxygen, pH, turbidity, and temperature. Sections VII.B.1. and VII.B.2. in the 2010 Methodology explain the applicable Class 2 numeric water quality standards and characteristics and for low dissolved oxygen the applicable Class 7 standard, data requirements, and impairment thresholds considered in these assessments. In general a minimum of 20 data points in the most recent 10 years are needed for an assessment and data demonstrating greater than 10 percent exceedance are included on the 303(d) list.[24]

Assessment Based on Numeric and Narrative Standards for the Protection of Human Health: Aquatic Consumption and Drinking Water

Assessments based on numeric and narrative standards for protection of human health include consideration of pollutants with Class 2 health based chronic water quality standards. Section VIII.A. in Minnesota's 2010 Methodology discusses, in general, the development of human health protective numeric chronic standards. Class 2 chronic standards are established after determining the water column concentration of a pollutant that will be protective for chronic exposure for aquatic organisms, human health and fish-eating wildlife. The most protective is

[22] 2010 Methodology at 32.
[23] 2010 Methodology at 34.
[24] 2010 Methodology at 38.

chosen as the chronic standard included in Minnesota rules.[25] Pollutants that have human health based chronic standards that are most often included in the State's assessments include mercury, polychlorinated biphenyls (PCBs), dioxins and chlorinated pesticides.[26] Section VIII.A.2.(a) – (c) in Minnesota's 2010 Methodology discusses these pollutants and the applicable Class 2 water quality standards used in assessments. In general, two exceedances of the chronic standard or a single exceedance of the maximum standard in three years indicates impairment. Five data points are needed within a 3 year period during the most recent 10 years.[27] As stated above, when the State develops water quality standards both a toxicity-based and a human health-based chronic criterion is calculated and the most restrictive is used to establish the chronic standard. For some pollutants, the toxicity-based and the human health-based criterion are very similar. For these pollutants, Minnesota's assessments consider both criteria. Table B-3 in Appendix B of Minnesota's 2010 Methodology identifies the pollutants that have human health-based and toxicity-based criteria that have similar values. The most recent 10 years of water quality data is considered in these assessments and in general, two exceedances of the human health-based or the toxicity-based criterion within three years or one exceedance of the maximum standard indicates impairment.[28] These data requirements and exceedance thresholds are the same as used by the State in their assessments of pollutants that have human health-based chronic standards, as discussed previously in this paragraph.

As previously stated in this decision, support of aquatic life means that concentrations of toxicants in water must be low enough that fish and other aquatic organisms are safe for people and wildlife to eat. Section IX of Minnesota's 2010 Methodology explains the four wildlife-based water quality standards used in assessments of the aquatic life use. Data requirements and exceedance thresholds for pollutants with wildlife-based standards used for determining impairment are the same as used by the State in their assessments of pollutants that have human health-based chronic standards. See previous paragraph for a discussion of the State's assessments using human health-based chronic standards.[29]

Human consumption of fish is considered a separate use support in Minnesota. Toxicants may be at levels sufficient to support aquatic life but because of bioaccumulation the fish are not safe for human consumption. Mercury, polychlorinated biphenyls (PCBs) and perfluorochemicals, specifically perfluorooctane sulfonate (PFOS), are contaminants found in fish that are considered in Minnesota's assessments. Other bioaccumulative pollutants such as DDT, dioxins and toxaphene have been analyzed in fish tissue samples but only where potential problems were

[25] 2010 Methodology at 39.
[26] 2010 Methodology at 40-42.
[27] 2010 Methodology at 42-43.
[28] 2010 Methodology at 43-44.
[29] 2010 Methodology at 50. See Table 6 of 2010 Methodology for data requirements and exceedance thresholds.

suspected.[30] In assessment of the aquatic consumption use support, Minnesota considers the use to be supported if it is safe to consume one fish meal per week over a lifetime. Limiting consumption to less than one meal per week indicates impairment. Impairment thresholds for PCBs and PFOS are established in Minnesota's 2010 Methodology at the fish tissue concentration considered to be the upper threshold for one meal per week fish consumption advisory for the sensitive population,[31] i.e., impairments for PCBs are based on fish tissue concentrations exceeding 0.22 ppm and impairments for PFOS are based on fish tissue concentrations exceeding 0.2 ppm.[32] In 2008 Minnesota adopted into Minnesota Rule chapter 7050 a mercury fish tissue criterion of 0.2 ppm. This criterion is more stringent than the upper threshold for one meal per week fish consumption advisory for the sensitive population used by Minnesota Department of Health fish consumption advisory. Consistent with Minnesota water quality standards, 0.2 ppm is the impairment threshold for aquatic consumption due to mercury.[33]

In 2010 Minnesota included assessments based on standards for the protection of human health Class 1 drinking consumption. Monitoring data collected throughout Minnesota show that nitrate concentrations in Minnesota streams are increasing. Although most Minnesotans receive their drinking water from groundwater and not streams, groundwater and surface waters are interconnected, therefore, the State has included assessments of Class 1B and Class 1C designated surface waters. Specifically, the State determines a 24-hour nitrate concentration which is compared to the 10 mg/L drinking consumption standard. Two 24-hour average exceedances within three years considering the most recent 10 years of data indicates impairment. A minimum of five data points for each three year period is required.[34]

Assessment Based on Numeric Standard for Protection of Aquatic Recreation

Minnesota has two sets of numeric standards protecting waters for aquatic recreation. Numeric standards established for *Escherichia coli (E. coli)* protect for primary and secondary body contact[35] while eutrophication standards protect for aquatic recreation in Minnesota lakes.

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[30] See 2010 Methodology Appendix B for impairment thresholds for other bioaccuulatives.

[31] Sensitive population is comprised of pregnant women, women who may become pregnant, and children under age 15. See Minnesota Department of Health, Minnesota Fish Consumption Advisory at http://www.health.state.mn.us/divs/eh/fish/ and 2010 Methodology at 44-46.

[32] 2010 Methodology at 47.

[33] 2010 Methodology at 46-48.

[34] 2010 Methodology at 48-49.

[35] For purposes of bacteriological standards, recreation in or on the water is divided into two types: primary body contact is considered to be any type of water recreation during which the accidental ingestion of a small amount of water is likely such as swimming, snorkeling, SCUBA, water skiing, kayaking, tubing and wading by young children; and secondary body contact is considered to be any type of water recreation during which the accidental ingestion of a small amount of water is unlikely such as boating, canoeing, fishing and wading by older children and adults. *Statement of Need and Reasonableness, Book III of III, In the Matter of Proposed Revisions of Minnesota Rules Chapter 7050, Relating to the Classification and Standards for Waters of the State, July 2007, pg. 83,* and 2010 Methodology at 51.

Minnesota has established *E. coli* standards for both Class 2 and Class 7 waters. Table 9 in Minnesota's 2010 Methodology identifies these water quality standards. The *E. coli* water quality standards include both a monthly geometric mean standard and an individual maximum standard. Minnesota considers both standards in their assessments. The monthly geometric mean *E. coli* standard is a geometric mean of not less than five samples collected in a month, however, most monitoring programs don't collect samples more often than once a month. In order to use the available data to the maximum extent, Minnesota aggregates available *E.* coli data for an individual month across the most recent 10 years of data. Minnesota's method of aggregating data for an individual month is based on a study conducted by the State which showed that for any given monitoring site there was less variability in fecal coliform data for a given month across years than there was for all months within one year.[36] Minnesota's prior assessment methodologies have included this same approach for fecal coliform assessments. For assessment of the monthly geometric mean standard, the State considers the most recent 10 years of data, aggregates the data by individual month for a specific assessment unit and if one or more months exceed the monthly geometric mean standard[37] the assessment unit is added to Minnesota's 303(d) list. For assessment of the individual maximum standard, an assessment unit is added to Minnesota's 303(d) list if, using at least 10 data points, more than 10% of individual values over the most recent 10 years exceed the maximum *E. coli* standard.[38] Prior assessment methodologies established methods for assessment using fecal coliform data or a statistical relationship between fecal coliform and *E. coli* data. Assessments for the 2010 list only used *E. coli* data for the following two reasons, (1) consistent with EPA recommendations on the preferred indicator of the potential presence of waterborne pathogens, Minnesota has replaced its fecal coliform water quality standard with a promulgated *E. coli* water quality standard; and (2) to avoid potential impacts on assessments from the variability in the *E. coli*/fecal coliform statistical relationship when converting data.

Minnesota's promulgated ecoregion-based lake eutrophication numeric water quality standards for total phosphorus, Secchi depth and chlorophyll-a[39] are the primary basis used in lake assessments. Table 11 of Minnesota's 2010 Methodology identifies the lake eutrophication standards used for aquatic recreation use assessments. Assessments consider data collected over the most recent 10-year period and use only data that has been determined to have excellent or

[36] 2010 Methodology at 51 and *Fecal Coliform Bacteria in Rivers,* MPCA, H.D. Markus, 1999 in EPA Region 5's 2002 administrative record to support EPA's approval of Minnesota's 2002 303(d) list.
[37] The monthly geometric mean water quality standard for Class 2 waters is 126 organisms per 100mL of water and for Class 7 waters is 630 organisms per 100mL of water. See 2010 Methodology at 52, Minn. R. ch. 7050.0222 subp. 2-5, and Minn. R. ch. 7050.0227 subp. 2.
[38] The *E. coli* maximum individual water quality standard for both Class 2 and 7 waters is 1260 organisms per 100mL of water. See 2010 Methodology at 52 and Minn. R. ch. 7050.0222 subp. 2-5, and Minn. R. ch. 7050.0227 subp. 2.
[39] See Minn. R. ch. 7050.0222 subp. 2-4.