Sartell Hydroelectric Project
FERC Project No. 8315

Application for a New License for a Major Water Power Project Less than 10 Megawatts

Prepared for

Eagle Creek Sartell Hydro, LLC

Prepared by

Mead & Hunt

meadhunt.com

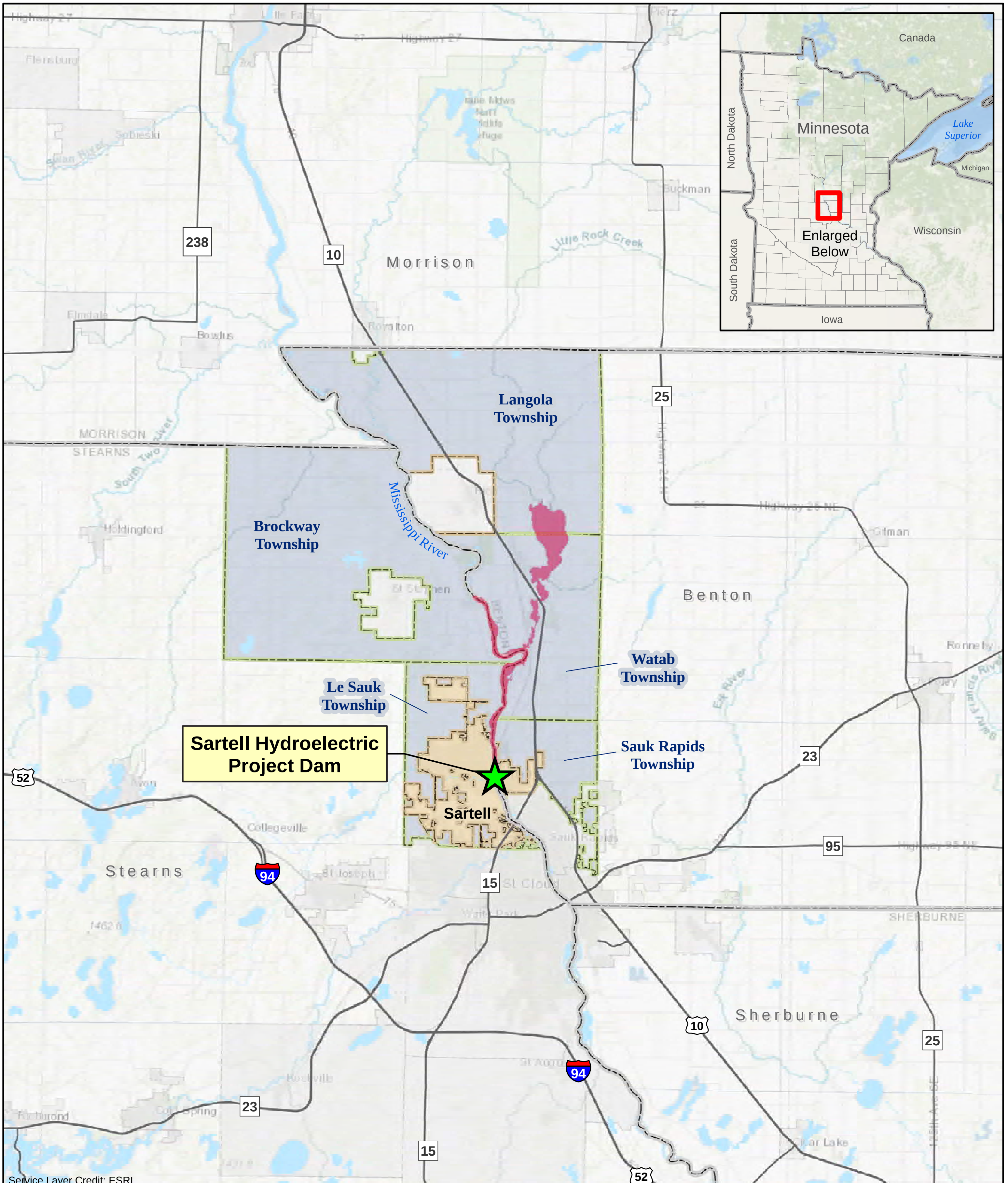
Volume 3 of 4
Appendices

Volume 3 of 4
Appendices

Appendix

Appendices (cont'd):

APPENDIX A-1 Sartell Project Location



EAGLE CREEK
RENEWABLE ENERGY
— EXCELLENCE IN HYDRO —

Project Boundary
County Boundary
City Boundary
Township Boundary

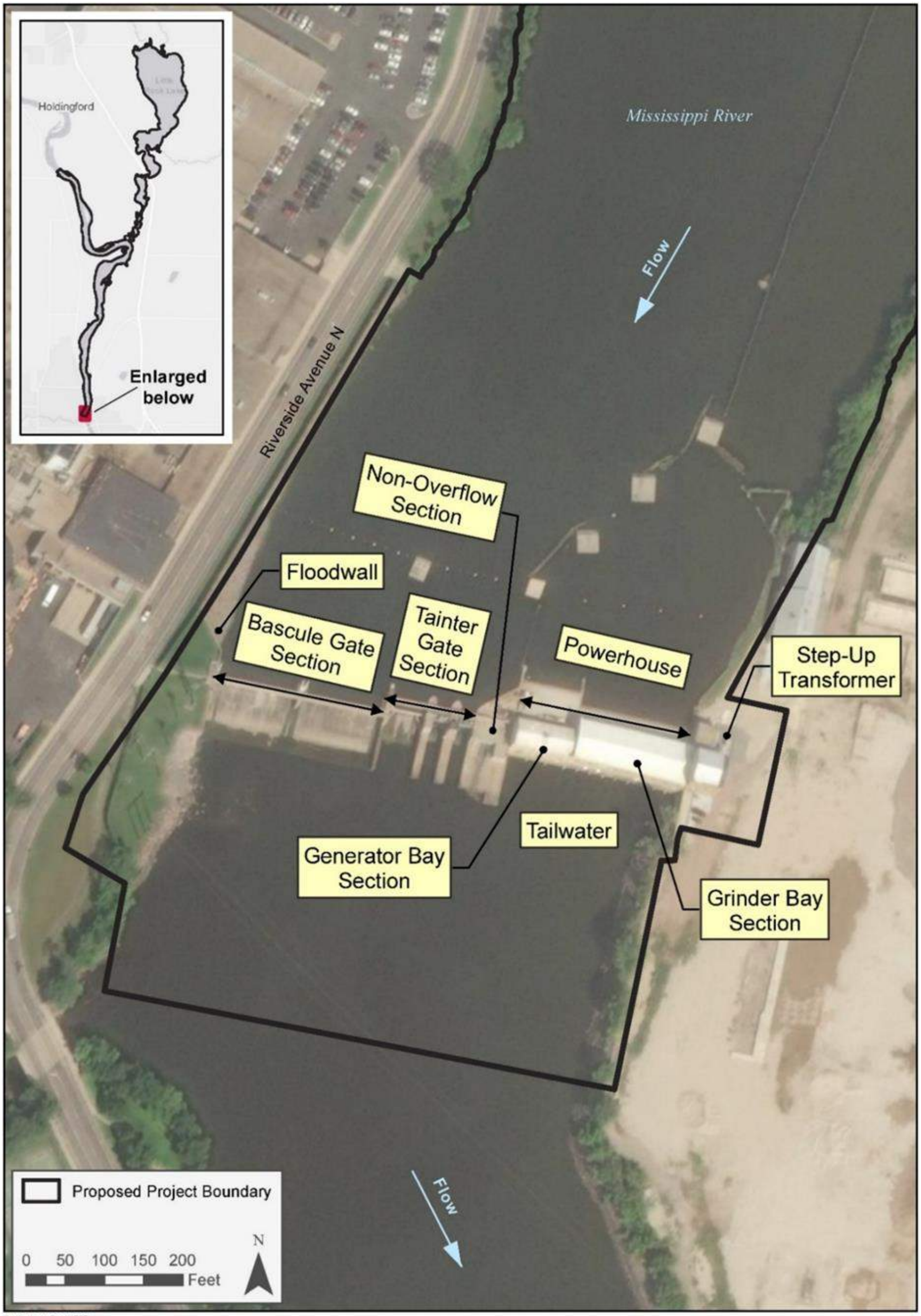
N

0 1.5 3 4.5 6 Miles

Sartell Hydroelectric Project
Project Location Map

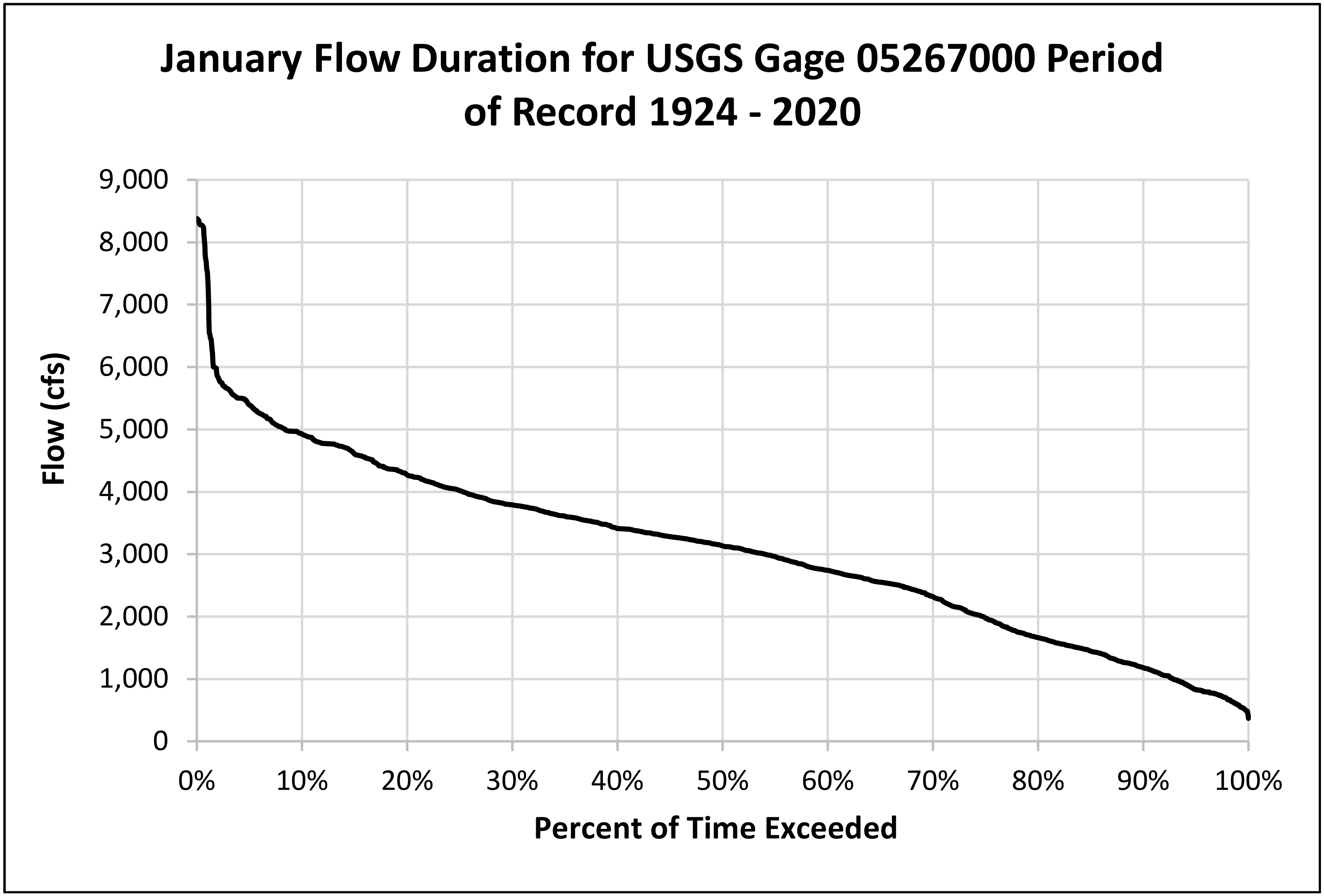
FERC No. 8315

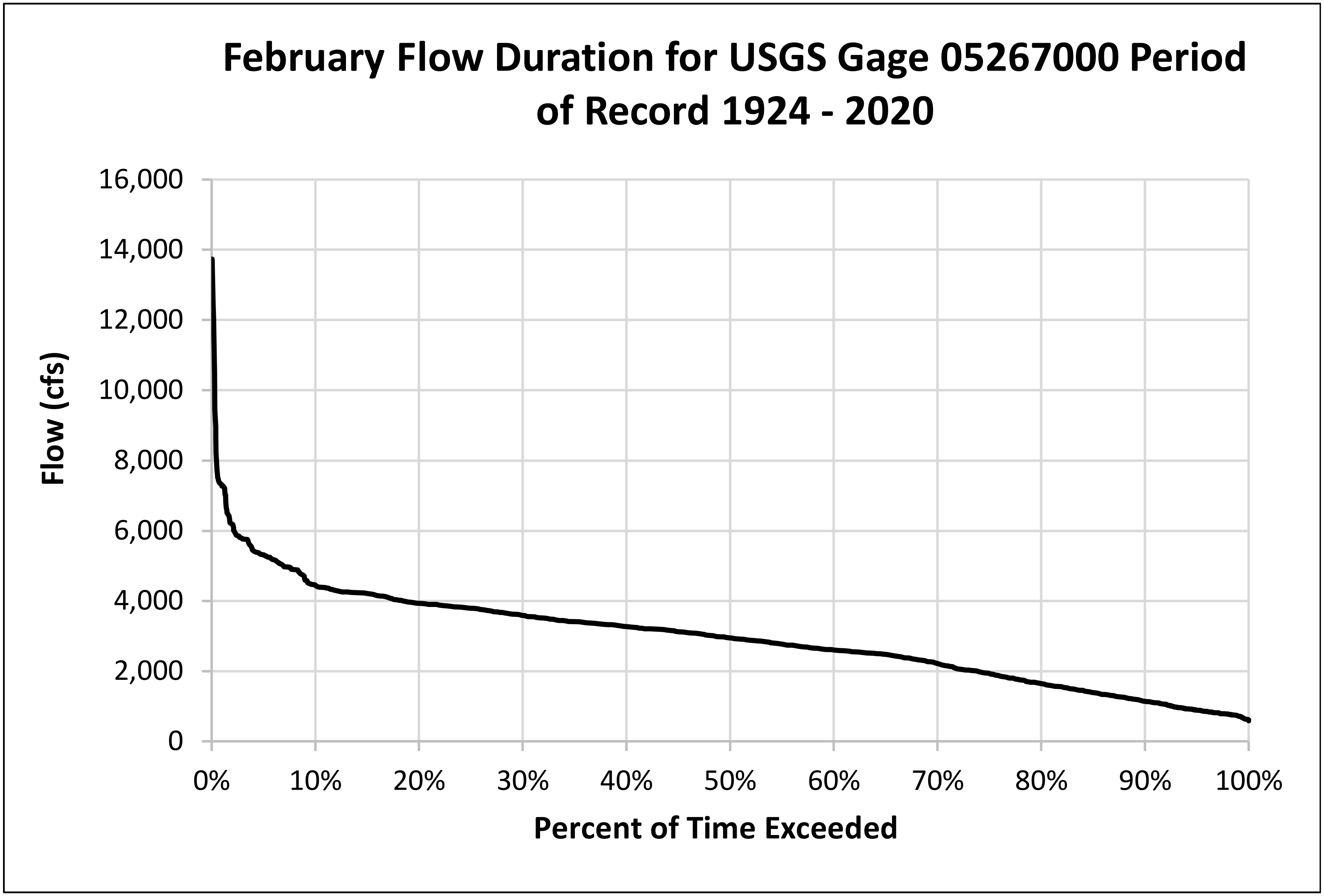
APPENDIX A-2 Sartell Project Facilities

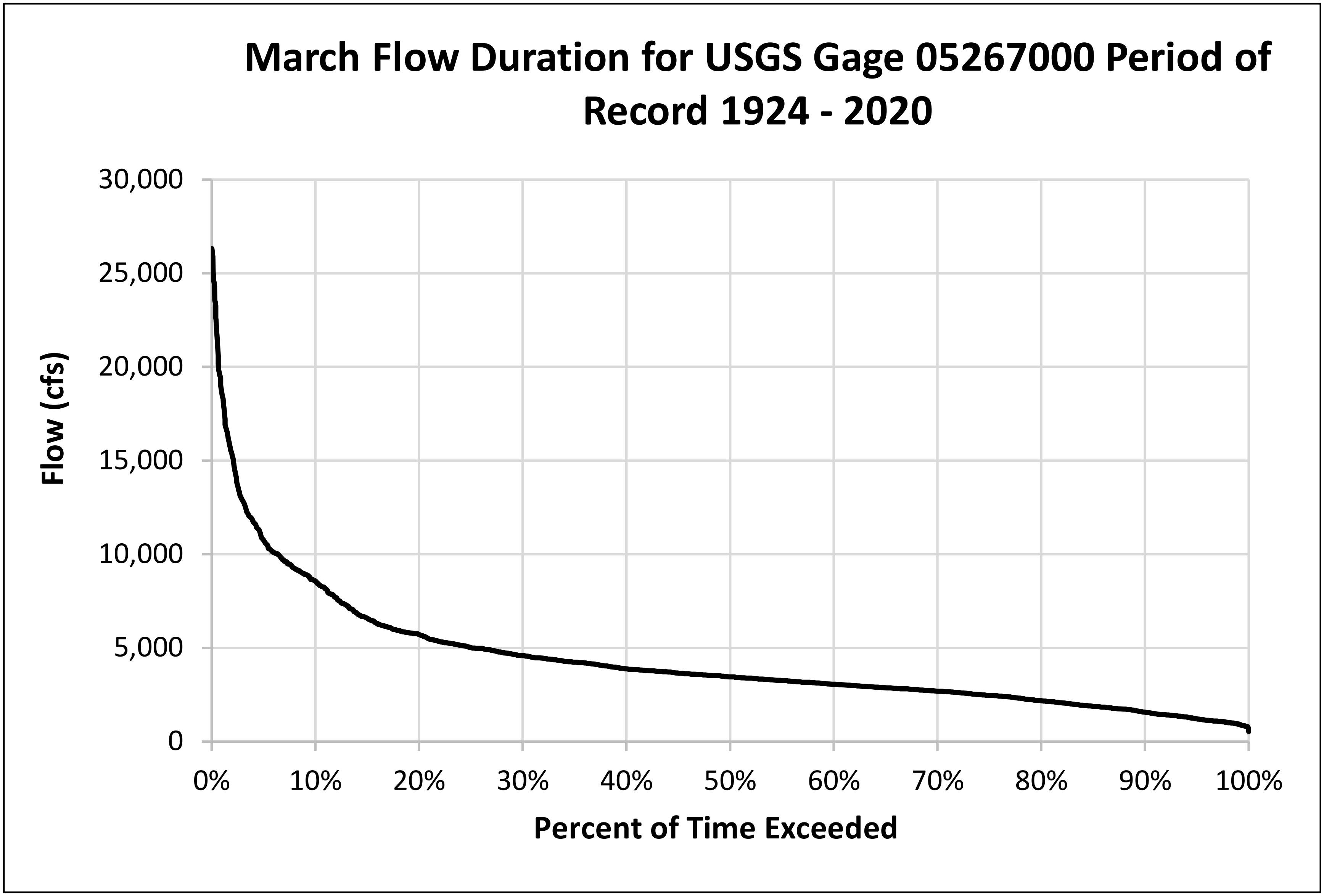


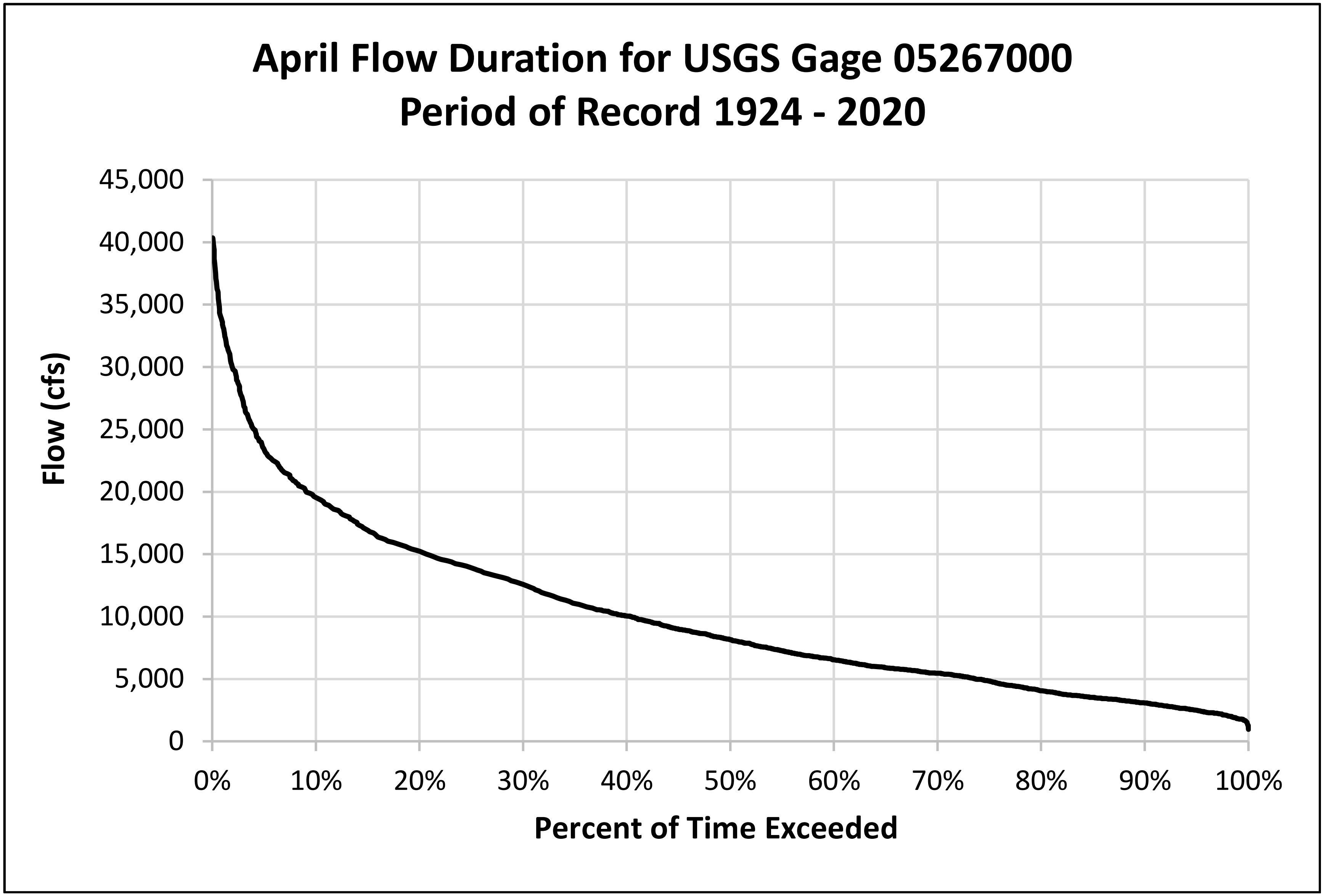
Service Layer Credit: ESRI

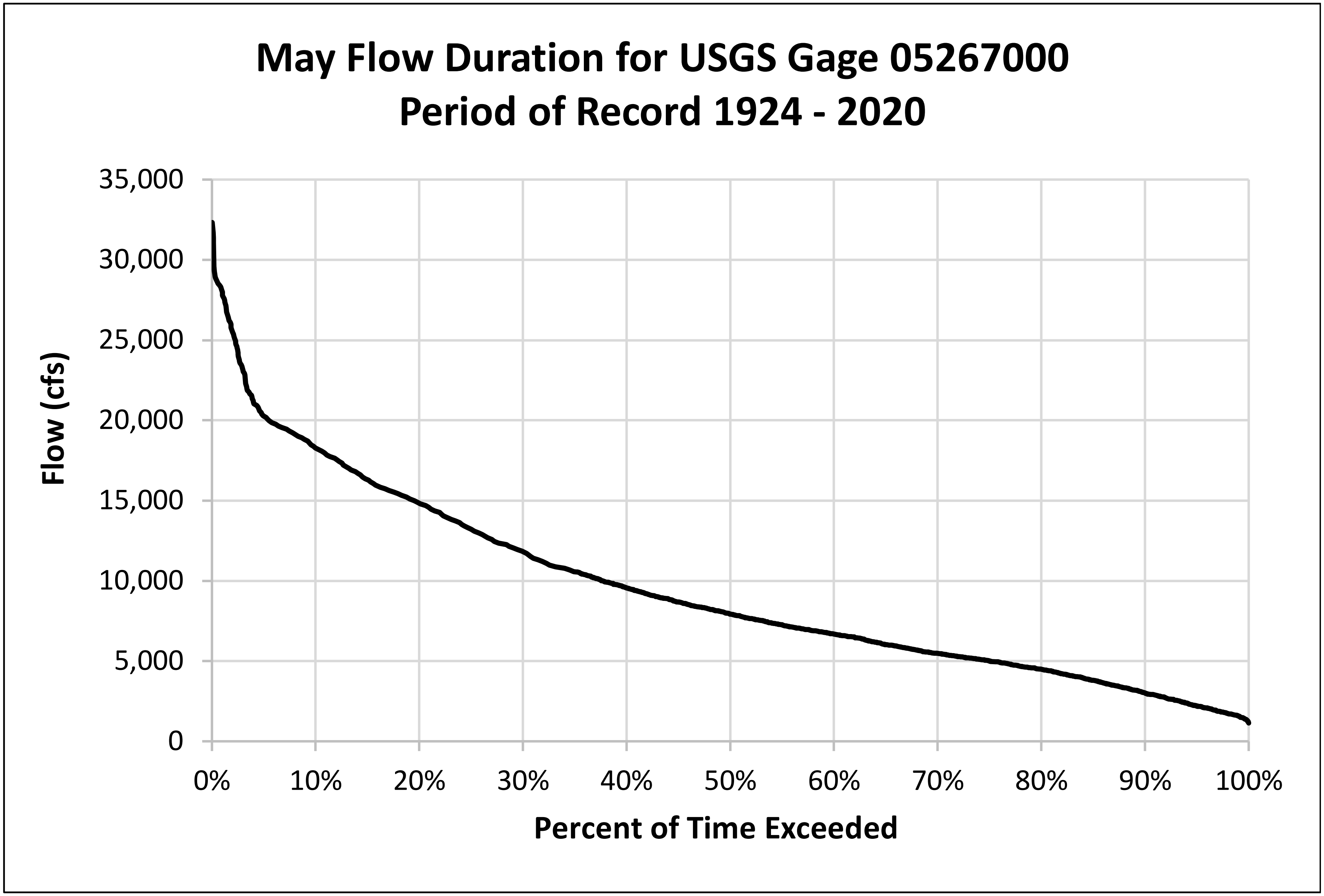
APPENDIX A-3 Sartell Flow Duration Curves

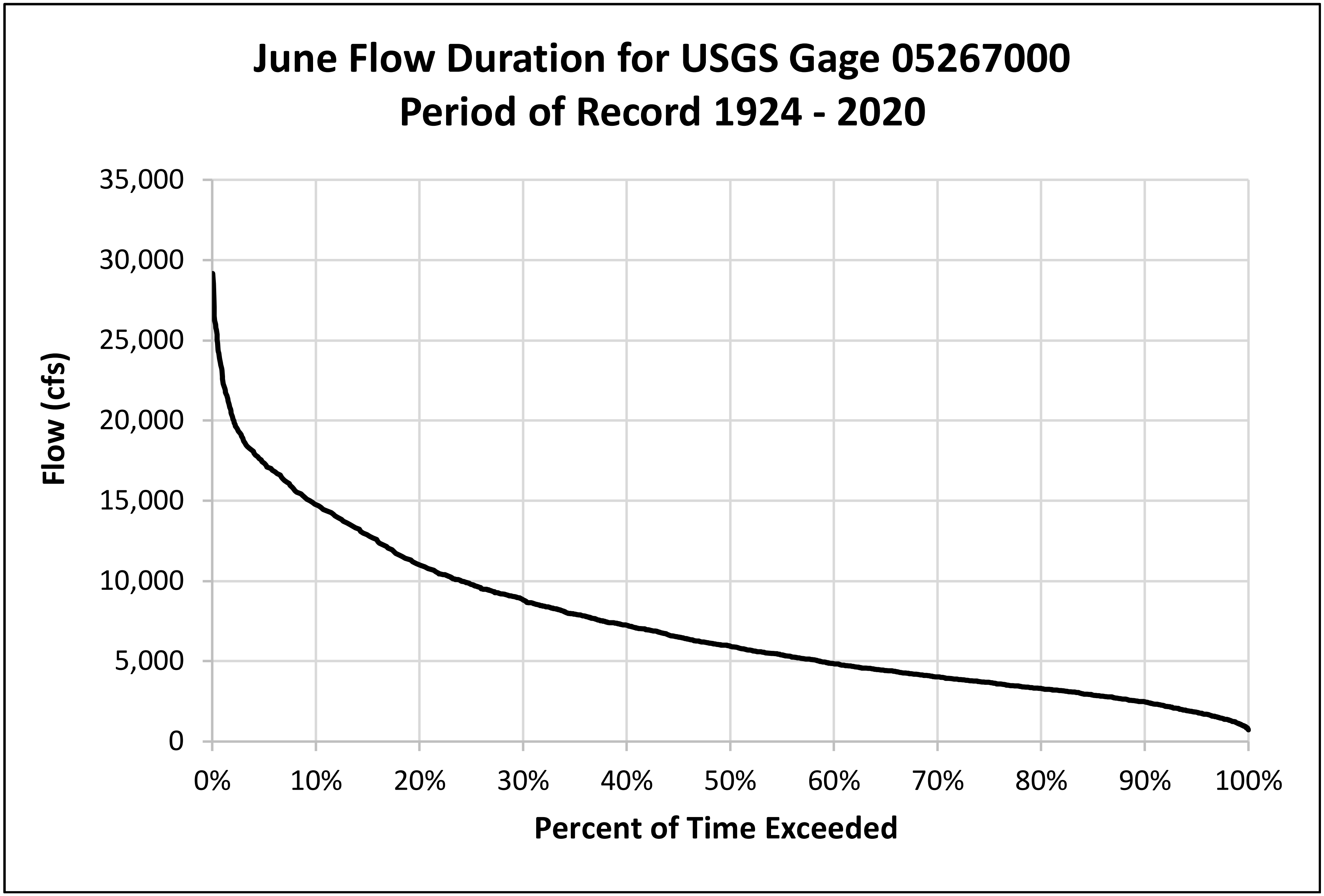

January Flow Duration for USGS Gage 05267000 Period of Record 1924 - 2020
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Exceeded


February Flow Duration for USGS Gage 05267000 Period of Record 1924 - 2020
Flow (cfs)
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Exceeded

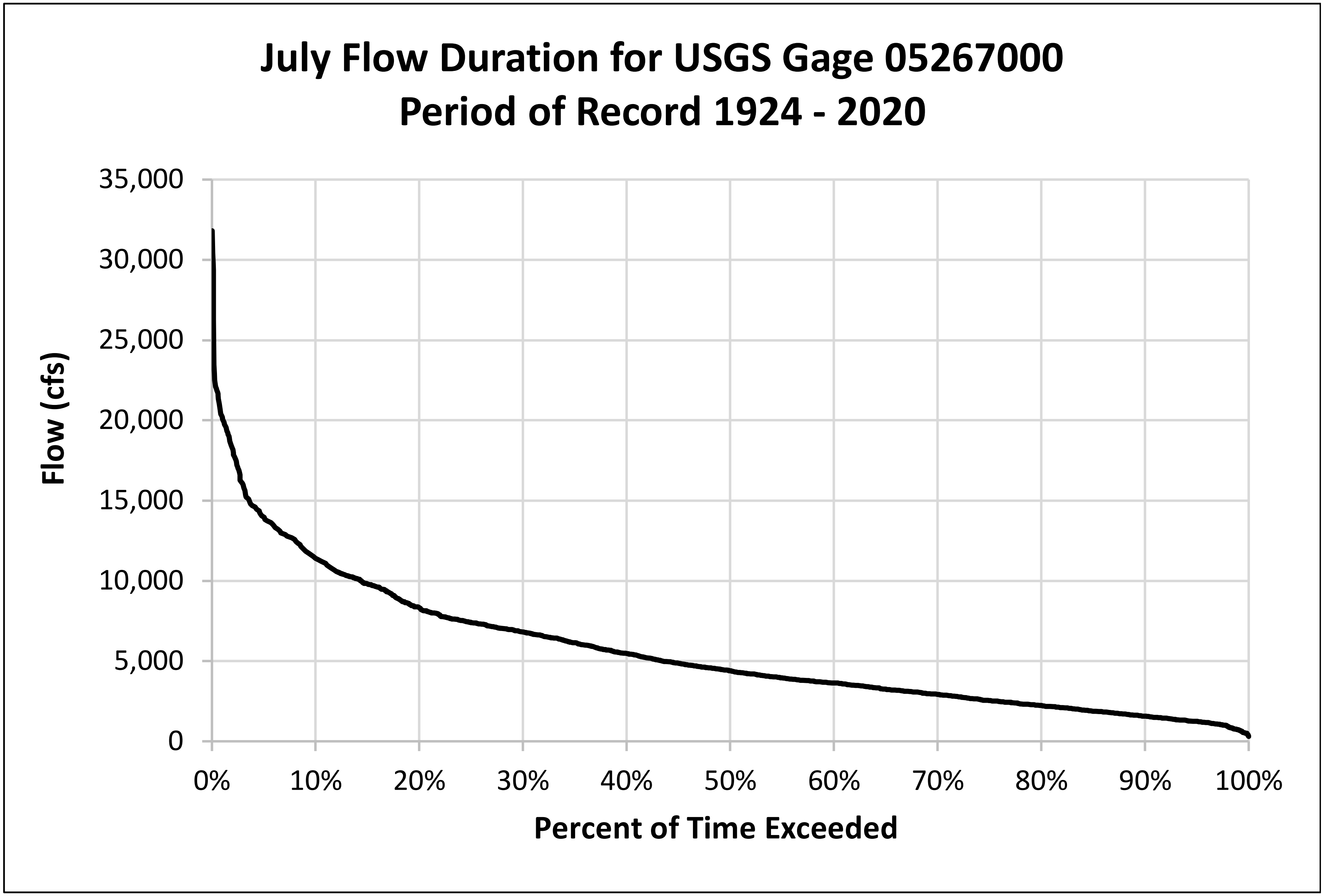

March Flow Duration for USGS Gage 05267000 Period of Record 1924 - 2020
Flow (cfs)
30,000
25,000
20,000
15,000
10,000
5,000
0
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Exceeded


April Flow Duration for USGS Gage 05267000
Period of Record 1924 - 2020
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Exceeded

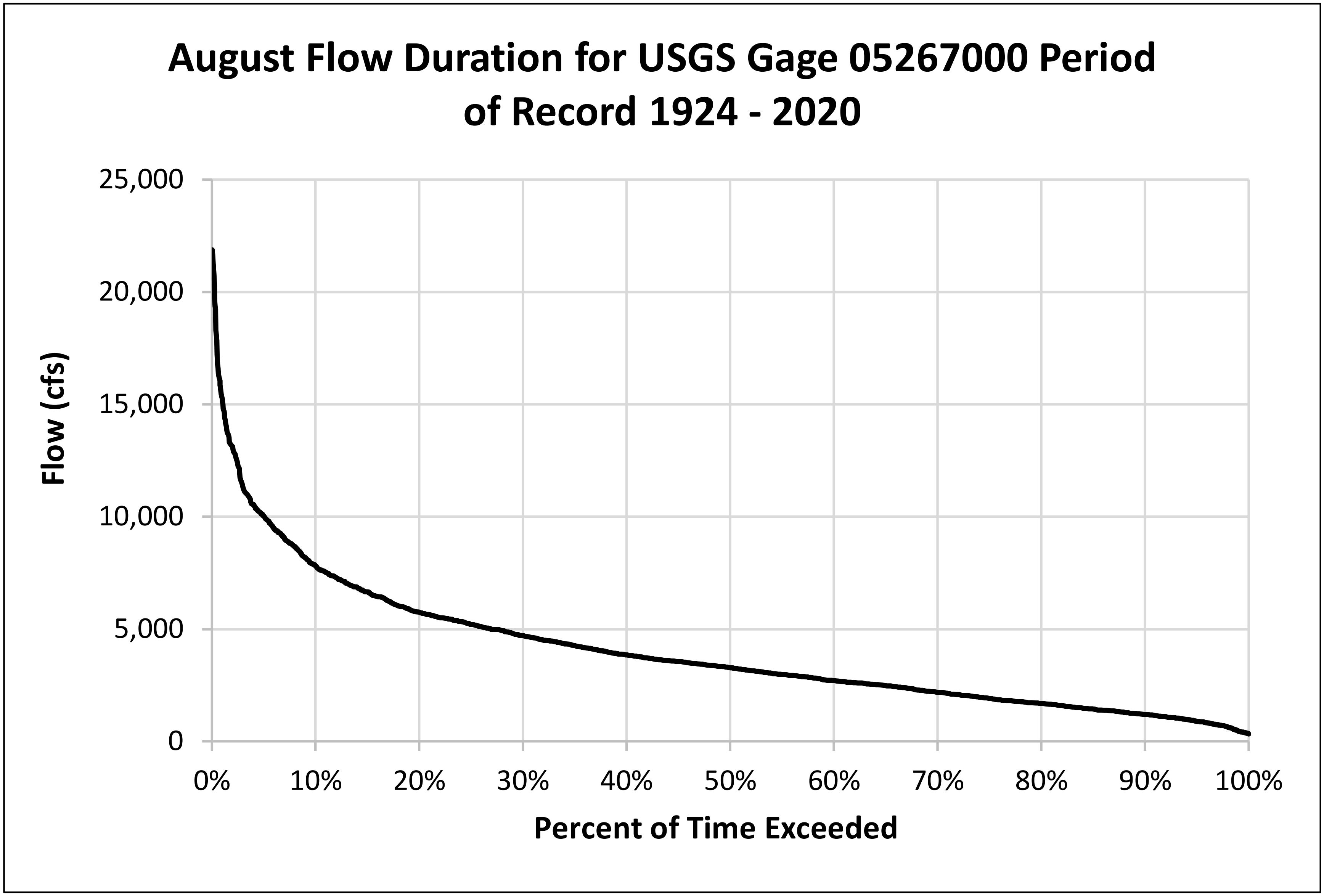

May Flow Duration for USGS Gage 05267000
Period of Record 1924 - 2020
Flow (cfs)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Exceeded

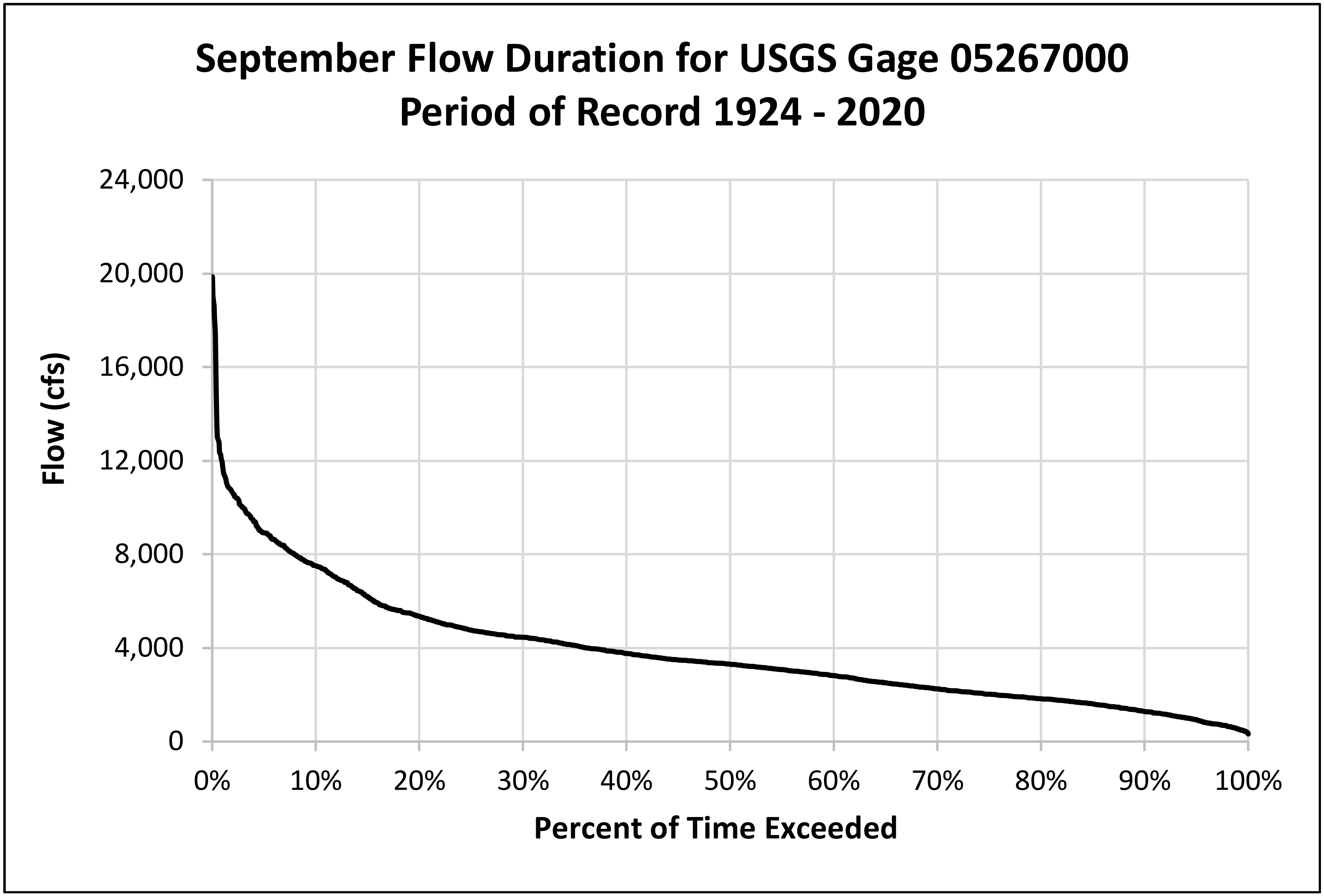

June Flow Duration for USGS Gage 05267000
Period of Record 1924 - 2020
Flow (cfs)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Exceeded

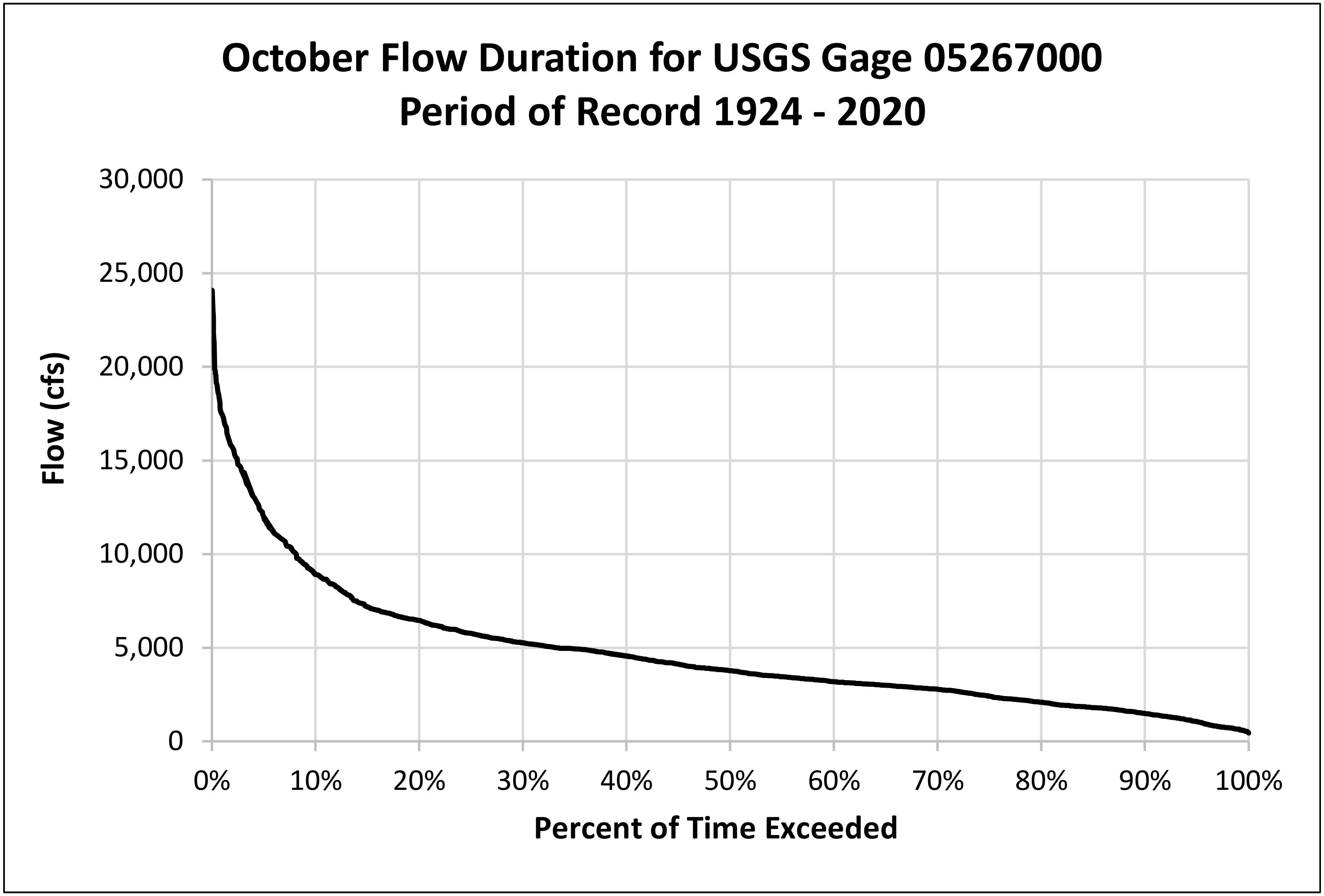
Sartell Hydroelectric Project
P-8315

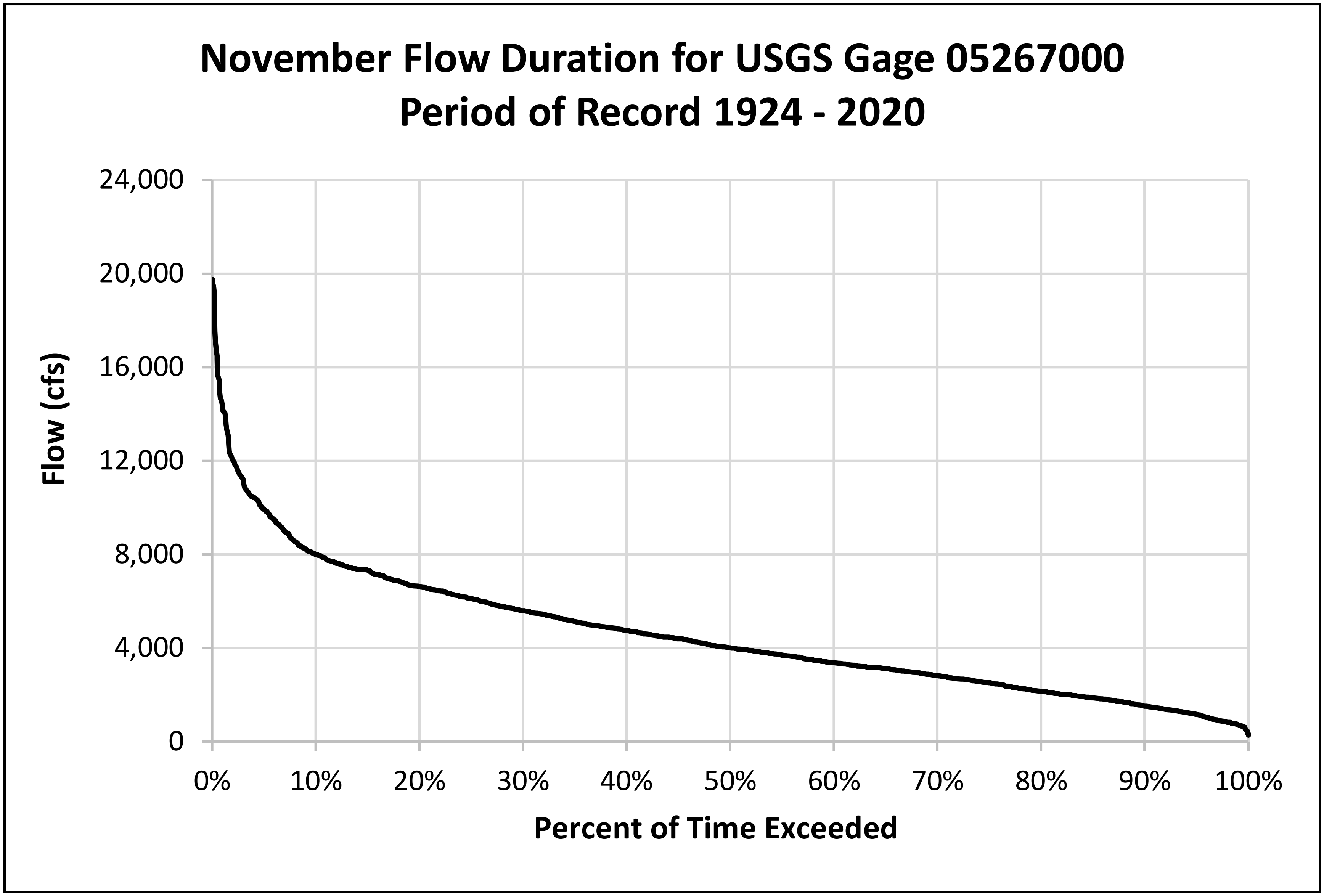


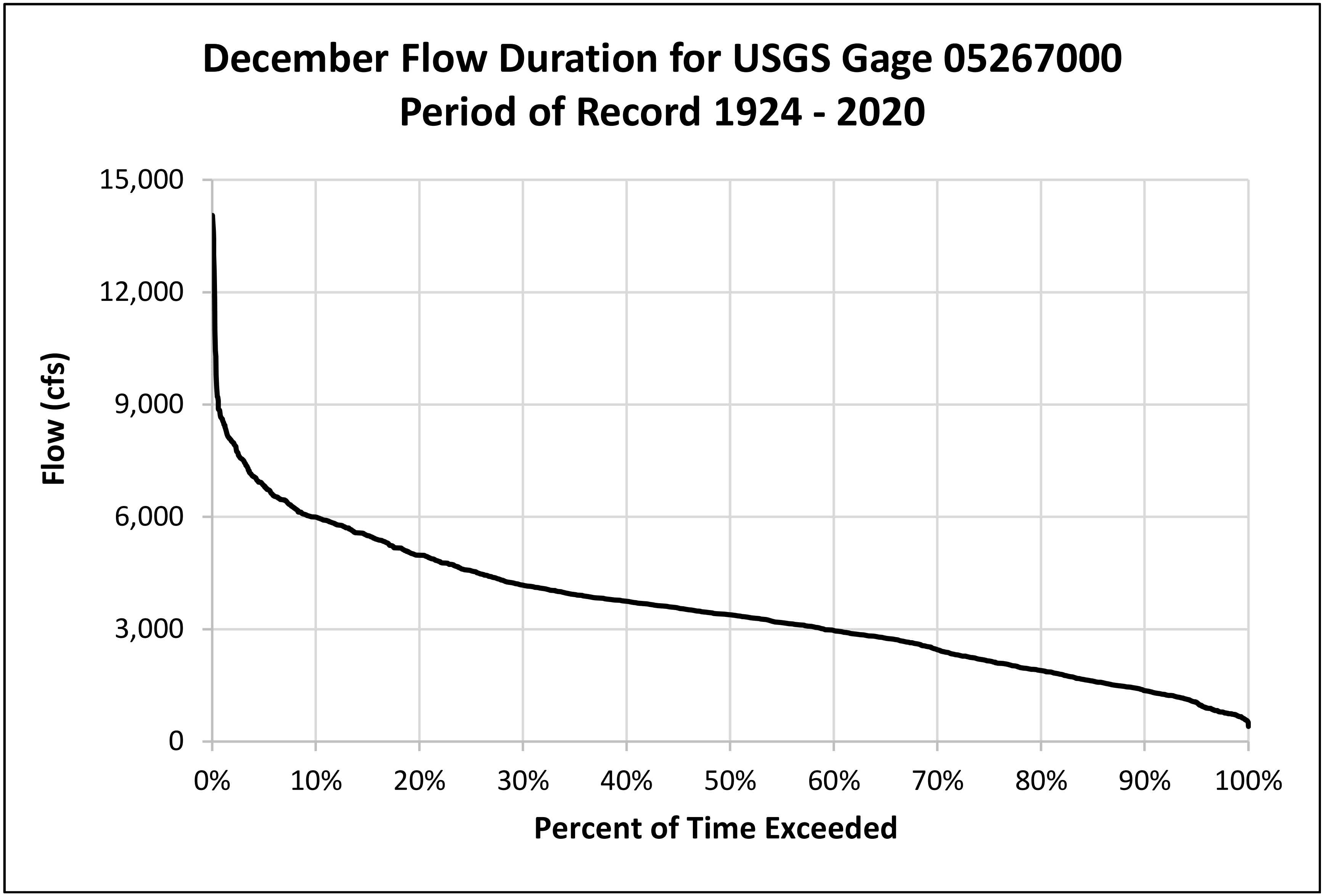
Sartell Hydroelectric Project
P-8315

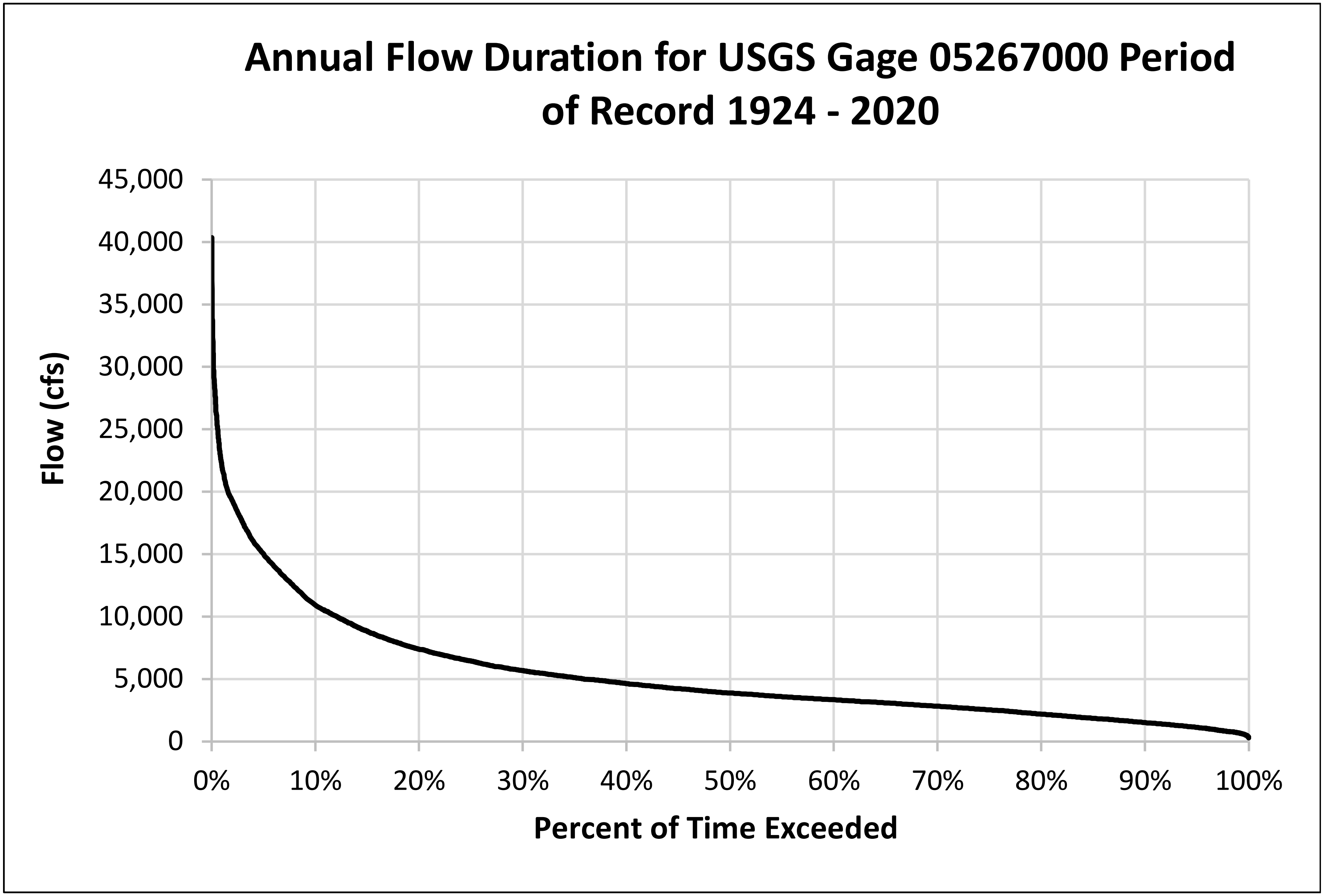



September Flow Duration for USGS Gage 05267000
Period of Record 1924 - 2020
Flow (cfs)
24,000
20,000
16,000
12,000
8,000
4,000
0
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Exceeded


October Flow Duration for USGS Gage 05267000
Period of Record 1924 - 2020
Flow (cfs)
30,000
25,000
20,000
15,000
10,000
5,000
0
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Exceeded


November Flow Duration for USGS Gage 05267000
Period of Record 1924 - 2020
Flow (cfs)
24,000
20,000
16,000
12,000
8,000
4,000
0
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Exceeded


December Flow Duration for USGS Gage 05267000
Period of Record 1924 - 2020
15,000
12,000
9,000
6,000
3,000
0
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Exceeded

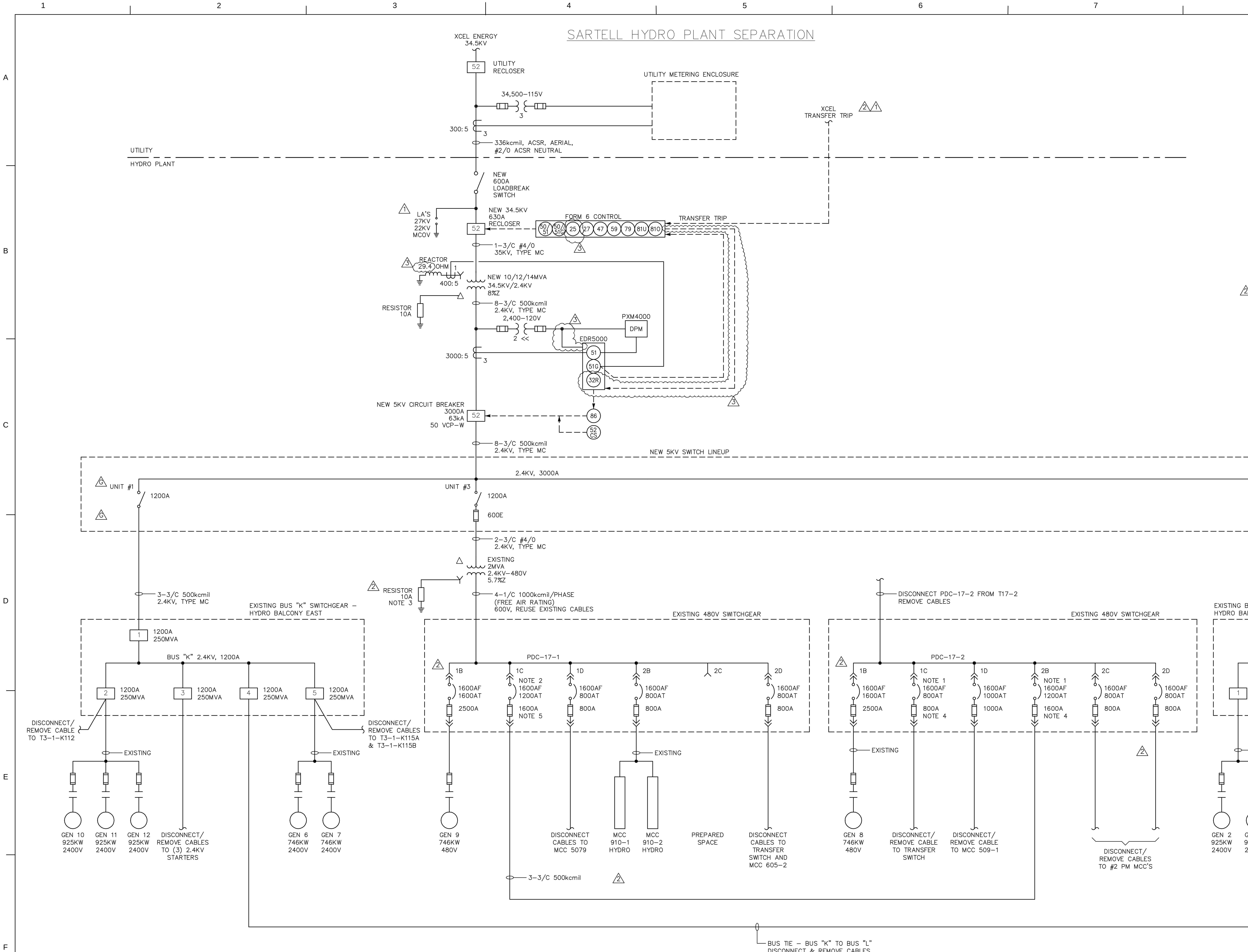

Annual Flow Duration for USGS Gage 05267000 Period of Record 1924 - 2020
Flow (cfs)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Exceeded

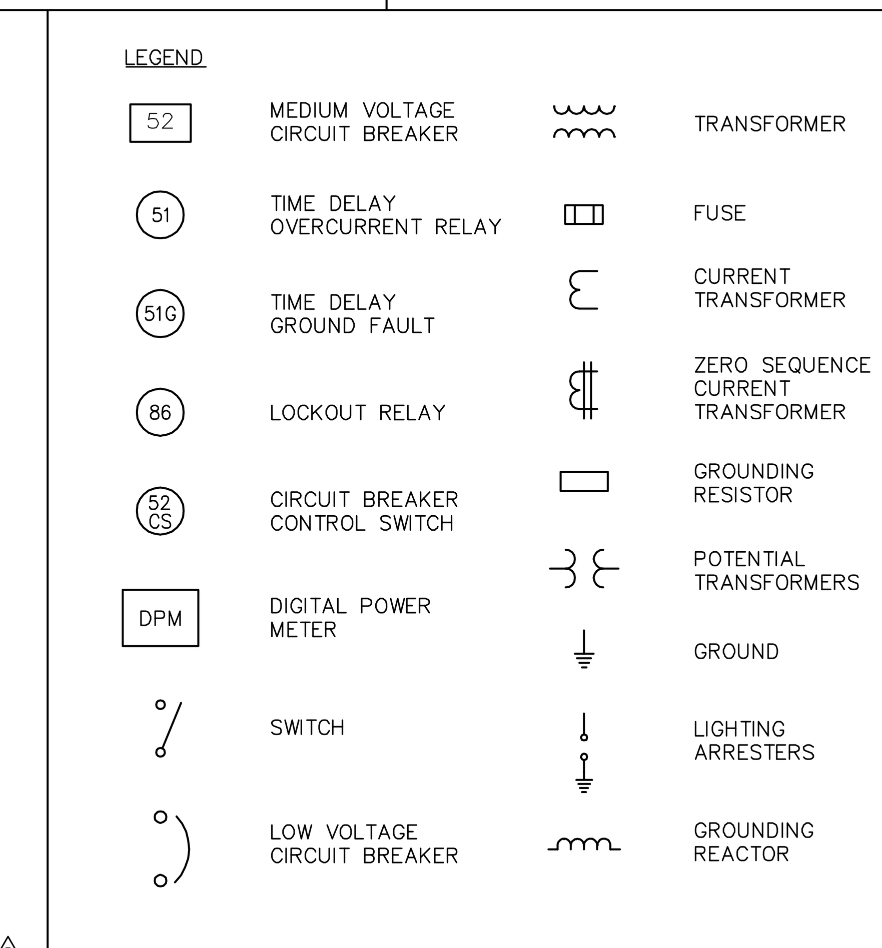
Sartell Hydroelectric Project
P-8315

Flow Duration for USGS Gage 05267000 (Period of Record 1924 - 2020)

Percent of Time	January	February	March	April	May	June	July	August	September	October	November	December	Annual
95	832	890	1,215	2,504	2,219	1,817	1,247	896	926	1,051	1,173	1,044	1,141
90	1,194	1,152	1,564	3,085	3,032	2,472	1,574	1,204	1,289	1,500	1,521	1,363	1,521
85	1,458	1,395	1,891	3,529	3,814	2,895	1,891	1,447	1,617	1,817	1,870	1,617	1,860
80	1,669	1,648	2,176	4,057	4,490	3,296	2,240	1,690	1,828	2,092	2,155	1,891	2,198
75	1,976	1,944	2,472	4,850	5,019	3,677	2,546	1,923	2,029	2,409	2,515	2,155	2,536
70	2,324	2,219	2,684	5,462	5,484	4,015	2,927	2,198	2,250	2,779	2,821	2,451	2,821
65	2,557	2,483	2,874	5,917	6,022	4,427	3,244	2,483	2,515	3,001	3,117	2,768	3,096
60	2,747	2,610	3,053	6,540	6,699	4,850	3,645	2,705	2,821	3,201	3,360	2,958	3,349
55	2,969	2,779	3,265	7,259	7,259	5,388	3,973	2,979	3,075	3,455	3,698	3,180	3,603
50	3,138	2,948	3,444	8,135	7,935	5,927	4,395	3,286	3,307	3,772	4,015	3,392	3,878
45	3,286	3,127	3,656	8,991	8,695	6,508	4,871	3,561	3,487	4,131	4,395	3,561	4,237
40	3,413	3,275	3,888	10,058	9,562	7,237	5,484	3,856	3,761	4,564	4,754	3,751	4,638
35	3,613	3,413	4,237	11,094	10,566	7,935	6,149	4,258	4,110	4,945	5,135	3,930	5,114
30	3,804	3,592	4,585	12,573	11,833	8,833	6,815	4,712	4,459	5,262	5,600	4,173	5,674
25	4,025	3,804	5,008	13,946	13,313	9,784	7,406	5,219	4,754	5,769	6,117	4,564	6,445
20	4,279	3,941	5,705	15,320	14,897	11,094	8,336	5,748	5,346	6,466	6,625	4,976	7,396
15	4,607	4,216	6,603	17,010	16,377	12,890	9,826	6,656	6,191	7,185	7,332	5,505	8,843
10	4,934	4,448	8,558	19,546	18,278	14,792	11,411	7,829	7,512	8,917	7,988	6,001	10,988

APPENDIX A-4 **One-Line Diagram of Electrical Circuits**





NOTES:

1. 1200A RATING PLUG IN PDC–17–2, CUBICLE 1C TO BE SWAPPED WITH 800A RATING PLUG IN PDC–17–2, CUBICLE 2B.
2. EXISTING 800A RATING PLUG IN PDC–17–1, CUBICLE 1C TO BE REPLACED WITH NEW 1200A RATING PLUG.
3. 2MVA TRANSFORMER NEUTRAL CONNECTED TO EXISTING HIGH RESISTANCE GROUND SYSTEM IN EXISTING PDC–17–1 480V SWITCHGEAR.
4. 1600A FUSES IN PDC–17–2, CUBICLE 1C TO BE SWAPPED WITH 800A FUSES IN PDC–17–2, CUBICLE 2B.
5. EXISTING 800A FUSES IN PDC–17–1, CUBICLE 1C TO BE REPLACED WITH NEW 1600A FUSES.

ISSUE	REV	DATE	BY	AP'D	REMARKS
3		09/12/14	JEW	PAB	REVISED REACTOR, ADDED SYNCH CHECK
2		08/07/14	JEW	PAB	ADDED 480V CB DATA, 480V HRG, REVISED 480V BUS TIE AND NOTES
1		07/25/14	JEW	PAB	ADDED FORM 6 CONTROL AND TRANSFER TRIP
0		07/14/14	JEW	PAB	FOR CONSTRUCTION
G		06/26/14	JEW	PAB	REVISED NEUTRAL CT'S, DELETED RELAYS
F		04/08/14	JEW	PAB	ADDED GSU TRANSFORMER NEUTRAL GROUNDING REACTOR
E		03/05/14	JEW	PAB	REVISED GSU TRANSFORMER & 2MVA TRANSFORMER CABLES
D		07/10/13	JEW	PAB	REVISED PDC-17-2, ADDED PDC-17-1, ADDED CABLE & METERING DATA
C		05/15/13	JEW	PAB	REVISED UTILITY METERING POINT
B		04/12/13	JEW	PAB	REVISED UTILITY METERING, CHANGED MAIN SW TO CB
A		03/14/13	JEW	PAB	ISSUED FOR CLIENT REVIEW

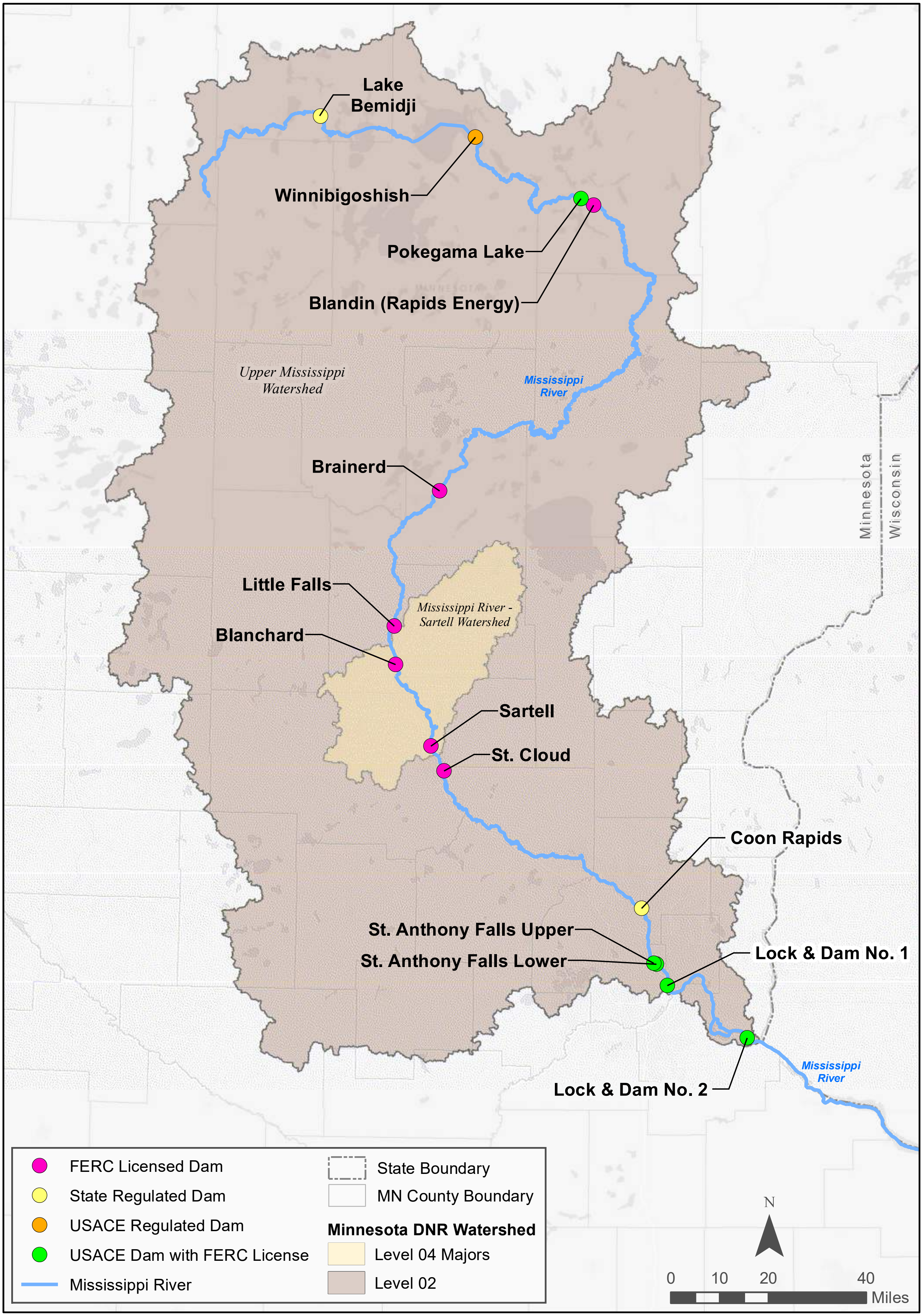
SCALE: NTS
NAME: JEW
CK'D: PAB
AP'D: PAB
DATE: 03/12/13

AIM DEVELOPMENT
SARTELL, MN
SARTELL HYDRO PLANT SEPARATION
ELECTRICAL
ONE LINE DIAGRAM

PÖYRY
PÖYRY (APPLETON) LLC APPLETON, WISCONSIN

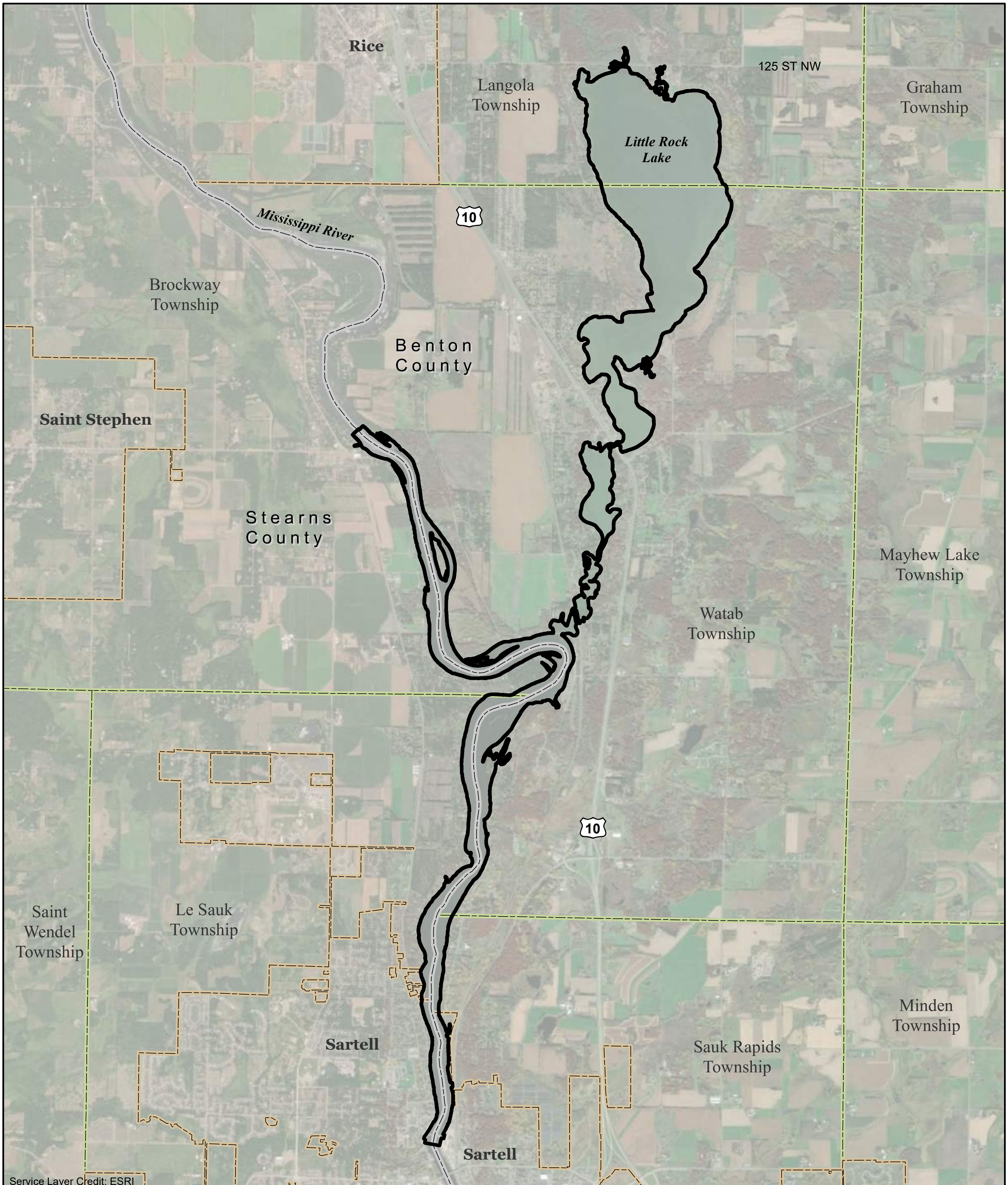
PROJ NO. 43X160634.10
DWG NO. E-1001
PLOTTED:
pa5a.dwg (24x36 Landscape)

APPENDIX E-5 Dams on the Upper Mississippi River



Service Layer Credit: ESRI, Minnesota DNR - Division of Ecological and Water Resources, Dam Safety Unit, Publication Date: 1/2/2020.

APPENDIX E-6 **Orthophotographic Map of Sartell Project Area**



Project Boundary
County Boundary
City Boundary
Township Boundary

N

0 0.5 1 1.5 2 Miles

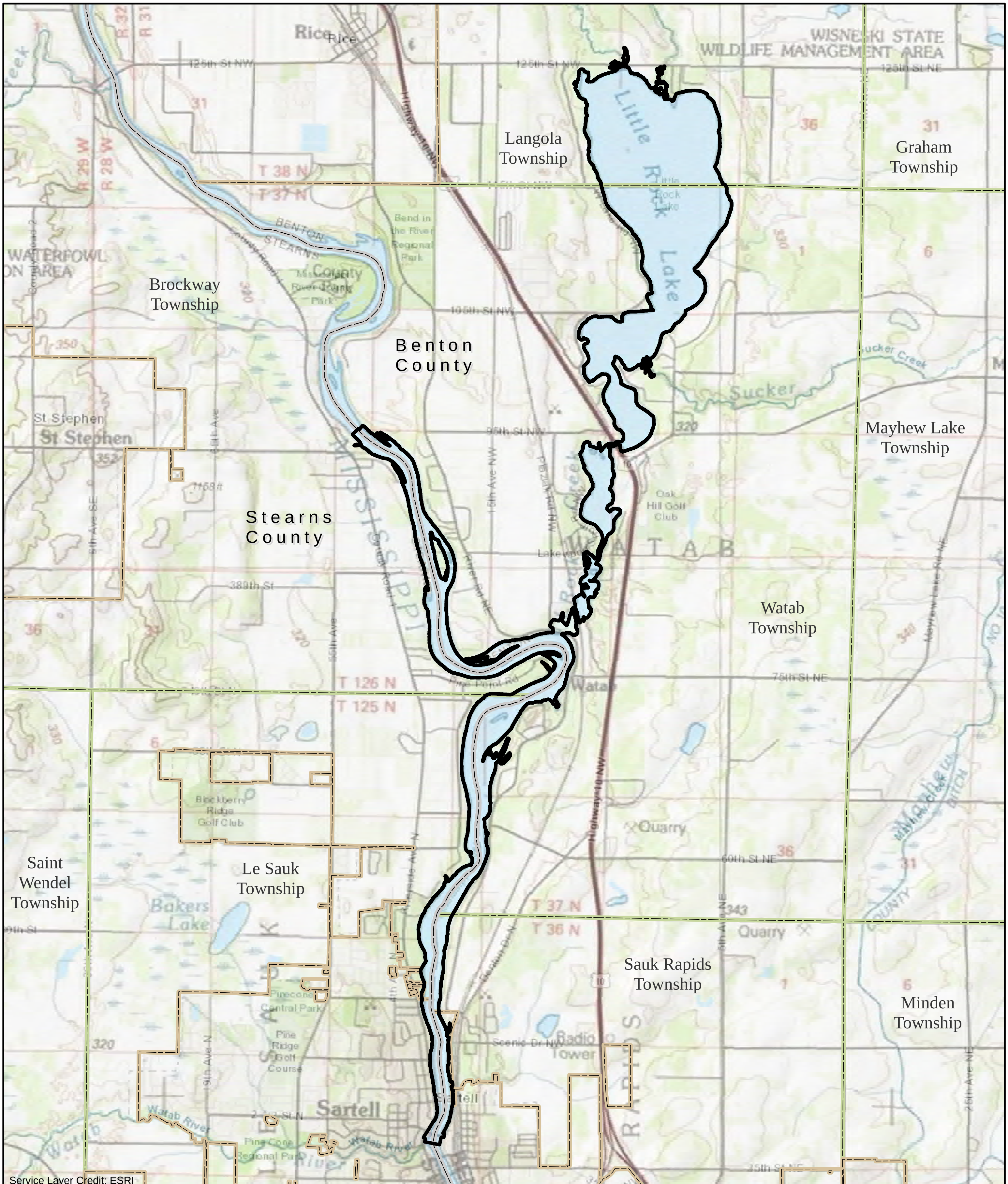
Sartell Hydroelectric Project
Orthophotographic Map

FERC No. 8315

EAGLE CREEK RENEWABLE ENERGY — EXCELLENCE IN HYDRO

Document Path: X:\4157800\192614.01\TECH\GIS\MAPS\DLA\Sartell_Boundary_Proposed_Ortho_DLA.mxd

APPENDIX E-7 **Topographic Map of Sartell Project Area**



Document Path: \\corp.meadhunt.com\sharedfolders\entp\415780\0192614.01\TECH\GIS\MAPS\DLA\Sartell_Boundary_Proposed_Topo_DLA.mxd

Project Boundary
County Boundary
City Boundary
Township Boundary

N

0 0.5 1 1.5 2 Miles

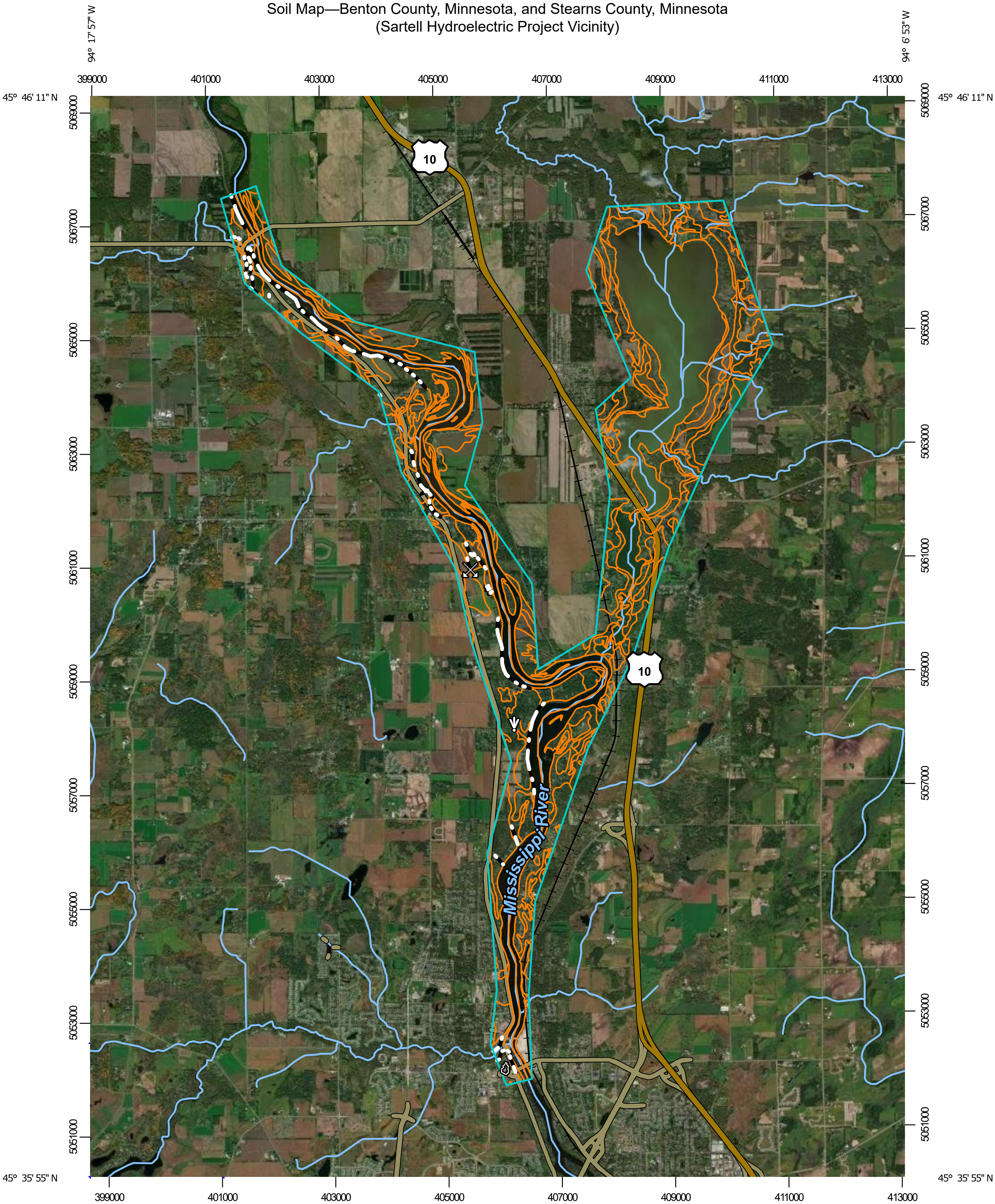
EAGLE CREEK
RENEWABLE ENERGY
— EXCELLENCE IN HYDRO —

Sartell Hydroelectric Project
Topographic Map

FERC No. 8315

APPENDIX E-8 Sartell Project Soil Report

Soil Map—Benton County, Minnesota, and Stearns County, Minnesota
(Sartell Hydroelectric Project Vicinity)



Map Scale: 1:92,500 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 1000, 2000, 4000, 6000

Feet: 0, 4000, 8000, 16000, 24000

N

Map projection: Web Mercator   Corner coordinates: WGS84   Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Benton County, Minnesota
Survey Area Data: Version 16, Sep 16, 2019

Soil Survey Area: Stearns County, Minnesota
Survey Area Data: Version 17, Sep 16, 2019

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 19, 2014—Oct 11, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1011A	Fordum-Winterfield complex, 0 to 2 percent slopes, frequently flooded	245.8	2.9%
1023A	Seelyeville and Markey soils, ponded, 0 to 1 percent slopes	94.0	1.1%
C60A	Bushville fine sand, 0 to 2 percent slopes	1.6	0.0%
C69B	Milaca, stony-St. Francis complex, 3 to 8 percent slopes	12.8	0.2%
D2A	Elkriver fine sandy loam, 0 to 2 percent slopes, rarely flooded	72.8	0.9%
D3A	Elkriver fine sandy loam, 0 to 2 percent slopes, occasionally flooded	17.2	0.2%
D8E	Sandberg loamy coarse sand, 6 to 30 percent slopes	76.1	0.9%
D14B	Elkriver-Mosford complex, 0 to 6 percent slopes, rarely flooded	227.9	2.7%
D17A	Duelm loamy sand, 0 to 2 percent slopes	169.6	2.0%
D20A	Isan-Isan, frequently ponded, complex, 0 to 2 percent slopes	351.9	4.2%
D30A	Seelyeville and Markey soils, depressional, 0 to 1 percent slopes	8.1	0.1%
D38A	Cantlin loamy fine sand, 0 to 3 percent slopes	13.1	0.2%
D44A	Isanti loamy fine sand, 0 to 2 percent slopes	0.4	0.0%
D46A	Lino loamy fine sand, 0 to 2 percent slopes	13.7	0.2%
D47A	Kost loamy fine sand, 0 to 2 percent slopes	15.6	0.2%
D47B	Kost loamy fine sand, 2 to 6 percent slopes	24.9	0.3%
D48A	Cantlin loamy fine sand, thick surface, 0 to 2 percent slopes	55.8	0.7%
D50A	Isanti fine sandy loam, depressional, 0 to 1 percent slopes	1.8	0.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
D51A	Kost loamy fine sand, banded substratum, 0 to 2 percent slopes	40.9	0.5%
D51B	Kost loamy fine sand, banded substratum, 2 to 6 percent slopes	61.2	0.7%
D51C	Kost loamy fine sand, banded substratum, 6 to 12 percent slopes	45.0	0.5%
D52A	Glendorado loamy fine sand, 0 to 2 percent slopes	26.9	0.3%
D54B	Hubbard, bedrock substratum-Rock outcrop complex, 1 to 8 percent slopes	46.8	0.6%
D55B	Zimmerman fine sand, banded substratum, 1 to 6 percent slopes	238.8	2.8%
D55C	Zimmerman fine sand, banded substratum, 6 to 12 percent slopes	54.6	0.6%
D55E	Zimmerman fine sand, banded substratum, 12 to 35 percent slopes	165.5	2.0%
D61A	Glendorado loamy sand, 0 to 2 percent slopes	74.2	0.9%
D62A	Hubbard-Mosford complex, Mississippi River Valley, 0 to 3 percent slopes	95.6	1.1%
D67A	Hubbard loamy sand, 0 to 2 percent slopes	694.7	8.2%
D67B	Hubbard loamy sand, 1 to 6 percent slopes	599.4	7.1%
D67C	Hubbard loamy sand, 2 to 12 percent slopes	89.6	1.1%
D67E	Hubbard loamy sand, Mississippi River Valley, 18 to 35 percent slopes	56.3	0.7%
GP	Pits, gravel-Udipsamments complex	2.6	0.0%
W	Water	2,133.5	25.3%
Subtotals for Soil Survey Area		**5,828.8**	**69.2%**
Totals for Area of Interest		**8,425.8**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
25	Becker fine sandy loam	42.5	0.5%
119B	Pomroy fine sand, 1 to 6 percent slopes	40.9	0.5%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
156B	Fairhaven loam, 2 to 6 percent slopes	16.3	0.2%
163B	Brainerd fine sandy loam, 1 to 4 percent slopes	1.0	0.0%
179B	Langola loamy sand, 1 to 4 percent slopes	28.6	0.3%
181	Litchfield loamy sand	4.3	0.1%
218	Watab loamy fine sand	20.8	0.2%
260	Duelm loamy sand, 0 to 2 percent slopes	57.2	0.7%
261	Isan-Isan, frequently ponded, complex, 0 to 2 percent slopes	7.7	0.1%
327A	Sverdrup sandy loam, Sandy Outwash, 0 to 2 percent slopes	33.5	0.4%
327B	Sverdrup sandy loam, Sandy Outwash, 2 to 6 percent slopes	7.8	0.1%
465	Kalmarville sandy loam, frequently flooded	119.2	1.4%
1018	Udifluvents, frequently flooded	84.5	1.0%
1892	Prebish fine sandy loam	1.1	0.0%
D67A	Hubbard loamy sand, 0 to 2 percent slopes	802.3	9.5%
D67B	Hubbard loamy sand, 1 to 6 percent slopes	715.7	8.5%
D67C	Hubbard loamy sand, 2 to 12 percent slopes	0.1	0.0%
W	Water	613.4	7.3%
Subtotals for Soil Survey Area		**2,597.0**	**30.8%**
Totals for Area of Interest		**8,425.8**	**100.0%**

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A A A

Area of Interest (AOI) | Soil Map | Soil Data Explorer | Download Soils Data | Shopping Cart (Free)

View Soil Information By Use: All Uses

Printable Version | Add to Shopping Cart

Intro to Soils | Suitabilities and Limitations for Use | Soil Properties and Qualities | Ecological Site Assessment | Soil Reports

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AOI Inventory

Building Site Development

Construction Materials

Disaster Recovery Planning

Land Classifications

Land Management

Recreational Development

Sanitary Facilities

Soil Chemical Properties

Soil Erosion

Conservation Planning

RUSLE2 Related Attributes

View Description | View Soil Report

Options

Include minor soils?

View Description | View Soil Report

Windbreaks and Environmental Plantings

Soil Health

Soil Physical Properties

Soil Qualities and Features

Vegetative Productivity

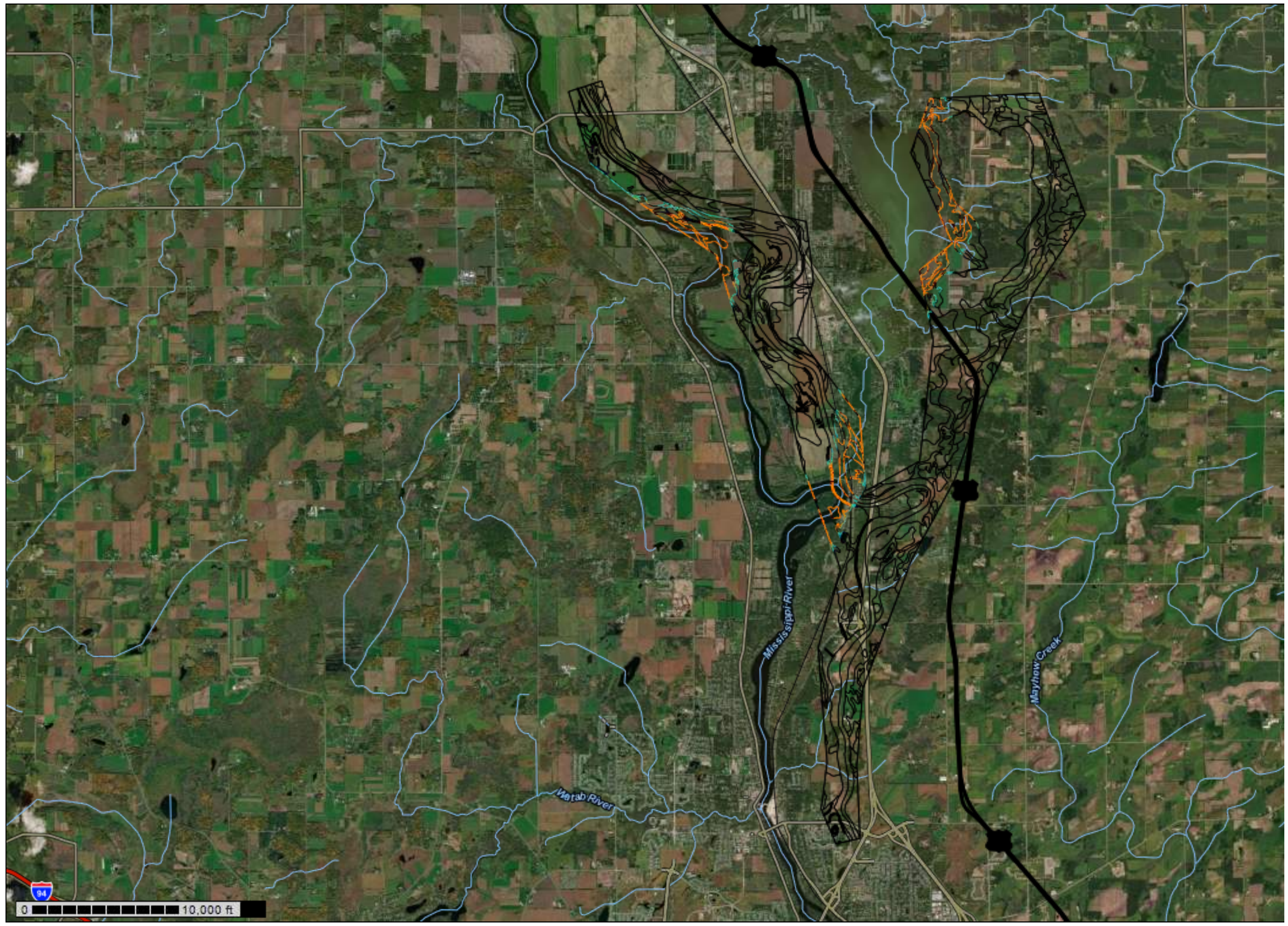
Waste Management

Water Features

Water Management

Soil Map

Scale (not to scale)



Report — RUSLE2 Related Attributes

Soil properties and interpretations for erosion runoff calculations. The surface mineral horizon properties are displayed or the first mineral horizon below an organic surface horizon. Organic horizons are not displayed.

Benton County, Minnesota								
Map symbol and soil name	**Pct. of map unit**	**Slope length (ft)**	**Hydrologic group**	**Kf**	**T factor**	**Representative value**		
						% Sand	**% Silt**	**% Clay**
1011A—Fordum-Winterfield complex, 0 to 2 percent slopes, frequently flooded								
Fordum, frequently flooded	65	148	A/D	.28	3	65.0	27.0	8.0
Winterfield, frequently flooded	25	49	A/D	.17	5	87.3	6.7	6.0
1023A—Seelyeville and Markey soils, ponded, 0 to 1 percent slopes								
Markey, ponded	45	125	A/D	—	1	—	—	—
C60A—Bushville fine sand, 0 to 2 percent slopes								
Bushville	85	82	C/D	.10	4	94.4	0.6	5.0
C69B—Milaca, stony-St. Francis complex, 3 to 8 percent slopes								
Milaca, stony	55	79	A/D	.15	4	71.3	16.7	12.0
St. francis	35	79	B	.32	2	69.3	21.7	9.0
D2A—Elkriver fine sandy loam, 0 to 2 percent slopes, rarely flooded								
Elkriver, rarely flooded	95	125	B	.28	3	64.2	26.8	9.0
D3A—Elkriver fine sandy loam, 0 to 2 percent slopes, occasionally flooded								
Elkriver, occasionally flooded	80	125	B/D	.28	3	64.2	26.8	9.0
D8E—Sandberg loamy coarse sand, 6 to 30 percent slopes								
Sandberg	75	102	A	.15	5	80.0	14.0	6.0
D14B—Elkriver-Mosford complex, 0 to 6 percent slopes, rarely flooded								
Elkriver, rarely flooded	70	125	B	.28	3	64.2	26.8	9.0
Mosford, rarely flooded	30	125	B	.28	2	67.3	20.2	12.5
D17A—Duelm loamy sand, 0 to 2 percent slopes								
Duelm	80	151	A	.17	5	85.0	9.0	6.0
D20A—Isan-Isan, frequently ponded, complex, 0 to 2 percent slopes								
Isan	65	98	A/D	.20	2	67.0	24.0	9.0

Benton County, Minnesota								
Isan, frequently ponded	30	98	A/D	.20	2	67.0	24.0	9.0
D30A—Seelyeville and Markey soils, depressional, 0 to 1 percent slopes								
Markey, depressional	45	125	A/D	—	1	—	—	—
D38A—Cantlin loamy fine sand, 0 to 3 percent slopes								
Cantlin	85	102	A	.20	5	80.3	16.7	3.0
D44A—Isanti loamy fine sand, 0 to 2 percent slopes								
Isanti	85	49	A/D	.28	5	80.3	16.7	3.0
D46A—Lino loamy fine sand, 0 to 2 percent slopes								
Lino	85	49	A/D	.32	5	80.3	16.7	3.0
D47A—Kost loamy fine sand, 0 to 2 percent slopes								
Kost	93	82	A	.17	5	86.8	6.7	6.5
D47B—Kost loamy fine sand, 2 to 6 percent slopes								
Kost	93	102	A	.17	5	86.8	6.7	6.5
D48A—Cantlin loamy fine sand, thick surface, 0 to 2 percent slopes								
Cantlin, thick surface	90	148	A	.17	5	80.3	16.7	3.0
D50A—Isanti fine sandy loam, depressional, 0 to 1 percent slopes								
Isanti, depressional	85	49	A/D	.28	2	65.8	31.2	3.0
D51A—Kost loamy fine sand, banded substratum, 0 to 2 percent slopes								
Kost, banded substratum	90	82	A	.17	5	86.8	6.7	6.5
D51B—Kost loamy fine sand, banded substratum, 2 to 6 percent slopes								
Kost, banded substratum	90	102	A	.17	5	86.8	6.7	6.5
D51C—Kost loamy fine sand, banded substratum, 6 to 12 percent slopes								
Kost, banded substratum	90	79	A	.17	5	86.8	6.7	6.5
D52A—Glendorado loamy fine sand, 0 to 2 percent slopes								

Benton County, Minnesota								
Glendorado	85	148	A/D	.17	5	86.8	6.7	6.5
D54B—Hubbard, bedrock substratum-Rock outcrop complex, 1 to 8 percent slopes								
Hubbard, bedrock substratum	70	—	A	.10	5	83.8	9.2	7.0
D55B—Zimmerman fine sand, banded substratum, 1 to 6 percent slopes								
Zimmerman, banded substratum	85	79	A	.10	5	97.3	0.7	2.0
D55C—Zimmerman fine sand, banded substratum, 6 to 12 percent slopes								
Zimmerman, banded substratum	85	75	A	.10	5	97.3	0.7	2.0
D55E—Zimmerman fine sand, banded substratum, 12 to 35 percent slopes								
Zimmerman, banded substratum	85	75	A	.10	5	97.3	0.7	2.0
D61A—Glendorado loamy sand, 0 to 2 percent slopes								
Glendorado	85	148	A/D	.15	5	84.9	9.1	6.0
D62A—Hubbard-Mosford complex, Mississippi River Valley, 0 to 3 percent slopes								
Hubbard, terrace	60	82	A	.02	5	86.0	8.0	6.0
Mosford	35	82	A	.20	2	68.0	19.0	13.0
D67A—Hubbard loamy sand, 0 to 2 percent slopes								
Hubbard	90	151	A	.02	5	86.0	8.0	6.0
D67B—Hubbard loamy sand, 1 to 6 percent slopes								
Hubbard	85	125	A	.02	5	86.0	8.0	6.0
D67C—Hubbard loamy sand, 2 to 12 percent slopes								
Hubbard	85	151	A	.02	5	86.0	8.0	6.0
D67E—Hubbard loamy sand, Mississippi River Valley, 18 to 35 percent slopes								
Hubbard, terrace	85	102	A	.02	5	86.0	8.0	6.0
Stearns County, Minnesota								

Stearns County, Minnesota

Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
25—Becker fine sandy loam								
Becker	90	102	A	.20	3	62.5	26.0	11.5
119B—Pomroy fine sand, 1 to 6 percent slopes								
Pomroy	90	177	A	.10	4	94.4	0.6	5.0
156B—Fairhaven loam, 2 to 6 percent slopes								
Fairhaven	90	161	B	.28	3	39.8	37.7	22.5
163B—Brainerd fine sandy loam, 1 to 4 percent slopes								
Brainerd	90	253	C/D	.24	4	66.9	20.1	13.0
179B—Langola loamy sand, 1 to 4 percent slopes								
Langola	90	203	A	.15	4	84.9	9.1	6.0
181—Litchfield loamy sand								
Litchfield	90	102	A	.10	5	83.5	9.0	7.5
218—Watab loamy fine sand								
Watab	90	75	C/D	.17	4	85.9	6.6	7.5
260—Duelm loamy sand, 0 to 2 percent slopes								
Duelm	80	151	A	.17	5	85.0	9.0	6.0
261—Isan-Isan, frequently ponded, complex, 0 to 2 percent slopes								
Isan	65	98	A/D	.20	2	67.0	24.0	9.0
Isan, frequently ponded	30	98	A/D	.20	2	67.0	24.0	9.0
327A—Sverdrup sandy loam, Sandy Outwash, 0 to 2 percent slopes								
Sverdrup	70	125	A	.20	2	61.0	24.0	15.0
327B—Sverdrup sandy loam, Sandy Outwash, 2 to 6 percent slopes								
Sverdrup	70	138	A	.20	2	61.0	24.0	15.0
465—Kalmarville sandy loam, frequently flooded								
Kalmarville, frequently flooded	100	102	A/D	.24	4	65.3	23.2	11.5

Stearns County, Minnesota								
1018—Udifluvents, frequently flooded								
Udifluvents, frequently flooded	90	102	A/D	.32	3	64.2	26.8	9.0
1892—Prebish fine sandy loam								
Prebish	95	151	B/D	.24	4	67.3	20.2	12.5
D67A—Hubbard loamy sand, 0 to 2 percent slopes								
Hubbard	90	151	A	.02	5	86.0	8.0	6.0
D67B—Hubbard loamy sand, 1 to 6 percent slopes								
Hubbard	85	125	A	.02	5	86.0	8.0	6.0
D67C—Hubbard loamy sand, 2 to 12 percent slopes								
Hubbard	85	151	A	.02	5	86.0	8.0	6.0

Description — RUSLE2 Related Attributes

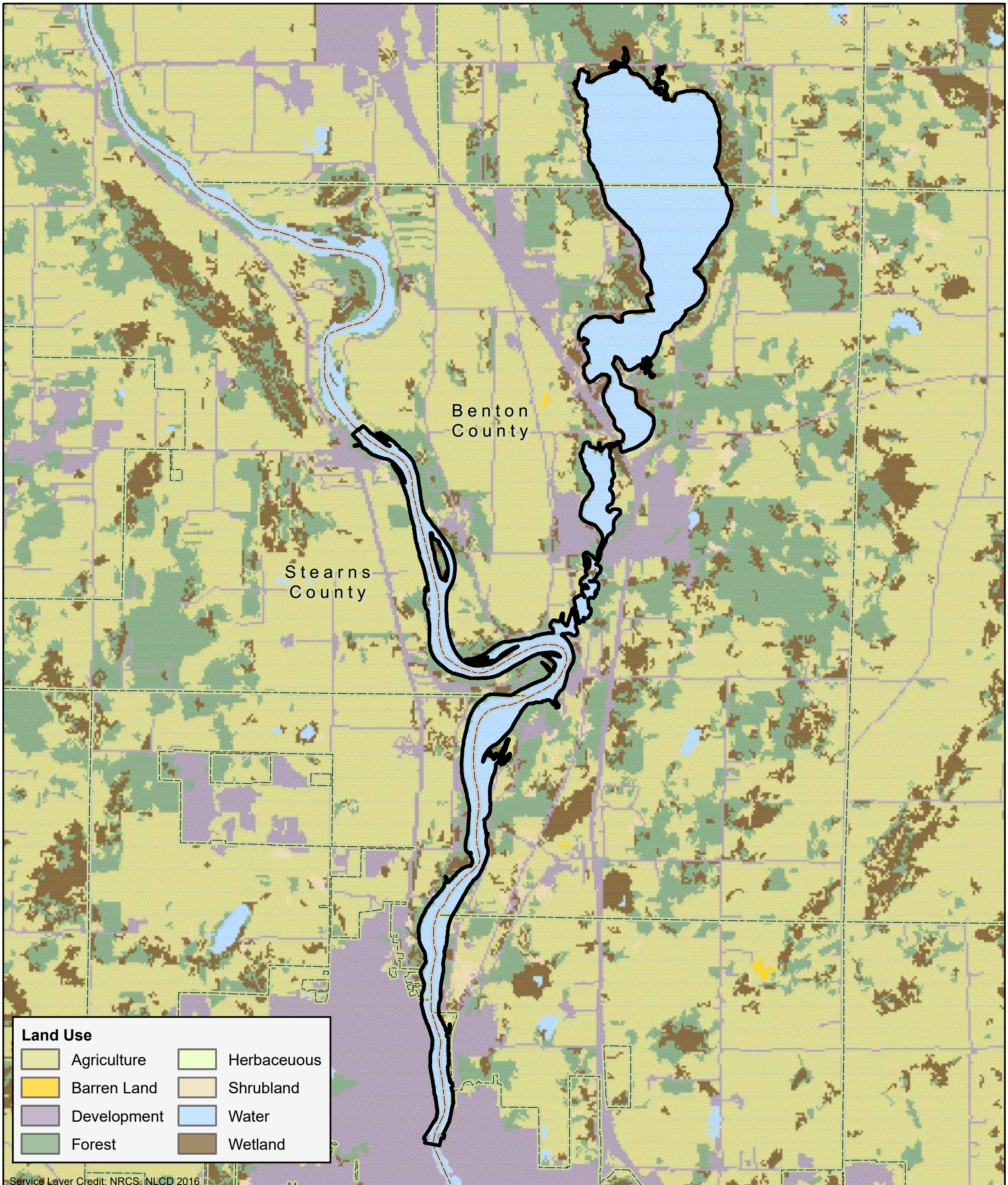
RUSLE2 Related Attributes

This report summarizes those soil attributes used by the Revised Universal Soil Loss Equation Version 2 (RUSLE2) for the map units in the selected area. The report includes the map unit symbol, the component name, and the percent of the component in the map unit. Soil property data for each map unit component include the hydrologic soil group, erosion factor Kf for the surface horizon, erosion factor T, and the representative percentage of sand, silt, and clay in the mineral surface horizon. Missing surface data may indicate the presence of an organic layer.

APPENDIX E-9 **MnDNR Historic Property Monitoring During the Sartell Pool Drawdown (Public)**

This appendix has been e-filed separately as privileged information.

APPENDIX E-10 Major Land Uses in Sartell Project Vicinity



EAGLE CREEK RENEWABLE ENERGY — EXCELLENCE IN HYDRO

Proposed Project Boundary
County Boundary
Township Boundary
City Boundary

N

0 0.5 1 1.5 2 Miles

Sartell Hydroelectric Project
Topographic Map

FERC No. 8315

APPENDIX E-11 Flood Zone Maps

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by the United States Geological Survey (USGS). The basemap shown is the USGS National Map: Orthoimagery. Last refreshed October, 2020.

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This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards. This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date.

N

0 500 1,000 2,000 3,000 4,000 Feet

Meters 0 105 210 420 630 840

FEMA

National Flood Insurance Program

CITY OF SARTELL
STEARNS COUNTY
BENTON COUNTY

MAP NUMBER

EFFECTIVE DATE

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0 250 500 1,000 1,500 2,000 Feet

0 50 100 200 300 400 Meters

N

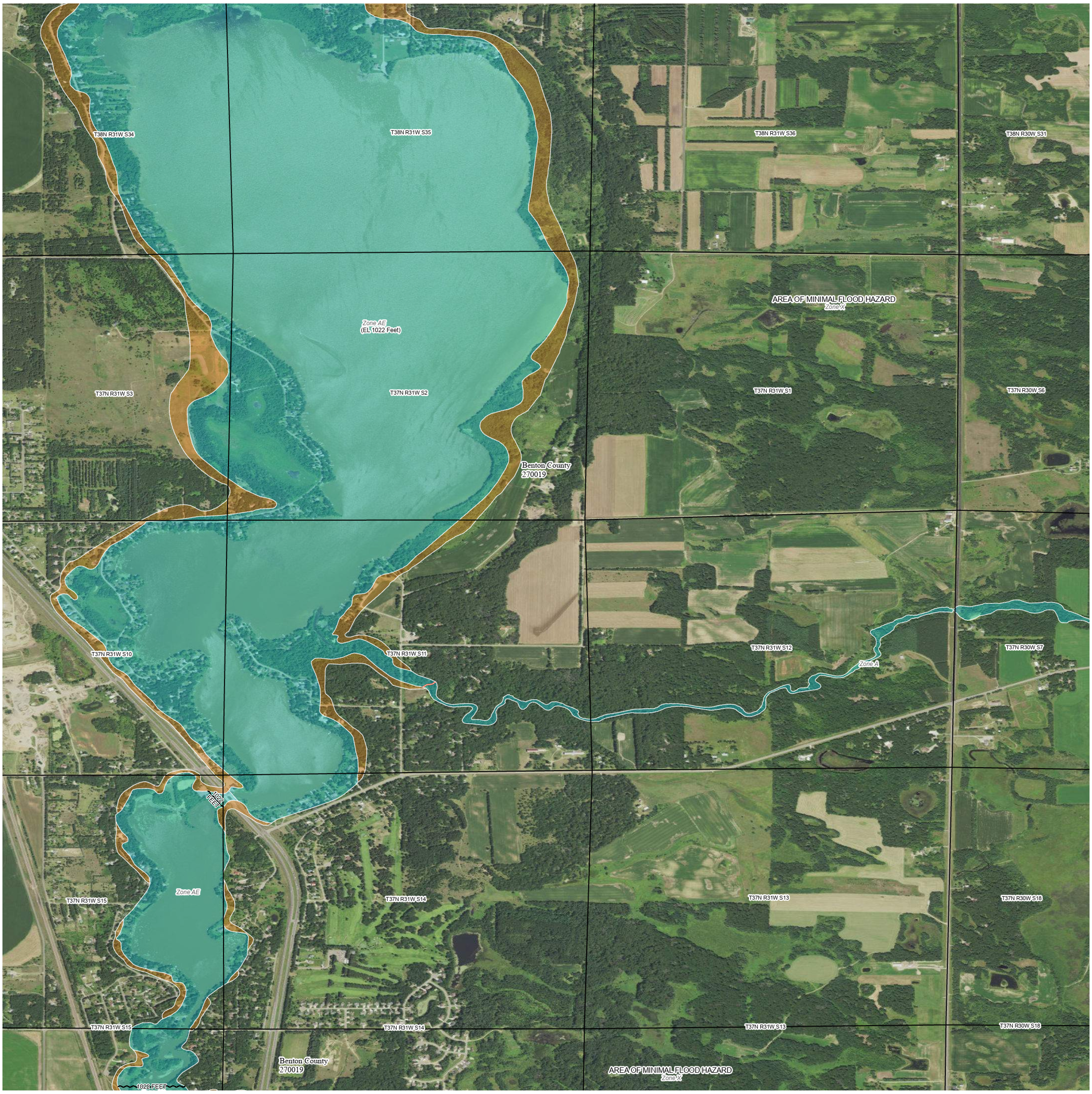
FEMA

National Flood Insurance Program

STEARNS COUNTY
CITY OF SARTELL
CITY OF SAUK RAPIDS

MAP NUMBER

EFFECTIVE DATE



BENTON COUNTY

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N

0 500 1,000 2,000 3,000 4,000 Feet

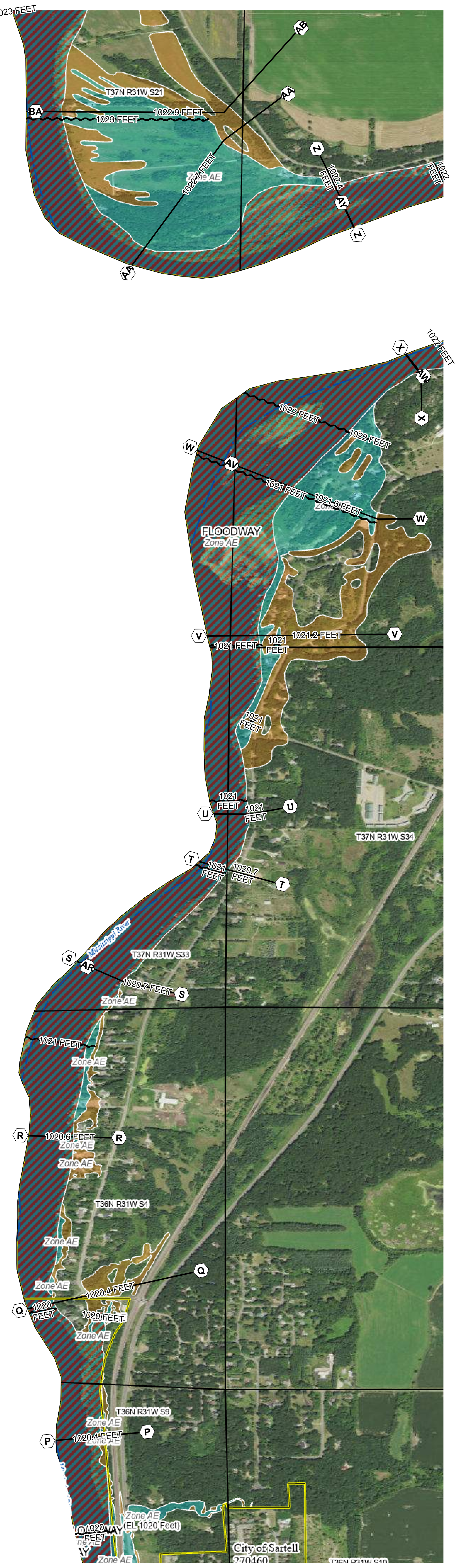
0 105 210 420 630 840 Meters

FEMA

National Flood Insurance Program

MAP NUMBER

EFFECTIVE DATE



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0 500 1,000 2,000 3,000 4,000 Feet

Meters
0 105 210 420 630 840

FEMA
National Flood Insurance Program

STEARNS COUNTY
CITY OF SARTELL
BENTON COUNTY

MAP NUMBER

EFFECTIVE DATE

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This map was exported from FEMA's National Flood Hazard Layer (NFHL) on **6/22/2022 5:51 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet at https://www.fema.gov/media-library/assets/documents/118418

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N

0 250 500 1,000 1,500 2,000 Feet

0 50 100 200 300 400 Meters

FEMA

National Flood Insurance Program

CITY OF RICE
CITY OF ST. STEPHEN
STEARNS COUNTY
BENTON COUNTY

MAP NUMBER

EFFECTIVE DATE

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Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

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0 500 1,000 2,000 3,000 4,000 Feet

Meters 0 105 210 420 630 840

N

FEMA

National Flood Insurance Program

STEARNS COUNTY
BENTON COUNTY

MAP NUMBER

EFFECTIVE DATE

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For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

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N

0 250 500 1,000 1,500 2,000 Feet

0 50 100 200 300 400 Meters

FEMA

National Flood Insurance Program

STEARNS COUNTY
CITY OF SARTELL
CITY OF SAUK RAPIDS
BENTON COUNTY

MAP NUMBER

EFFECTIVE DATE

APPENDIX E-12 MN Rule 7050

CHAPTER 7050

MINNESOTA POLLUTION CONTROL AGENCY

WATERS OF THE STATE

WATER QUALITY STANDARDS FOR PROTECTION OF WATERS OF THE STATE

CLASSIFICATIONS

7050.0100 [Repealed, 9 SR 913]
Published Electronically: *April 1, 2008*

WATER QUALITY STANDARDS FOR PROTECTION OF WATERS OF THE STATE

7050.0110 SCOPE.

Parts 7050.0130 to 7050.0227 apply to all waters of the state, both surface and underground. This chapter includes a classification system of beneficial uses applicable to waters of the state, narrative and numeric water quality standards that protect specific beneficial uses, antidegradation provisions, and other provisions to protect the physical, chemical, and biological integrity of waters of the state. Parts 7050.0400 to 7050.0470 classify all surface waters within or bordering Minnesota and designate the beneficial uses for which these waters are protected. This chapter applies to point source and nonpoint source discharges and to the physical alterations of wetlands. Other water quality rules of general or specific application that include any more stringent water quality standards or prohibitions are preserved.

Effluent limits and treatment requirements for discharges of sewage, industrial wastes, and other wastes are located in chapter 7053.

Statutory Authority: *MS s 115.03; 115.44*

History: *9 SR 913; 12 SR 1810; 18 SR 2195; 32 SR 1699; 9 SR 913; 12 SR 1810; 18 SR 2195; 32 SR 1699; 41 SR 545*

Published Electronically: *December 9, 2016*

7050.0120 [Repealed, 9 SR 913]

Published Electronically: *April 1, 2008*

7050.0130 GENERAL DEFINITIONS.

Subpart 1. **Scope.** For purposes of this chapter, the following terms have the meanings given them.

Subp. 2. **Terms defined in statute.** The terms "waters of the state," "groundwater," "water pollution," and "toxic pollutants," as well as any other terms for which definitions are given in the pollution control statutes, as used herein have the meanings given to them in Minnesota Statutes, sections 115.01 and 115.41, with the exception that disposal systems or treatment works operated under permit or certificate of compliance of the agency are not "waters of the state."

Subp. 3. **Seven-day ten-year low flow or $7Q_{10}$.**

A. "Seven-day ten-year low flow" or "$7Q_{10}$ " means the lowest average seven-day flow with a once in ten-year recurrence interval. A $7Q_{10}$ is derived by identifying the lowest average flow for a seven-consecutive-day period from daily flow records for each year of record, from a continuous flow gauging station. The seven-day average low flow values for each year are arrayed in order of magnitude and fitted to a probability distribution. The $7Q_{10}$ is the stream or river flow that is equal to or exceeded by 90 percent of the values in the distribution.

B. The period of record for determining the specific flow for the stated recurrence interval, where records are available, shall include at least the most recent ten years of record, including flow records obtained after establishment of flow regulation devices, if any. Where stream flow records are not available, the flow may be estimated on the basis of available information on the watershed characteristics, precipitation, runoff, and other relevant data. The calculations shall not be applied to lakes and their embayments which have no comparable flow recurrence interval.

Subp. 4. **Commissioner.** "Commissioner" means the commissioner of the Minnesota Pollution Control Agency or the commissioner's designee.

Subp. 5. **Nonpoint source.** "Nonpoint source" means a land management or land use activity that contributes or may contribute to ground and surface water pollution as a result of runoff, seepage, or percolation and that is not defined as a point source under Minnesota Statutes, section 115.01, subdivision 11.

Subp. 6. **Surface waters.** "Surface waters" means waters of the state excluding groundwater as defined in Minnesota Statutes, section 115.01, subdivision 6.

Subp. 7. **Other terms.** Other terms and abbreviations used in this chapter are defined in the part in which they are used. Terms and abbreviations used in this chapter that are not specifically defined in applicable federal or state law shall be construed in conformance with the context, and in relation to the applicable section of the statutes pertaining to the matter, and current professional usage.

Statutory Authority: *MS s 115.03; 115.44*

History: *9 SR 913; 12 SR 1810; 15 SR 1057; 18 SR 2195; 32 SR 1699*
Published Electronically: *April 1, 2008*

7050.0140 USE CLASSIFICATIONS FOR WATERS OF THE STATE.

Subpart 1. **Introduction.** Based on considerations of best usage and the need for water quality protection in the interest of the public, and in conformance with the requirements of Minnesota Statutes, section 115.44, the waters of the state are grouped into one or more of the classes in subparts 2 to 8. The classifications are listed in parts 7050.0400 to 7050.0470. The classifications should not be construed to be in order of priority, nor considered to be exclusive or prohibitory of other beneficial uses.

Subp. 2. **Class 1 waters, domestic consumption.** Domestic consumption includes all waters of the state that are or may be used as a source of supply for drinking, culinary or food processing use, or other domestic purposes and for which quality control is or may be necessary to protect the public health, safety, or welfare.

Subp. 3. **Class 2 waters, aquatic life and recreation.** Aquatic life and recreation includes all waters of the state that support or may support aquatic biota, bathing, boating, or other recreational purposes and for which quality control is or may be necessary to protect aquatic or terrestrial life or their habitats or the public health, safety, or welfare.

Subp. 4. **Class 3 waters, industrial consumption.** Industrial consumption includes all waters of the state that are or may be used as a source of supply for industrial process or cooling water, or any other industrial or commercial purposes, and for which quality control is or may be necessary to protect the public health, safety, or welfare.

Subp. 5. **Class 4 waters, agriculture and wildlife.** Agriculture and wildlife includes all waters of the state that are or may be used for any agricultural purposes, including stock watering and irrigation, or by waterfowl or other wildlife and for which quality control is or may be necessary to protect terrestrial life and its habitat or the public health, safety, or welfare.

Subp. 6. **Class 5 waters, aesthetic enjoyment and navigation.** Aesthetic enjoyment and navigation includes all waters of the state that are or may be used for any form of water transportation or navigation or fire prevention and for which quality control is or may be necessary to protect the public health, safety, or welfare.

Subp. 7. **Class 6 waters, other uses and protection of border waters.** Other uses includes all waters of the state that serve or may serve the uses in subparts 2 to 6 or any other beneficial uses not listed in this part, including without limitation any such uses in this or any other state, province, or nation of any waters flowing through or originating in this state, and for which quality control is or may be necessary for the declared purposes in this part, to conform with the requirements of the legally constituted state or national agencies having jurisdiction over such waters, or for any other considerations the agency may deem proper.

Subp. 8. **Class 7 waters, limited resource value waters.** Limited resource value waters include surface waters of the state that have been subject to a use attainability analysis and have been found to have limited value as a water resource. Water quantities in these waters are intermittent or less than one cubic foot per second at the $7Q_{10}$ flow as defined in part 7050.0130, subpart 3. These waters shall be protected so as to allow secondary body contact use, to preserve the groundwater for use as a potable water supply, and to protect aesthetic qualities of the water. It is the intent of the agency that very few waters be classified as limited resource value waters. The use attainability analysis must take into consideration those factors listed in Minnesota Statutes, section 115.44, subdivisions 2 and 3. The agency, in cooperation and agreement with the Department of Natural Resources with respect to determination of fisheries values and potential, shall use this information to determine the extent to which the waters of the state demonstrate that:

A. the existing and potential faunal and floral communities 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; or

C. there are limited recreational opportunities, such as fishing, swimming, wading, or boating, in and on the water resource.

The conditions in items A and C or B and C must be established by the use attainability analysis before the waters can be classified as limited resource value waters.

Statutory Authority: *MS s 115.03; 115.44*

History: *9 SR 913; 32 SR 1699; 42 SR 441*
Published Electronically: *November 20, 2017*

7050.0150 DETERMINATION OF WATER QUALITY, BIOLOGICAL AND PHYSICAL CONDITIONS, AND COMPLIANCE WITH STANDARDS.

Subpart 1. **Policy and scope.** The intent of the state is to protect and maintain surface waters in a condition which allows for the maintenance of all existing beneficial uses. The condition of a surface water body is determined by its physical, chemical, and biological qualities. The agency shall determine an exceedance of water quality standards or an impaired condition based on pollution of the waters of the state from point and nonpoint sources that has resulted in degradation of the physical, chemical, or biological qualities of the water body to the extent that attainable or previously existing beneficial uses are actually or potentially lost.

The narrative water quality standards in subpart 3 prescribe the qualities or properties of surface waters that are necessary for the protection of designated public uses and benefits. If the narrative standards in this part are exceeded, it is considered indicative of a polluted condition which is actually or potentially deleterious, harmful, detrimental, or injurious with respect to the designated uses of the waters of the state.

Subparts 5 to 7 list factors the commissioner will use to determine if surface waters are in compliance with applicable narrative standards in subpart 3. Determination of compliance with the narrative standards will be made for individual water bodies on a case-by-case basis.

Subp. 2. **Other standards preserved.** The requirements of this part are in addition to the application of other narrative or numeric water quality standards in this chapter. If the requirements of this part conflict with any other narrative or numeric standard in this chapter, the more stringent standard applies.

Subp. 3. **Narrative standards.** 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 aquatic biota 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 aquatic biota normally present shall not be prevented or hindered by the discharge of any sewage, industrial waste, or other wastes to the waters.

Subp. 4. **Definitions.** For the purposes of this chapter and chapter 7053, the following terms have the meanings given them.

A. "122-day ten-year low flow" or "$122Q_{10}$" means the lowest average 122-day flow with a once in ten-year recurrence interval. A $122Q_{10}$ is derived using the same methods used to derive a $7Q_{10}$, and the guidelines regarding period of record for flow data and estimating a $7Q_{10}$ apply equally to determining a $122Q_{10}$, as described in part 7050.0130, subpart 3.

B. "Altered materially," "material increase," "material manner," "seriously impaired," and "significant increase," as used in subparts 3, 5, and 6, mean that pollution of the waters of the state has resulted in degradation of the physical, chemical, or biological qualities of the water body to the extent that attainable or previously existing beneficial uses are actually or potentially lost.

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.

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

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.

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.

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.

H. "BOD_5" or "five-day biochemical oxygen demand" means the amount of dissolved oxygen needed by aerobic biological organisms to break down organic material present in a given water sample at a certain temperature over a five-day period.

I. "Chlorophyll-a" means a pigment in green plants including algae. The concentration of chlorophyll-a, expressed in weight per unit volume of water, is a measurement of the abundance of algae.

J. "Diel flux" means the daily change in a constituent, such as dissolved oxygen or pH, when there is a distinct daily cycle in the measurement. Diel dissolved oxygen flux means the difference between the maximum daily dissolved oxygen concentration and the minimum daily dissolved oxygen concentration.

K. "Ecoregion" means an area of relative homogeneity in ecological systems based on similar soils, land use, land surface form, and potential natural vegetation. Minnesota ecoregions are shown on the map in part 7050.0468.

L. "Eutrophication" means the increased productivity of the biological community in water bodies in response to increased nutrient loading. Eutrophication is characterized by increased growth and abundance of algae and other aquatic plants, reduced water transparency, reduction or loss of dissolved oxygen, and other chemical and biological changes. The acceleration of eutrophication due to excess nutrient loading from human sources and activities, called cultural eutrophication, causes a degradation of water quality and possible loss of beneficial uses.

M. "Eutrophication standard" means the combination of indicators of enrichment and indicators of response as described in subpart 5. The indicators upon which the eutrophication standard for specific water bodies are based are as provided under subparts 5a to 5c.

N. "Hydraulic residence time" means the time water resides in a basin or, alternately, the time it would take to fill the basin if it were empty.

O. "Impaired water" or "impaired condition" means a water body that does not meet applicable water quality standards or fully support applicable beneficial uses, due in whole or in part to water pollution from point or nonpoint sources, or any combination thereof.

P. "Index of biotic integrity," "index of biological integrity, " or "IBI" means an index developed by measuring attributes of an aquatic community that change in quantifiable and predictable ways in response to human disturbance, representing the health of that community.

Q. "Lake" means an enclosed basin filled or partially filled with standing fresh water with a maximum depth greater than 15 feet. Lakes may have no inlet or outlet, an inlet or outlet, or both an inlet and outlet.

R. "Lake morphometry" means the physical characteristics of the lake basin that are reasonably necessary to determine the shape of a lake, such as maximum length and width, maximum and mean depth, area, volume, and shoreline configuration.

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

T. "Mixing status" means the frequency of complete mixing of the lake water from surface to bottom, which is determined by whether temperature gradients are established and maintained in the water column during the summer season.

U. "Measurable increase" or "measurable impact" means a change in trophic status that can be discerned above the normal variability in water quality data using a weight of evidence approach. The change in trophic status does not require a demonstration of statistical significance to be considered measurable. Mathematical models may be used as a tool in the data analysis to help predict changes in trophic status.

V. "Natural causes" means the multiplicity of factors that determine the physical, chemical, or biological conditions that would exist in a water body in the absence of measurable impacts from human activity or influence.

W. "Normal aquatic biota" and "normally present" mean a healthy aquatic community expected to be present in the water body in the absence of pollution of the water, consistent with any variability due to natural hydrological, substrate, habitat, or other physical and chemical characteristics. Expected presence is based on comparing the aquatic community in the water body of interest to the aquatic community in representative reference water bodies.

X. "Nuisance algae bloom" means an excessive population of algae that is characterized by obvious green or blue-green pigmentation in the water, floating mats of algae, reduced light transparency, aesthetic degradation, loss of recreational use, possible harm to the aquatic community, or possible toxicity to animals and humans. Algae blooms are measured through tests for chlorophyll-a, observations of Secchi disk transparency, and observations of impaired recreational and aesthetic conditions by the users of the water body, or any other reliable data that identifies the population of algae in an aquatic community.

Y. "Periphyton" means algae on the bottom of a water body. In rivers or streams, these forms are typically found attached to logs, rocks, or other substrates, but when dislodged the algae will become part of the seston.

Z. "Readily available and reliable data and information" means chemical, biological, and physical data and information determined by the commissioner to meet the quality assurance and quality control requirements in subpart 8, that are not more than ten years old from the time they are used for the assessment. A subset of data in the ten-year period, or data more than ten years old can be used if credible scientific evidence shows that these data are representative of current conditions.

AA. "Reference water body" means a water body minimally or least impacted by point or nonpoint sources of pollution that is representative of water bodies of a similar surface water body type and within a geographic region such as an ecoregion or watershed. Reference water bodies are used as a base for comparing the quality of similar water bodies in the same geographic region.

BB. "Reservoir" means a body of water in a natural or artificial basin or watercourse where the outlet or flow is artificially controlled by a structure such as a dam. Reservoirs are distinguished from river systems by having a hydraulic residence time of at least 14 days. For purposes of this item, residence time is determined using a flow equal to the $122Q_{10}$ for the months of June through September.

CC. "River nutrient region" means the geographic basis for regionalizing the river eutrophication criteria as described in Heiskary, S. and K. Parson, Regionalization of Minnesota's Rivers for Application of River Nutrient Criteria, Minnesota Pollution Control Agency (2013), which is incorporated by reference. The document is not subject to frequent change and is available through the Minitex interlibrary loan system.

DD. "Secchi disk" means a tool that is used to measure the transparency of lake water. A Secchi disk is an eight-inch weighted disk on a calibrated rope, either white or with quadrants of black and white. To measure water transparency with a Secchi disk, the disk is viewed from the shaded side of a boat. The depth of the water at the point where the disk reappears upon raising it after it has been lowered beyond visibility is recorded.

EE. "Secchi disk transparency" means the transparency of water as measured by a Secchi disk, a Secchi tube, or a transparency tube.

FF. "Secchi tube" means a tool that is used to measure the transparency of stream or river water. A Secchi tube is a clear plastic tube, one meter in length and 1-3/4 inch in diameter, with a mini-Secchi disk on a string. To measure water transparency, the tube is filled with water collected from a stream or river and, looking into the tube from the top, the weighted Secchi disk is lowered into the tube by a string until it disappears and then raised until it reappears, allowing the user to raise and lower the disk within the same water sample numerous times. The depth of the water at the midpoint between disappearance and reappearance of the disk is recorded in centimeters, which are marked on the side of the tube. If the Secchi disk is visible when it is lowered to the bottom of the tube, the transparency reading is recorded as "greater than 100 centimeters."

GG. "Seston" means particulate matter suspended in water bodies and includes plankton and organic and inorganic matter.

HH. "Shallow lake" means an enclosed basin filled or partially filled with standing fresh water with a maximum depth of 15 feet or less or with 80 percent or more of the lake area shallow enough to support emergent and submerged rooted aquatic plants (the littoral zone). It is uncommon for shallow lakes to thermally stratify during the summer. The quality of shallow lakes will permit the propagation and maintenance of a healthy indigenous aquatic community and they will be suitable for boating and other forms of aquatic recreation for which they may be usable. Shallow lakes are differentiated from wetlands and lakes on a case-by-case basis. Wetlands are defined in part 7050.0186, subpart 1a.

II. "Summer-average" means a representative average of concentrations or measurements of nutrient enrichment factors, taken over one summer season.

JJ. "Summer season" means a period annually from June 1 through September 30.

KK. "Transparency tube" means a tool that is used to measure the transparency of stream or river water. A transparency tube is a graduated clear plastic tube, 24 inches or more in length by 1-1/2 inches in diameter, with a stopper at the bottom end. The inside surface of the stopper is painted black and white. To measure water transparency, the tube is filled with water from a surface water; the water is released through a valve at the bottom end until the painted surface of the stopper is just visible through the water column when viewed from the top of the tube. The depth, in centimeters, is noted. More water is released until the screw in the middle of the painted symbol on the stopper is clearly visible; this depth is noted. The two observed depths are averaged to obtain a transparency measurement.

LL. "Trophic status or condition" means the productivity of a lake as measured by the phosphorus content, algae abundance, and depth of light penetration.

MM. "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).

NN. "Water body" means a lake, reservoir, wetland, or a geographically defined portion of a river or stream.

OO. "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.

Subp. 5. **Impairment of waters due to excess algae or plant growth.** In evaluating whether the narrative standards in subpart 3, which prohibit any material increase in undesirable slime growths or aquatic plants including algae, are being met, the commissioner will use all readily available and reliable data and information for the following factors of use impairment:

A. representative summer-average concentrations of total phosphorus and total nitrogen measured in the water body;

B. representative summer-average concentrations of chlorophyll-a seston measured in the water body;

C. representative summer-average measurements of Secchi disk transparency in the water body;

D. representative summer-average concentrations of five-day biochemical oxygen demand measured in rivers and streams;

E. representative diel dissolved oxygen flux measurements in rivers and streams as averaged over a minimum of four consecutive days during the summer season;

F. representative measurements of pH in the water body during the summer season;

G. representative measurements of chlorophyll-a (periphyton) on substrates on the beds of rivers and streams during the summer season; and

H. any other scientifically objective, credible, and supportable factor.

Subp. 5a. **Impaired condition; lakes, shallow lakes, and reservoirs.**

A. For lakes, shallow lakes, and reservoirs, a finding of an impaired condition must be supported by data showing:

(1) elevated levels of nutrients under subpart 5, item A; and

(2) at least one factor showing impaired conditions resulting from nutrient overenrichment under subpart 5, items B and C.

B. The trophic status data described in subpart 5, items A to C and H, must be assessed in light of the magnitude, duration, and frequency of nuisance algae blooms in the water body; and documented impaired recreational and aesthetic conditions observed by the users of the water body due to excess algae or plant growth, reduced transparency, or other deleterious conditions caused by nutrient overenrichment.

C. Assessment of trophic status and the response of a given water body to nutrient enrichment will take into account the trophic status of reference water bodies; and all relevant factors that affect the trophic status of the given water body appropriate for its geographic region, such as the temperature, morphometry, hydraulic residence time, mixing status, watershed size, and location.

Subp. 5b. **Impaired condition; rivers and streams.** For rivers and streams, a finding of an impaired condition must be supported by data showing:

A. elevated levels of nutrients under subpart 5, item A, and at least one factor showing impaired conditions resulting from nutrient overenrichment under subpart 5, item B, D, E, F, or H; or

B. elevated levels of chlorophyll-a (periphyton) under subpart 5, item G.

Subp. 5c. **Impaired condition; navigational pools.** For navigational pools, a finding of impaired condition must be supported by data showing:

A. elevated levels of nutrients under subpart 5, item A; and

B. impaired conditions resulting from nutrient overenrichment under subpart 5, item B.

Subp. 6. **Impairment of biological community and aquatic habitat.** In evaluating whether the narrative standards in subpart 3, which prohibit serious impairment of the normal aquatic biota 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 aquatic biota normally present, are being met, the commissioner will consider all readily available and reliable data and information for the following factors of use impairment:

A. an index of biological integrity calculated from measurements of attributes of the resident fish community, including measurements of:

(1) species diversity and composition;

(2) feeding and reproduction characteristics; and

(3) fish abundance and condition;

B. an index of biological integrity calculated from measurements of attributes of the resident aquatic invertebrate community, including measurements of:

(1) species diversity and composition;

(2) feeding characteristics; and

(3) species abundance and condition;

C. an index of biological integrity calculated from measurements of attributes of the resident aquatic plant community, including measurements of:

(1) species diversity and composition, including algae; and

(2) species abundance and condition;

D. a quantitative or qualitative assessment of habitat quality, determined by an assessment of:

(1) stream morphological features that provide spawning, nursery, and refuge areas for fish and invertebrates;

(2) bottom substrate size and variety;

(3) variations in water depth;

(4) sinuosity of the stream course;

(5) physical or hydrological alterations of the stream bed including excessive sedimentation;

(6) types of land use in the watershed; and

(7) other scientifically accepted and valid factors of habitat quality; and

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 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.

Subp. 7. **Impairment of waters relating to fish for human consumption.**

A. In evaluating whether the narrative standards in subpart 3, which prevent harmful pesticide or other toxic pollutant residues in aquatic flora or fauna, are being met, the commissioner must use the methods in:

(1) parts 7050.0218 and 7050.0219 for site-specific fish tissue-based chronic criterion (CC_{ft}); or

(2) parts 7050.0222 and 7052.0100 for fish tissue-based chronic standard (CS_{ft}).

B. If CS_{ft} has not been established for a pollutant with chronic standards (CS) applicable in water (CS_{dfr}, CS_{dev}, or CS_{fr}, as defined in parts 7050.0218, subpart 3, item Q, and 7050.0219, subpart 13, item B), the residue levels in fish muscle tissue established by the Minnesota Department of Health must be used to identify surface waters supporting fish for which the Minnesota Department of Health recommends a reduced frequency of fish consumption for the protection of public health. A water body will be considered impaired when the recommended consumption frequency is less than one meal per week, such as one meal per month, for any member of the population. That is, a water body will not be considered impaired if the recommended consumption frequency is one meal per week, or any less restrictive recommendation such as two meals per week, for all members of the population. The impaired condition must be supported with measured data on the contaminant levels in the resident fish.

C. When making impairment determinations in an individual water body for a pollutant with both a fish tissue-based CC_{ft} or CS_{ft} and a CS applicable in water, comparison of fish tissue data to the CC_{ft} or CS_{ft} must be the basis for the final impairment determination.

Subp. 8. **Determination of compliance.** In making tests or analyses of the waters of the state, sewage, industrial wastes, or other wastes to determine compliance with the standards and water quality condition, samples shall be collected in a manner and place, and of such type, number, and frequency as may be considered necessary by the agency from the viewpoint of adequately reflecting the condition of the waters, the composition of the effluents, and the effects of the pollutants upon the specified uses. The samples shall be collected, preserved, and analyzed following accepted quality control and quality assurance methods, and according to the procedures in Code of Federal Regulations, title 40, part 136. The agency may accept or may develop other methods, procedures, guidelines, or criteria for collecting and analyzing samples and measuring water quality characteristics. The commissioner will retain a record of all impairment decisions using the factors in this part, including all supporting data, for a minimum of eight years.

Statutory Authority: *MS s 115.03; 115.44; L 2005 1Sp1 art 2 s 151*

History: *9 SR 913; 15 SR 1057; 18 SR 2195; 27 SR 1217; 31 SR 1168; 32 SR 1699; 39 SR 154; 39 SR 1344; 42 SR 441*

Published Electronically: *November 20, 2017*

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*

7050.0160 [Repealed, 9 SR 913]

Published Electronically: *April 1, 2008*

7050.0170 NATURAL WATER QUALITY.

The waters of the state may, in a natural condition, have water quality characteristics or chemical concentrations approaching or exceeding the water quality standards. Natural conditions exist where there is no discernible impact from point or nonpoint source pollutants attributable to human activity or from a physical alteration of wetlands. Natural background levels are defined by water quality monitoring. Where water quality monitoring data are not available, background levels can be predicted based on data from a watershed with similar characteristics.

Where natural background levels do not exceed applicable standards, the addition of pollutants from human activity and resulting point or nonpoint source discharges shall be limited such that, in total, the natural background levels and the additions from human activity shall not exceed the standards. When reasonable justification exists to preserve the higher natural quality of a water resource, the commissioner may use the natural background levels that are lower than the applicable site-specific standards to control the addition of the same pollutants from human activity. The reasonable justification must meet the requirements under parts 7050.0250 to 7050.0335.

Where background levels exceed applicable standards, the background levels may be used as the standards for controlling the addition of the same pollutants from point or nonpoint source discharges in place of the standards.

In the adoption of standards for individual waters of the state, the agency will be guided by the standards herein but may make reasonable modifications of the same on the basis of evidence brought forth at a public hearing if it is shown to be desirable and in the public interest to do so in order to encourage the best use of the waters of the state or the lands bordering such waters.

Statutory Authority: *MS s 115.03; 115.44*

History: *9 SR 913; 12 SR 1810; 18 SR 2195; 9 SR 913; 12 SR 1810; 18 SR 2195; 41 SR 545*
Published Electronically: *December 9, 2016*

7050.0180 [Repealed, 41 SR 545]
Published Electronically: *December 9, 2016*

7050.0185 [Repealed, 41 SR 545]
Published Electronically: *December 9, 2016*

7050.0186 WETLAND STANDARDS AND MITIGATION.

Subpart 1. **Policy and wetland beneficial uses.** It is the policy of the state to protect wetlands and prevent significant adverse impacts on wetland beneficial uses caused by chemical, physical, biological, or radiological changes. The quality of wetlands shall be maintained to permit the propagation and maintenance of a healthy community of aquatic and terrestrial species indigenous to wetlands, preserve wildlife habitat, and support biological diversity of the landscape. In addition, these waters shall be suitable for boating and other forms of aquatic recreation as specified in part 7050.0222, subpart 6; general industrial use as specified in part 7050.0223, subpart 5; irrigation, use by wildlife and livestock, erosion control, groundwater 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.

Subp. 1a. **Definitions.**

A. "Physical alteration" means the dredging, filling, draining, or permanent inundating of a wetland. Restoring a degraded wetland by reestablishing its hydrology is not a physical alteration.

B. "Wetlands" are those areas that are inundated or saturated by surface water or groundwater 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 groundwater 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.

Subp. 1b. **Wetland pollution prohibited.** Wetland conditions shall be protected from chemical, physical, biological, or radiological changes to prevent significant adverse impacts to the designated beneficial uses listed in subpart 1. The antidegradation provisions in this chapter are applicable to wetlands.

Subp. 2. **Wetland mitigation principles.** The wetland mitigative sequence incorporates the principles in items A to C in descending order of priority. Wetland mitigation maintains antidegradation of wetland designated uses:

A. avoid the impact altogether by not taking a certain action or parts of an action;

B. minimize the impact by limiting the degree or magnitude of the action and its implementation, and by taking affirmative actions to rectify the impact and reduce or eliminate the impact over time; and

C. mitigate the unavoidable impact to the designated uses of a wetland by compensation. Compensatory mitigation shall be accomplished in the following descending order of priority of replacement:

(1) restoration of a previously diminished wetland; and

(2) creation of a wetland.

Subp. 3. **Determination of wetland dependency.** A project is wetland dependent if wetland designated uses are essential to fulfill the basic purpose of the project. A wetland dependent project is exempt from subpart 4, but will follow the remainder of the mitigation sequence. Where the proposed project is not wetland dependent, the wetland mitigation sequence in subpart 2 must be followed.

Subp. 4. **Impact avoidance.** No person may cause or allow a physical alteration which has the potential for a significant adverse impact on one or more designated uses of a wetland, unless there is not a prudent and feasible alternative that would avoid impacts to the designated uses of the wetland.

A. Prudent and feasible alternatives that do not involve wetlands are presumed to be available unless clearly demonstrated otherwise by the permit or certification applicant.

B. If no prudent and feasible alternative is available for avoidance, potential significant adverse impacts to the designated uses of the wetland shall be minimized in compliance with subpart 5.

Subp. 5. **Impact minimization.**

A. The permit or certification applicant shall implement actions to minimize potential significant adverse impacts of the physical alteration.

B. In evaluating the applicant's actions to minimize impacts, the agency shall consider:

(1) the spatial requirements of the project;

(2) the location of existing structural or natural features that may dictate the placement or configuration of the project;

(3) the purpose of the project and how the purpose relates to placement, configuration, or density;

(4) the sensitivity of the site design to the natural features of the site, including topography, hydrology, and existing vegetation;

(5) the designated uses and spatial distribution of the wetlands on the site;

(6) individual and cumulative impacts; and

(7) the applicable minimization activities identified in Code of Federal Regulations, title 40, part 230, subpart H, as amended.

C. If the potential for significant adverse impacts on designated uses remains after all actions to minimize the impacts have been incorporated into the proposed project, unavoidable impacts shall be compensated for in compliance with subpart 6.

Subp. 6. **Impact compensation.** The permit or certification applicant shall provide compensatory mitigation for unavoidable impacts on the designated uses of the wetland in accordance with this subpart.

A. Compensatory mitigation must be sufficient to ensure replacement of the diminished or lost designated uses of the wetland that was physically altered.

B. Compensatory mitigation shall be accomplished in the following descending order of priority of replacement:

(1) restoration of a previously diminished wetland; and

(2) creation of a wetland.

C. If compensatory mitigation is accomplished by restoration or creation, the replacement wetland shall be of the same type and in the same watershed as the impacted wetland, to the extent prudent and feasible.

D. Compensatory mitigation shall be completed before or concurrent with the actual physical alteration of the wetland affected by the proposed project to the extent prudent and feasible.

Statutory Authority: *MS s 115.03; 115.44*

History: *18 SR 2195; 32 SR 1699; 18 SR 2195; 32 SR 1699; 41 SR 545*
Published Electronically: *December 9, 2016*

7050.0190 VARIANCE FROM STANDARDS.

Subpart 1. **Applicability.** A variance under this part is a temporary change in a state water quality standard for a specified pollutant that reflects the highest attainable conditions for a permittee during the term of the variance. This part applies to variance requests from individual point source discharges to surface waters of the state for any water quality-based effluent limit based on a water quality standard of this chapter that is included in a permit. To be eligible for a water quality standards variance, the permittee must demonstrate to the agency that the permittee has met the following conditions:

A. the variance would not jeopardize the continued existence of an endangered or threatened species listed under chapter 6134 or section 4 of the Endangered Species Act, United States Code, title 16, section 1533, or result in destruction or adverse modification of the species' critical habitat;

B. standards will not be attained by implementing effluent limitations required under sections 301(b) and 306 of the Clean Water Act, United States Code, title 33, sections 1311(b) and 1316, and by the permittee implementing cost-effective and reasonable best management practices for nonpoint sources under the permittee's control as established under state authority; and

C. the variance would not remove an existing use.

Subp. 2. **Listing.** The agency shall advise the United States Environmental Protection Agency of variances granted by the agency under this part, together with information as to the need for the variance. By October 1 each year, the commissioner shall prepare a list of the variances currently in effect and approved by the United States Environmental Protection Agency or granted by the agency under part 7053.0195. The list must be available for public inspection and must be provided to the United States Environmental Protection Agency. The list must identify the person that received the variance, the rule from which the variance was granted, the water body affected, the year approved by the United States Environmental Protection Agency or granted by the agency under part 7053.0195, the date the variance expires, and any restrictions that apply in lieu of the rule requirement.

Subp. 3. [Repealed, 41 SR 463]

Subp. 4. **Conditions for approval.** Before a variance can become effective, the variance must be submitted to and approved by the United States Environmental Protection Agency in accordance with section 303(c) of the Clean Water Act and Code of Federal Regulations, title 40, sections 131.20 and 131.21. To be eligible for a preliminary determination by the agency to grant the variance, the permittee must:

A. demonstrate to the agency that attaining the water quality standard is not feasible because:

(1) naturally occurring pollutant concentrations prevent attainment of the water quality standard;

(2) natural, ephemeral, intermittent, or low-flow conditions or water levels prevent attainment of water quality standards, unless these conditions may be compensated for by discharging sufficient volume of effluent to enable water quality standards to be met without violating the water conservation requirements of Minnesota Statutes, chapter 103G;

(3) human-caused conditions or sources of pollution prevent attainment of water quality standards, and the conditions or sources cannot be remedied or would cause more environmental damage to correct than to leave in place;

(4) dams, diversions, or other types of hydrologic modifications preclude attainment of water quality standards, and it is not feasible to restore the water body to its original condition or to operate the modification in a way that would result in attainment of the water quality standard;

(5) physical conditions related to the natural features of the water body, such as the lack of a proper substrate cover, flow, depth, pools, riffles, and the like, unrelated to chemical water quality, preclude attainment of aquatic life protection uses; or

(6) controls more stringent than those required under sections 301(b) and 306 of the Clean Water Act, United States Code, title 33, sections 1311(b) and 1316, would result in substantial and widespread negative economic and social impacts;

B. show that the variance conforms with parts 7050.0250 to 7050.0335;

C. characterize the extent of any increased risk to human health and the environment associated with granting the variance, such that the agency is able to conclude that any increased risk is consistent with the protection of the public health, safety, and welfare; and

D. show sufficient information to allow the agency to determine the water quality currently attained and the interim numeric effluent conditions that reflect the highest attainable conditions for a permittee during the term of the variance.

Subp. 5. **Submittal and notice requirements.** Variance application submittal, public notice of the agency's preliminary determination to grant the variance, and notice requirements must conform to part 7000.7000.

Subp. 6. **Agency final decision; variance requirements.** The agency must make a final decision regarding the variance request that conforms to the procedural requirements in part 7000.7000. The agency must hold at least one meeting that meets the minimum public participation requirements in Code of Federal Regulations, title 40, section 25.5, before the agency makes a final decision on the variance request. If the agency grants the variance and the variance is approved by the United States Environmental Protection Agency, the permit issued by the agency must include and incorporate the following variance terms and conditions:

A. an effluent limitation representing currently achievable treatment conditions based on discharge monitoring or projected effluent quality that is no less stringent than that achieved under the previous permit;

B. a schedule of compliance activities to improve water quality and move toward attainment of the underlying water quality standard;

C. an effluent limitation sufficient to meet the underlying water quality standard, upon the expiration of the variance, when the duration of the variance is shorter than the duration of the permit; and

D. a provision allowing the agency to reopen and modify the permit based on agency triennial water quality standards revisions applicable to the variance.

Subp. 7. **Renewal.** To be eligible for renewal of a variance, the permittee is subject to the requirements of subparts 1 to 6.

Subp. 8. **Term and expiration.** The terms and conditions of a water quality standards variance are included and incorporated in the permit issued by the agency. The term of a variance must only be as long as necessary to achieve the highest attainable condition. For a variance with the term greater than five years, only if requested in writing by the permittee, the agency shall reevaluate the variance every five years in accordance with Code of Federal Regulations, title 40, section 131.14 (b)(1)(v) and (vi), as provided by the Federal Register, volume 80, page 51048. If the permittee does not request a reevaluation, the variance expires at the end of the five-year period.

Subp. 9. **Public notice and review.**

A. Every three years, the agency shall provide public notice of a list of variances currently in effect at the time of public notice, consistent with the triennial review of water quality standards required under Code of Federal Regulations, title 40, section 131.20. The public notice shall include a statement that a person may submit to the agency new information that has become available relevant to the list of variances.

B. If a permittee requests a renewal of a variance according to subpart 7, the agency shall consider information submitted under item A in its review for renewal of the variance. Variances from discharge effluent limits and treatment requirements are granted by the agency under parts 7000.7000 and 7053.0195.

Statutory Authority: *MS s 115.03; 115.44; 116.07*

History: *9 SR 913; 12 SR 1810; 19 SR 1310; 32 SR 1699; 41 SR 463; 41 SR 545*
Published Electronically: *December 9, 2016*

7050.0200 [Repealed, 32 SR 1699]
Published Electronically: *April 1, 2008*

7050.0210 GENERAL STANDARDS FOR WATERS OF THE STATE.

Subpart 1. [Repealed, 32 SR 1699]

Subp. 2. **Nuisance conditions prohibited.** No sewage, industrial waste, or other wastes shall be discharged from either point or nonpoint sources into any waters of the state so as to cause any nuisance conditions, such as the presence of significant amounts of floating solids, scum, visible oil film, excessive suspended solids, material discoloration, obnoxious odors, gas ebullition, deleterious sludge deposits, undesirable slimes or fungus growths, aquatic habitat degradation, excessive growths of aquatic plants, or other offensive or harmful effects.

Subp. 3. [Repealed, 32 SR 1699]

Subp. 4. **Highest levels of water quality.** The highest levels of water quality, including, but not limited to, dissolved oxygen, that are attainable in the waters of the state by continuous operation at the maximum capability of all primary and secondary units of treatment works or their equivalent, discharging effluents into the waters of the state, must be maintained in order to enhance conditions for the specified uses.

Subp. 5. **Mixing zones.** Reasonable allowance will be made for dilution of the effluents, which are in compliance with this chapter and chapter 7053, as applicable, following discharge into waters of the state. The agency, by allowing dilution, will consider the effect on all uses of the waters of the state into which the effluents are discharged. The extent of dilution allowed regarding any specific discharge as specified in part 7053.0205, subpart 7, shall not violate the applicable water quality standards in this chapter and chapter 7052, including the antidegradation requirements contained in those chapters. This subpart also applies in cases where a class 7 water is tributary to a class 2 water.

Mixing zones must be established by the agency on an individual basis, with primary consideration being given to the following guidelines:

A. mixing zones in rivers shall permit an acceptable passageway for the movement of fish;

B. the total mixing zone or zones at any transect of the stream should contain no more than 25 percent of the cross sectional area and/or volume of flow of the stream, and should not extend over more than 50 percent of the width;

C. mixing zone characteristics shall not be lethal to aquatic organisms;

D. for contaminants other than heat, the FAV, as defined in part 7050.0218, subpart 3, item Y, for toxic pollutants should not be exceeded as a one-day mean concentration at any point in the mixing zone;

E. mixing zones should be as small as possible, and not intersect spawning or nursery areas, migratory routes, water intakes, nor mouths of rivers; and

F. overlapping of mixing zones should be minimized and measures taken to prevent adverse synergistic effects.

Subp. 6. [Renumbered 7050.0211, subpart 1]

Subp. 6a. [Renumbered 7050.0211, subpart 2]

Subp. 6b. [Renumbered 7050.0211, subpart 3]

Subp. 6c. **Other requirements preserved.** The requirements of this chapter are in addition to any requirement imposed by the Clean Water Act, United States Code, title 33, sections 1251 et seq., and its implementing regulations. In the case of a conflict between the requirements of this chapter and the requirements of the Clean Water Act or its implementing regulations, the more stringent requirement controls.

Subp. 7. **Minimum stream flow.** Point and nonpoint sources of water pollution shall be controlled so that the water quality standards will be maintained at all stream flows that are equal to or greater than the $7Q_{10}$ for the critical month or months, unless another flow condition is specifically stated as applicable in this chapter.

Subp. 8. [Renumbered 7050.0213]

Subp. 9. [Repealed, 32 SR 1699]

Subp. 10. [Repealed, 32 SR 1699]

Subp. 11. [Repealed, 12 SR 1810]

Subp. 12. [Repealed, 32 SR 1699]

Subp. 13. **Pollution prohibited.** No sewage, industrial waste, or other wastes shall be discharged from either a point or a nonpoint source into the waters of the state in such quantity or in such manner alone or in combination with other substances as to cause pollution as defined by law. In any case where the waters of the state into which sewage, industrial waste, or other waste effluents discharge are assigned different standards than the waters of the state into which the receiving waters flow, the standards applicable to the waters into which the sewage, industrial waste, or other wastes discharged shall be supplemented by the following:

The quality of any waters of the state receiving sewage, industrial waste, or other waste effluents shall be such that no violation of the standards of any waters of the state in any other class shall occur by reason of the discharge of the sewage, industrial waste, or other waste effluents.

Subp. 13a. [Repealed, 32 SR 1699]

Subp. 14. [Repealed, 15 SR 1057]

Subp. 15. [Repealed, 32 SR 1699]

Subp. 16. [Renumbered 7050.0214]

Subp. 17. [Repealed, 32 SR 1699]

Subp. 18. [Repealed, 32 SR 1699]

Statutory Authority: *MS s 115.03; 115.44*

History: *9 SR 913; 9 SR 2756; L 1987 c 186 s 15; 12 SR 1810; 15 SR 1057; 18 SR 614; 18 SR 2195; 22 SR 1466; 24 SR 1105; 27 SR 1217; 32 SR 1699; 9 SR 913; 9 SR 2756; L 1987 c 186 s 15; 12 SR 1810; 15 SR 1057; 18 SR 614; 18 SR 2195; 22 SR 1466; 24 SR 1105; 27 SR 1217; 32 SR 1699; 41 SR 545; 9 SR 913; 9 SR 2756; L 1987 c 186 s 15; 12 SR 1810; 15 SR 1057; 18 SR 614; 18 SR 2195; 22 SR 1466; 24 SR 1105; 27 SR 1217; 32 SR 1699; 41 SR 545*

Published Electronically: *November 20, 2017*

7050.0211 [Repealed, 32 SR 1699]

Published Electronically: *April 1, 2008*

7050.0212 [Repealed, 32 SR 1699]

Published Electronically: *April 1, 2008*

7050.0213 [Repealed, 32 SR 1699]

Published Electronically: *April 1, 2008*

7050.0214 [Repealed, 32 SR 1699]
Published Electronically: *April 1, 2008*

7050.0215 [Repealed, 32 SR 1699]
Published Electronically: *April 1, 2008*

7050.0216 [Repealed, 32 SR 1699]
Published Electronically: *April 1, 2008*

7050.0217 OBJECTIVES FOR PROTECTION OF SURFACE WATERS FROM TOXIC POLLUTANTS.

Subpart 1. **Purpose and applicability.** The purpose of this part is to establish the objectives for developing numeric water quality standards listed in parts 7050.0220, 7050.0222, 7050.0227, and 7052.0100 and site-specific water quality criteria for toxic pollutants or chemicals developed in the absence of numeric standards. The listed numeric standards for toxics and site-specific numeric criteria established by methods in parts 7050.0218 and 7050.0219 protect class 2 waters for the propagation and maintenance of aquatic biota, the consumption of fish and edible aquatic life by humans, the use of surface waters for public and private domestic consumption where applicable, and the consumption of aquatic organisms by wildlife. These criteria also protect the uses assigned to class 7, limited resource value, waters as described in parts 7050.0140 and 7050.0227.

Subp. 2. **Objectives.**

A. Protection of the aquatic community from the toxic effects of pollutants means the protection of no less than 95 percent of all the species in any aquatic community. Greater protection may be applied to a community if economically, recreationally, or ecologically important species are very sensitive.

B. Protection of human consumers of fish, other edible aquatic organisms, and water for drinking from surface waters means that exposure from noncarcinogenic chemicals, including nonlinear carcinogens (NLC), singly or in mixtures, must be below levels expected to produce known adverse effects; the combined risk from mixtures of noncarcinogens and NLC must not exceed the common health risk index endpoints or health endpoints described in part 7050.0222, subpart 7, item D; and the incremental cancer risk from exposure to carcinogenic chemicals, singly or in mixtures, must not exceed one in 100,000. The combined risk from mixtures of linear carcinogens (C) will be determined as described in part 7050.0222, subpart 7, item E.

C. Protection of wildlife that eat aquatic organisms means the protection of the most sensitive wildlife species or populations. Greater protection may be applied if the exposed animals include endangered or threatened wildlife species listed in chapter 6134, or in Code of Federal Regulations, title 50, part 17, under the Endangered Species Act of 1973, United States Code, title 16, sections 1531 to 1543.

Statutory Authority: *MS s 115.03; 115.44*

History: *15 SR 1057; 18 SR 2195; 32 SR 1699; 39 SR 1344; 42 SR 441*

Published Electronically: *November 20, 2017*

7050.0218 FOR TOXIC POLLUTANTS: DEFINITIONS AND METHODS FOR DETERMINATION OF HUMAN HEALTH-BASED NUMERIC STANDARDS AND SITE-SPECIFIC NUMERIC CRITERIA FOR AQUATIC LIFE, HUMAN HEALTH, AND FISH-EATING WILDLIFE.

Subpart 1. **Purpose.** The methods in this part and part 7050.0219 meet the objectives in part 7050.0217 and provide the basis for developing human health-based numeric chronic standards and site-specific numeric criteria for aquatic toxicity, human health, and fish-eating wildlife. The agency may also adopt new standards according to Minnesota Statutes, chapter 14, to replace those listed in parts 7050.0220 to 7050.0227 and 7052.0100 that are more stringent or less stringent if new scientific evidence shows that a change in the standard is justified.

Subp. 2. **Site-specific criteria.** The class 2 and class 7 numeric water quality standards for toxic pollutants in parts 7050.0220, 7050.0222, 7050.0227, and 7052.0100 do not address all pollutants that may be discharged to surface waters and cause toxic effects. Therefore, methods are established in this part and part 7050.0219 to address on a site-specific basis the discharge into surface waters of toxic pollutants not listed in parts 7050.0220, 7050.0222, 7050.0227, 7052.0100. Class 2 and class 7 site-specific numeric criteria for toxic pollutants shall be derived by the commissioner using the procedures in this part.

A. A site-specific criterion so derived is specific to the point source being addressed. Any effluent limitation derived from a site-specific criterion under this subpart shall only be required after the discharger has been given notice of the specific proposed effluent limitations and an opportunity to request a hearing as provided in part 7000.1800.

B. A site-specific criterion so derived for remedial action cleanup activities is specific to the affected surface water body.

Subp. 3. **Definitions.** For the purposes of parts 7050.0217 to 7050.0227, the following terms have the meanings given them.

A. "Acute-chronic ratio" or "ACR" means the ratio of the acute toxicity, expressed as a LC50 or EC50, of a toxicant to its chronic toxicity expressed as the chronic value. The ACR is used as a factor for estimating chronic toxicity on the basis of acute toxicity.

B. "Acute toxicity" means a stimulus severe enough to rapidly induce a response. In toxicity tests, a response is normally observed in 96 hours or less. Acute effects are often measured in terms of mortality or other debilitating effects, represented as LC50s or EC50s, and expressed as concentrations of mass per unit volume, percent effluent, or toxic units.

C. "Adjustment factor, lifetime" or "$AF_{lifetime}$" means the numeric multiplier used to modify the adult-based cancer slope factor for lifetime (70 years standard in risk characterization) exposure based on chemical-specific data.

D. "Adverse effect" means a biochemical change, functional impairment, or pathologic lesion that affects the performance of the whole organism or reduces an organism's ability to respond to an additional environmental challenge.

E. "Age-dependent adjustment factor" or "ADAF" means the default numeric modifiers to the cancer slope factor that account for the increased susceptibility to cancer from early-life exposures to linear carcinogens in the absence of chemical-specific data. For default use, there are three ADAF:

(1) $ADAF_{0<2}$ = 10, for birth up to two years of age;

(2) $ADAF_{2\text{ to }<16}$ = 3, for two up to 16 years of age; and

(3) $ADAF_{16+}$ = 1, for 16 years of age and older.

F. "Available and reliable scientific data" means information derived from scientific literature including: published literature in peer reviewed scientific journals, USEPA ambient water quality criteria documents, and other reports or documents published by the USEPA or other governmental agencies.

G. "Bioaccumulation factor" or "BAF" means the concentration of a pollutant in one or more tissues of an aquatic organism, exposed from any source of the pollutant but primarily from the water column, diet, and bottom sediments, divided by the average concentration in the solution in which the organism had been living, under steady state conditions.

H. "Bioaccumulative chemical of concern" or "BCC" has the meaning given in part 7052.0010, subpart 4.

I. "Bioconcentration factor" or "BCF" means the concentration of a pollutant in one or more tissues of an aquatic organism, exposed only to the water as the source of the pollutant, divided by the average concentration in the solution in which the organism had been living, under steady state conditions.

J. "Biomagnification" means the increase in tissue concentration of a pollutant in aquatic organisms at successive trophic levels through a series of predator-prey associations, primarily occurring through dietary accumulation. The expression used to quantify this increase is the biomagnification factor or "BMF." For a given water body, the BMF is calculated as:

(1) the ratio of the tissue concentration of a pollutant in a predator at a particular trophic level to the tissue concentration in its prey at the next lower trophic level; or

(2) the ratio estimated from a comparable laboratory model.

K. "Biota-sediment accumulation factor" or "BSAF" means the ratio (in kilogram of organic carbon/kilogram of lipid) of a pollutant's lipid-normalized concentration in tissue of an aquatic organism to its organic carbon-normalized concentration in surface sediment, where:

(1) the ratio does not change substantially over time;

(2) both the organism and its food are exposed; and

(3) the surface sediment is representative of average surface sediment in the vicinity of the organism.

L. "Cancer potency slope factor" or "CSF" means a factor indicative of a chemical's human cancer causing potential and an upper-bound estimate of cancer risk per increment of dose that can be used to estimate cancer risk probabilities for different exposure levels. CSF is expressed in units of cancer incidence per milligram of pollutant per kilogram of body weight-day $(mg/kg\text{-}day)^{-1}$.

M. "Cancer risk level" or "CR" means the probability that daily exposure to a carcinogen over a lifetime may induce cancer. CR refers to an incremental or additional excess cancer risk equal to 1×10^{-5} (1 in 100,000) and is applied with the cancer potency slope factor for single chemicals and for mixtures.

N. "Carcinogen, linear" or "C" means a chemical agent for which, either by a known mode of action or a conservative assumption, the associated cancer risk varies in direct proportion to the extent of exposure and for which there is no risk-free level of exposure. The toxicological value for a C is the cancer potency slope factor. Seventy years is the standard lifetime duration used by United States Environmental Protection Agency in the characterization of lifetime cancer risk.

O. "Carcinogen, nonlinear" or "NLC" means a chemical agent for which, particularly at low doses, the associated cancer risk does not rise in direct proportion to the extent of exposure and for which a threshold level of exposure exists below which there is no cancer risk. For NLC, the reference dose is the toxicological value used as the threshold for cancer risk.

P. "Chronic toxicity" means a stimulus that lingers or continues for a long period of time, often one-tenth the life span or more. A chronic effect can be mortality, reduced growth, reproduction impairment, harmful changes in behavior, and other nonlethal effects.

Q. "Chronic criterion" or "CC" and "chronic standard" or "CS" mean the highest water concentration or fish tissue concentration of a toxicant or effluent to which aquatic life, humans, or wildlife can be exposed indefinitely without causing chronic toxicity. CC represents a site-specific chronic criterion developed under this part and part 7050.0219 or part 7052.0110. CS represents a chronic standard listed in parts 7050.0220 and 7050.0222 or in part 7052.0100. CC and CS are further distinguished by the organisms they are developed to protect and medium in which they apply:

(1) CC_{tox} or CS_{tox} represent values applied in surface water developed to protect aquatic life from chronic toxicity;

(2) CC_{dfr} or CS_{dfr} represent values applied in surface water based on protecting humans from exposure to the pollutant from drinking water, eating fish, and aquatic recreation;

(3) CC_{fr} or CS_{fr} represent values applied in surface water based on protecting humans from exposure to the pollutant from eating fish and aquatic recreation;

(4) CC_{ft} or CS_{ft} represent values applied in fish tissue based on protecting humans from exposure to the pollutant from eating fish; and

(5) CC_w represents values applied in surface water based on protecting wildlife from exposure to the pollutant from eating aquatic organisms.

R. "Chronic value" means the geometric mean of the highest tested concentration that did not cause an unacceptable adverse effect and the lowest tested concentration that did cause an unacceptable adverse effect, and in which all higher test values cause an effect, in an approved chronic test.

S. "Criterion" means a number or numbers established for a pollutant derived under this part or part 7050.0219 or 7052.0110, or issued by the USEPA, to protect aquatic life, humans, or wildlife.

T. "Developmental health endpoint" or "developmental toxicity" means an adverse effect on the developing organism that may result from parental exposure prior to conception, maternal exposure during prenatal development, or direct exposure postnatally until the time of sexual maturation. Developmental toxicity may be detected at any point in the lifespan of the organism. The major manifestations of developmental toxicity include:

(1) death of the developing organism;

(2) structural abnormality;

(3) altered growth; or

(4) functional deficiency.

U. "Duration" means the time over which the instream concentration of a pollutant is averaged for comparison with the standard or criterion.

V. "Durations for human health-based algorithms" or "D" means the length of the exposure period under consideration for noncancer and linear cancer algorithms.

(1) The four default D used in developing reference doses and corresponding intake rates are:

(a) acute: a period of 24 hours or less;

(b) short-term: a period of more than 24 hours, up to 30 days;

(c) subchronic: a period of more than 30 days, up to eight years based on application of the less than ten percent standard life expectancy of 70 years for humans; or

(d) chronic: a period of more than eight years.

(2) The default durations for use in the linear cancer algorithms with age dependent adjustment factors are:

(a) two years for the birth up to two-year age group;

(b) 14 years for the two- up to 16-year age group; and

(c) 54 years for the 16- up to 70-year age group.

For any algorithm, use of chemical-specific data to define durations for noncancer or linear cancer algorithms are preferred when acceptable data are available.

W. "Effect concentration" or "EC50" means the toxicant concentration that causes equilibrium loss, immobilization, mortality, or other debilitating effects in 50 percent of the exposed organisms during a specific time of observation.

X. "Endocrine" or "E" means a change in circulating hormone levels or interactions with hormone receptors, regardless of the organ or organ system affected. Health endpoints with or without the E designation are deemed equivalent, for example, thyroid (E) = thyroid, and must be included in the same health risk index equation.

Y. "Final acute value" or "FAV" means 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 is the acute toxicity limitation applied to mixing zones in part 7050.0210, subpart 5; and to dischargers in parts 7053.0215, subpart 1; 7053.0225, subpart 6; and 7053.0245, subpart 1.

Z. "Food chain multiplier" or "FCM" means the ratio of a bioaccumulation factor by trophic level to an appropriate bioconcentration factor. FCM refers to values developed using USEPA models or from available and reliable field studies.

AA. "Frequency" means the number of times a standard can be exceeded in a specified period of time without causing acute or chronic toxic effects on the aquatic community, human health, or fish-eating wildlife.

BB. "Genus mean acute value" or "GMAV" means the geometric mean of the SMAVs available for the genus.

CC. "Health risk index" means the sum of the quotients calculated by identifying all chemicals that share a common health endpoint or are based on linear carcinogenicity and dividing the water or fish tissue concentration for each chemical (measured or statistically derived) by its applicable chronic standard or chronic criterion. To meet the objectives in part 7050.0217, the health risk index must not exceed a value of one. The equations for the risk indices are found in part 7050.0222, subpart 7, items D and E.

DD. "Health risk index endpoint" or "health endpoint" means the general description of toxic effects used to group chemicals for the purpose of calculating a health risk index.

EE. "Intake rate" or "IR" means rate of ingestion, inhalation, or dermal contact, depending on the route of exposure, expressed as the amount of a media taken in, on a per body weight and daily basis, for a specified duration.

FF. "Lethal concentration" or "LC50" means the toxicant concentration killing 50 percent of the exposed organisms in a specific time of observation.

GG. "Lowest observable adverse effect level" or "LOAEL" means the lowest exposure level that caused a statistically or biologically significant increase in the frequency or severity of adverse effects observed between the exposed population and its appropriate control group.

HH. "Magnitude" means the acceptable amount of a toxic pollutant in water or fish tissue expressed as a concentration.

II. "Maximum criterion" or "MC" means 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 MC equals the FAV divided by two.

JJ. "Maximum standard" or "MS" means 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. Maximum standards are listed in part 7050.0222.

KK. "MDH" means the Minnesota Department of Health.

LL. "Mode of action" or "MOA" means the sequence of key events following pollutant or chemical exposure upon which the toxic outcome depends.

MM. "National methods" means the methods the USEPA uses to develop aquatic life criteria as described in Stephan, C.E., D.J. Mount, D.J. Hansen, J.H. Gentile, G.A. Chapman, and W.A. Brungs, 1985, "Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses," USEPA, Office of Research and Development, Environmental Research Laboratories, Duluth MN; Narragansett, RI, Corvallis, OR. 98 p; available through the National Technical Information Service, Springfield, VA. (Publication PB85-227049).

NN. "No observable adverse effect level" or "NOAEL" means the highest exposure level at which there is no statistically or biologically significant increase in the frequency or severity of adverse effects between the exposed population and its appropriate control group.

OO. "Octanol to water partition coefficient" or "K_{ow}" means the ratio of the concentration of a chemical in the octanol phase to its concentration in the aqueous phase of a two-phase octanol to water system after equilibrium of the chemical between the two phases has been achieved. The base 10 logarithm of the K_{ow} or log K_{ow} is used in the calculation of bioaccumulation factors. The log K_{ow} has been shown to be proportional to the bioconcentration potential of lipophilic organic chemicals.

PP. "Percent effluent" means the representation of acute or chronic toxicity of an effluent as a percent of whole effluent mixed in dilution water, where acute toxicity is expressed by LC50s or EC50s and chronic toxicity is expressed by NOAEL.

QQ. "Reference dose" or "RfD" means an estimate of a dose for a given duration to the human population, including susceptible subgroups such as infants, that is likely to be without an appreciable risk of adverse effects during a lifetime. It is derived from a suitable dose level at which there are few or no statistically or biologically significant increases in the frequency or severity of an adverse effect between the dosed population and its associated control group. The RfD includes one or more divisors, applied to the suitable dose level, accounting for:

(1) uncertainty in extrapolating from mammalian laboratory animal data to humans;

(2) variation in toxicological sensitivity among individuals in the human population;

(3) uncertainty in extrapolating from effects observed in a short-term study to effects of long-term exposure;

(4) uncertainty in using a study in which health effects were found at all doses tested; and

(5) uncertainty associated with deficiencies in the available data.

The product of the divisors is not to exceed 3,000 in an RfD used for a chronic standard. The RfD is expressed in units of daily dose as milligrams of chemical per kilogram of body weight-day or mg/kg-day.

RR. "Relative source contribution factor" or "RSC" means the percentage or apportioned amount (subtraction method) of the reference dose for a pollutant allocated to surface water exposures from drinking or incidental water ingestion and fish consumption. In the absence of sufficient data to establish a pollutant- or chemical-specific RSC value, the default RSC is 0.2 or 0.5 as described in part 7050.0219, subpart 5.

SS. "Species mean acute value" or "SMAV" means the geometric mean of all the available and acceptable acute values for a species.

TT. "Standard" means a number or numbers established for a pollutant or water quality characteristic to protect a specified beneficial use as listed in parts 7050.0221 to 7050.0227. The standard for a toxic pollutant includes the CS, MS, and FAV. Some pollutants do not have an MS or an FAV due to insufficient data. For these pollutants, the CS alone is the standard.

UU. "Toxic effect" means an observable or measurable adverse biological event in an organ, tissue, or system. The designation of health endpoints does not exclude other possible observable or measurable biological events. For the purpose of grouping chemicals and creating a health risk index when multiple chemicals are present, toxic effects may be ascribed to more general health risk index endpoints or health endpoints.

VV. "Toxic pollutant" means a pollutant listed as toxic under section 307(a)(1) of the Clean Water Act, United States Code, title 33, section 1317(a)(1), or as defined by Minnesota Statutes, section 115.01, subdivision 20. Toxic pollutant is used interchangeably in this part and parts 7050.0217, 7050.0219, and 7050.0222, subpart 7, items B to G, with the terms "pollutant" and "chemical."

WW. "Toxic unit" means a measure of acute or chronic toxicity in an effluent. One acute toxic unit (TUa) is the reciprocal of the effluent concentration that causes 50 percent effect or mortality to organisms for acute exposures (100/LC50); one chronic toxic unit (TUc) is the reciprocal of the effluent concentration that causes no observable adverse effect level on test organisms for chronic exposures (100/NOAEL).

XX. "Trophic level" or "TL" means the food web level in an ecosystem that is occupied by an organism or group of organisms because of what they eat and how they are related to the rest of the food web. For example, trophic level 3 in an aquatic ecosystem consists of small fish such as bluegills, crappies, and smelt and trophic level 4 consists of larger carnivorous fish such as walleye, northern pike, and most trout species.

YY. "USEPA" means the United States Environmental Protection Agency.

ZZ. "Water quality characteristic" means a characteristic of natural waters, such as total hardness or pH. Some water quality characteristics can affect the toxicity of pollutants to aquatic organisms.

AAA. "Whole effluent toxicity test" means the aggregate toxic effect of an effluent measured directly by a 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.

Subp. 4. **Adoption of USEPA national criteria.** The USEPA establishes aquatic life and human health-based criteria under section 304(a)(1) of the Clean Water Act, United States Code, title 33, section 1314. The USEPA criteria, subject to modification as described in this subpart, are applicable to class 2 waters of the state. The USEPA has described the national methods for developing aquatic life criteria in "Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses."

USEPA criteria that vary with an ambient water quality characteristic such as total hardness or pH will be established for specific waters or reaches using data available to the commissioner. Central values such as the means or medians for the characteristic will be used unless there is evidence to support using different values. Values for water quality characteristics can be estimated for specific waters or reaches that have no data by using data from a nearby watershed with similar chemical properties.

A. The USEPA aquatic life criteria are adopted unchanged by the agency, unless modified under item C, as the criteria applicable to designated class 2A waters in parts 7050.0420 and 7050.0470.

B. The USEPA criteria are adopted, subject to modification as described in this item or item C, for application to cool and warm water habitats and wetlands. Cool and warm water habitats (class 2Bd and 2B) are defined in part 7050.0430 or listed in part 7050.0470. Wetlands (class 2D) waters are defined in part 7050.0425 or listed in part 7050.0470.

(1) Acute data, in the form of the ranked genus mean acute values used by the USEPA to determine the national criteria, are the data used to determine the class 2Bd, 2B, and 2D criteria.

(2) GMAVs for fish in the family Salmonidae are deleted from the lowest of the ranked GMAVs so that all of the lowest four GMAVs in the USEPA data set are for nonsalmonid species. Following these deletions, no other salmonid GMAVs are deleted. If none of the lowest four GMAVs in the USEPA data set are for salmonid species, no GMAVs are deleted. The minimum of eight GMAVs specified in the national methods must be met, except that nonsalmonid fish can take the

place of the salmonid requirement if the prescribed deletions eliminate all salmonids from the national data set.

(3) The number of GMAVs in the USEPA criteria data set is reduced by the number of salmonid GMAVs deleted.

(4) The FAV is determined according to the national methods as follows:

(a) for each species for which one or more acute value is available, a SMAV is calculated as the geometric mean of all the acceptable acute values;

(b) for each genus for which one or more SMAV is available, a GMAV is calculated as the geometric mean of all the SMAVs;

(c) the GMAVs are ranked from the lowest to the highest;

(d) a rank is assigned to the GMAVs from "1" for the lowest to "N" for the highest, and if two or more GMAVs are identical, successive ranks are arbitrarily assigned;

(e) the cumulative probability (P) for each GMAV is calculated as rank/(N+1);

(f) the four GMAVs that have cumulative probabilities closest to 0.05 are selected, and if there are less than 59 GMAVs, these will always be the lowest four GMAVs; and

(g) using the selected GMAVs and their respective cumulative probabilities, calculate:

$$S^2 = \frac{\Sigma((\ln \text{GMAV})^2)-((\Sigma(\ln \text{GMAV}))^2/4)}{\Sigma(P)-((\Sigma(\text{square root of } P))^2/4)}$$

$$L = \frac{\Sigma(\ln \text{GMAV})-S(\Sigma(\text{square root of } P))}{4}$$

$A = S(\text{square root of } 0.05) + L$

$FAV = e^A$

where: FAV = final acute value

N = number of GMAVs

P = rank/N+1

ln = natural logarithm to base e S,L, and A are intermediate steps

(5) If, as a result of the recalculation of the USEPA criterion for application to class 2Bd, 2B, and 2D waters, the FAV for these water classes is lower than the FAV for class 2A waters, the class 2Bd, 2B, or 2D FAV will be changed to equal the class 2A FAV, unless the lower class 2Bd, 2B, or 2D FAV is justified based on the available toxicological data.

(6) The MC is the FAV divided by two.

(7) The CC is determined using the national methods. If sufficient chronic data is available to determine the CC directly from chronic values, salmonid chronic values will be deleted from the national data set following the same procedures used for acute data in this item. If sufficient chronic data is not available, the USEPA ACR, subject to modification under item C, is divided into the FAV to determine the CC.

C. If the commissioner finds that the information that supports a USEPA criterion is no longer current or complete for reasons including, but not limited to, changes to the relationship between a water quality characteristic and toxicity; the ACR; the weight given to toxicity data for a commercially or recreationally important species; or the human health-based methods; then the commissioner shall evaluate all available information and modify the criterion according to the information and with the objectives in part 7050.0217 and the methods in this part and part 7050.0219. Any effluent limitation determined to be necessary based on site-specific criteria derived under this item shall only be required after the discharger has been given notice to the specific proposed effluent limitations and an opportunity to request a hearing as provided in part 7000.1800.

Subp. 5. **Toxicity-based criteria.** Toxicity-based aquatic life criteria shall be determined using the methods in this subpart when no USEPA criterion is available.

A. Criteria shall be determined using the USEPA national method if the minimum data required in this item and item B are met. Data for saltwater organisms can be used for nonionizable organic chemicals. Data for saltwater organisms cannot be used for ionizable organic or inorganic chemicals. Data for all North American species can be used. A minimum of eight GMAVs representing the following groups must be available:

(1) species in three families in the phylum Chordata, one of which must be a salmonid;

(2) a freshwater or saltwater crustacean;

(3) a freshwater cladoceran;

(4) a family in a phylum other than Chordata or Arthropoda; and

(5) two other families not in the phylum Chordata.

B. The additional acute data requirements in subitems (1) and (2) apply when developing criteria for pesticides.

(1) If the chemical is an insecticide, one of the eight GMAVs required in item A, subitem (5), must be for an insect.

(2) If the chemical is a herbicide, the eight GMAVs required in item A must be supplemented with acute data for two plant species, one of which is an algal species.

C. The FAV is calculated as described in subpart 4, item B, subitem (4). No more than two of the lowest four GMAVs may be for a saltwater species.

D. The MC is the FAV divided by two.

E. The CC_{tox} is the FAV divided by an ACR. Available chronic data are used to determine ACRs as described in item F and measured chronic values are compared to the CC_{tox}. If an approved chronic value for a commercially, recreationally, or ecologically important freshwater species is lower than the CC_{tox}, the CC_{tox} will be set to equal that chronic value.

F. The ACR is determined according to subitems (1) to (3).

(1) A measured ACR is determined by dividing the acute value by the chronic value for the same species from tests that meet the requirements for determining ACRs in the national method. If more than one ACR is available for a species, a species mean ACR is calculated as the geometric mean of the available ACRs.

(2) A minimum of three measured ACRs, each for a different species, must be available to determine a final measured ACR. The final measured ACR is the geometric mean of all the available species mean ACRs.

(3) If no measured ACRs are available, the following default ACRs shall be used:

(a) an ACR of 20 is used with nonpesticide, nonbioaccumulative organic chemicals with log K_{ow} values of three or less; and

(b) an ACR of 55 is used with pesticides, inorganic chemicals, or bioaccumulative organic chemicals with log K_{ow} values greater than three.

(4) If two or fewer measured ACRs are available, the default ACRs in subitem (3) are incorporated into the calculation of the final ACR as follows:

(a) if two measured ACRs are available, the final ACR is the geometric mean of the two measured ACRs and the appropriate default ACR; and

(b) if one measured ACR is available, the final ACR is the geometric mean of the measured ACR and two appropriate default ACRs.

G. If the acute data available do not meet the requirements in items A and B, toxicity-based criteria can be determined by the method in this item. This method is not applicable to ionizable organic chemicals, or to bioaccumulative organic chemicals and pesticides with BCF greater than 5,000 or log K_{ow} values greater than 5.19.

(1) Acute data are assembled. A minimum of two acute values in the following groups must be available:

(a) a member of the class Osteichthyes (fish); and

(b) a member of one of the following genera in the family Daphnidae: *Daphnia, Ceriodaphnia, Simocephalus*.

(2) For insecticides, a third acute value must be available for an insect species in addition to the acute values required in subitem (1).

(3) For herbicides, two acute values for plant species, one of which is an algal species, must be available in addition to the acute values required in subitem (1).

(4) Data for saltwater species shall not be used except for purposes of determining ACRs.

(5) SMAVs are calculated as the geometric mean of all the acute values for one species.

(6) GMAVs are calculated as the geometric mean of the SMAVs.

(7) The lowest GMAV from among the available GMAVs is selected.

(8) The FAV is calculated by dividing the lowest GMAV by the appropriate factor listed below, depending on the number of GMAVs available that meet the minimum data requirements in subitems (2) and (3) and in item A.

Number of GMAVs	Factor
2	13.0
3	8.0
4	7.0
5	6.1
6	5.2
7	4.3

(9) The MC is calculated by dividing the FAV by two.

(10) A final ACR is determined as described in item F, except that the default ACR shall be 18 for all chemicals for which this method is applicable as specified in this item.

(11) The CC_{tox} is calculated by dividing the FAV by the appropriate ACR.

(12) If chronic data are available, they are used to determine measured ACR as described in item F, and chronic data are compared to the CC_{tox}.

Subp. 6. [Repealed, 39 SR 1344]

Subp. 7. [Repealed, 39 SR 1344]

Subp. 8. **Taste and odor criteria.** The agency shall limit the addition of pollutants to surface waters to the extent necessary to protect fish and other edible freshwater organisms from acquiring objectionable tastes and odors. The agency will use the USEPA national organoleptic criteria, established under section 304(a)(1) of the Clean Water Act, United States Code, title 33, section 1314, when establishing concentrations above which unacceptable tastes and odors could be imparted to aquatic organisms.

Subp. 9. **Wildlife-based criteria.** The agency shall use the procedures in this subpart to establish wildlife-based criteria. Wildlife criteria shall protect wildlife consumers of freshwater aquatic organisms from adverse effects of toxic pollutants. Wildlife criteria are applicable to all surface waters, subject to the exceptions in subpart 10, item B, subitem (1).

A. Wildlife-based criteria shall be determined using toxicological information from available sources of scientific data for wildlife or domestic animal species, exposed to toxic pollutants through ingestion including gavage.

B. Wildlife-based criteria are calculated using the following formula:

$$CC_w \text{ mg/L} = \frac{\text{NOAEL x BWt x SSF}}{\text{DW + (F x BAF)}}$$

where: CC_w = wildlife chronic criterion in mg/L

NOAEL = no observable adverse effect level in mg of substance per kg of body weight per day (mg/kg BWt/day) as derived from mammalian or avian toxicity studies. If the NOAEL is in mg/L, the NOAEL will be multiplied by the average daily volume of water consumed by the test animals in liters per day and divided by the average weight of the test animals in kg. If the NOAEL is in mg/kg of food consumed, the NOAEL will be multiplied by the average amount of food consumed daily by the test animals and divided by the average weight of the test animals in kg

BWt = average body weight of test organisms in kg

SSF = species sensitivity factor to account for difference in the sensitivity in test species. This factor will vary between 1 and 0.1. The appropriate factor will be determined by the commissioner based on available and reliable scientific data on the relative sensitivity of the test organism compared to other wildlife species

DW = average volume of water consumed per day by the test animals in liters

F = average amount of food consumed per day by test animals in kg

BAF = BAF in liters per kg

C. Drinking (DW) and feeding (F) rates for test organisms can be estimated using the following equations if these rates are not available from the original study:

(1) for mammalian species:

(a) $DW = 0.099 \times (BWt)^{0.90}$; and

(b) $F = 0.0687 \times (BWt)^{0.82}$; and

(2) for avian species:

(a) $DW = 0.059 \times (BWt)^{0.67}$; and

(b) $F = 0.058 \times (BWt)^{0.65}$.

D. A final BAF for calculating a wildlife chronic criterion (CC_w) is determined as in subpart 7, except that the BCFs and BAFs are adjusted to represent whole body BCFs and BAFs.

(1) Normalized BCFs and BAFs are multiplied by 12 percent lipid for CC_w applicable to class 2A waters.

(2) Normalized BCFs and BAFs are multiplied by five percent lipid for CC_w applicable to class 2Bd and 2B waters.

(3) If percent lipid data is not available, whole body BCFs and BAFs are used as reported.

(4) BCFs estimated using the relationship between BCFs and the log K_{ow} are normalized by dividing the estimated BCF by 7.6 and then multiplying by 12 for class 2A waters or by five for class 2Bd and 2B waters.

(5) Measured or estimated BCFs for lipophilic organic chemicals with log K_{ow} values in the range of three or more are multiplied by the factor from subpart 7, item B, subitem (8).

Subp. 10. **Applicable criteria or human health-based standard.** The final criteria or chronic standard for human health for toxic pollutants for surface waters must be the lowest of the applicable criteria or standards for human health derived under this part and part 7050.0219.

A. Applicable criteria or standards for human health by use for class 2A, 2Bd, 2B, and 2D surface waters are listed for each applicable population protected (aquatic life, humans, and fish-eating wildlife). The applicable criteria or standards for human health must be the lowest of the CC or CS as described in subitems (1) to (3):

(1) for aquatic life toxicity: a CC_{tox} and MC based on toxicity to aquatic organisms from subpart 4 or 5 or a CC_{tox} based on plant toxicity from subpart 4 or 5;

(2) for human health: a CC or CS by medium (water or fish) as described in part 7050.0219, subpart 2, or a concentration that will prevent unacceptable taste or odor in water, fish, or other edible aquatic organisms from subpart 8; or

(3) when available, for fish-eating wildlife: a CC_w from subpart 9.

B. Applicable criteria for class 7 waters must be the lowest of the following:

(1) a CC_w from subpart 9, if aquatic organisms can be sustained in the class 7 water so that they are subject to predation by wildlife; or

(2) other drinking water or aquatic life standards for toxic pollutants, consistent with the uses class 7 waters are protected for under part 7050.0140.

C. If the site-specific application of criteria developed in this subpart is used to establish an effluent limitation for national pollutant discharge elimination system and state disposal system permits or to establish the degree of remedial action cleanup activities, the provisions of part 7050.0222, subpart 7, items B to G, apply.

D. The CS or CC and MS or MC must be averaged over the durations described in part 7050.0222, subpart 7, item C.

Statutory Authority: *MS s 14.06; 115.03; 115.44; 116.07*

History: *15 SR 1057; 18 SR 2195; 19 SR 1310; 24 SR 1105; 32 SR 1699; 39 SR 1344; 41 SR 545; 42 SR 441*

Published Electronically: *November 20, 2017*

7050.0219 HUMAN HEALTH-BASED CRITERIA AND STANDARDS.

Subpart 1. **Objective.** Human health-based criteria and standards protect humans from potential adverse effects of eating fish and edible aquatic organisms and incidental ingestion of water while recreating in class 2 waters and from the consumption of drinking water from class 1 surface waters (includes class 2A and 2Bd waters). Human health-based criteria and standards must be determined using the methods in this part.

Subp. 2. **Applicability of methods.** Human health-based chronic criteria (CC) or chronic standards (CS) must be evaluated based on the pollutant's toxicological profile: noncarcinogen or nonlinear carcinogen (NLC), developmental susceptibility, and linear carcinogen (C).

A. Algorithms for these toxicological profiles by class 2 subclasses are described in subparts 13 to 15. Other scientifically defensible algorithms may be applied by the commissioner on a chemical-specific basis for evaluating developmental susceptibility to toxic pollutants in fish tissue based on the consideration listed in subparts 3 to 5.

B. The most stringent CC or CS by medium (water or fish tissue), class 2 subclass, and toxicological profile, or taste and odor criteria as described in part 7050.0218, subpart 8, are the final applicable human health-based CC or CS.

Subp. 3. **Available and reliable scientific data.** The data and information used to develop a site-specific CC or CS must be approved by the commissioner. The commissioner must consider measures of availability and reliability of the data and information.

Subp. 4. **Toxicological values.** The RfD used to calculate criteria for noncarcinogenic and nonlinear carcinogenic chemicals (NLC) and the CSF and $AF_{lifetime}$or CSF and ADAF used to calculate CC or CS for linear carcinogenic (C) chemicals are obtained from the MDH or developed according to parts 4717.7820, subparts 5 and 21, and 7050.0218, subpart 3.

Subp. 5. **Exposure values.** Drinking water intake rates are obtained from the MDH. RSC uses a default value of 0.2 for most pollutants, unless:

A. there are no significant known or potential sources other than those addressed for the designated use, then 0.5 must be used; or

B. sufficient exposure data are available to support an alternative pollutant-specific value between 0.2 and 0.8.

Subp. 6. **Bioaccumulation factors.** This subpart describes the process and data for deriving bioaccumulation factors (BAF) used in the calculation of the human health-based chronic criteria (CC) or chronic standards (CS).

A. Information used for defining BAF must be consistent with the pollutant form used to derive the RfD or CSF. BAF development must also consider other forms that bioaccumulate in fish tissue. The preferred bioaccumulation data are available and reliable field and laboratory studies.

B. A general description of the steps and data used to determine final state or site BAF are listed in subitems (1) to (6) and described in detail in subparts 7 to 12.

(1) Categorize the pollutant based on certain properties into one of three broadly defined chemical categories: nonionic organic, ionic organic, or inorganic and organometallic chemicals as described in subpart 7.

(2) Define the methods for developing baseline BAF as described in subpart 8. A baseline BAF is the expression of the BAF based on the bioavailable or freely dissolved fraction of a pollutant in the ambient water and normalized concentration of the pollutant within the organism.

(3) Determine the relevant procedure (1 to 6) for identifying the acceptable baseline BAF methods (maximum of four) and their hierarchy for developing individual or aquatic species-specific baseline BAF as described in subpart 9.

(4) Calculate species mean baseline BAF from acceptable individual baseline BAF as described in subpart 10.

(5) Determine final baseline BAF for TL_3 and TL_4 as described in subpart 11.

(6) Develop final state or site BAF for TL_3 and TL_4 based on default parameters by class 2 subclass or site-specific data as described in subpart 12.

Subp. 7. **Chemical categorization.** For BAF purposes, organic chemicals that have no or negligible ionization at the pH range of ambient surface waters are categorized as nonionic organic chemicals; organic chemicals that undergo ionization at the pH range of ambient surface waters are categorized as ionic organic chemicals and further delineated for BAF development based on subpart 9, item C; organometallic chemicals and other chemicals or elements are categorized as organometallic and inorganic chemicals.

Subp. 8. **Methods for baseline BAF.** The four methods for developing baseline BAF in items A to D are listed in a hierarchy from most preferred to least preferred, except as noted in subpart 9: use of field-measured BAF studies (field BAF); use of field-measured BSAF studies (field BSAF); use of laboratory-measured BCF studies with food chain multipliers (lab BCF*FCM); and use of octanol-water partition coefficients with food chain multipliers (K_{ow}*FCM). Where relevant, differences in the baseline BAF methods are described by chemical categorization.

A. Method 1: Field BAF. The field-measured BAF for a nonionic organic chemical is calculated based on the total concentration of the chemical in the appropriate tissue of the aquatic organism (on a wet tissue basis) and the total concentration of chemical in ambient surface water at the site of sampling (BAF^t_T).

measured $BAF^t_T = C_t/C_w$

where: BAF^t_T = field-measured BAF based on total concentration in tissue and water (L/kg)

C_t = total concentration of the chemical in the specified wet tissue (µg/kg)

C_w = total concentration of the chemical in water (µg/L)

The measured BAF^t_T is converted to a baseline BAF or BAF_1^{fd} by the following equation:

$$\text{baseline } BAF_l^{fd} = \left[\frac{\text{measured } BAF_T^t}{f_{fd}}\right]\left(\frac{1}{f_l}\right)$$

where: baseline BAF_1^{fd} = BAF expressed on a freely dissolved and lipid-normalized basis (L/kg)

f_l = fraction of the tissue that is lipid

f_{fd} = fraction of the total chemical that is freely dissolved in ambient surface water

The freely dissolved fraction or f_{fd} is the portion of the nonionic organic chemical that is not bound to particulate organic carbon or dissolved organic carbon and is calculated:

$$f_{fd} = \frac{1}{[1 + (POC \times K_{OW}) + (DOC \times 0.08 \times K_{OW})]}$$

where: POC = concentration of particulate organic carbon (kg/L)

DOC = concentration of dissolved organic carbon (kg/L)

K_{OW} = n-octanol water partition coefficient for the chemical

POC and DOC concentrations are obtained from the original study from which the field-measured BAF is determined. If POC and DOC concentrations are not reported in the BAF study, reliable estimates of POC and DOC are obtained from other studies at closely related sites within the same water body. If no study data are available, the USEPA national default DOC and POC values are used, as they are representative of average ambient surface water conditions. The USEPA national default values are DOC of 2.9 mg/L and POC of 0.5 mg/L, converted to kg/L by dividing by 1,000,000.

For the field-measured BAF for a chemical classified as inorganic and organometallic, the field BAF is equal to the baseline BAF and is not expressed on a lipid or freely dissolved fraction basis. Normalization on other characteristics must be supported by chemical-specific data.

B. Method 2: Field BSAF. For nonionic organic chemicals, the field-measured BSAF is determined by relating lipid-normalized concentration of the chemical in the appropriate tissue of the aquatic organism to organic carbon-normalized concentrations of the chemical in surface sediment.

$$\text{BSAF} = \frac{C_l}{C_{soc}}$$

where: BSAF = biota-sediment accumulation factor for the chemical (kg of sediment organic carbon/kg of lipid)

C_l = lipid-normalized concentration of the chemical in the specified wet tissue (µg/g lipid), calculated as:

$$C_l = \frac{C_t}{f_l}$$

where: f_l = fraction lipid content in the tissue

Other variables as defined under item A

C_{soc} = organic-carbon normalized concentration of a chemical in surface sediment samples (µg/g sediment organic carbon), calculated as:

$$C_{soc} = \frac{C_s}{f_{oc}}$$

where: C_s = concentration of chemical in dry sediment (µg/g sediment)

f_{oc} = fraction organic carbon in dry sediment

The measured BSAF is converted to a baseline BAF or BAF_1^{fd} by the following equation:

$$(\text{baseline } BAF_1^{fd})_i = (BSAF)_i \frac{(\Pi_{socw})_r \, (D_{i/r}) \, (K_{OW})_i}{(K_{ow})_r}$$

where: $(\text{baseline } BAF_1^{fd})_i$ = BAF expressed on a freely dissolved and lipid-normalized basis for chemical of interest "i" or the chemical that is the basis of the criteria (L/kg)

$BSAF_i$ = measured BSAF for the chemical "i" (kg organic carbon/kg of lipid)

$(\Pi_{socw})_r$ = sediment to water partition coefficient or sediment organic carbon to freely dissolved concentration ratio of the reference chemical "r." Reference chemicals with $(\Pi_{socw})_r/(K_{ow})$ similar to that of the chemical of interest are preferred for this method (L/kg sediment organic carbon)

$$\left(\prod_{socw}\right)_r = \frac{(C_{soc})_r}{(C_w^{fd})_r}$$

where: $(C_{soc})_r$ = concentration of the reference chemical "r" in dry sediment normalized to sediment organic carbon (µg/kg sediment organic carbon)

$(C^{fd}_w)_r$ = concentration of the reference chemical "r" freely dissolved in water (µg/L)

$(D_{i/r})$ = ratio between $\Pi_{socw/}K_{ow}$ for chemicals "i" and reference chemical "r"; a ratio equal to or close to one is preferred

$(K_{ow})_i$ = octanol-water partition coefficient for the chemical "i"

$(K_{ow})_r$ = octanol-water partition coefficient for the reference chemical "r"

Other variables as defined under item A

C. Method 3: Lab BCF*FCM. The laboratory-measured BCF for nonionic organic chemicals is calculated based on the total concentration of the chemical in the appropriate tissue of the aquatic organism (on a wet tissue basis) and the total concentration of chemical in the study water (BCF^t_T).

$$\text{measured } BCF^t_T = \frac{C_t}{C_w}$$

where: C_w = total concentration of chemical in the laboratory test water (µg/L)

Other variables as defined under item A

Baseline BAF_1^{fd} equation:

$$\text{baseline } BAF_1^{fd} = (FCM)\left[\frac{\text{measured } BCF_T^t}{f_{fd}} - 1\right] x \left(\frac{1}{f_1}\right)$$

where: f_{fd} = fraction of the total chemical in the test water that is freely dissolved, where POC and DOC or reasonable estimates based on total organic carbon (TOC) values measured in the test water are used, unless not available, then the following defaults are used based on typical lab water characteristics: DOC of 2.5 mg/L and POC at 0 mg/L, converted to kg/L by dividing by 1,000,000

FCM = food chain multiplier

Other variables as defined under item A

For ionic organic, inorganic, and organometallic chemicals, based on available data, the laboratory BCF is equal to the baseline BAF and is not expressed on a lipid or freely dissolved fraction basis. Normalization on other characteristics must be supported by chemical-specific data. FCM must come from field BAF studies.

D. Method 4: K_{ow}*FCM. In this method, K_{ow} is assumed to be equal to the baseline BAF_1^{fd} for certain nonionic organic chemicals described in the procedures.

$$\text{baseline } BAF_1^{fd} = (FCM) \text{ x } (K_{ow})$$

where: Variables as defined under items A and C

Subp. 9. **Hierarchy of acceptable baseline BAF methods.** Determine the hierarchy of acceptable baseline BAF methods available under subpart 8 for appropriate use based on the chemical categorization of the pollutant and other relevant properties as described under Procedures 1 to 6.

A. Procedures 1 to 6 are used for defining the hierarchy and use of the four baseline BAF methods based on chemical categorization and a chemical's ionization state in ambient surface waters, hydrophobicity, biomagnification, and metabolism in aquatic organisms, primarily freshwater fish species. Table 1 provides the basic information for identifying the acceptable procedures and hierarchy for baseline BAF methods as described under items B to D:

Table 1.
Chemical Categorization

Nonionic Organic and Ionic (negligible ionization) Organic Chemicals				Inorganic, Organometallic, and Ionic Chemicals	
Hydrophobicity				Biomagnification Factor (BMF)	
log $K_{ow} \geq 4$		log $K_{ow} < 4$		BMF ≤ 1,000	BMF > 1,000
Metabolism in Aquatic Organisms (Fish)					
Low or Unknown	High	Low or Unknown	High		
Procedures:					
Procedure 1	Procedure 2	Procedure 3	Procedure 4	Procedure 5	Procedure 6
1) Field BAF 2) Field BSAF 3) Lab BCF*FCM 4) K_{ow}*FCM	1) Field BAF 2) Field BSAF 3) Lab BCF	1) Field BAF or Lab BCF 2) K_{ow}	Field BAF or Lab BCF	Field BAF or Lab BCF	1) Field BAF 2) Lab BCF*FCM

B. For nonionic (neutral) organic chemicals, defined as chemicals that have no or negligible ionization in ambient surface water, Procedures 1 to 4 describe the hierarchy of acceptable baseline BAF methods to use.

(1) Procedure 1 applies to nonionic organic chemicals with moderate to high hydrophobicity defined as log K_{ow} greater than or equal to (≥) 4 and either a low level of documented metabolism in aquatic organisms or lack of sufficient data to characterize metabolism. All four baseline BAF methods are available for use based on the stated hierarchy in table 1 and availability of acceptable data.

(2) Procedure 2 applies to nonionic organic chemicals with moderate to high hydrophobicity defined as log $K_{ow} \geq 4$ and a high level of documented metabolism in aquatic organisms. The acceptable methods are field BAF, BSAF, and lab BCF*FCM, where FCM is equal to one.

(3) Procedure 3 applies to nonionic organic chemicals with low hydrophobicity defined as log K_{ow} less than (<) 4 and either a low level of documented metabolism in aquatic organisms or lack of sufficient data to characterize metabolism. The acceptable methods are field BAF or lab BCF*FCM, with equal preference given, and K_{ow}*FCM, where FCM is equal to one in both methods.

(4) Procedure 4 applies to nonionic organic chemicals with low hydrophobicity defined as log $K_{ow} < 4$ and high levels of documented metabolism in aquatic organisms. Equal preference is given to both acceptable methods: field BAF or lab BCF*FCM, where FCM is equal to one.

C. For ionic organic chemicals (defined as chemicals that can readily accept or donate protons) the procedures that define the available hierarchy and appropriate baseline BAF methods depend on further characteristics of the chemical. The main characteristics relate to exhibiting primarily nonionic (neutral) characteristics (ionization is negligible) or ionic characteristic in average surface water pH ranges based on its acid dissociation constant (K_a) expressed as the negative base 10 log (pK_a) and functional group or groups:

(1) When ionization is negligible, the chemical is categorized as a nonionic organic chemical and baseline BAF procedures are applied based on hydrophobicity and metabolism characteristics described for Procedures 1 to 4 under item B, subitems (1) to (4).

(2) In all other cases, the chemical is categorized with inorganic and organometallic chemicals and addressed with Procedure 5 or 6 under item D, subitem (1) or (2).

Available chemical-specific data that supports more defensible baseline BAF methods must be used in place of these default assignments.

D. Inorganic and organometallic chemicals are defined as inorganic minerals, other inorganic chemicals, and elements: metals and metalloids and organometallic chemicals, and Procedures 5 and 6 define the use of acceptable baseline BAF methods. Procedures 5 and 6 are distinguished by the determination of whether the chemical demonstrates biomagnifications through field BAF or laboratory BCF studies, with BAF or BMF greater than 1,000 being the cut-off for this purpose. BMF is calculated using chemical concentrations in the tissue of aquatic organisms at two successive trophic levels as:

$$BMF_{(TL,\,n)} = C_{t\,(TL,\,n)} / C_{t\,(TL,\,n\text{-}1)}$$

where: $C_{t\,(TL,\,n)}$ = total concentration of relevant chemical form or forms in appropriate tissue of predator organism at trophic level "n" (may be either wet weight or dry weight concentration so long as both the predator and prey concentrations are expressed in the same manner) (µg/kg)

$C_{t\,(TL,\,n\text{-}1)}$ = total concentration of relevant chemical form or forms in appropriate tissue of prey organism at the next lower trophic level from the predator (may be either wet weight or dry weight concentration so long as both the predator and prey concentrations are expressed in the same manner) (µg/kg)

(1) Procedure 5 applies when geometric mean BAF or BMF is less than or equal to 1,000 when comparing successive trophic level ratios up through trophic level 4. Equal preference is given to field BAF or lab BCF*FCM, where FCM is equal to one. For this procedure, field BAF or lab BCF is applied as the baseline BAF.

measured $BAF^t_T = C_t/C_w$ or $BCF^t_T = C_t/C_w$ are applied as the baseline BAF.

where: Variables as defined under subpart 8

(2) Procedure 6 applies when geometric mean BAF or BMF is greater than 1,000 when comparing successive trophic level ratios up through trophic level 4. The acceptable methods are

field BAF or lab BCF*FCM, with preference for field BAF. For this procedure, field BAF or lab BCF is applied as the baseline BAF.

measured $BAF^t_T = C_t/C_w$ or $BCF^t_T = C_t/C_w$ are applied as the baseline BAF.

where: Variables as defined under subpart 8

Subp. 10. **Species mean baseline BAF.** Calculate species and mean baseline BAF from acceptable individual baseline BAF.

A. For each appropriate baseline BAF method, calculate species-mean baseline BAF using the geometric mean.

B. Any baseline BAF with large differences between species (greater than ten percent) needs additional justification for use in a species-mean baseline BAF.

C. Evaluate data uncertainties for consideration in method hierarchy application for calculating trophic level baseline BAF.

Subp. 11. **Final baseline BAF by trophic level.** Determine the final baseline BAF by trophic level (TL):

A. Calculate geometric mean baseline BAF for TL_3 and TL_4 using available species-means for each baseline BAF method. For class 2A water, preference is given for *Salmonidae* data and developed as a single representative TL_4 baseline BAF.

B. Combine species-means for methods that have equal preference in procedural hierarchies and have similarly reliable baseline BAF based on evaluation of data uncertainties for a final baseline BAF for TL_3 where applicable, and final baseline BAF for TL_4.

C. For some pollutants, TL_3 and TL_4 baseline BAF may be identical when not dependent on trophic level factors, such as lipid partitioning.

Subp. 12. **Final state or site BAF by trophic level.** Calculate final state or site BAF for TL_3 where applicable and TL_4 for use in developing human health-based chronic criteria or standards.

A. For nonionic organic chemicals and ionic organic chemicals with no or negligible ionization as defined under subpart 7, for each TL_3 and TL_4, calculate a state or site BAF using the following equation:

$$\text{state or site } BAF_{(TL\ n)} = \left[\left(\text{final baseline } BAF_l^{fd}\right)_{TL\ n} \times (f_l)_{TL\ n} + 1\right] \times (f_{fd})$$

where: $(\text{final baseline } BAF_l^{fd})_{TL\,n}$ = final trophic-level-mean baseline BAF expressed on a freely dissolved and lipid-normalized basis for trophic level "n" (L/kg)

$(f_l)_{TL\,n}$ = lipid fraction of aquatic species consumed at trophic level "n" by class 2 subclass: class 2A = 0.06; class 2Bd/2B/2C/2D = 0.02 for TL_3 and 0.015 for TL_4

f_{fd} = fraction of the total chemical in water that is freely dissolved in ambient waters

The default DOC and POC values for the state ambient class 2 surface waters are 7.5 x 10^{-6} kg/L (7.5 mg/L) and 5 x 10^{-7} kg/L (0.5 mg/L), respectively. For a site BAF for use in site-specific criteria development, the DOC and POC values are from the site monitoring data, if available; in all other cases, the state defaults are used.

B. For inorganic and organometallic chemicals and ionic organic chemicals with ionization in natural waters, the baseline BAF^t_T using total chemical concentrations or bioavailable forms are directly applied as the state or site BAF:

$$\text{state } BAF_{(TL\,n)} \text{ or site BAF} = \text{final baseline } BAF_{(TL\,n)}$$

Subp. 13. **Algorithms for class 2A or 2Bd surface waters.** This subpart describes human health-based criteria or standards for classes of surface waters designated for drinking water, fish consumption, and recreational use. To develop a final chronic criteria (CC_{dfr}) or standard (CS_{dfr}) applicable to surface waters designated class 2A or 2Bd, items A to D must be evaluated for use based on the pollutant's toxicological profile: noncarcinogen or nonlinear carcinogen (NLC); developmental susceptibility; or linear carcinogen (C).

A. Algorithm for noncarcinogenic or NLC chemicals applicable to surface waters designated class 2A or 2Bd to calculate: CC_{dfr} or CS_{dfr}=

$$\frac{RfD_{chronic}\text{ (mg/kg-d) x RSC (no units) x 1,000 µg/mg}}{\{DWIR_{chronic}\text{ (L/kg-d)} + FCR_{adult}\text{ (kg/kg-d)}[(0.24 \text{ x } BAF_{TL3}\text{ (L/kg)}) + (0.76 \text{ x } BAF_{TL4}\text{ (L/kg)})]\}}$$

where: CC_{dfr} or CS_{dfr} = drinking water plus fish consumption and recreation chronic criterion or standard in µg/L

$RfD_{chronic}$ = reference dose for chronic duration in mg/kg-day

RSC = relative source contribution factor

1,000 µg/mg = a factor used to convert milligram (mg) to microgram (µg);

there are 1,000 micrograms per milligram

$DWIR_{chronic}$ = drinking water intake rate for the chronic duration based on a 95th percentile time-weighted average from MDH; rate may be chemical-specific with sufficient data or use the default rate of 0.043 L/kg-d

FCR_{adult} = fish consumption intake rate of 0.00043 kg/kg-d based on 0.030 kg/day of amount of fish assumed to be consumed per day and 70 kg adult body weight or rate may be chemical-specific with sufficient data

BAF_{TL3} = final BAF for TL_3 fish in L/kg; accounts for 24 percent of fish consumed

BAF_{TL4} = final BAF for TL_4 fish in L/kg; accounts for 76 percent of fish consumed; for class 2A, the BAF_{TL4} is applied to 100 percent of the FCR

B. Supplemental algorithm for developmental susceptibility for noncarcinogenic or NLC chemicals applicable to surface waters designated class 2A or 2Bd to calculate: CC_{dev} or CS_{dev} =

$$\frac{RfD_{duration\_(acute,\ short\text{-}term,\ or\ subchronic)}\ (mg/kg\text{-}d) \times RSC\ (no\ units) \times 1{,}000\ \mu g/mg}{DWIR_{duration\_(acute,\ short\text{-}term,\ or\ subchronic)}\ (L/kg\text{-}d)}$$

where: CC_{dev} or CS_{dev} = developmental-based drinking water chronic criterion or standard in µg/L applied when shorter duration adverse effects and exposure parameters result in a more stringent chronic criterion or standard than calculated from item A

$RfD_{duration}$ = reference dose for acute, short-term, or subchronic duration in mg/kg-day

$DWIR_{duration}$ = drinking water intake rate for acute, short-term, or subchronic duration in L/kg-d; drinking water intake rate for the acute, short-term, and subchronic durations based on a 95th percentile time-weighted average from MDH; rate may be chemical-specific with sufficient data or use default rates of 0.289, 0.289, and 0.077 L/kg-d, respectively

Other variables as defined under item A

C. Algorithm for linear carcinogenic chemicals with lifetime adjustment factors ($AF_{lifetime}$) applicable to surface waters designated class 2A or 2Bd to calculate: CC_{dfr} or CS_{dfr} =

$$\frac{CR\ (1 \times 10^{-5})}{CSF(mg/kg\text{-}d)^{-1} \times AF_{Lifetime}} \times \frac{1000\ \mu g/mg}{\{DWIR_{Lifetime}(L/kg\text{-}d) + FCR_{Adult}\ (kg/kg\text{-}d)\left[(0.24 \times BAF_{TL3}\ (L/kg)) + (0.76 \times BAF_{TL4}(L/kg))\right]\}}$$

where: CC_{dfr} or CS_{dfr} = drinking water plus fish consumption and recreation chronic criterion or standard in µg/L

CR = cancer risk level or an additional excess cancer risk equal to 1×10^{-5} (1 in 100,000)

CSF = cancer potency slope factor in $(mg/kg\text{-}d)^{-1}$

$AF_{lifetime}$ = adjustment factor, lifetime (no units)

$DWIR_{lifetime}$ = drinking water intake rate for lifetime duration; drinking water intake rate for the lifetime duration based on a 95th percentile time-weighted average from MDH; rate may be chemical-specific with sufficient data or use default rate of 0.043 L/kg-d

Other variables as defined under item A

D. Algorithm for linear carcinogenic chemicals with age-dependent adjustment factors (ADAF) applicable to surface waters designated class 2A or 2Bd to calculate: CC_{dfr} or CS_{dfr} =

$$\frac{CR\,(1 \times 10^{-5}) \times 1000}{\begin{pmatrix} \left\{CSF \times ADAF_{<2} \times D_{<2} \times [DWIR_{<2} + FCR_{<2} \times (0.24BAF_{TL3} + 0.76BAF_{TL4})]\right\} + \\ \left\{CSF \times ADAF_{2\,to\,<16} \times D_{2to<16} \times [DWIR_{2\,to<16} + FCR_{2\,to<16} \times (0.24BAF_{TL3} + 0.76BAF_{TL4})]\right\} + \\ \left\{CSF \times ADAF_{16to70} \times D_{16to70} \times [DWIR_{16to70} + FCR_{Adult} \times (0.24BAF_{TL3} + 0.76BAF_{TL4})]\right\} \end{pmatrix} /70yrs}$$

where: CC_{dfr} or CS_{dfr} = drinking water plus fish consumption and recreation chronic criterion or standard in µg/L

ADAF = age-dependent adjustment factor by age groups

D = duration corresponding to the three age groups: birth up to two years of age (two-year duration), two years of age up to 16 years of age (14-year duration), and 16 years of age up to 70 years of age (54-year duration)

DWIR = drinking water intake rate for age groups; drinking water intake rate for the lifetime duration based on a 95th percentile time-weighted average from MDH; rate may be chemical-specific with sufficient data or use default rates for:

$DWIR_{0<2}$ = 0.137 L/kg-d, birth up to two years of age

$DWIR_{2\ to\ <\ 16}$ = 0.047 L/kg-d, two up to 16 years of age

$DWIR_{16\ to\ 70}$ = 0.039 L/kg-d, 16 up to 70 years of age

FCR = fish consumption intake rate by age groups:

$FCR_{0<2}$ = 0.00086 kg/kg-d

$FCR_{2\ to\ <\ 16}$ = 0.00055 kg/kg-d

$FCR_{16\ to\ 70}$ = 0.00043 kg/kg-d

Subp. 14. **Algorithm for class 2B, 2C, or 2D surface waters.** This subpart describes human health-based criteria or standards for classes of surface waters designated for fish consumption and recreational use (nondrinking water use). To develop a final chronic criteria (CC_{fr}) or standard (CS_{fr}) applicable to surface waters designated class 2B, 2C, or 2D, items A to C must be evaluated for use based on the pollutant's toxicological profile: noncarcinogen or nonlinear carcinogen (NLC) or linear carcinogen (C).

A. Algorithm for noncarcinogenic or NLC chemicals applicable to class 2B, 2C, or 2D surface waters to calculate: CC_{fr} or CS_{fr} =

$$\frac{RfD_{chronic}\ (mg/kg\text{-}d) \times RSC\ (no\ units) \times 1{,}000\ \mu g/mg}{\{IWR_{chronic}\ (L/kg\text{-}d) + FCR_{adult}\ (kg/kg\text{-}d)[(0.24 \times BAF_{TL3}\ (L/kg)) + (0.76 \times BAF_{TL4}\ (L/kg)]\}}$$

where: CC_{fr} or CS_{fr} = fish consumption and recreation chronic criterion or standard in μg/L

$IWR_{chronic}$ = 0.0013 L/kg-d; assumed incidental water intake rate based on minimum chronic duration

Other variables as defined under subpart 13

B. Algorithm for linear carcinogenic chemicals with lifetime adjustment factors ($AF_{lifetime}$) applicable to surface waters designated class 2B, 2C, or 2D to calculate: CC_{fr}or CS_{fr} =

$$\frac{CR\ (1 \times 10^{-5})}{CSF(\ mg/kg\text{-}d)^{-1} \times AF_{Lifetime}} \times \frac{1000\ \mu g/mg}{\{IWR_{chronic}\ (L/kg\text{-}d) + FCR_{Adult}\ (kg/kg\text{-}d)\left[(0.24 \times BAF_{TL3}\ (L/kg)) + (0.76 \times BAF_{TL4}(L/kg))\right]\}}$$

where: CC_{fr} or CS_{fr} = fish consumption and recreation chronic criterion or standard in μg/L

Other variables as defined under item A and subpart 13

C. Algorithm for linear carcinogenic chemicals with age-dependent adjustment factors (ADAF) applicable to surface waters designated class 2B, 2C, or 2D to calculate: CC_{fr} or CS_{fr} =

$$\frac{CR\ (1 \times 10^{-5}) \times 1000}{\left(\begin{array}{l}\left\{CSF \times ADAF_{<2} \times D_{<2} \times [IWR + FCR_{<2} \times (0.24BAF_{TL3} + 0.76BAF_{TL4})]\right\} + \\ \left\{CSF \times ADAF_{2\,to\,<16} \times D_{2\,to\,<16} \times [IWR + FCR_{2\,to\,<16} \times (0.24BAF_{TL3} + 0.76BAF_{TL4})]\right\} + \\ \left\{CSF \times ADAF_{16\,to\,70} \times D_{16\,to\,70} \times [IWR + FCR_{Adult} \times (0.24BAF_{TL3} + 0.76BAF_{TL4})]\right\}\end{array}\right) / 70yrs}$$

where: CC_{fr} or CS_{fr} = fish consumption and recreation chronic criterion or standard in μg/L

Other variables as defined under item A and subpart 13

Subp. 15. **Algorithms for class 2 fish tissue.** This subpart describes algorithms and fish tissue criteria (CC_{ft}) and standards (CS_{ft}) for chemical with BAF greater than 1,000 (BCC threshold) applicable to class 2 surface waters. Items A to C must be evaluated for use based on the pollutant's toxicological profile: noncarcinogen or nonlinear carcinogen (NLC) or linear carcinogen (C).

A. Algorithm for noncarcinogenic or NLC chemicals applicable to class 2 surface waters to calculate: CC_{ft} or CS_{ft} =

$$\frac{RfD_{chronic} \text{ (mg/kg-d) x RSC (no units) or - RSC (mg/kg-d)}}{FCR_{adult} \text{ (kg/kg-d)}}$$

where: CC_{ft} or CS_{ft} = fish tissue-based chronic criterion or standard in mg/kg

Other variables as defined under subpart 13

B. Algorithm for linear carcinogenic chemicals with lifetime adjustment factors ($AF_{lifetime}$) applicable to class 2 surface waters to calculate: CC_{ft} or CS_{ft} =

$$\frac{\text{CR } (1 \text{ x } 10^{-5})}{\text{CSF (mg/kg-d)}^{-1} \text{ x } AF_{lifetime} \text{ (no units)}} \text{ x } \frac{1}{FCR_{Adult} \text{ (kg/kg-d)}}$$

where: CC_{ft} or CS_{ft} = fish tissue-based chronic criterion or standard in mg/kg

Other variables as defined under subpart 13

C. Algorithm for linear carcinogenic chemicals with age-dependent adjustment factors (ADAFs) applicable to class 2 surface waters to calculate: CC_{ft} or CS_{ft} =

$$\frac{\text{CR } (1 \text{ x } 10^{-5})}{\left[\frac{(\text{CSF x } ADAF_{<2} \text{ x } D_{0\text{-}2} \text{x } FCR_{<2}) + (\text{CSF x } ADAF_{2\text{-}16} \text{ x } D_{2\text{-}16} \text{ x } FCR_{2\text{-}16}) + (\text{CSF x } ADAF_{16\text{-}70} \text{x } D_{16\text{-}70} \text{ x } FCR_{16\text{-}70})}{\text{70 years}}\right]}$$

where: CC_{ft} or CS_{ft} = fish tissue-based chronic criterion or standard in mg/kg

Other variables as defined under subpart 13

Statutory Authority: *MS s 115.03; 115.44*

History: *39 SR 1344; 42 SR 441*

Published Electronically: *December 14, 2017*

7050.0220 SPECIFIC WATER QUALITY STANDARDS BY ASSOCIATED USE CLASSES.

Subpart 1. **Purpose and scope.** The numeric and narrative water quality standards in this chapter prescribe the qualities or properties of the waters of the state that are necessary for the designated public uses and benefits. If the standards in this chapter are exceeded, it is considered indicative of a polluted condition which is actually or potentially deleterious, harmful, detrimental, or injurious with respect to designated uses or established classes of the waters of the state.

All surface waters are protected for multiple beneficial uses. Numeric water quality standards are tabulated in this part for all uses applicable to four common categories of surface waters, so that all applicable standards for each category are listed together in subparts 3a to 6a. The four categories are:

A. cold water 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 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 aquatic life and habitat and wetlands: classes 2B, 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).

Subp. 2. **Explanation of tables.**

A. Class 1 domestic consumption (DC) standards are the United States Environmental Protection Agency primary (maximum contaminant levels) and secondary drinking water standards, as contained in Code of Federal Regulations, title 40, parts 141 and 143, as amended through July 1, 2006. The DC standards are listed in subparts 3a and 4a, except that individual pollutants, substances, or organisms in the treatment technological, disinfectants, microbiological, and radiological categories are not listed unless they are listed because a secondary drinking water standard or a standard for another use class exists.

B. Certain drinking water standards are not applicable to class 1 waters. The following are not applicable to class 1 surface waters: the primary drinking water standards for acrylamide, epichlorohydrin, copper, lead, and turbidity (treatment technique standards) and the standards in the disinfectants and microbiological organisms categories. The drinking water standards not applicable to class 1 groundwaters are listed in part 7050.0221.

C. Class 2 standards for metals are expressed as total metal in subparts 3a to 5a, but must be converted to dissolved metal standards for application to surface waters. Conversion factors for converting total metal standards to dissolved metal standards are listed in part 7050.0222, subpart 9. The conversion factor for metals not listed in part 7050.0222, subpart 9, is one. The dissolved metal standard equals the total metal standard times the conversion factor. Water quality-based effluent limits for metals are expressed as total metal.

D. The tables of standards in subparts 3a to 6a include the following abbreviations and acronyms:

AN	means aesthetic enjoyment and navigation, class 5 waters
*	an asterisk following the FAV and MS values or double dashes (–) means part 7050.0222, subpart 7, item G, applies
(c)	means the chemical is assumed to be a human carcinogen
CS	means chronic standard, defined in part 7050.0218, subpart 3
DC	means domestic consumption (drinking water), class 1 waters
–	double dashes means there is no standard
exp. ()	means the natural antilogarithm (base e) of the expression in parenthesis
FAV	means final acute value, defined in part 7050.0218, subpart 3
IC	means industrial consumption, class 3 waters
IR	means agriculture irrigation use, class 4A waters
LS	means agriculture livestock and wildlife use, class 4B waters
MS	means maximum standard, defined in part 7050.0218, subpart 3
NA	means not applicable
(S)	means the associated value is a secondary drinking water standard
su	means standard unit. It is the reporting unit for pH
TH	means total hardness in mg/L, which is the sum of the calcium and magnesium concentrations expressed as $CaCO_3$
TON	means threshold odor number

E. Important synonyms or acronyms for some chemicals are listed in parentheses below the primary name.

F. When two or more use classes have standards for the same pollutant, the most stringent standard applies pursuant to part 7050.0450. All surface waters are protected for class 6, but this class has no numeric standards so it is not included in the tables.

Subp. 3. [Repealed, 24 SR 1105]

Subp. 3a. **Cold water aquatic life and habitat, drinking water, and associated use classes.** Water quality standards applicable to use classes 1B; 2A, 2Ae, or 2Ag; 3A or 3B; 4A and 4B; and 5 surface waters. The water quality standards in part 7050.0222, subpart 2, that apply to class 2A also apply to classes 2Ae and 2Ag. In addition to the water quality standards in part

7050.0222, subpart 2, the biological criteria defined in part 7050.0222, subpart 2d, apply to classes 2Ae and 2Ag.

A. MISCELLANEOUS SUBSTANCE, CHARACTERISTIC, OR POLLUTANT

	2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B IR	5 AN
(1) Ammonia, un-ionized as N, µg/L	16	--	--	--	--	--	--	--
(2) Asbestos, >10 µm (c), fibers/L	--	--	--	7.0e+06	--	--	--	--
(3) Bicarbonates (HCO_3), meq/L	--	--	--	--	--	5	--	--
(4) Bromate, µg/L	--	--	--	10	--	--	--	--
(5) Chloride, mg/L	230	860	1,720	250(S)	50/100	--	--	--

	2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B IR	5 AN
(6) Chlorine, total residual, µg/L	11	19	38	--	--	--	--	--
(7) Chlorite, µg/L	--	--	--	1,000	--	--	--	--
(8) Color, Pt-Co	30	--	--	15(S)	--	--	--	--

(9) Cyanide, free, µg/L

5.2	22	45	200	--	--	--	--

(10) *Escherichia (E.) coli* bacteria, organisms/100 mL

See item D	--	--	--	--	--	--	--

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B IR**	**5 AN**

(11) Eutrophication standards for lakes and reservoirs (phosphorus, total, µg/L; chlorophyll-a, µg/L; Secchi disk transparency, meters)

See part 7050.0222, subparts 2 and 2a	--	--	--	--	--	--	--

(12) Eutrophication standards for rivers, streams, and navigational pools (phosphorus, total µg/L; chlorophyll-a (seston), µg/L; five-day biochemical oxygen demand (BOD_5), mg/L; diel dissolved oxygen flux, mg/L; chlorophyll-a (periphyton), mg/m^2)

See part 7050.0222, subparts 2 and 2b	--	--	--	--	--	--	--

(13) Fluoride, mg/L

--	--	--	4	--	--	--	--

(14) Fluoride, mg/L

--	--	--	2(S)	--	--	--	--

(15) Foaming agents, µg/L

--	--	--	500(S)	--	--	--	--

(16) Hardness, Ca+Mg as $CaCO_3$, mg/L

--	--	--	--	50/250	--	--	--

2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B IR	5 AN

(17) Hydrogen sulfide, mg/L

--	--	--	--	--	--	--	0.02

(18) Nitrate as N, mg/L

--	--	--	10	--	--	--	--

(19) Nitrite as N, mg/L

--	--	--	1	--	--	--	--

(20) Nitrate + Nitrite as N, mg/L

--	--	--	10	--	--	--	--

(21) Odor, TON

--	--	--	3(S)	--	--	--	--

2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B IR	5 AN

(22) Oil, µg/L

500	5,000	10,000	--	--	--	--	--

(23) Oxygen, dissolved, mg/L

7, as a daily minimum	--	--	--	--	--	--	--

(24) pH minimum, su

6.5	--	--	6.5(S)	6.5/6.0	6.0	6.0	6.0

(25) pH maximum, su

8.5	--	--	8.5(S)	8.5/9.0	8.5	9.0	9.0

(26) Radioactive materials

See item E	--	--	See item E	--	See item E	See item E	--

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B IR**	**5 AN**

(27) Salinity, total, mg/L

--	--	--	--	--	--	1,000	--

(28) Sodium, meq/L

--	--	--	--	--	60% of total cations	--	--

(29) Specific conductance at 25°C, µmhos/cm

--	--	--	--	--	1,000	--	--

(30) Sulfate, mg/L

--	--	--	250(S)	--	--	--	--

(31) Sulfates, wild rice present, mg/L

--	--	--	--	--	10	--	--

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B IR**	**5 AN**

(32) Temperature, °F

No material increase	--	--	--	--	--	--	--

(33) Total dissolved salts, mg/L

--	--	--	--	--	700	--	--

(34) Total dissolved solids, mg/L

--	--	--	500(S)	--	--	--	--

(35) Total suspended solids (TSS), mg/L

See part 7050.0222, subpart 2	--	--	--	--	--	--	--

B. METALS AND ELEMENTS

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(1) Aluminum, total, µg/L

87	748	1,496	50-200(S)	--	--	--	--

(2) Antimony, total, µg/L

5.5	90	180	6	--	--	--	--

(3) Arsenic, total, µg/L

2.0	360	720	10	--	--	--	--

(4) Barium, total, µg/L

--	--	--	2,000	--	--	--	--

(5) Beryllium, total, µg/L

--	--	--	4.0	--	--	--	--

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(6) Boron, total, µg/L

--	--	--	--	--	500	--	--

(7) Cadmium, total, µg/L

1.1	3.9	7.8	5	--	--	--	--

Class 2A cadmium standards are hardness dependent. Cadmium values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 2, for examples at other hardness values and equations to calculate cadmium standards for any hardness value not to exceed 400 mg/L.

(8) Chromium +3, total, µg/L

207	1,737	3,469	--	--	--	--	--

Class 2A trivalent chromium standards are hardness dependent. Chromium +3 values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 2, for examples at other hardness values and equations to calculate trivalent chromium standards for any hardness value not to exceed 400 mg/L.

(9) Chromium +6, total, µg/L

11	16	32	--	--	--	--	--

(10) Chromium, total, µg/L

--	--	--	100	--	--	--	--

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(11) Cobalt, total, µg/L

2.8	436	872	--	--	--	--	--

(12) Copper, total, µg/L

9.8	18	35	1,000 (S)	--	--	--	--

Class 2A copper standards are hardness dependent. Copper values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 2, for examples at other hardness values and equations to calculate copper standards for any hardness value not to exceed 400 mg/L.

(13) Iron, total, µg/L

--	--	--	300(S)	--	--	--	--

(14) Lead, total, µg/L

3.2	82	164	NA	--	--	--	--

Class 2A lead standards are hardness dependent. Lead values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 2, for examples at other hardness values and equations to calculate lead standards for any hardness value not to exceed 400 mg/L.

(15) Manganese, total, µg/L

--	--	--	50(S)	--	--	--	--

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(16) Mercury, total, in water, ng/L

6.9	2,400*	4,900*	2,000	--	--	--	--

(17) Mercury, total in edible fish tissue, mg/kg or parts per million

0.2	--	--	--	--	--	--	--

(18) Nickel, total, µg/L

158	1,418	2,836	--	--	--	--	--

Class 2A nickel standards are hardness dependent. Nickel values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 2, for examples at other hardness values and equations to calculate nickel standards for any hardness value not to exceed 400 mg/L.

(19) Selenium, total, µg/L

5.0	20	40	50	--	--	--	--

(20) Silver, total, µg/L

0.12	2.0	4.1	100(S)	--	--	--	--

Class 2A silver MS and FAV are hardness dependent. Silver values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 2, for examples at other hardness values and equations to calculate silver standards for any hardness value not to exceed 400 mg/L.

	2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**
(21) Thallium, total, µg/L	0.28	64	128	2	--	--	--	--
(22) Zinc, total, µg/L	106	117	234	5,000 (S)	--	--	--	--

Class 2A zinc standards are hardness dependent. Zinc values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 2, for examples at other hardness values and equations to calculate zinc standards for any hardness value not to exceed 400 mg/L.

C. ORGANIC POLLUTANTS OR CHARACTERISTICS

	2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**
(1) Acenaphthene, µg/L	20	56	112	--	--	--	--	--
(2) Acetochlor, µg/L	3.6	86	173	--	--	--	--	--
(3) Acrylonitrile (c), µg/L	0.38	1,140*	2,281*	--	--	--	--	--
(4) Alachlor (c), µg/L	3.8	800*	1,600*	2	--	--	--	--
(5) Aldicarb, µg/L	--	--	--	3	--	--	--	--

	2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN
(6) Aldicarb sulfone, µg/L								
	--	--	--	2	--	--	--	--
(7) Aldicarb sulfoxide, µg/L								
	--	--	--	4	--	--	--	--
(8) Anthracene, µg/L								
	0.035	0.32	0.63	--	--	--	--	--
(9) Atrazine (c), µg/L								
	3.4	323	645	3	--	--	--	--
(10) Benzene (c), µg/L								
	5.1	4,487*	8,974*	5	--	--	--	--

	2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN
(11) Benzo(a)pyrene, µg/L								
	--	--	--	0.2	--	--	--	--
(12) Bromoform, µg/L								
	33	2,900	5,800	See sub-item (73)	--	--	--	--
(13) Carbofuran, µg/L								
	--	--	--	40	--	--	--	--
(14) Carbon tetrachloride (c), µg/L								
	1.9	1,750*	3,500*	5	--	--	--	--

(15) Chlordane (c), ng/L

0.073	1,200*	2,400*	2,000	--	--	--	--
2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(16) Chlorobenzene, µg/L (Monochlorobenzene)

20	423	846	100	--	--	--	--

(17) Chloroform (c), µg/L

53	1,392	2,784	See sub-item (73)	--	--	--	--

(18) Chlorpyrifos, µg/L

0.041	0.083	0.17	--	--	--	--	--

(19) Dalapon, µg/L

--	--	--	200	--	--	--	--

(20) DDT (c), ng/L

0.11	550*	1,100*	--	--	--	--	--
2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(21) 1,2-Dibromo-3-chloropropane (c), µg/L

--	--	--	0.2	--	--	--	--

(22) Dichlorobenzene (ortho), µg/L

--	--	--	600	--	--	--	--

(23) 1,4-Dichlorobenzene (para) (c), µg/L

--	--	--	75	--	--	--	--

(24) 1,2-Dichloroethane (c), µg/L

3.5	45,050*	90,100*	5	--	--	--	--

(25) 1,1-Dichloroethylene, µg/L

--	--	--	7	--	--	--	--

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(26) 1,2-Dichloroethylene (cis), µg/L

--	--	--	70	--	--	--	--

(27) 1,2-Dichloroethylene (trans), µg/L

--	--	--	100	--	--	--	--

(28) 2,4-Dichlorophenoxyacetic acid (2,4-D), µg/L

--	--	--	70	--	--	--	--

(29) 1,2-Dichloropropane (c), µg/L

--	--	--	5	--	--	--	--

(30) Dieldrin (c), ng/L

0.0065	1,300*	2,500*	--	--	--	--	--

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(31) Di-2-ethylhexyl adipate, µg/L

--	--	--	400	--	--	--	--

(32) Di-2-ethylhexyl phthalate (c), µg/L

1.9	--*	--*	6	--	--	--	--

(33) Di-n-Octyl phthalate, µg/L

2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN
30	825	1,650	--	--	--	--	--

(34) Dinoseb, µg/L

2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN
--	--	--	7	--	--	--	--

(35) Diquat, µg/L

2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN
--	--	--	20	--	--	--	--

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(36) Endosulfan, µg/L

2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN
0.0076	0.084	0.17	--	--	--	--	--

(37) Endothall, µg/L

2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN
--	--	--	100	--	--	--	--

(38) Endrin, µg/L

2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN
0.0039	0.090	0.18	2	--	--	--	--

(39) Ethylbenzene (c), µg/L

2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN
68	1,859	3,717	700	--	--	--	--

(40) Ethylene dibromide, µg/L

2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN
--	--	--	0.05	--	--	--	--

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(41) Fluoranthene, µg/L

2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN
1.9	3.5	6.9	--	--	--	--	--

(42) Glyphosate, µg/L

--	--	--	700	--	--	--	--

(43) Haloacetic acids (c), µg/L (Bromoacetic acid, Dibromoacetic acid, Dichloroacetic acid, Monochloroacetic acid, and Trichloroacetic acid)

--	--	--	60	--	--	--	--

(44) Heptachlor (c), ng/L

0.10	260*	520*	400	--	--	--	--

(45) Heptachlor epoxide (c), ng/L

0.12	270*	530*	200	--	--	--	--

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(46) Hexachlorobenzene (c), ng/L

0.061	--*	--*	1,000	--	--	--	--

(47) Hexachlorocyclopentadiene, µg/L

--	--	--	50	--	--	--	--

(48) Lindane (c), µg/L (Hexachlorocyclohexane, gamma-)

0.0087	1.0*	2.0*	0.2	--	--	--	--

(49) Methoxychlor, µg/L

--	--	--	40	--	--	--	--

(50) Methylene chloride (c), µg/L (Dichloromethane)

45	13,875*	27,749*	5	--	--	--	--

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(51) Metolachlor

23	271	543	--	--	--	--	--

(52) Naphthalene, µg/L

65	409	818	--	--	--	--	--

(53) Oxamyl, µg/L (Vydate)

--	--	--	200	--	--	--	--

(54) Parathion, µg/L

0.013	0.07	0.13	--	--	--	--	--

(55) Pentachlorophenol, µg/L

0.93	15	30	1	--	--	--	--

Class 2A MS and FAV are pH dependent. Pentachlorophenol values shown are for a pH of 7.5 only. See part 7050.0222, subpart 2, for examples at other pH values and equations to calculate pentachlorophenol standards for any pH value.

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(56) Phenanthrene, µg/L

3.6	32	64	--	--	--	--	--

(57) Phenol, µg/L

123	2,214	4,428	--	--	--	--	--

(58) Picloram, µg/L

--	--	--	500	--	--	--	--

(59) Polychlorinated biphenyls (c), ng/L (PCBs, total)

0.014	1,000*	2,000*	500	--	--	--	--

(60) Simazine, µg/L

--	--	--	4	--	--	--	--

2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN

(61) Styrene (c), µg/L

--	--	--	100	--	--	--	--

(62) 2,3,7,8-Tetrachlorodibenzo-p-dioxin, ng/L (TCDD-dioxin)

--	--	--	0.03	--	--	--	--

(63) 1,1,2,2-Tetrachloroethane (c), µg/L

1.1	1,127*	2,253*	--	--	--	--	--

(64) Tetrachloroethylene (c), µg/L

3.8	428*	857*	5	--	--	--	--

(65) Toluene, µg/L

253	1,352	2,703	1,000	--	--	--	--

2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN

(66) Toxaphene (c), ng/L

0.31	730*	1,500*	3,000	--	--	--	--

(67) 2,4,5-TP, µg/L (Silvex)

--	--	--	50	--	--	--	--

(68) 1,2,4-Trichlorobenzene, µg/L

--	--	--	70	--	--	--	--

(69) 1,1,1-Trichloroethane, µg/L

329	2,957	5,913	200	--	--	--	--

(70) 1,1,2-Trichloroethane, µg/L

--	--	--	5	--	--	--	--

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**
(71) 1,1,2-Trichloroethylene (c), µg/L							
25	6,988	13,976*	5	--	--	--	--
(72) 2,4,6-Trichlorophenol, µg/L							
2.0	102	203	--	--	--	--	--
(73) Trihalomethanes, total (c), µg/L (Bromodichloromethane, Bromoform, Chlorodibromomethane, and Chloroform)							
--	--	--	80	--	--	--	--
(74) Vinyl chloride (c), µg/L							
0.17	--*	--*	2	--	--	--	--
(75) Xylenes, total, µg/L							
166	1,407	2,814	10,000	--	--	--	--

D. *Escherichia (E.) coli* bacteria shall not exceed 126 organisms per 100 milliliters as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than ten percent of all samples taken during any calendar month individually exceed 1,260 organisms per 100 milliliters. The standard applies only between April 1 and October 31.

E. For radioactive materials, see parts 7050.0221, subpart 2; 7050.0222, subpart 2; and 7050.0224, subparts 2 and 3.

Subp. 4. [Repealed, 24 SR 1105]

Subp. 4a. **Cool and warm water aquatic life and habitat, drinking water, and associated use classes.** Water quality standards applicable to use classes 1B or 1C; 2Bd, 2Bde, 2Bdg, or 2Bdm; 3A or 3B; 4A and 4B; and 5 surface waters. The water quality standards in part 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 part 7050.0222, subpart 3, the biological criteria defined in part 7050.0222, subpart 3d, apply to classes 2Bde, 2Bdg, and 2Bdm.

A. MISCELLANEOUS SUBSTANCE, CHARACTERISTIC, OR POLLUTANT

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B IC	4A IR	4B LS	5 AN

(1) Ammonia, un-ionized as N, µg/L

40	--	--	--	--	--	--	--

(2) Asbestos, >10 µm (c), fibers/L

--	--	--	7.0e+06	--	--	--	--

(3) Bicarbonates (HCO_3), meq/L

--	--	--	--	--	5	--	--

(4) Bromate, µg/L

--	--	--	10	--	--	--	--

(5) Chloride, mg/L

230	860	1,720	250(S)	50/100	--	--	--

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B IC	4A IR	4B LS	5 AN

(6) Chlorine, total residual, µg/L

11	19	38	--	--	--	--	--

(7) Chlorite, µg/L

--	--	--	1,000	--	--	--	--

(8) Color, Pt-Co

--	--	--	15(S)	--	--	--	--

(9) Cyanide, free, µg/L

5.2	22	45	200	--	--	--	--

(10) *Escherichia (E.) coli* bacteria, organisms/100 mL

See item D	--	--	--	--	--	--	--

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(11) Eutrophication standards for lakes, shallow lakes, and reservoirs (phosphorus, total, µg/L; chlorophyll-a, µg/L; Secchi disk transparency, meters)

See part 7050.0222, subparts 3 and 3a	--	--	--	--	--	--	--

(12) Eutrophication standards for rivers, streams, and navigational pools (phosphorus, total µg/L; chlorophyll-a (seston), µg/L; five-day biochemical oxygen demand (BOD_5), mg/L; diel dissolved oxygen flux, mg/L; chlorophyll-a (periphyton), mg/m^2)

See part 7050.0222, subparts 3 and 3b	--	--	--	--	--	--	--

(13) Fluoride, mg/L

--	--	--	4	--	--	--	--

(14) Fluoride, mg/L

--	--	--	2(S)	--	--	--	--

(15) Foaming agents, µg/L

--	--	--	500(S)	--	--	--	--

(16) Hardness, Ca+Mg as $CaCO_3$, mg/L

--	--	--	--	50/250	--	--	--

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B IC	4A IR	4B LS	5 AN

(17) Hydrogen sulfide, mg/L

--	--	--	--	--	--	--	0.02

(18) Nitrate as N, mg/L

--	--	--	10	--	--	--	--

(19) Nitrite as N, mg/L

--	--	--	1	--	--	--	--

(20) Nitrate + Nitrite as N, mg/L

--	--	--	10	--	--	--	--

(21) Odor, TON

--	--	--	3(S)	--	--	--	--

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B IC	4A IR	4B LS	5 AN

(22) Oil, µg/L

500	5,000	10,000	--	--	--	--	--

(23) Oxygen, dissolved, mg/L

See part 7050.0222, subpart 3	--	--	--	--	--	--	--

(24) pH minimum, su

6.5	--	--	6.5(S)	6.5/6.0	6.0	6.0	6.0

(25) pH maximum, su

9.0	--	--	8.5(S)	8.5/9.0	8.5	9.0	9.0

(26) Radioactive materials

See item E	--	--	See item E	--	See item E	See item E	--

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(27) Salinity, total, mg/L

--	--	--	--	--	--	1,000	--

(28) Sodium, meq/L

--	--	--	--	--	60% of total cations	--	--

(29) Specific conductance at 25°C, µmhos/cm

--	--	--	--	--	1,000	--	--

(30) Sulfate, mg/L

--	--	--	250(S)	--	--	--	--

(31) Sulfates, wild rice present, mg/L

--	--	--	--	--	10	--	--

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(32) Temperature, °F

See item F	--	--	--	--	--	--	--

(33) Total dissolved salts, mg/L

--	--	--	--	--	700	--	--

(34) Total dissolved solids, mg/L

--	--	--	500(S)	--	--	--	--

(35) Total suspended solids (TSS), mg/L

See part 7050.0222, subpart 3	--	--	--	--	--	--	--

B. METALS AND ELEMENTS

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(1) Aluminum, total, μg/L

125	1,072	2,145	50-200(S)	--	--	--	--

(2) Antimony, total, μg/L

5.5	90	180	6	--	--	--	--

(3) Arsenic, total, μg/L

2.0	360	720	10	--	--	--	--

(4) Barium, total, μg/L

--	--	--	2,000	--	--	--	--

(5) Beryllium, total, μg/L

--	--	--	4.0	--	--	--	--

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(6) Boron, total, μg/L

--	--	--	--	--	500	--	--

(7) Cadmium, total, µg/L

1.1	33	67	5	--	--	--	--

Class 2Bd cadmium standards are hardness dependent. Cadmium values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 3, for examples at other hardness values and equations to calculate cadmium standards for any hardness value not to exceed 400 mg/L.

(8) Chromium +3, total, µg/L

207	1,737	3,469	--	--	--	--	--

Class 2Bd trivalent chromium standards are hardness dependent. Chromium +3 values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 3, for examples at other hardness values and equations to calculate trivalent chromium standards for any hardness value not to exceed 400 mg/L.

(9) Chromium +6, total, µg/L

11	16	32	--	--	--	--	--

(10) Chromium, total, µg/L

--	--	--	100	--	--	--	--

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(11) Cobalt, total, µg/L

2.8	436	872	--	--	--	--	--

(12) Copper, total, µg/L

9.8	18	35	1,000 (S)	--	--	--	--

Class 2Bd copper standards are hardness dependent. Copper values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 3, for examples at other hardness values and equations to calculate copper standards for any hardness value not to exceed 400 mg/L.

(13) Iron, total, µg/L

--	--	--	300(S)	--	--	--	--

(14) Lead, total, µg/L

3.2	82	164	NA	--	--	--	--

Class 2Bd lead standards are hardness dependent. Lead values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 3, for examples at other hardness values and equations to calculate lead standards for any hardness value not to exceed 400 mg/L.

(15) Manganese, total, µg/L

--	--	--	50(S)	--	--	--	--

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(16) Mercury, total in water, ng/L

6.9	2,400*	4,900*	2,000	--	--	--	--

(17) Mercury, total in edible fish tissue, mg/kg or parts per million

0.2	--	--	--	--	--	--	--

(18) Nickel, total, µg/L

158	1,418	2,836	--	--	--	--	--

Class 2Bd nickel standards are hardness dependent. Nickel values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 3, for examples at other hardness values and equations to calculate nickel standards for any hardness value not to exceed 400 mg/L.

(19) Selenium, total, µg/L

5.0	20	40	50	--	--	--	--

(20) Silver, total, µg/L

1.0	2.0	4.1	100(S)	--	--	--	--

Class 2Bd silver MS and FAV are hardness dependent. Silver values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 3, for examples at other hardness values and equations to calculate silver standards for any hardness value not to exceed 400 mg/L.

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B IC	4A IR	4B LS	5 AN

(21) Thallium, total, µg/L

0.28	64	128	2	--	--	--	--

(22) Zinc, total, µg/L

106	117	234	5,000 (S)	--	--	--	--

Class 2Bd zinc standards are hardness dependent. Zinc values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 3, for examples at other hardness values and equations to calculate zinc standards for any hardness value not to exceed 400 mg/L.

C. ORGANIC POLLUTANTS OR CHARACTERISTICS

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B ICIC	4A IR	4B LS	5 AN

(1) Acenaphthene, µg/L

20	56	112	--	--	--	--	--

(2) Acetochlor, µg/L

3.6	86	173	--	--	--	--	--

(3) Acrylonitrile (c), µg/L

0.38	1,140*	2,281*	--	--	--	--	--

(4) Alachlor (c), µg/L

4.2	800*	1,600*	2	--	--	--	--

(5) Aldicarb, µg/L

--	--	--	3	--	--	--	--

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B ICIC	4A IR	4B LS	5 AN

(6) Aldicarb sulfone, µg/L

--	--	--	2	--	--	--	--

(7) Aldicarb sulfoxide, µg/L

--	--	--	4	--	--	--	--

(8) Anthracene, µg/L

0.035	0.32	0.63	--	--	--	--	--

(9) Atrazine (c), µg/L

3.4	323	645	3	--	--	--	--

(10) Benzene (c), µg/L

6.0	4,487*	8,974*	5	--	--	--	--

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B ICIC	4A IR	4B LS	5 AN

(11) Benzo(a)pyrene, µg/L

--	--	--	0.2	--	--	--	--

(12) Bromoform, µg/L

41	2,900	5,800	See subitem (73)	--	--	--	--

(13) Carbofuran, µg/L

--	--	--	40	--	--	--	--

(14) Carbon tetrachloride (c), µg/L

1.9	1,750*	3,500*	5	--	--	--	--

(15) Chlordane (c), ng/L

0.29	1,200*	2,400*	2,000	--	--	--	--

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**

(16) Chlorobenzene, µg/L (Monochlorobenzene)

20	423	846	100	--	--	--	--

(17) Chloroform (c), µg/L

53	1,392	2,784	See subitem (73)	--	--	--	--

(18) Chlorpyrifos, µg/L

0.041	0.083	0.17	--	--	--	--	--

(19) Dalapon, µg/L

--	--	--	200	--	--	--	--

(20) DDT (c), ng/L

1.7	550*	1,100*	--	--	--	--	--

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**

(21) 1,2-Dibromo-3-chloropropane (c), µg/L

--	--	--	0.2	--	--	--	--

(22) Dichlorobenzene (ortho), µg/L

--	--	--	600	--	--	--	--

(23) 1,4-Dichlorobenzene (para) (c), µg/L

--	--	--	75	--	--	--	--

(24) 1,2-Dichloroethane (c), µg/L

3.8	45,050*	90,100*	5	--	--	--	--

(25) 1,1-Dichloroethylene, µg/L

--	--	--	7	--	--	--	--

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**

(26) 1,2-Dichloroethylene (cis), µg/L

--	--	--	70	--	--	--	--

(27) 1,2-Dichloroethylene (trans), µg/L

--	--	--	100	--	--	--	--

(28) 2,4-Dichlorophenoxyacetic acid (2,4-D), µg/L

--	--	--	70	--	--	--	--

(29) 1,2-Dichloropropane (c), µg/L

--	--	--	5	--	--	--	--

(30) Dieldrin (c), ng/L

0.026	1,300*	2,500*	--	--	--	--	--

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**

(31) Di-2-ethylhexyl adipate, µg/L

--	--	--	400	--	--	--	--

(32) Di-2-ethylhexyl phthalate (c), µg/L

1.9	--*	--*	6	--	--	--	--

(33) Di-n-Octyl phthalate, µg/L

30	825	1,650	--	--	--	--	--

(34) Dinoseb, µg/L

--	--	--	7	--	--	--	--

(35) Diquat, µg/L

--	--	--	20	--	--	--	--

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**

(36) Endosulfan, µg/L

0.029	0.28	0.56	--	--	--	--	--

(37) Endothall, µg/L

--	--	--	100	--	--	--	--

(38) Endrin, µg/L

0.016	0.090	0.18	2	--	--	--	--

(39) Ethylbenzene (c), µg/L

68	1,859	3,717	700	--	--	--	--

(40) Ethylene dibromide, µg/L

--	--	--	0.05	--	--	--	--

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**

(41) Fluoranthene, µg/L

1.9	3.5	6.9	--	--	--	--	--

(42) Glyphosate, µg/L

--	--	--	700	--	--	--	--

(43) Haloacetic acids (c), µg/L (Bromoacetic acid, Dibromoacetic acid, Dichloroacetic acid, Monochloroacetic acid, and Trichloroacetic acid)

--	--	--	60	--	--	--	--

(44) Heptachlor (c), ng/L

0.39	260*	520*	400	--	--	--	--

(45) Heptachlor epoxide (c), ng/L

0.48	270*	530*	200	--	--	--	--

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**

(46) Hexachlorobenzene (c), ng/L

0.24	--*	--*	1,000	--	--	--	--

(47) Hexachlorocyclopentadiene, µg/L

--	--	--	50	--	--	--	--

(48) Lindane (c), µg/L (Hexachlorocyclohexane, gamma-)

0.032	4.4*	8.8*	0.2	--	--	--	--

(49) Methoxychlor, µg/L

--	--	--	40	--	--	--	--

(50) Methylene chloride (c), µg/L (Dichloromethane)

46	13,875*	27,749*	5	--	--	--	--

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B ICIC	4A IR	4B LS	5 AN

(51) Metolachlor

23	271	543	--	--	--	--	--

(52) Naphthalene, µg/L

81	409	818	--	--	--	--	--

(53) Oxamyl, µg/L (Vydate)

--	--	--	200	--	--	--	--

(54) Parathion, µg/L

0.013	0.07	0.13	--	--	--	--	--

(55) Pentachlorophenol, µg/L

1.9	15	30	1	--	--	--	--

Class 2Bd MS and FAV are pH dependent. Pentachlorophenol values shown are for a pH of 7.5 only. See part 7050.0222, subpart 3, for examples at other pH values and equations to calculate pentachlorophenol standards for any pH value.

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B ICIC	4A IR	4B LS	5 AN

(56) Phenanthrene, µg/L

3.6	32	64	--	--	--	--	--

(57) Phenol, µg/L

123	2,214	4,428	--	--	--	--	--

(58) Picloram, µg/L

--	--	--	500	--	--	--	--

(59) Polychlorinated biphenyls (c), ng/L (PCBs, total)

0.029	1,000*	2,000*	500	--	--	--	--

(60) Simazine, µg/L

--	--	--	4	--	--	--	--

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**

(61) Styrene (c), µg/L

--	--	--	100	--	--	--	--

(62) 2,3,7,8-Tetrachlorodibenzo-p-dioxin, ng/L (TCDD-dioxin)

--	--	--	0.03	--	--	--	--

(63) 1,1,2,2-Tetrachloroethane (c), µg/L

1.5	1,127*	2,253*	--	--	--	--	--

(64) Tetrachloroethylene (c), µg/L

3.8	428*	857*	5	--	--	--	--

(65) Toluene, µg/L

253	1,352	2,703	1,000	--	--	--	--

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**

(66) Toxaphene (c), ng/L

1.3	730*	1,500*	3,000	--	--	--	--

(67) 2,4,5-TP, µg/L (Silvex)

--	--	--	50	--	--	--	--

(68) 1,2,4-Trichlorobenzene, µg/L

--	--	--	70	--	--	--	--

(69) 1,1,1-Trichloroethane, µg/L

329	2,957	5,913	200	--	--	--	--

(70) 1,1,2-Trichloroethane, µg/L

--	--	--	5	--	--	--	--

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**

(71) 1,1,2-Trichloroethylene (c), µg/L

25	6,988*	13,976*	5	--	--	--	--

(72) 2,4,6-Trichlorophenol, µg/L

2.0	102	203	--	--	--	--	--

(73) Trihalomethanes, total (c), µg/L (Bromodichloromethane, Bromoform, Chlorodibromomethane, and Chloroform)

--	--	--	80	--	--	--	--

(74) Vinyl chloride (c), µg/L

0.18	--*	--*	2	--	--	--	--

(75) Xylenes, total, µg/L

166	1,407	2,814	10,000	--	--	--	--

D. *Escherichia (E.) coli* bacteria shall not exceed 126 organisms per 100 milliliters as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than ten percent of all samples taken during any calendar month individually exceed 1,260 organisms per 100 milliliters. The standard applies only between April 1 and October 31.

E. For radioactive materials, see parts 7050.0221, subpart 3; 7050.0222, subpart 3; and 7050.0224, subparts 2 and 3.

F. Temperature must not exceed five degrees Fahrenheit above natural in streams and three degrees Fahrenheit above natural in lakes, based on monthly average of maximum daily temperature, except in no case shall it exceed the daily average temperature of 86 degrees Fahrenheit.

Subp. 5. [Repealed, 24 SR 1105]

Subp. 5a. **Cool and warm water aquatic life and habitat and associated use classes.** Water quality standards applicable to use classes 2B, 2Be, 2Bg, 2Bm, or 2D; 3A, 3B, or 3C; 4A and 4B; and 5 surface waters. See parts 7050.0223, subpart 5; 7050.0224, subpart 4; and 7050.0225, subpart 2, for class 3D, 4C, and 5 standards applicable to wetlands, respectively. The water quality standards in part 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 part 7050.0222, subpart 4, the biological criteria defined in part 7050.0222, subpart 4d, apply to classes 2Be, 2Bg, and 2Bm.

A. MISCELLANEOUS SUBSTANCE, CHARACTERISTIC, OR POLLUTANT

2B&D CS	**2B&D MS**	**2B&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**
(1) Ammonia, un-ionized as N, µg/L						
40	--	--	--	--	--	--
(2) Bicarbonates (HCO_3), meq/L						
--	--	--	--	5	--	--
(3) Chloride, mg/L						
230	860	1,720	50/100/250	--	--	--
(4) Chlorine, total residual, µg/L						
11	19	38	--	--	--	--
(5) Cyanide, free, µg/L						
5.2	22	45	--	--	--	--

2B&D CS	**2B&D MS**	**2B&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(6) *Escherichia (E.) coli* bacteria, organisms/100 mL

See item D	--	--	--	--	--	--

(7) Eutrophication standards for lakes, shallow lakes, and reservoirs (phosphorus, total, µg/L; chlorophyll-a, µg/L; Secchi disk transparency, meters)

See part 7050.0222, subparts 4 and 4a	--	--	--	--	--	--

(8) Eutrophication standards for rivers, streams, and navigational pools (phosphorus, total µg/L; chlorophyll-a (seston), µg/L; five-day biochemical oxygen demand (BOD_5), mg/L; diel dissolved oxygen flux, mg/L; chlorophyll-a (periphyton), mg/m^2)

See part 7050.0222, subparts 4 and 4b	--	--	--	--	--	--	--

(9) Hardness, Ca+Mg as $CaCO_3$, mg/L

--	--	--	50/250/500	--	--	--

(10) Hydrogen sulfide, mg/L

--	--	--	--	--	--	0.02

(11) Oil, µg/L

500	5,000	10,000	--	--	--	--

2B&D CS	**2B&D MS**	**2B&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(12) Oxygen, dissolved, mg/L

See part 7050.0222, subparts 4 and 6	--	--	--	--	--	--

(13) pH minimum, su

	6.5 See item E	--	--	6.5/6.0/6.0	6.0	6.0	6.0
(14) pH maximum, su							
	9.0 See item E	--	--	8.5/9.0/9.0	8.5	9.0	9.0
(15) Radioactive materials							
	See item F	--	--	--	See item F	See item F	--
(16) Salinity, total, mg/L							
	--	--	--	--	--	1,000	--

	2B&D CS	**2B&D MS**	**2B&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**
(17) Sodium, meq/L							
	--	--	--	--	60% of total cations	--	--
(18) Specific conductance at 25°C, μ mhos/cm							
	--	--	--	--	1,000	--	--
(19) Sulfates, wild rice present, mg/L							
	--	--	--	--	10	--	--
(20) Temperature, °F							
	See item G	--	--	--	--	--	--
(21) Total dissolved salts, mg/L							
	--	--	--	--	700	--	--

(22) Total suspended solids (TSS), mg/L

See part 7050.0222, subpart 4	--	--	--	--	--	--

B. METALS AND ELEMENTS

2B&D CS	**2B&D MS**	**2B&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(1) Aluminum, total, µg/L

125	1,072	2,145	--	--	--	--

(2) Antimony, total, µg/L

31	90	180	--	--	--	--

(3) Arsenic, total, µg/L

53	360	720	--	--	--	--

(4) Boron, total, µg/L

--	--	--	--	500	--	--

(5) Cadmium, total, µg/L

1.1	33	67	--	--	--	--

Class 2B and 2D cadmium standards are hardness dependent. Cadmium values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 4, for examples at other hardness values and equations to calculate cadmium standards for any hardness value not to exceed 400 mg/L.

2B&D CS	**2B&D MS**	**2B&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(6) Chromium +3, total, µg/L

207	1,737	3,469	--	--	--	--

Class 2B and 2D trivalent chromium standards are hardness dependent. Chromium +3 values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 4, for examples at other hardness values and equations to calculate trivalent chromium standards for any hardness value not to exceed 400 mg/L.

(7) Chromium +6, total, µg/L

11	16	32	--	--	--	--

(8) Cobalt, total, µg/L

5.0	436	872	--	--	--	--

(9) Copper, total, µg/L

9.8	18	35	--	--	--	--

Class 2B and 2D copper standards are hardness dependent. Copper values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 4, for examples at other hardness values and equations to calculate copper standards for any hardness value not to exceed 400 mg/L.

(10) Lead, total, µg/L

3.2	82	164	--	--	--	--

Class 2B and 2D lead standards are hardness dependent. Lead values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 4, for examples at other hardness values and equations to calculate lead standards for any hardness value not to exceed 400 mg/L.

2B&D CS	**2B&D MS**	**2B&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(11) Mercury, total in water, ng/L

6.9	2,400*	4,900*	--	--	--	--

(12) Mercury, total in edible fish tissue, mg/kg or parts per million

0.2	--	--	--	--	--	--

(13) Nickel, total, µg/L

158	1,418	2,836	--	--	--	--

Class 2B and 2D nickel standards are hardness dependent. Nickel values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 4, for examples at other hardness values and equations to calculate nickel standards for any hardness value not to exceed 400 mg/L.

(14) Selenium, total, µg/L

5.0	20	40	--	--	--	--

(15) Silver, total, µg/L

1.0	2.0	4.1	--	--	--	--

Class 2B and 2D silver MS and FAV are hardness dependent. Silver values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 4, for examples at other hardness values and equations to calculate silver standards for any hardness value not to exceed 400 mg/L.

2B&D CS	**2B&D MS**	**2B&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(16) Thallium, total, µg/L

0.56	64	128	--	--	--	--

(17) Zinc, total, µg/L

106	117	234	--	--	--	--

Class 2B and 2D zinc standards are hardness dependent. Zinc values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 4, for examples at other hardness values and equations to calculate zinc standards for any hardness value not to exceed 400 mg/L.

C. ORGANIC POLLUTANTS OR CHARACTERISTICS

2B&D CS	**2B&D MS**	**2B&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(1) Acenaphthene, µg/L

20	56	112	--	--	--	--

(2) Acetochlor, µg/L

3.6	86	173	--	--	--	--

(3) Acrylonitrile (c), µg/L

0.89	1,140*	2,281*	--	--	--	--

(4) Alachlor (c), µg/L

59	800	1,600	--	--	--	--

(5) Anthracene, µg/L

0.035	0.32	0.63	--	--	--	--

2B&D CS	**2B&D MS**	**2B&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(6) Atrazine (c), µg/L

10	323	645	--	--	--	--

(7) Benzene (c), µg/L

98	4,487	8,974	--	--	--	--

(8) Bromoform, µg/L

466	2,900	5,800	--	--	--	--

(9) Carbon tetrachloride (c), µg/L

5.9	1,750*	3,500*	--	--	--	--

(10) Chlordane (c), ng/L

0.29	1,200*	2,400*	--	--	--	--

2B&D CS	**2B&D MS**	**2B&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(11) Chlorobenzene, µg/L (Monochlorobenzene)

20	423	846	--	--	--	--

(12) Chloroform (c), µg/L

155	1,392	2,78	--	--	--	--

(13) Chlorpyrifos, µg/L

0.041	0.083	0.17	--	--	--	--

(14) DDT (c), ng/L

1.7	550*	1,100*	--	--	--	--

(15) 1,2-Dichloroethane (c), µg/L

190	45,050*	90,100*	--	--	--	--

2B&D CS	**2B&D MS**	**2B&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(16) Dieldrin (c), ng/L

0.026	1,300*	2,500*	--	--	--	--

(17) Di-2-ethylhexyl phthalate (c), µg/L

2.1	--*	--*	--	--	--	--

(18) Di-n-Octyl phthalate, µg/L

30	825	1,650	--	--	--	--

(19) Endosulfan, µg/L

0.031	0.28	0.56	--	--	--	--

(20) Endrin, µg/L

0.016	0.090	0.18	--	--	--	--

2B&D CS	**2B&D MS**	**2B&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(21) Ethylbenzene (c), µg/L

68	1,859	3,717	--	--	--	--

(22) Fluoranthene, µg/L

1.9	3.5	6.9	--	--	--	--

(23) Heptachlor (c), ng/L

0.39	260*	520*	--	--	--	--

(24) Heptachlor epoxide (c), ng/L

0.48	270*	530*	--	--	--	--

(25) Hexachlorobenzene (c), ng/L

0.24	--*	--*	--	--	--	--

2B&D CS	**2B&D MS**	**2B&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(26) Lindane (c), µg/L (Hexachlorocyclohexane, gamma-)

0.036	4.4*	8.8*	--	--	--	--

(27) Methylene chloride (c), µg/L (Dichloromethane)

1,940	13,875	27,749	--	--	--	--

(28) Metolachlor

23	271	543	--	--	--	--

(29) Naphthalene, µg/L

81	409	818	--	--	--	--

(30) Parathion, µg/L

0.013	0.07	0.13	--	--	--	--

2B&D CS	2B&D MS	2B&D FAV	3A/3B/3C IC	4A IR	4B LS	5 AN

(31) Pentachlorophenol, µg/L

5.5	15	30	--	--	--	--

Class 2B and 2D standards are pH dependent, except that the CS will not exceed 5.5 µg/L. Pentachlorophenol values shown are for a pH of 7.5 only. See part 7050.0222, subpart 4, for examples at other pH values and equations to calculate pentachlorophenol standards for any pH value.

(32) Phenanthrene, µg/L

3.6	32	64	--	--	--	--

(33) Phenol, µg/L

123	2,214	4,428	--	--	--	--

(34) Polychlorinated biphenyls (c), ng/L (PCBs, total)

0.029	1,000*	2,000*	--	--	--	--

(35) 1,1,2,2-Tetrachloroethane (c), µg/L

13	1,127	2,253	--	--	--	--

2B&D CS	2B&D MS	2B&D FAV	3A/3B/3C IC	4A IR	4B LS	5 AN

(36) Tetrachloroethylene (c), µg/L

8.9	428	857	--	--	--	--

(37) Toluene, µg/L

253	1,352	2,703	--	--	--	--

(38) Toxaphene (c), ng/L

1.3	730*	1,500*	--	--	--	--

2B&D CS	2B&D MS	2B&D FAV	3A/3B/3C IC	4A IR	4B LS	5 AN
(39) 1,1,1-Trichloroethane, µg/L						
329	2,957	5,913	--	--	--	--
(40) 1,1,2-Trichloroethylene (c), µg/L						
120	6,988	13,976	--	--	--	--

2B&D CS	2B&D MS	2B&D FAV	3A/3B/3C IC	4A IR	4B LS	5 AN
(41) 2,4,6-Trichlorophenol, µg/L						
2.0	102	203	--	--	--	--
(42) Vinyl chloride (c), µg/L						
9.2	--*	--*	--	--	--	--
(43) Xylenes, total, µg/L						
166	1,407	2,814	--	--	--	--

D. *Escherichia (E.) coli* bacteria shall not exceed 126 organisms per 100 milliliters as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than ten percent of all samples taken during any calendar month individually exceed 1,260 organisms per 100 milliliters. The standard applies only between April 1 and October 31.

E. For pH, maintain background. See part 7050.0222, subpart 6.

F. For radioactive materials, see parts 7050.0222, subpart 4; and 7050.0224, subparts 2 and 3.

G. Temperature must not exceed:

(1) Class 2B standard: five degrees Fahrenheit above natural in streams and three degrees Fahrenheit above natural in lakes, based on monthly average of maximum daily temperature, except in no case shall it exceed the daily average temperature of 86 degrees Fahrenheit; and

(2) Class 2D standard: maintain background as defined in part 7050.0222, subpart 6.

Subp. 6. [Repealed, 24 SR 1105]

Subp. 6a. **Limited resource value waters and associated use classes.**

A. WATER QUALITY STANDARDS APPLICABLE TO USE CLASSES 3C, 4A, 4B, 5, AND 7 SURFACE WATERS

	7 LIMITED RESOURCE VALUE	3C 1C	4A 1R	4B LS	5 AN
(1) Bicarbonates (HCO_3), meq/L	--	--	5	--	--
(2) Boron, µg/L	--	--	500	--	--
(3) Chloride, mg/L	--	250	--	--	--
(4) *Escherichia (E.) coli* bacteria, organisms/100 mL	See item B	--	--	--	--
(5) Hardness, Ca+Mg as $CaCO_3$, mg/L	--	500	--	--	--
(6) Hydrogen sulfide, mg/L	--	--	--	--	0.02
(7) Oxygen, dissolved, mg/L	See item C	--	--	--	--

(8) pH minimum, su

6.0	6.0	6.0	6.0	6.0

(9) pH maximum, su

9.0	9.0	8.5	9.0	9.0

(10) Radioactive materials

--	--	See item D	See item D	--

7 LIMITED RESOURCE VALUE	**3C 1C**	**4A 1R**	**4B LS**	**5 AN**

(11) Salinity, total, mg/L

--	--	--	1,000	--

(12) Sodium, meq/L

--	--	60% of total cations	--	--

(13) Specific conductance at 25°C, µmhos/cm

--	--	1,000	--	--

(14) Sulfates, wild rice present, mg/L

--	--	10	--	--

(15) Total dissolved salts, mg/L

--	--	700	--	--

(16) Toxic pollutants

See item E	--	--	--	--

B. *Escherichia (E.) coli* bacteria shall not exceed 630 organisms per 100 milliliters as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than ten percent of all samples taken during any calendar month individually exceed 1,260 organisms per 100 milliliters. The standard applies only between May 1 and October 31.

C. The level of dissolved oxygen must be maintained at concentrations:

(1) that will avoid odors or putrid conditions in the receiving water;

(2) at not less than one milligram per liter (daily average); and

(3) above zero milligrams per liter at all times.

D. For radioactive materials, see part 7050.0224, subparts 2 and 3.

E. Toxic pollutants shall not be allowed in such quantities or concentrations that will impair the specified uses.

Subp. 7. **Site-specific modifications of standards.**

A. The standards in this part and in parts 7050.0221 to 7050.0227 are subject to review and modification as applied to a specific surface water body, reach, or segment. If site-specific information is available that shows that a site-specific modification is more appropriate than the statewide or ecoregion standard for a particular water body, reach, or segment, the site-specific information shall be applied.

B. The information supporting a site-specific modification can be provided by the commissioner or by any person outside the agency. The commissioner shall evaluate all relevant data in support of a modified standard and determine whether a change in the standard for a specific water body or reach is justified.

C. Any effluent limit determined to be necessary based on a modified standard shall only be required after the discharger has been given notice of the specific proposed effluent limits and an opportunity to request a hearing as provided in part 7000.1800.

D. Through the procedures established in items A to C, the following site-specific reservoir eutrophication standards apply to Lake Pepin (25-0001-00) in lieu of the water quality standards listed in this part and part 7050.0222:

(1) Phosphorus, total	µg/L	less than or equal to 100
(2) Chlorophyll-a (seston)	µg/L	less than or equal to 28

Statutory Authority: *MS s 115.03; 115.44*

History: *9 SR 913; 12 SR 1810; 15 SR 1057; 18 SR 2195; 24 SR 1105; 24 SR 1133; 32 SR 1699; 39 SR 154; 42 SR 441*

Published Electronically: *November 20, 2017*

7050.0221 SPECIFIC WATER QUALITY STANDARDS FOR CLASS 1 WATERS OF THE STATE; DOMESTIC CONSUMPTION.

Subpart 1. **General.**

A. The numeric and narrative water quality standards in this part prescribe the qualities or properties of the waters of the state that are necessary for the domestic consumption designated public uses and benefits. If the standards in this part are exceeded in waters of the state that have the class 1 designation, it is considered indicative of a polluted condition which is actually or potentially deleterious, harmful, detrimental, or injurious with respect to the designated uses.

B. The class 1 standards in this part are the United States Environmental Protection Agency primary (maximum contaminant levels) and secondary drinking water standards, as contained in Code of Federal Regulations, title 40, parts 141 and 143, as amended. These Environmental Protection Agency drinking water standards are adopted and incorporated by reference with the exceptions in this item. The following standards are not applicable to class 1 groundwaters: the primary drinking water standards for acrylamide, epichlorohydrin, copper, and lead (treatment technique standards) and standards in the disinfectants and disinfection by-products categories. The following standards are not applicable to class 1 surface waters: the primary drinking water standards for acrylamide, epichlorohydrin, copper, lead, and turbidity (treatment technique standards) and the standards in the disinfectants and microbiological organisms categories.

Subp. 2. **Class 1A waters; domestic consumption.** The quality of class 1A waters of the state shall be such that without treatment of any kind the raw waters will meet in all respects both the primary (maximum contaminant levels) and secondary drinking water standards issued by the United States Environmental Protection Agency as referenced in subpart 1. The Environmental Protection Agency drinking water standards are adopted and incorporated by reference, except as noted in subpart 1. These standards will ordinarily be restricted to underground waters with a high degree of natural protection.

Subp. 3. **Class 1B waters.** The quality of class 1B waters of the state shall be such that with approved disinfection, such as simple chlorination or its equivalent, the treated water will meet both the primary (maximum contaminant levels) and secondary drinking water standards issued by the United States Environmental Protection Agency as referenced in subpart 1. The Environmental Protection Agency drinking water standards are adopted and incorporated by reference, except as noted in subpart 1.

These standards will ordinarily be restricted to surface and underground waters with a moderately high degree of natural protection and apply to these waters in the untreated state.

Subp. 4. **Class 1C waters.** The quality of class 1C 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 both the primary (maximum contaminant levels) and secondary drinking water standards issued by the United States Environmental Protection Agency as referenced in subpart 1. The Environmental Protection Agency drinking water standards are adopted and incorporated by reference, except as noted in subpart 1.

These standards will ordinarily be restricted to surface waters, and groundwaters in aquifers not considered to afford adequate protection against contamination from surface or other sources of pollution. Such aquifers normally would include fractured and channeled limestone, unprotected impervious hard rock where water is obtained from mechanical fractures or joints with surface connections, and coarse gravels subjected to surface water infiltration. These standards shall also apply to these waters in the untreated state.

Subp. 5. [Repealed, 32 SR 1699]

Subp. 6. **Additional standards.** In addition to the standards in subparts 2 to 5, no sewage, industrial waste, or other wastes from point or nonpoint sources, treated or untreated, shall be discharged into or permitted by any person to gain access to any waters of the state classified for domestic consumption so as to cause any material undesirable increase in the taste, hardness, temperature, chronic toxicity, corrosiveness, or nutrient content, or in any other manner to impair the natural quality or value of the waters for use as a source of drinking water.

Statutory Authority: *MS s 115.03; 115.44*

History: *18 SR 2195; 24 SR 1105; 32 SR 1699; 39 SR 154*

Published Electronically: *November 20, 2017*

7050.0222 SPECIFIC WATER QUALITY STANDARDS FOR CLASS 2 WATERS OF THE STATE; AQUATIC LIFE AND RECREATION.

Subpart 1. **General.**

A. The numeric and narrative water quality standards in this part prescribe the qualities or properties of the waters of the state that are necessary for the aquatic life and recreation designated public uses and benefits. If the standards in this part are exceeded in waters of the state that have the class 2 designation, it is considered indicative of a polluted condition which is actually or potentially deleterious, harmful, detrimental, or injurious with respect to the designated uses.

B. Standards for metals are expressed as total metal in this part, but must be converted to dissolved metal standards for application to surface waters. Conversion factors for converting total to dissolved metal standards are listed in subpart 9. The conversion factor for metals not listed in subpart 9 is one. The dissolved metal standard equals the total metal standard times the conversion factor. Water quality-based effluent limits for metals are expressed as total metal.

C. The tables of standards in this part include the following abbreviations and acronyms:

*	an asterisk following the FAV and MS values or double dashes (--) means subpart 7, item E, applies
(c)	means the chemical is assumed to be a human carcinogen
°C	means degrees Celsius
CS	means chronic standard, defined in part 7050.0218, subpart 3

--	double dashes means there is no standard
°F	means degrees Fahrenheit
FAV	means final acute value, defined in part 7050.0218, subpart 3
HH	in the "basis" column means the standard is human health-based
MS	means maximum standard, defined in part 7050.0218, subpart 3
NA	means not applicable
su	means standard unit. It is the reporting unit for pH
TH	means total hardness in milligrams per liter, which is the sum of the calcium and magnesium concentrations expressed as $CaCO_3$
Tox	in the "basis" column means the standard is toxicity-based

D. Important synonyms or acronyms for some chemicals are listed in parentheses below the primary name.

Subp. 2. **Class 2A waters; aquatic life and recreation.** The quality of class 2A surface waters shall be such as to permit the propagation and maintenance of a healthy community of cold water aquatic biota, and their habitats according to the definitions in subpart 2c. These waters shall be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable. This class of surface waters is also protected as a source of drinking water. Abbreviations, acronyms, and symbols are explained in subpart 1.

Substance, Characteristic, or Pollutant (Class 2A)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
Acenaphthene	µg/L	20	HH	56	112	Tox
Acetochlor	µg/L	3.6	Tox	86	173	Tox
Acrylonitrile (c)	µg/L	0.38	HH	1,140*	2,281*	Tox
Alachlor (c)	µg/L	3.8	HH	800*	1,600*	Tox
Aluminum, total	µg/L	87	Tox	748	1,496	Tox
Ammonia un-ionized as N	µg/L	16	Tox	--	--	NA

The percent un-ionized ammonia can be calculated for any temperature and pH by using the following equation taken from Emerson, K., R.C. Russo, R.E. Lund, and R.V. Thurston, Aqueous ammonia equilibrium calculations; effect of pH and temperature. Journal of the Fisheries Research Board of Canada 32: 2379-2383 (1975):

$$f = \frac{1}{10^{(pk_a - pH)} + 1} \times 100$$

where: f = the percent of total ammonia in the un-ionized state

pk_a= 0.09 + (2730/T) (dissociation constant for ammonia)

T = temperature in degrees Kelvin (273.16° Kelvin = 0° Celsius)

Substance, Characteristic, or Pollutant (Class 2A)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
Anthracene	µg/L	0.035	Tox	0.32	0.63	Tox
Antimony, total	µg/L	5.5	HH	90	180	Tox
Arsenic, total	µg/L	2.0	HH	360	720	Tox
Atrazine (c)	µg/L	3.4	HH	323	645	Tox
Benzene (c)	µg/L	5.1	HH	4,487*	8,974*	Tox
Bromoform	µg/L	33	HH	2,900	5,800	Tox
Cadmium, total	µg/L	equation	Tox	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations:

The CS in µg/L shall not exceed: exp.(0.7852[ln(total hardness mg/L)]-3.490)

The MS in µg/L shall not exceed: exp.(1.128[ln(total hardness mg/L)]-3.828)

The FAV in µg/L shall not exceed: exp.(1.128[ln(total hardness mg/L)]-3.1349)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total cadmium standards for five hardness values:

TH in mg/L	50	100	200	300	400
Cadmium, total					
CS µg/L	0.66	1.1	2.0	2.7	3.4
MS µg/L	1.8	3.9	8.6	14	19
FAV µg/L	3.6	7.8	17	27	37

Substance, Characteristic, or Pollutant (Class 2A)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
Carbon tetrachloride (c)	µg/L	1.9	HH	1750*	3500*	Tox
Chlordane (c)	ng/L	0.073	HH	1200*	2400*	Tox
Chloride	mg/L	230	Tox	860	1720	Tox
Chlorine, total residual	µg/L	11	Tox	19	38	Tox

Chlorine standard applies to conditions of continuous exposure, where continuous exposure refers to chlorinated effluents that are discharged for more than a total of two hours in any 24-hour period.

Chlorobenzene (Monochlorobenzene)	µg/L	20	HH	423	846	Tox
Chloroform (c)	µg/L	53	HH	1,392	2,784	Tox
Chlorpyrifos	µg/L	0.041	Tox	0.083	0.17	Tox
Chromium +3, total	µg/L	equation	Tox	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations:

The CS in µg/L shall not exceed: exp.(0.819[ln(total hardness mg/L)]+1.561)

The MS in µg/L shall not exceed: exp.(0.819[ln(total hardness mg/L)]+3.688)

The FAV in µg/L shall not exceed: exp.(0.819[ln(total hardness mg/L)]+4.380)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total chromium +3 standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Chromium +3, total					
CS µg/L	117	207	365	509	644
MS µg/L	984	1,737	3,064	4,270	5,405
FAV µg/L	1,966	3,469	6,120	8,530	10,797

Substance, Characteristic, or Pollutant (Class 2A)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
Chromium +6, total	µg/L	11	Tox	16	32	Tox
Cobalt, total	µg/L	2.8	HH	436	872	Tox
Color value	Pt/Co	30	NA	--	--	NA
Copper, total	µg/L	equation	Tox	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations:

The CS in µg/L shall not exceed: exp.(0.620[ln(total hardness mg/L)]-0.570)

The MS in µg/L shall not exceed: exp.(0.9422[ln(total hardness mg/L)]-1.464)

The FAV in µg/L shall not exceed: exp.(0.9422[ln(total hardness mg/L)]-0.7703)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total copper standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Copper, total					
CS µg/L	6.4	9.8	15	19	23

MS µg/L	9.2	18	34	50	65
FAV µg/L	18	35	68	100	131

Substance, Characteristic, or Pollutant (Class 2A)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
Cyanide, free	µg/L	5.2	Tox	22	45	Tox
DDT (c)	ng/L	0.11	HH	550*	1100*	Tox
1,2-Dichloroethane (c)	µg/L	3.5	HH	45,050*	90,100*	Tox
Dieldrin (c)	ng/L	0.0065	HH	1,300*	2,500*	Tox
Di-2-ethylhexyl phthalate (c)	µg/L	1.9	HH	--*	--*	NA
Di-n-octyl phthalate	µg/L	30	Tox	825	1,650	Tox
Endosulfan	µg/L	0.0076	HH	0.084	0.17	Tox
Endrin	µg/L	0.0039	HH	0.090	0.18	Tox
Escherichia (E.) coli	See below	See below	HH	See below	See below	NA

Not to exceed 126 organisms per 100 milliliters as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than ten percent of all samples taken during any calendar month individually exceed 1,260 organisms per 100 milliliters. The standard applies only between April 1 and October 31.

Ethylbenzene	µg/L	68	Tox	1,859	3,717	Tox

Substance, Characteristic, or Pollutant (Class 2A)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**

Eutrophication standards for class 2A lakes and reservoirs.

Designated lake trout lakes in all ecoregions (lake trout lakes support natural populations of lake trout, *Salvelinus namaycush*):

Phosphorus, total	µg/L	12	NA	--	--	NA
Chlorophyll-a	µg/L	3	NA	--	--	NA
Secchi disk transparency	meters	No less than 4.8	NA	--	--	NA

Designated trout lakes in all ecoregions, except lake trout lakes:

Phosphorus, total	µg/L	20	NA	--	--	NA
Chlorophyll-a	µg/L	6	NA	--	--	NA
Secchi disk transparency	meters	No less than 2.5	NA	--	--	NA

Additional narrative eutrophication standards for class 2A lakes and reservoirs are found under subpart 2a.

Eutrophication standards for class 2A rivers and streams.

North River Nutrient Region:

Phosphorus, total	µg/L	less than or equal to 50
Chlorophyll-a (seston)	µg/L	less than or equal to 7
Diel dissolved oxygen flux	mg/L	less than or equal to 3.0
Biochemical oxygen demand (BOD_5)	mg/L	less than or equal to 1.5

Central River Nutrient Region:

Phosphorus, total	µg/L	less than or equal to 100
Chlorophyll-a (seston)	µg/L	less than or equal to 18
Diel dissolved oxygen flux	mg/L	less than or equal to 3.5
Biochemical oxygen demand (BOD_5)	mg/L	less than or equal to 2.0

South River Nutrient Region:

Phosphorus, total	µg/L	less than or equal to 150
Chlorophyll-a (seston)	µg/L	less than or equal to 35

Diel dissolved oxygen flux	mg/L	less than or equal to 4.5
Biochemical oxygen demand (BOD_5)	mg/L	less than or equal to 3.0

Additional narrative eutrophication standards for class 2A rivers and streams are found under subpart 2b.

Substance, Characteristic, or Pollutant (Class 2A)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
Fluoranthene	µg/L	1.9	Tox	3.5	6.9	Tox
Heptachlor (c)	ng/L	0.10	HH	260*	520*	Tox
Heptachlor epoxide (c)	ng/L	0.12	HH	270*	530*	Tox
Hexachlorobenzene (c)	ng/L	0.061	HH	--*	--*	Tox
Lead, total	µg/L	equation	Tox	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations:

The CS in µg/L shall not exceed: exp.(1.273[ln(total hardness mg/L)]-4.705)

The MS in µg/L shall not exceed: exp.(1.273[ln(total hardness mg/L)]-1.460)

The FAV in µg/L shall not exceed: exp.(1.273[ln(total hardness mg/L)]-0.7643)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total lead standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Lead, total					
CS µg/L	1.3	3.2	7.7	13	19
MS µg/L	34	82	197	331	477
FAV µg/L	68	164	396	663	956

Substance, Characteristic, or Pollutant (Class 2A)	Units	CS	Basis for CS	MS	FAV	Basis for MS, FAV
Lindane (c) (Hexachlorocyclohexane, gamma-)	µg/L	0.0087	HH	1.0*	2.0*	Tox
Mercury, total in water	ng/L	6.9	HH	2,400*	4,900*	Tox
Mercury, total in edible fish	mg/kg ppm	0.2	HH	NA	NA	NA
Methylene chloride (c) Dichloromethane)	µg/L	45	HH	13,875*	27,749*	Tox
Metolachlor	µg/L	23	Tox	271	543	Tox
Naphthalene	µg/L	65	HH	409	818	Tox
Nickel, total	µg/L	equation	Tox/HH	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations:

The CS shall not exceed the human health-based standard of 297 µg/L. For waters with total hardness values less than 212 mg/L, the CS in µg/L is toxicity-based and shall not exceed: exp.(0.846[ln(total hardness mg/L)]+1.1645)

The MS in µg/L shall not exceed: exp.(0.846[ln(total hardness mg/L)]+3.3612)

The FAV in µg/L shall not exceed: exp.(0.846[ln(total hardness mg/L)]+4.0543)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total nickel standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Nickel, total					
CS µg/L	88	158	283	297	297

MS µg/L	789	1,418	2,549	3,592	4,582
FAV µg/L	1,578	2,836	5,098	7,185	9,164

Substance, Characteristic, or Pollutant (Class 2A)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
Oil	µg/L	500	NA	5,000	10,000	NA
Oxygen, dissolved	mg/L	See below	NA	--	--	NA

7.0 mg/L as a daily minimum. This dissolved oxygen standard requires compliance with the standard 50 percent of the days at which the flow of the receiving water is equal to the $7Q_{10}$.

Parathion	µg/L	0.013	Tox	0.07	0.13	Tox
Pentachlorophenol	µg/L	0.93	HH	equation	equation	Tox

The MS and FAV vary with pH and are calculated using the following equations:

The MS in µg/L shall not exceed: exp.(1.005[pH]-4.830)

The FAV in µg/L shall not exceed: exp.(1.005[pH]-4.1373)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For pH values less than 6.0, 6.0 shall be used to calculate the standard and for pH values greater than 9.0, 9.0 shall be used to calculate the standard.

Example of pentachlorophenol standards for five pH values:

pH su	6.5	7.0	7.5	8.0	8.5
Pentachlorophenol					
CS µg/L	0.93	0.93	0.93	0.93	0.93
MS µg/L	5.5	9.1	15	25	41
FAV µg/L	11	18	30	50	82

Substance, Characteristic, or Pollutant (Class 2A)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
pH, minimum	su	6.5	NA	--	--	NA
pH, maximum	su	8.5	NA	--	--	NA
Phenanthrene	µg/L	3.6	Tox	32	64	Tox
Phenol	µg/L	123	Tox	2,214	4,428	Tox
Polychlorinated biphenyls, total (c)	ng/L	0.014	HH	1,000*	2,000*	Tox
Radioactive materials	NA	See below	NA	See below	See below	NA

Not to exceed the lowest concentrations permitted to be discharged to an uncontrolled environment as permitted by the appropriate authority having control over their use.

Selenium, total	µg/L	5.0	Tox	20	40	Tox
Silver, total	µg/L	0.12	Tox	equation	equation	Tox

The MS and FAV vary with total hardness and are calculated using the following equations:

The MS in µg/L shall not exceed: exp.(1.720[ln(total hardness mg/L)]-7.2156)

The FAV in µg/L shall not exceed: exp.(1.720[ln(total hardness mg/L)]-6.520)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of silver standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Silver, total					
CS µg/L	0.12	0.12	0.12	0.12	0.12
MS µg/L	1.0	2.0	6.7	13	22
FAV µg/L	1.2	4.1	13	27	44

Substance, Characteristic, or Pollutant (Class 2A)	Units	CS	Basis for CS	MS	FAV	Basis for MS, FAV
Temperature	°C or °F	No material increase	NA	--	--	NA
1,1,2,2-Tetrachloroethane (c)	µg/L	1.1	HH	1,127*	2,253*	Tox
Tetrachloroethylene (c)	µg/L	3.8	HH	428*	857*	Tox
Thallium, total	µg/L	0.28	HH	64	128	Tox
Toluene	µg/L	253	Tox	1,352	2,703	Tox
Toxaphene (c)	ng/L	0.31	HH	730*	1,500*	Tox
1,1,1-Trichloroethane	µg/L	329	Tox	2,957	5,913	Tox
1,1,2-Trichloroethylene (c)	µg/L	25	HH	6,988*	13,976*	Tox
2,4,6-Trichlorophenol	µg/L	2.0	HH	102	203	Tox
Total suspended solids (TSS)	mg/L	10	NA	--	--	NA
TSS standards for class 2A may be exceeded for no more than ten percent of the time. This standard applies April 1 through September 30						
Vinyl chloride (c)	µg/L	0.17	HH	--*	--*	NA
Xylene, total m,p,o	µg/L	166	Tox	1,407	2,814	Tox
Zinc, total	µg/L	equation	Tox	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations:

The CS in µg/L shall not exceed: exp.(0.8473[ln(total hardness mg/L)]+0.7615)

The MS in µg/L shall not exceed: exp.(0.8473[ln(total hardness mg/L)]+0.8604)

The FAV in µg/L shall not exceed: exp.(0.8473[ln(total hardness mg/L)]+1.5536

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of zinc standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Zinc, total					
CS µg/L	59	106	191	269	343
MS µg/L	65	117	211	297	379
FAV µg/L	130	234	421	594	758

Subp. 2a. **Narrative eutrophication standards for lakes and reservoirs.**

A. Eutrophication standards for lakes and reservoirs are compared to summer-average data. Exceedance of the total phosphorus and either the chlorophyll-a or Secchi disk transparency standard is required to indicate a polluted condition.

B. It is the policy of the agency to protect all lakes and reservoirs from the undesirable effects of cultural eutrophication. Lakes and reservoirs with a baseline quality better than the numeric eutrophication standards in subpart 2 must be maintained in that condition through the strict application of all relevant federal, state, and local requirements governing antidegradation, the discharge of nutrients from point and nonpoint sources, and the protection of lake or reservoir resources, including, but not limited to:

(1) the antidegradation requirements in parts 7050.0250 to 7050.0335;

(2) the phosphorus effluent limits for point sources, where applicable in chapter 7053;

(3) the requirements for feedlots in chapter 7020;

(4) the requirements for individual sewage treatment systems in chapter 7080;

(5) the requirements for control of storm water in chapter 7090;

(6) county shoreland ordinances; and

(7) implementation of mandatory and voluntary best management practices to minimize point and nonpoint sources of nutrients.

C. Lakes and reservoirs with a baseline quality that is poorer than the numeric eutrophication standards in subpart 2 must be considered to be in compliance with the standards if the baseline quality is the result of natural causes. The commissioner shall determine baseline quality and compliance with these standards using data and the procedures in part 7050.0150, subpart 5.

D. When applied to reservoirs, the eutrophication standards in this subpart and subpart 2 may be modified on a site-specific basis to account for characteristics unique to reservoirs that can affect trophic status, such as water temperature, variations in hydraulic residence time, watershed size, and the fact that reservoirs may receive drainage from more than one ecoregion. Information supporting a site-specific standard can be provided by the commissioner or by any person outside the agency. The commissioner shall evaluate all data in support of a modified standard and determine whether a change in the standard for a specific reservoir is justified. Any total phosphorus effluent limit determined to be necessary based on a modified standard shall only be required after the discharger has been given notice of the specific proposed effluent limits and an opportunity to request a hearing as provided in part 7000.1800.

E. Eutrophication standards applicable to lakes and reservoirs that lie on the border between two ecoregions or that are in the Red River Valley (also referred to as Lake Agassiz Plains), Northern Minnesota Wetlands, or Driftless Area Ecoregion must be applied on a case-by-case basis. The commissioner shall use the standards applicable to adjacent ecoregions as a guide.

Subp. 2b. **Narrative eutrophication standards for rivers and streams.**

A. Eutrophication standards for rivers and streams are compared to summer-average data or as specified in subpart 2. Exceedance of the total phosphorus levels and chlorophyll-a (seston), five-day biochemical oxygen demand (BOD_5), diel dissolved oxygen flux, or pH levels is required to indicate a polluted condition.

B. Rivers and streams that exceed the phosphorus levels but do not exceed the chlorophyll-a (seston), five-day biochemical oxygen demand (BOD_5), diel dissolved oxygen flux, or pH levels meet the eutrophication standard.

C. For chlorophyll-a (periphyton), the standard is exceeded if concentrations exceed 150 mg/m^2 more than one year in ten.

D. It is the policy of the agency to protect all rivers and streams from the undesirable effects of cultural eutrophication. Rivers and streams with a baseline quality better than the numeric eutrophication standards in subpart 3 must be maintained in that condition through the strict application of all relevant federal, state, and local requirements governing antidegradation, the discharge of nutrients from point and nonpoint sources, including:

(1) the antidegradation requirements in parts 7050.0250 to 7050.0335;

(2) the phosphorus effluent limits for point sources, where applicable, in chapter 7053;

(3) the requirements for feedlots in chapter 7020;

(4) the requirements for individual sewage treatment systems in chapter 7080;

(5) the requirements for control of storm water in chapter 7090;

(6) county shoreland ordinances; and

(7) implementation of mandatory and voluntary best management practices to minimize point and nonpoint sources of nutrients.

E. Rivers and streams with a baseline quality that does not meet the numeric eutrophication standards in part 7050.0150, subpart 5b, are in compliance with the standards if the baseline quality is the result of natural causes. The commissioner must determine baseline quality and compliance with these standards using data and the procedures in part 7050.0150, subpart 5.

Subp. 2c. **Beneficial use definitions for lotic cold water aquatic life and habitats (class 2A).**

A. Subitems (1) to (5) apply to the beneficial uses in items B and C:

(1) The designation and attainment of beneficial uses are based on the biological criteria in subpart 2d.

(2) The attributes of species composition, diversity, and functional organization are measured using:

(a) the fish IBI as defined in Fish Data Collection Protocols for Lotic Waters in Minnesota (2017); or

(b) the macroinvertebrate IBI as defined in Macroinvertebrate Data Collection Protocols for Lotic Waters in Minnesota (2017).

(3) Water body types for streams and rivers are defined in the documents referenced in subitem (2).

(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 website at www.pca.state.mn.us/regulations/minnesota-rulemaking;

(b) Fish Data Collection Protocols for Lotic Waters in Minnesota, Minnesota Pollution Control Agency (2017). The document is available on the agency's website at www.pca.state.mn.us/regulations/minnesota-rulemaking;

(c) Macroinvertebrate Data Collection Protocols for Lotic Waters in Minnesota, Minnesota Pollution Control Agency (2017). The document is available on the agency's website at www.pca.state.mn.us/regulations/minnesota-rulemaking; and

(d) Development of Biological Criteria for Tiered Aquatic Life Uses, Minnesota Pollution Control Agency (2016). The document is available on the agency's website at www.pca.state.mn.us/regulations/minnesota-rulemaking.

(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 parts 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 part 7050.0222. These subclass designators are applied to lotic waters only.

B. "Exceptional cold water aquatic life and habitat" or "class 2Ae" is a beneficial use that means waters capable of supporting and maintaining an exceptional and balanced, integrated, adaptive community of cold water aquatic organisms having a species composition, diversity, and functional organization comparable to the 75th percentile of biological condition gradient level 3 as established in Calibration of the Biological Condition Gradient for Streams of Minnesota, Gerritsen et al. (2012).

C. "General cold water aquatic life and habitat" or "class 2Ag" is a beneficial use that means waters capable of supporting and maintaining a balanced, integrated, adaptive community of cold water aquatic organisms having a species composition, diversity, and functional organization comparable to the median of biological condition gradient level 4 as established in Calibration of the Biological Condition Gradient for Streams of Minnesota, Gerritsen et al. (2012).

Subp. 2d. **Biological criteria for lotic cold water aquatic life and habitats (class 2A).**

Water Body Type	**Tier**	**Class**	**Assemblage**	**Biocriterion**
Southern cold water streams	Exceptional	2Ae	Fish	82
	General	2Ag	Fish	50
Northern cold water streams	Exceptional	2Ae	Fish	60
	General	2Ag	Fish	35
Northern cold water streams	Exceptional	2Ae	Macroinvertebrates	52
	General	2Ag	Macroinvertebrates	32
Southern cold water streams	Exceptional	2Ae	Macroinvertebrates	72
	General	2Ag	Macroinvertebrates	43

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 or macroinvertebrates.

Subp. 3. **Class 2Bd waters.** The quality of class 2Bd surface waters shall be such as to permit the propagation and maintenance of a healthy community of cool or warm water aquatic biota and their habitats according to the definitions in subpart 3c. These waters shall be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable. This class of surface waters is also protected as a source of drinking water. The applicable standards are given below. Abbreviations, acronyms, and symbols are explained in subpart 1.

Substance, Characteristic, or Pollutant (Class 2Bd)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**

Acenaphthene	µg/L	20	HH	56	112	Tox
Acetochlor	µg/L	3.6	Tox	86	173	Tox
Acrylonitrile (c)	µg/L	0.38	HH	1,140*	2,281*	Tox
Alachlor (c)	µg/L	4.2	HH	800*	1,600*	Tox
Aluminum, total	µg/L	125	Tox	1,072	2,145	Tox
Ammonia un-ionized as N	µg/L	40	Tox	--	--	NA

The percent un-ionized ammonia can be calculated for any temperature and pH by using the following equation taken from Emerson, K., R.C. Russo, R.E. Lund, and R.V. Thurston, Aqueous ammonia equilibrium calculations; effect of pH and temperature. Journal of the Fisheries Research Board of Canada 32: 2379-2383 (1975):

$$f = 1/(10^{(pka-pH)} + 1) \times 100$$

where: f = the percent of total ammonia in the un-ionized state

$pk_a = 0.09 + (2730/T)$ (dissociation constant for ammonia)

T = temperature in degrees Kelvin (273.16° Kelvin = 0° Celsius)

Substance, Characteristic, or Pollutant (Class 2Bd)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
Anthracene	µg/L	0.035	Tox	0.32	0.63	Tox
Antimony, total	µg/L	5.5	HH	90	180	Tox
Arsenic, total	µg/L	2.0	HH	360	720	Tox
Atrazine (c)	µg/L	3.4	HH	323	645	Tox
Benzene (c)	µg/L	6.0	HH	4,487*	8,974*	Tox
Bromoform	µg/L	41	HH	2,900	5,800	Tox
Cadmium, total	µg/L	equation	Tox	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations:

The CS in µg/L shall not exceed: exp.(0.7852[ln(total hardness mg/L)]-3.490)

The MS in µg/L shall not exceed: exp.(1.128[ln(total hardness mg/L)]-1.685)

The FAV in µg/L shall not exceed: exp.(1.128[ln(total hardness mg/L)]-0.9919)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total cadmium standards for five hardness values:

TH in mg/L	50	100	200	300	400
Cadmium, total					
CS µg/L	0.66	1.1	2.0	2.7	3.4
MS µg/L	15	33	73	116	160
FAV µg/L	31	67	146	231	319

Substance, Characteristic, or Pollutant (Class 2Bd)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
Carbon tetrachloride (c)	µg/L	1.9	HH	1,750*	3,500*	Tox
Chlordane (c)	ng/L	0.29	HH	1,200*	2,400*	Tox
Chloride	mg/L	230	Tox	860	1,720	Tox
Chlorine, total residual	µg/L	11	Tox	19	38	Tox

Chlorine standard applies to conditions of continuous exposure, where continuous exposure refers to chlorinated effluents that are discharged for more than a total of two hours in any 24-hour period.

Chlorobenzene (Monochlorobenzene)	µg/L	20	HH	423	846	Tox
Chloroform (c)	µg/L	53	HH	1,392	2,784	Tox
Chlorpyrifos	µg/L	0.041	Tox	0.083	0.17	Tox
Chromium +3, total	µg/L	equation	Tox	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations:

The CS in µg/L shall not exceed: exp.(0.819[ln(total hardness mg/L)]+1.561)

The MS in µg/L shall not exceed: exp.(0.819[ln(total hardness mg/L)]+3.688)

The FAV in µg/L shall not exceed: exp.(0.819[ln(total hardness mg/L)]+4.380)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total chromium +3 standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Chromium +3, total					
CS µg/L	117	207	365	509	644
MS µg/L	984	1,737	3,064	4,270	5,405
FAV µg/L	1,966	3,469	6,120	8,530	10,797

Substance, Characteristic, or Pollutant (Class 2Bd)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
Chromium +6, total	µg/L	11	Tox	16	32	Tox
Cobalt, total	µg/L	2.8	HH	436	872	Tox
Copper, total	µg/L	equation	Tox	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations:

The CS in µg/L shall not exceed: exp.(0.620[ln(total hardness mg/L)]-0.570)

The MS in µg/L shall not exceed: exp.(0.9422[ln(total hardness mg/L)]-1.464)

The FAV in µg/L shall not exceed: exp.(0.9422[ln(total hardness mg/L)]-0.7703)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total copper standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Copper, total					
CS µg/L	6.4	9.8	15	19	23
MS µg/L	9.2	18	34	50	65
FAV µg/L	18	35	68	100	131

Substance, Characteristic, or Pollutant (Class 2Bd)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
Cyanide, free	µg/L	5.2	Tox	22	45	Tox
DDT (c)	ng/L	1.7	HH	550*	1,100*	Tox
1,2-Dichloroethane (c)	µg/L	3.8	HH	45,050*	90,100*	Tox
Dieldrin (c)	ng/L	0.026	HH	1,300*	2,500*	Tox
Di-2-ethylhexyl phthalate (c)	µg/L	1.9	HH	--*	--*	NA
Di-n-octyl phthalate	µg/L	30	Tox	825	1,650	Tox
Endosulfan	µg/L	0.029	HH	0.28	0.56	Tox
Endrin	µg/L	0.016	HH	0.090	0.18	Tox
Escherichia (E.) coli	See below	See below	HH	See below	See below	NA

Not to exceed 126 organisms per 100 milliliters as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than ten percent of all samples taken during any calendar month individually exceed 1,260 organisms per 100 milliliters. The standard applies only between April 1 and October 31.

Ethylbenzene	µg/L	68	Tox	1,859	3,717	Tox

Substance, Characteristic, or Pollutant (Class 2Bd)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for**

						MS, FAV

Eutrophication standards for class 2Bd lakes, shallow lakes, and reservoirs.

Lakes, Shallow Lakes, and Reservoirs in Northern Lakes and Forest Ecoregion

Phosphorus, total	µg/L	30	NA	--	--	NA
Chlorophyll-a	µg/L	9	NA	--	--	NA
Secchi disk transparency	meters	Not less than 2.0	NA	--	--	NA

Lakes and Reservoirs in North Central Hardwood Forest Ecoregion

Phosphorus, total	µg/L	40	NA	--	--	NA
Chlorophyll-a	µg/L	14	NA	--	--	NA
Secchi disk transparency	meters	Not less than 1.4	NA	--	--	NA

Lakes and Reservoirs in Western Corn Belt Plains and Northern Glaciated Plains Ecoregions

Phosphorus, total	µg/L	65	NA	--	--	NA
Chlorophyll-a	µg/L	22	NA	--	--	NA
Secchi disk transparency	meters	Not less than 0.9	NA	--	--	NA

Shallow Lakes in North Central Hardwood Forest Ecoregion

Phosphorus, total	µg/L	60	NA	--	--	NA
Chlorophyll-a	µg/L	20	NA	--	--	NA
Secchi disk transparency	meters	Not less than 1.0	NA	--	--	NA

Shallow Lakes in Western Corn Belt Plains and Northern Glaciated Plains Ecoregions

Phosphorus, total	µg/L	90	NA	--	--	NA
Chlorophyll-a	µg/L	30	NA	--	--	NA
Secchi disk transparency	meters	Not less than 0.7	NA	--	--	NA

Additional narrative eutrophication standards for class 2Bd lakes, shallow lakes, and reservoirs are found under subpart 3a.

Eutrophication standards for class 2Bd rivers and streams.

North River Nutrient Region

Phosphorus, total	µg/L	less than or equal to 50
Chlorophyll-a (seston)	µg/L	less than or equal to 7
Diel dissolved oxygen flux	mg/L	less than or equal to 3.0
Biochemical oxygen demand (BOD_5)	mg/L	less than or equal to 1.5

Central River Nutrient Region

Phosphorus, total	µg/L	less than or equal to 100
Chlorophyll-a (seston)	µg/L	less than or equal to 18
Diel dissolved oxygen flux	mg/L	less than or equal to 3.5
Biochemical oxygen demand (BOD_5)	mg/L	less than or equal to 2.0

South River Nutrient Region

Phosphorus, total	µg/L	less than or equal to 150
Chlorophyll-a (seston)	µg/L	less than or equal to 35
Diel dissolved oxygen flux	mg/L	less than or equal to 4.5
Biochemical oxygen demand (BOD_5)	mg/L	less than or equal to 3.0

Additional narrative eutrophication standards for class 2Bd rivers and streams are found under subpart 3b.

Substance, Characteristic,	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for**

or Pollutant (Class 2Bd)						MS, FAV
Fluoranthene	µg/L	1.9	Tox	3.5	6.9	Tox
Heptachlor (c)	ng/L	0.39	HH	260*	520*	Tox
Heptachlor epoxide (c)	ng/L	0.48	HH	270*	530*	Tox
Hexachlorobenzene (c)	ng/L	0.24	HH	--*	--*	Tox
Lead, total	µg/L	equation	Tox	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations:

The CS in µg/L shall not exceed: exp.(1.273[ln(total hardness mg/L)]-4.705)

The MS in µg/L shall not exceed: exp.(1.273[ln(total hardness mg/L)]-1.460)

The FAV in µg/L shall not exceed: exp.(1.273[ln(total hardness mg/L)]-0.7643)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total lead standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Lead, total					
CS µg/L	1.3	3.2	7.7	13	19
MS µg/L	34	82	197	331	477
FAV µg/L	68	164	396	663	956

Substance, Characteristic, or Pollutant (Class 2Bd)	Units	CS	Basis for CS	MS	FAV	Basis for MS, FAV

Lindane (c) (Hexachlorocyclohexane, gamma-)	µg/L	0.032	HH	4.4*	8.8*	Tox
Mercury, total in water	ng/L	6.9	HH	2,400*	4,900*	Tox
Mercury, total in edible fish tissue	mg/kg ppm	0.2	HH	NA	NA	NA
Methylene chloride (c) (Dichloromethane)	µg/L	46	HH	13,875*	27,749*	Tox
Metolachlor	µg/L	23	Tox	271	543	Tox
Naphthalene	µg/L	81	Tox	409	818	Tox
Nickel, total	µg/L	equation	Tox/HH	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations:

The CS shall not exceed the human health-based standard of 297 µg/L. For waters with total hardness values less than 212 mg/L, the CS in µg/L is toxicity-based and shall not exceed: exp.(0.846[ln(total hardness mg/L)]+1.1645)

The MS in µg/L shall not exceed: exp.(0.846[ln(total hardness mg/L)]+3.3612)

The FAV in µg/L shall not exceed: exp.(0.846[ln(total hardness mg/L)]+4.0543)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total nickel standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Nickel, total					
CS µg/L	88	158	283	297	297
MS µg/L	789	1,418	2,549	3,592	4,582
FAV µg/L	1,578	2,836	5,098	7,185	9,164

Substance, Characteristic, or Pollutant (Class 2Bd)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for**

						MS, FAV
Oil	µg/L	500	NA	5,000	10,000	NA
Oxygen, dissolved	mg/L	See below	NA	--	--	NA

5.0 mg/L as a daily minimum. This dissolved oxygen standard may be modified on a site-specific basis according to part 7050.0220, subpart 7, except that no site-specific standard shall be less than 5 mg/L as a daily average and 4 mg/L as a daily minimum. Compliance with this standard is required 50 percent of the days at which the flow of the receiving water is equal to the $7Q_{10}$.

Parathion	µg/L	0.013	Tox	0.07	0.13	Tox
Pentachlorophenol	µg/L	1.9	HH	equation	equation	Tox

The MS and FAV vary with pH and are calculated using the following equations:

The MS in µg/L shall not exceed: exp.(1.005[pH]-4.830)

The FAV in µg/L shall not exceed: exp.(1.005[pH]-4.1373)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For pH values less than 6.0, 6.0 shall be used to calculate the standard and for pH values greater than 9.0, 9.0 shall be used to calculate the standard.

Example of pentachlorophenol standards for five pH values:

pH su	6.5	7.0	7.5	8.0	8.5
Pentachlorophenol					
CS µg/L	1.9	1.9	1.9	1.9	1.9
MS µg/L	5.5	9.1	15	25	41
FAV µg/L	11	18	30	50	82

Substance, Characteristic, or Pollutant (Class 2Bd)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for**

						MS, FAV
pH, minimum	su	6.5	NA	--	--	NA
pH, maximum	su	9.0	NA	--	--	NA
Phenanthrene	µg/L	3.6	Tox	32	64	Tox
Phenol	µg/L	123	Tox	2,214	4,428	Tox
Polychlorinated biphenyls, total (c)	ng/L	0.029	HH	1,000*	2,000*	Tox
Radioactive materials	NA	See below	NA	See below	See below	NA

Not to exceed the lowest concentrations permitted to be discharged to an uncontrolled environment as permitted by the appropriate authority having control over their use.

Selenium, total	µg/L	5.0	Tox	20	40	Tox
Silver, total	µg/L	1.0	Tox	equation	equation	Tox

The MS and FAV vary with total hardness and are calculated using the following equations:

The MS in µg/L shall not exceed: exp.(1.720[ln(total hardness mg/L)]-7.2156)

The FAV in µg/L shall not exceed: exp.(1.720[ln(total hardness mg/L)]-6.520)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total silver standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Silver, total					
CS µg/L	1.0	1.0	1.0	1.0	1.0
MS µg/L	1.0	2.0	6.7	13	22
FAV µg/L	1.2	4.1	13	27	44

Substance, Characteristic, or Pollutant (Class 2Bd)	Units	CS	Basis for CS	MS	FAV	Basis for MS, FAV
Temperature	°F	See below	NA	--	--	NA

5°F above natural in streams and 3°F above natural in lakes, based on monthly average of the maximum daily temperatures, except in no case shall it exceed the daily average temperature of 86°F.

Substance, Characteristic, or Pollutant (Class 2Bd)	Units	CS	Basis for CS	MS	FAV	Basis for MS, FAV
1,1,2,2-Tetrachloroethane (c)	µg/L	1.5	HH	1,127*	2,253*	Tox
Tetrachloroethylene (c)	µg/L	3.8	HH	428*	857*	Tox
Thallium, total	µg/L	0.28	HH	64	128	Tox
Toluene	µg/L	253	Tox	1,352	2,703	Tox
Toxaphene (c)	ng/L	1.3	HH	730*	1,500*	Tox
1,1,1-Trichloroethane	µg/L	329	Tox	2,957	5,913	Tox
1,1,2-Trichloroethylene (c)	µg/L	25	HH	6,988*	13,976*	Tox
2,4,6-Trichlorophenol	µg/L	2.0	HH	102	203	Tox
Total suspended solids (TSS)						
North River Nutrient Region	mg/L	15	NA	-	-	NA
Central River Nutrient Region	mg/L	30	NA	-	-	NA
South River Nutrient Region	mg/L	65	NA	-	-	NA
Red River mainstem - headwaters to border	mg/L	100	NA	-	-	NA
TSS standards for the class 2Bd North, Central, and South River Nutrient Regions and the Red River mainstem may be exceeded for no more than ten percent of the time. This standard applies April 1 through September 30						

Total suspended solids (TSS), summer average						
Lower Mississippi River mainstem - Pools 2 through 4	mg/L	32	NA	-	-	NA
Lower Mississippi River mainstem below Lake Pepin	mg/L	30	NA	-	-	NA
TSS standards for the class 2Bd Lower Mississippi River may be exceeded for no more than 50 percent of the time. This standard applies June 1 through September 30						

Substance, Characteristic, or Pollutant (Class 2Bd)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
Vinyl chloride (c)	µg/L	0.18	HH	--*	--*	NA
Xylene, total m,p,o	µg/L	166	Tox	1,407	2,814	Tox
Zinc, total	µg/L	equation	Tox	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations:

The CS in µg/L shall not exceed: exp.(0.8473[ln(total hardness mg/L)]+0.7615)

The MS in µg/L shall not exceed: exp.(0.8473[ln(total hardness mg/L)]+0.8604)

The FAV in µg/L shall not exceed: exp.(0.8473[ln(total hardness mg/L)]+1.5536)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total zinc standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Zinc, total					

CS µg/L	59	106	191	269	343
MS µg/L	65	117	211	297	379
FAV µg/L	130	234	421	594	758

Subp. 3a. **Narrative eutrophication standards for class 2Bd lakes, shallow lakes, and reservoirs.**

A. Eutrophication standards applicable to lakes, shallow lakes, and reservoirs that lie on the border between two ecoregions or that are in the Red River Valley (also referred to as Lake Agassiz Plains), Northern Minnesota Wetlands, or Driftless Area Ecoregion must be applied on a case-by-case basis. The commissioner shall use the standards applicable to adjacent ecoregions as a guide.

B. Eutrophication standards are compared to summer-average data. Exceedance of the total phosphorus and either the chlorophyll-a or Secchi disk transparency standard is required to indicate a polluted condition.

C. It is the policy of the agency to protect all lakes, shallow lakes, and reservoirs from the undesirable effects of cultural eutrophication. Lakes, shallow lakes, and reservoirs with a baseline quality better than the numeric eutrophication standards in subpart 3 must be maintained in that condition through the strict application of all relevant federal, state, and local requirements governing antidegradation, the discharge of nutrients from point and nonpoint sources, and the protection of lake, shallow lake, and reservoir resources, including, but not limited to:

(1) the antidegradation requirements in parts 7050.0250 to 7050.0335;

(2) the phosphorus effluent limits for point sources, where applicable in chapter 7053;

(3) the requirements for feedlots in chapter 7020;

(4) the requirements for individual sewage treatment systems in chapter 7080;

(5) the requirements for control of storm water in chapter 7090;

(6) county shoreland ordinances; and

(7) implementation of mandatory and voluntary best management practices to minimize point and nonpoint sources of nutrients.

D. Lakes, shallow lakes, and reservoirs with a baseline quality that is poorer than the numeric eutrophication standards in subpart 3 must be considered to be in compliance with the standards if the baseline quality is the result of natural causes. The commissioner shall determine baseline quality and compliance with these standards using data and the procedures in part 7050.0150, subpart 5.

E. When applied to reservoirs, the eutrophication standards in this subpart and subpart 3 may be modified on a site-specific basis to account for characteristics of reservoirs that can affect trophic status, such as water temperature, variations in hydraulic residence time, watershed size, and the fact that reservoirs may receive drainage from more than one ecoregion. Information supporting a site-specific standard can be provided by the commissioner or by any person outside the agency. The commissioner shall evaluate all data in support of a modified standard and determine whether a change in the standard for a specific reservoir is justified. Any total phosphorus effluent limit determined to be necessary based on a modified standard shall only be required after the discharger has been given notice of the specific proposed effluent limits and an opportunity to request a hearing as provided in part 7000.1800.

Subp. 3b. **Narrative eutrophication standards for rivers, streams, and navigational pools.**

A. Eutrophication standards for rivers, streams, and navigational pools are compared to summer-average data or as specified in subpart 3. Exceedance of the total phosphorus levels and chlorophyll-a (seston), five-day biochemical oxygen demand (BOD_5), diel dissolved oxygen flux, or pH levels is required to indicate a polluted condition.

B. Rivers, streams, and navigational pools that exceed the phosphorus levels but do not exceed the chlorophyll-a (seston), five-day biochemical oxygen demand (BOD_5), diel dissolved oxygen flux, or pH levels meet the eutrophication standard.

C. A polluted condition also exists when the chlorophyll-a (periphyton) concentration exceeds 150 mg/m^2 more than one year in ten.

D. It is the policy of the agency to protect all rivers, streams, and navigational pools from the undesirable effects of cultural eutrophication. Rivers, streams, and navigational pools with a baseline quality better than the numeric eutrophication standards in subpart 3 must be maintained in that condition through the strict application of all relevant federal, state, and local requirements governing antidegradation, the discharge of nutrients from point and nonpoint sources including:

(1) the antidegradation requirements in parts 7050.0250 to 7050.0335;

(2) the phosphorus effluent limits for point sources, where applicable, in chapter 7053;

(3) the requirements for feedlots in chapter 7020;

(4) the requirements for individual sewage treatment systems in chapter 7080;

(5) the requirements for control of storm water in chapter 7090;

(6) county shoreland ordinances; and

(7) implementation of mandatory and voluntary best management practices to minimize point and nonpoint sources of nutrients.

E. Rivers, streams, and navigational pools with a baseline quality that does not meet the numeric eutrophication standards in part 7050.0150, subpart 5b, are in compliance with the standards if the baseline quality is the result of natural causes. The commissioner must determine baseline quality and compliance with these standards using data and the procedures in part 7050.0150, subpart 5.

Subp. 3c. **Beneficial use definitions for lotic warm or cool water aquatic life and habitats (class 2Bd).**

A. Subitems (1) to (5) apply to the beneficial uses in items B to D:

(1) The designation and attainment of beneficial uses are based on the biological criteria in subpart 3d.

(2) The attributes of species composition, diversity, and functional organization are measured using:

(a) the fish IBI as defined in Fish Data Collection Protocols for Lotic Waters in Minnesota (2017); or

(b) the macroinvertebrate IBI as defined in Macroinvertebrate Data Collection Protocols for Lotic Waters in Minnesota (2017).

(3) Water body types for streams and rivers are defined in the documents referenced in subitem (2).

(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 website at www.pca.state.mn.us/regulations/minnesota-rulemaking;

(b) Fish Data Collection Protocols for Lotic Waters in Minnesota, Minnesota Pollution Control Agency (2017). The document is available on the agency's website at www.pca.state.mn.us/regulations/minnesota-rulemaking;

(c) Macroinvertebrate Data Collection Protocols for Lotic Waters in Minnesota, Minnesota Pollution Control Agency (2017). The document is available on the agency's website at www.pca.state.mn.us/regulations/minnesota-rulemaking; and

(d) Development of Biological Criteria for Tiered Aquatic Life Uses, Minnesota Pollution Control Agency (2016). The document is available on the agency's website at www.pca.state.mn.us/regulations/minnesota-rulemaking.

(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 parts 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 part 7050.0222. These subclass designators are applied to lotic waters only.

B. "Exceptional cool and warm water aquatic life and habitat, also protected as a source for drinking water" or "class 2Bde" is a beneficial use that means waters capable of supporting and maintaining an exceptional and balanced, integrated, adaptive community of warm or cool water aquatic organisms having a species composition, diversity, and functional organization comparable to the 75th percentile of biological condition gradient level 3 as established in Calibration of the Biological Condition Gradient for Streams of Minnesota, Gerritsen et al. (2012).

C. "General cool and warm water aquatic life and habitat, also protected as a source for drinking water" or "class 2Bdg" is a beneficial use that means waters capable of supporting and maintaining a balanced, integrated, adaptive community of warm or cool water aquatic organisms having a species composition, diversity, and functional organization comparable to the median of biological condition gradient level 4 as established in Calibration of the Biological Condition Gradient for Streams of Minnesota, Gerritsen et al. (2012).

D. "Modified cool and warm water aquatic life and habitat, also protected as a source for drinking water" or "class 2Bdm" is a beneficial use that means waters capable of supporting and maintaining a balanced, integrated, adaptive community of warm or cool water aquatic organisms having a species composition, diversity, and functional organization comparable to the median of biological condition gradient level 5 as established in Calibration of the Biological Condition Gradient for Streams of Minnesota, Gerritsen et al. (2012).

(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 the class 2Bdg beneficial use is not feasible because of human-induced modifications of the physical habitat. These modifications must be the result of direct alteration to the channel, such as drainageway maintenance, bank stabilization, and impoundments.

(2) Examples of class 2Bdm waters are the stream channel modification activities regulated under:

(a) sections 401 and 404 of the Clean Water Act; or

(b) Minnesota Statutes, chapter 103E.

Subp. 3d. **Biological criteria for lotic warm or cool water aquatic life and habitats (class 2Bd).**

Water Body Type	**Tier**	**Class**	**Assemblage**	**Biocriterion**
Southern rivers	Exceptional	2Bde	Fish	71
	General	2Bdg	Fish	49
Southern streams	Exceptional	2Bde	Fish	66
	General	2Bdg	Fish	50
	Modified	2Bdm	Fish	35
Southern headwaters	Exceptional	2Bde	Fish	74

	General	2Bdg	Fish	55
	Modified	2Bdm	Fish	33
Northern rivers	Exceptional	2Bde	Fish	67
	General	2Bdg	Fish	38
Northern streams	Exceptional	2Bde	Fish	61
	General	2Bdg	Fish	47
	Modified	2Bdm	Fish	35
Northern headwaters	Exceptional	2Bde	Fish	68
	General	2Bdg	Fish	42
	Modified	2Bdm	Fish	23
Low gradient	Exceptional	2Bde	Fish	70
	General	2Bdg	Fish	42
	Modified	2Bdm	Fish	15
Northern forest rivers	Exceptional	2Bde	Macroinvertebrates	77
	General	2Bdg	Macroinvertebrates	49
Prairie and southern forest rivers	Exceptional	2Bde	Macroinvertebrates	63
	General	2Bdg	Macroinvertebrates	31
High-gradient northern forest streams	Exceptional	2Bde	Macroinvertebrates	82
	General	2Bdg	Macroinvertebrates	53
Low-gradient northern forest streams	Exceptional	2Bde	Macroinvertebrates	76
	General	2Bdg	Macroinvertebrates	51
	Modified	2Bdm	Macroinvertebrates	37
High-gradient southern streams	Exceptional	2Bde	Macroinvertebrates	62
	General	2Bdg	Macroinvertebrates	37
	Modified	2Bdm	Macroinvertebrates	24

Low-gradient southern forest streams	Exceptional	2Bde	Macroinvertebrates	66
	General	2Bdg	Macroinvertebrates	43
	Modified	2Bdm	Macroinvertebrates	30
Low-gradient prairie streams	Exceptional	2Bde	Macroinvertebrates	69
	General	2Bdg	Macroinvertebrates	41
	Modified	2Bdm	Macroinvertebrates	22

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 or macroinvertebrates.

Subp. 4. **Class 2B waters.** The quality of class 2B surface waters shall be such as to permit the propagation and maintenance of a healthy community of cool or warm water aquatic biota, and their habitats according to the definitions in subpart 4c. These waters shall be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable. This class of surface water is not protected as a source of drinking water. The applicable standards are given below. Abbreviations, acronyms, and symbols are explained in subpart 1.

Substance, Characteristic, or Pollutant (Class 2B)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
Acenaphthene	µg/l	20	HH	56	112	Tox
Acetochlor	µg/L	3.6	Tox	86	173	Tox
Acrylonitrile (c)	µg/l	0.89	HH	1,140*	2,281*	Tox
Alachlor (c)	µg/L	59	Tox	800	1,600	Tox
Aluminum, total	µg/L	125	Tox	1,072	2,145	Tox
Ammonia un-ionized as N	µg/L	40	Tox	--	--	NA

The percent un-ionized ammonia can be calculated for any temperature and pH by using the following equation taken from Emerson, K., R.C. Russo, R.E. Lund, and R.V. Thurston, Aqueous ammonia equilibrium calculations; effect of pH and temperature. Journal of the Fisheries Research Board of Canada 32: 2379-2383 (1975):

$$f = 1/(10^{(pka-pH)} + 1) \times 100$$

where: f = the percent of total ammonia in the un-ionized state

$pk_a = 0.09 + (2730/T)$ (dissociation constant for ammonia)

T = temperature in degrees Kelvin (273.16° Kelvin = 0° Celsius)

Substance, Characteristic, or Pollutant (Class 2B)	Units	CS	Basis for CS	MS	FAV	Basis for MS, FAV
Anthracene	µg/L	0.035	Tox	0.32	0.63	Tox
Antimony, total	µg/L	31	Tox	90	180	Tox
Arsenic, total	µg/L	53	HH	360	720	Tox
Atrazine (c)	µg/L	10	Tox	323	645	Tox
Benzene (c)	µg/L	98	HH	4,487	8,974	Tox
Bromoform	µg/L	466	HH	2,900	5,800	Tox
Cadmium, total	µg/L	equation	Tox	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations:

The CS in µg/L shall not exceed: exp.(0.7852[ln(total hardness mg/L)]-3.490)

The MS in µg/L shall not exceed: exp.(1.128[ln(total hardness mg/L)]-1.685)

The FAV in µg/L shall not exceed: exp.(1.128[ln(total hardness mg/L)]-0.9919)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total cadmium standards for five hardness values:

TH in mg/L	50	100	200	300	400
Cadmium, total					
CS µg/L	0.66	1.1	2.0	2.7	3.4
MS µg/L	15	33	73	116	160
FAV µg/L	31	67	146	231	319

Substance, Characteristic, or Pollutant (Class 2B)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
Carbon tetrachloride (c)	µg/L	5.9	HH	1,750*	3,500*	Tox
Chlordane (c)	ng/L	0.29	HH	1,200*	2,400*	Tox
Chloride	mg/L	230	Tox	860	1,720	Tox
Chlorine, total residual	µg/L	11	Tox	19	38	Tox

Chlorine standard applies to conditions of continuous exposure, where continuous exposure refers to chlorinated effluents that are discharged for more than a total of two hours in any 24-hour period.

Chlorobenzene (Monochlorobenzene)	µg/L	20	HH	423	846	Tox
Chloroform (c)	µg/L	155	Tox	1,392	2,784	Tox
Chlorpyrifos	µg/L	0.041	Tox	0.083	0.17	Tox
Chromium +3, total	µg/L	equation	Tox	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations

The CS in µg/L shall not exceed: exp.(0.819[ln(total hardness mg/L)]+1.561)

The MS in µg/L shall not exceed: exp.(0.819[ln(total hardness mg/L)]+3.688)

The FAV in µg/L shall not exceed: exp.(0.819[ln(total hardness mg/L)]+4.380)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total chromium +3 standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Chromium +3, total					
CS µg/L	117	207	365	509	644

MS µg/L	984	1,737	3,064	4,270	5,405
FAV µg/L	1,966	3,469	6,120	8,530	10,797

Substance, Characteristic, or Pollutant (Class 2B)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
Chromium +6, total	µg/L	11	Tox	16	32	Tox
Cobalt, total	µg/L	5.0	Tox	436	872	Tox
Copper, total	µg/L	equation	Tox	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations:

The CS in µg/L shall not exceed: exp.(0.6200[ln(total hardness mg/L)]-0.570)

The MS in µg/L shall not exceed: exp.(0.9422[ln(total hardness mg/L)]-1.464)

The FAV in µg/L shall not exceed: exp.(0.9422[ln(total hardness mg/L)]-0.7703)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total copper standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Copper, total					
CS µg/L	6.4	9.8	15	19	23
MS µg/L	9.2	18	34	50	65
FAV µg/L	18	35	68	100	131

Substance, Characteristic, or Pollutant (Class 2B)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**

Cyanide, free	µg/L	5.2	Tox	22	45	Tox
DDT (c)	ng/L	1.7	HH	550*	1,100*	Tox
1,2-Dichloroethane (c)	µg/L	190	HH	45,050*	90,100*	Tox
Dieldrin (c)	ng/L	0.026	HH	1,300*	2,500*	Tox
Di-2-ethylhexyl phthalate (c)	µg/L	2.1	HH	--*	--*	NA
Di-n-octyl phthalate	µg/L	30	Tox	825	1,650	Tox
Endosulfan	µg/L	0.031	HH	0.28	0.56	Tox
Endrin	µg/L	0.016	HH	0.090	0.18	Tox
Escherichia (E.) coli	See below	See below	HH	See below	See below	NA

Not to exceed 126 organisms per 100 milliliters as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than ten percent of all samples taken during any calendar month individually exceed 1,260 organisms per 100 milliliters. The standard applies only between April 1 and October 31.

Ethylbenzene	µg/L	68	Tox	1,859	3,717	Tox

Substance, Characteristic, or Pollutant (Class 2B)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**

Eutrophication standards for class 2B lakes, shallow lakes, and reservoirs.

Lakes, Shallow Lakes, and Reservoirs in Northern Lakes and Forest Ecoregions

Phosphorus, total	µg/L	30	NA	--	--	NA
Chlorophyll-a	µg/L	9	NA	--	--	NA
Secchi disk transparency	meters	Not less than 2.0	NA	--	--	NA

Lakes and Reservoirs in North Central Hardwood Forest Ecoregion

Phosphorus, total	µg/L	40	NA	--	--	NA
Chlorophyll-a	µg/L	14	NA	--	--	NA
Secchi disk transparency	meters	Not less than 1.4	NA	--	--	NA

Lakes and Reservoirs in Western Corn Belt Plains and Northern Glaciated Plains Ecoregions

Phosphorus, total	µg/L	65	NA	--	--	NA
Chlorophyll-a	µg/L	22	NA	--	--	NA
Secchi disk transparency	meters	Not less than 0.9	NA	--	--	NA

Shallow Lakes in North Central Hardwood Forest Ecoregion

Phosphorus, total	µg/L	60	NA	--	--	NA
Chlorophyll-a	µg/L	20	NA	--	--	NA
Secchi disk transparency	meters	Not less than 1.0	NA	--	--	NA

Shallow Lakes in Western Corn Belt Plains and Northern Glaciated Plains Ecoregions

Phosphorus, total	µg/L	90	NA	--	--	NA
Chlorophyll-a	µg/L	30	NA	--	--	NA
Secchi disk transparency	meters	Not less than 0.7	NA	--	--	NA

Additional narrative eutrophication standards for class 2B lakes, shallow lakes, and reservoirs are found in subpart 4a.

Substance, Characteristic, or Pollutant (Class 2B)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**

Eutrophication standards for class 2B rivers and streams.

North River Nutrient Region

Phosphorus, total	µg/L	less than or equal to 50
Chlorophyll-a (seston)	µg/L	less than or equal to 7
Diel dissolved oxygen flux	mg/L	less than or equal to 3.0
Biochemical oxygen demand (BOD_5)	mg/L	less than or equal to 1.5

Central River Nutrient Region

Phosphorus, total	µg/L	less than or equal to 100
Chlorophyll-a (seston)	µg/L	less than or equal to 18
Diel dissolved oxygen flux	mg/L	less than or equal to 3.5
Biochemical oxygen demand (BOD_5)	mg/L	less than or equal to 2.0

South River Nutrient Region

Phosphorus, total	µg/L	less than or equal to 150
Chlorophyll-a (seston)	µg/L	less than or equal to 40
Diel dissolved oxygen flux	mg/L	less than or equal to 5.0
Biochemical oxygen demand (BOD_5)	mg/L	less than or equal to 3.5

Site-specific standards for specified river reaches or other waters are:

Mississippi River Navigational Pool 1 (river miles 854.1 to 847.7 reach from Fridley to Ford Dam in St. Paul)

Phosphorus, total	µg/L	less than or equal to 100
Chlorophyll-a (seston)	µg/L	less than or equal to 35

Mississippi River Navigational Pool 2 (river miles 847.7 to 815.2 reach from Ford Dam to Hastings Dam)

Phosphorus, total	µg/L	less than or equal to 125
Chlorophyll-a (seston)	µg/L	less than or equal to 35

Mississippi River Navigational Pool 3 (river miles 815.2 to 796.9 reach from Hastings Dam to Red Wing Dam)

Phosphorus, total	µg/L	less than or equal to 100
Chlorophyll-a (seston)	µg/L	less than or equal to 35

Mississippi River Navigational Pool 4 (river miles 796.9 to 752.8 reach from Red Wing Dam to Alma Dam). Lake Pepin occupies majority of Pool 4 and Lake Pepin site-specific standards are used for this pool.

Mississippi River Navigational Pools 5 to 8 (river miles 752.8 to 679.1 Alma Dam to Genoa Dam)

Phosphorus, total	µg/L	less than or equal to 100
Chlorophyll-a (seston)	µg/L	less than or equal to 35

Lake Pepin

Phosphorus, total	µg/L	less than or equal to 100
Chlorophyll-a (seston)	µg/L	less than or equal to 28

Crow Wing River from confluence of Long Prairie River to the mouth of the Crow Wing River at the Mississippi River

Phosphorus, total	µg/L	less than or equal to 75
Chlorophyll-a (seston)	µg/L	less than or equal to 13
Diel dissolved oxygen flux	mg/L	less than or equal to 3.5
Biochemical oxygen demand (BOD_5)	mg/L	less than or equal to 1.7

Crow River from the confluence of the North Fork of the Crow River and South Fork of the Crow River to the mouth of the Crow River at the Mississippi River

Phosphorus, total	µg/L	less than or equal to 125
Chlorophyll-a (seston)	µg/L	less than or equal to 27
Diel dissolved oxygen flux	mg/L	less than or equal to 4.0
Biochemical oxygen demand (BOD_5)	mg/L	less than or equal to 2.5

Additional narrative eutrophication standards for class 2B rivers and streams are found in subpart 4b.

Substance, Characteristic, or Pollutant (Class 2B)	Units	CS	Basis for CS	MS	FAV	Basis for MS, FAV
Fluoranthene	µg/L	1.9	Tox	3.5	6.9	Tox
Heptachlor (c)	ng/L	0.39	HH	260*	520*	Tox
Heptachlor epoxide (c)	ng/L	0.48	HH	270*	530*	Tox
Hexachlorobenzene (c)	ng/L	0.24	HH	--*	--*	Tox
Lead, total	µg/L	equation	Tox	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations:

The CS in µg/L shall not exceed: exp.(1.273[ln(total hardness mg/L)]-4.705)

The MS in µg/L shall not exceed: exp.(1.273[ln(total hardness mg/L)]-1.460)

The FAV in µg/L shall not exceed: exp.(1.273[ln(total hardness mg/L)]-0.7643)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total lead standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Lead, total					
CS µg/L	1.3	3.2	7.7	13	19
MS µg/L	34	82	197	331	477
FAV µg/L	68	164	396	663	956

Substance, Characteristic, or Pollutant (Class 2B)	Units	CS	Basis for CS	MS	FAV	Basis for MS, FAV

Lindane (c) (Hexachlorocyclobenzene, gamma-)	µg/L	0.036	HH	4.4*	8.8*	Tox
Mercury, total in water	ng/L	6.9	HH	2,400*	4,900*	Tox
Mercury, total in edible fish tissue	mg/kg ppm	0.2	HH	NA	NA	NA
Methylene chloride (c) (Dichloromethane)	µg/L	1,940	HH	13,875	27,749	Tox
Metolachlor	µg/L	23	Tox	271	543	Tox
Naphthalene	µg/L	81	Tox	409	818	Tox
Nickel, total	µg/L	equation	Tox	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations:

The CS in µg/L shall not exceed: exp.(0.846[ln(total hardness mg/L)]+1.1645)

The MS in µg/L shall not exceed: exp.(0.846[ln(total hardness mg/L)]+3.3612)

The FAV in µg/L shall not exceed: exp.(0.846[ln(total hardness mg/l)]+4.0543)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total nickel standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Nickel, total					
CS µg/L	88	158	283	399	509
MS µg/L	789	1,418	2,549	3,592	4,582
FAV µg/L	1,578	2,836	5,098	7,185	9,164

Substance, Characteristic, or Pollutant (Class 2B)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**

Oil	µg/l	500	NA	5,000	10,000	NA
Oxygen, dissolved	mg/L	See below	NA	--	--	NA

5.0 mg/L as a daily minimum. This dissolved oxygen standard may be modified on a site-specific basis according to part 7050.0220, subpart 7, except that no site-specific standard shall be less than 5 mg/L as a daily average and 4 mg/L as a daily minimum. Compliance with this standard is required 50 percent of the days at which the flow of the receiving water is equal to the $7Q_{10}$. This standard applies to all class 2B waters except for:

(1) those portions of the Mississippi River from the outlet of the Metro Wastewater Treatment Works in Saint Paul (River Mile 835) to Lock and Dam No. 2 at Hastings (River Mile 815). For this reach of the Mississippi River, the standard is not less than 5 mg/L as a daily average from April 1 through November 30, and not less than 4 mg/L at other times; and

(2) the portion of the Minnesota River from the outlet of the Blue Lake wastewater treatment works (River Mile 21) to the mouth at Fort Snelling. For the specified reach of the Minnesota River, the standard is not less than 5 mg/L as a daily average year round.

Parathion	µg/L	0.013	Tox	0.07	0.13	Tox
Pentachlorophenol	µg/L	equation	Tox/HH	equation	equation	Tox

The CS, MS, and FAV vary with pH and are calculated using the following equations:

For waters with pH values greater than 6.95, the CS shall not exceed the human health-based standard of 5.5 µg/L.

For waters with pH values less than 6.96, the CS in µg/L shall not exceed the toxicity-based standard of exp.(1.005[pH]-5.290)

The MS in µg/L shall not exceed: exp.(1.005[pH]-4.830)

The FAV in µg/L shall not exceed: exp.(1.005[pH]-4.1373)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For pH values less than 6.0, 6.0 shall be used to calculate the standard and for pH values greater than 9.0, 9.0 shall be used to calculate the standard.

Example of pentachlorophenol standards for five pH values:

pH su	6.5	7.0	7.5	8.0	8.5
Pentachlorophenol					
CS µg/L	3.5	5.5	5.5	5.5	5.5

MS µg/L	5.5	9.1	15	25	41
FAV µg/L	11	18	30	50	82

Substance, Characteristic, or Pollutant (Class 2B)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
pH, minimum	su	6.5	NA	--	--	NA
pH, maximum	su	9.0	NA	--	--	NA
Phenanthrene	µg/L	3.6	Tox	32	64	Tox
Phenol	µg/L	123	Tox	2,214	4,428	Tox
Polychlorinated biphenyls, total (c)	ng/L	0.029	HH	1,000*	2,000*	Tox
Radioactive materials	NA	See below	NA	See below	See below	NA

Not to exceed the lowest concentrations permitted to be discharged to an uncontrolled environment as permitted by the appropriate authority having control over their use.

Selenium, total	µg/L	5.0	Tox	20	40	Tox
Silver, total	µg/L	1.0	Tox	equation	equation	Tox

The MS and FAV vary with total hardness and are calculated using the following equations:

The MS in µg/L shall not exceed: exp.(1.720[ln(total hardness mg/L)]-7.2156)

The FAV in µg/L shall not exceed: exp.(1.720[ln(total hardness mg/L)]-6.520

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total silver standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Silver, total					

CS µg/L	1.0	1.0	1.0	1.0	1.0
MS µg/L	1.0	2.0	6.7	13	22
FAV µg/L	1.2	4.1	13	27	44

Substance, Characteristic, or Pollutant (Class 2B)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
Temperature	°F	See below	NA	--	--	NA

5°F above natural in streams and 3°F above natural in lakes, based on monthly average of the maximum daily temperatures, except in no case shall it exceed the daily average temperature of 86°F.

1,1,2,2-Tetrachloroethane (c)	µg/L	13	HH	1,127	2,253	Tox
Tetrachloroethylene (c)	µg/L	8.9	HH	428	857	Tox
Thallium, total	µg/L	0.56	HH	64	128	Tox
Toluene	µg/L	253	Tox	1,352	2,703	Tox
Toxaphene (c)	ng/L	1.3	HH	730*	1,500*	Tox
1,1,1-Trichloroethane	µg/L	329	Tox	2,957	5,913	Tox
1,1,2-Trichloroethylene (c)	µg/L	120	HH	6,988	13,976	Tox
2,4,6-Trichlorophenol	µg/L	2.0	HH	102	203	Tox
Total suspended solids (TSS)						
North River Nutrient Region	mg/L	15	NA	--	--	NA
Central River Nutrient Region	mg/L	30	NA	--	--	NA
South River Nutrient Region	mg/L	65	NA	--	--	NA
Red River mainstem - headwaters to border	mg/L	100	NA	--	--	NA

TSS standards for the class 2B North, Central, and South River

Nutrient Regions and the Red River mainstem may be exceeded for no more than ten percent of the time. This standard applies April 1 through September 30						
Total suspended solids (TSS), summer average						
Lower Mississippi River mainstem - Pools 2 through 4	mg/L	32	NA	--	--	NA
Lower Mississippi River mainstem below Lake Pepin	mg/L	30	NA	--	--	NA
TSS standards for the class 2B Lower Mississippi River may be exceeded for no more than 50 percent of the time. This standard applies June 1 through September 30						

Substance, Characteristic, or Pollutant (Class 2B)	**Units**	**CS**	**Basis for CS**	**MS**	**FAV**	**Basis for MS, FAV**
Vinyl chloride (c)	μg/L	9.2	HH	--*	--*	NA
Xylene, total m,p,o	μg/L	166	Tox	1,407	2,814	Tox
Zinc, total	μg/L	equation	Tox	equation	equation	Tox

The CS, MS, and FAV vary with total hardness and are calculated using the following equations:

The CS in μg/L shall not exceed: exp.(0.8473[ln(total hardness mg/L)]+0.7615)

The MS in μg/L shall not exceed: exp.(0.8473[ln(total hardness mg/L)]+0.8604)

The FAV in μg/L shall not exceed: exp.(0.8473[ln(total hardness mg/L)]+1.5536)

Where: exp. is the natural antilogarithm (base e) of the expression in parenthesis.

For hardness values greater than 400 mg/L, 400 mg/L shall be used to calculate the standard.

Example of total zinc standards for five total hardness values:

TH in mg/L	50	100	200	300	400
Zinc, total					
CS µg/L	59	106	191	269	343
MS µg/L	65	117	211	297	379
FAV µg/L	130	234	421	594	758

Subp. 4a. **Narrative eutrophication standards for class 2B lakes, shallow lakes, and reservoirs.**

A. Eutrophication standards applicable to lakes, shallow lakes, and reservoirs that lie on the border between two ecoregions or that are in the Red River Valley (also referred to as Lake Agassiz Plains), Northern Minnesota Wetlands, or Driftless Area Ecoregion must be applied on a case-by-case basis. The commissioner shall use the standards applicable to adjacent ecoregions as a guide.

B. Eutrophication standards are compared to summer-average data. Exceedance of the total phosphorus and either the chlorophyll-a or Secchi disk transparency standard is required to indicate a polluted condition.

C. It is the policy of the agency to protect all lakes, shallow lakes, and reservoirs from the undesirable effects of cultural eutrophication. Lakes, shallow lakes, and reservoirs with a baseline quality better than the numeric eutrophication standards in subpart 4 must be maintained in that condition through the strict application of all relevant federal, state, and local requirements governing antidegradation, the discharge of nutrients from point and nonpoint sources, and the protection of lake, shallow lake, and reservoir resources, including, but not limited to:

(1) the antidegradation requirements in parts 7050.0250 to 7050.0335;

(2) the phosphorus effluent limits for point sources, where applicable in chapter 7053;

(3) the requirements for feedlots in chapter 7020;

(4) the requirements for individual sewage treatment systems in chapter 7080;

(5) the requirements for control of storm water in chapter 7090;

(6) county shoreland ordinances; and

(7) implementation of mandatory and voluntary best management practices to minimize point and nonpoint sources of nutrients.

D. Lakes, shallow lakes, and reservoirs with a baseline quality that is poorer than the numeric eutrophication standards in subpart 4 must be considered to be in compliance with the standards if the baseline quality is the result of natural causes. The commissioner shall determine baseline quality and compliance with these standards using data and the procedures in part 7050.0150, subpart 5.

E. When applied to reservoirs, the eutrophication standards in this subpart and subpart 4 may be modified on a site-specific basis to account for characteristics of reservoirs that can affect trophic status, such as water temperature, variations in hydraulic residence time, watershed size, and the fact that reservoirs may receive drainage from more than one ecoregion. Information supporting a site-specific standard can be provided by the commissioner or by any person outside the agency. The commissioner shall evaluate all data in support of a modified standard and determine whether a change in the standard for a specific reservoir is justified. Any total phosphorus effluent limit determined to be necessary based on a modified standard shall only be required after the discharger has been given notice of the specific proposed effluent limits and an opportunity to request a hearing as provided in part 7000.1800.

Subp. 4b. **Narrative eutrophication standards for class 2B rivers and streams.**

A. Eutrophication standards for rivers and streams are compared to summer-average data or as specified in subpart 4. Exceedance of the total phosphorus levels and chlorophyll-a (seston), five-day biochemical oxygen demand (BOD_5), diel dissolved oxygen flux, or pH levels is required to indicate a polluted condition.

B. Rivers and streams that exceed the phosphorus levels but do not exceed the chlorophyll-a (seston), five-day biochemical oxygen demand (BOD_5), diel dissolved oxygen flux, or pH levels meet the eutrophication standard.

C. A polluted condition also exists when the chlorophyll-a (periphyton) concentration exceeds 150 mg/m^2 more than one year in ten

D. It is the policy of the agency to protect all rivers, streams, and navigational pools from the undesirable effects of cultural eutrophication. Rivers, streams, and navigational pools with a baseline quality better than the numeric eutrophication standards in subpart 4 must be maintained in that condition through the strict application of all relevant federal, state, and local requirements governing antidegradation, the discharge of nutrients from point and nonpoint sources, including:

(1) the antidegradation requirements in parts 7050.0250 to 7050.0335;

(2) the phosphorus effluent limits for point sources, where applicable in chapter 7053;

(3) the requirements for feedlots in chapter 7020;

(4) the requirements for individual sewage treatment systems in chapter 7080;

(5) the requirements for control of storm water in chapter 7090;

(6) county shoreland ordinances; and

(7) implementation of mandatory and voluntary best management practices to minimize point and nonpoint sources of nutrients.

E. Rivers, streams, and navigational pools with a baseline quality that does not meet the numeric eutrophication standards in subpart 4 are in compliance with the standards if the baseline quality is the result of natural causes. The commissioner must determine baseline quality and compliance with these standards using data and the procedures in part 7050.0150, subpart 5.

Subp. 4c. **Beneficial use definitions for lotic warm or cool water aquatic life and habitats (class 2B).**

A. Subitems (1) to (5) apply to the beneficial uses in items B to D:

(1) The designation and attainment of beneficial uses are based on the criteria in subpart 4d.

(2) The attributes of species composition, diversity, and functional organization are measured using:

(a) the fish IBI as defined in Fish Data Collection Protocols for Lotic Waters in Minnesota (2017); or

(b) the macroinvertebrate IBI as defined in Macroinvertebrate Data Collection Protocols for Lotic Waters in Minnesota (2017).

(3) Water body types for streams and rivers are defined in the documents referenced in subitem (2).

(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 website at www.pca.state.mn.us/regulations/minnesota-rulemaking;

(b) Fish Data Collection Protocols for Lotic Waters in Minnesota, Minnesota Pollution Control Agency (2017). The document is available on the agency's website at www.pca.state.mn.us/regulations/minnesota-rulemaking;

(c) Macroinvertebrate Data Collection Protocols for Lotic Waters in Minnesota, Minnesota Pollution Control Agency (2017). The document is available on the agency's website at www.pca.state.mn.us/regulations/minnesota-rulemaking; and

(d) Development of Biological Criteria for Tiered Aquatic Life Uses, Minnesota Pollution Control Agency (2016). The document is available on the agency's website at www.pca.state.mn.us/regulations/minnesota-rulemaking.

(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 parts 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 part 7050.0222. These subclass designators are applied to lotic waters only.

B. "Exceptional cool and warm water aquatic life and habitat" or "class 2Be" is a beneficial use that means waters capable of supporting and maintaining an exceptional and balanced, integrated, adaptive community of warm or cool water aquatic organisms having a species composition, diversity, and functional organization comparable to the 75th percentile of biological condition gradient level 3 as established in Calibration of the Biological Condition Gradient for Streams of Minnesota, Gerritsen et al. (2012).

C. "General cool and warm water aquatic life and habitat" or "class 2Bg" is a beneficial use that means waters capable of supporting and maintaining a balanced, integrated, adaptive community of warm or cool water aquatic organisms having a species composition, diversity, and functional organization comparable to the median of biological condition gradient level 4 as established in Calibration of the Biological Condition Gradient for Streams of Minnesota, Gerritsen et al. (2012).

D. "Modified cool and warm water aquatic life and habitat" or "class 2Bm" is a beneficial use that means waters capable of supporting and maintaining a balanced, integrated, adaptive community of warm or cool water aquatic organisms having a species composition, diversity, and functional organization comparable to the median of biological condition gradient level 5 as established in Calibration of the Biological Condition Gradient for Streams of Minnesota, Gerritsen et al. (2012).

(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 the class 2Bg beneficial use is not feasible because of human-induced modifications of the physical habitat. These modifications must be the result of direct alteration to the channel, such as drainageway maintenance, bank stabilization, and impoundments.

(2) Examples of class 2Bm waters are the stream channel modification activities regulated under:

(a) sections 401 and 404 of the Clean Water Act; or

(b) Minnesota Statutes, chapter 103E.

Subp. 4d. **Biological criteria for lotic warm or cool water aquatic life and habitats (class 2B).**

Water Body Type	Tier	Class	Assemblage	Biocriterion
Southern rivers	Exceptional	2Be	Fish	71
	General	2Bg	Fish	49
Southern streams	Exceptional	2Be	Fish	66

	General	2Bg	Fish	50
	Modified	2Bm	Fish	35
Southern headwaters	Exceptional	2Be	Fish	74
	General	2Bg	Fish	55
	Modified	2Bm	Fish	33
Northern rivers	Exceptional	2Be	Fish	67
	General	2Bg	Fish	38
Northern streams	Exceptional	2Be	Fish	61
	General	2Bg	Fish	47
	Modified	2Bm	Fish	35
Northern headwaters	Exceptional	2Be	Fish	68
	General	2Bg	Fish	42
	Modified	2Bm	Fish	23
Low gradient	Exceptional	2Be	Fish	70
	General	2Bg	Fish	42
	Modified	2Bm	Fish	15
Northern forest rivers	Exceptional	2Be	Macroinvertebrates	77
	General	2Bg	Macroinvertebrates	49
Prairie and southern forest rivers	Exceptional	2Be	Macroinvertebrates	63
	General	2Bg	Macroinvertebrates	31
High-gradient northern forest streams	Exceptional	2Be	Macroinvertebrates	82
	General	2Bg	Macroinvertebrates	53
Low-gradient northern forest streams	Exceptional	2Be	Macroinvertebrates	76
	General	2Bg	Macroinvertebrates	51
	Modified	2Bm	Macroinvertebrates	37

High-gradient southern streams	Exceptional	2Be	Macroinvertebrates	62
	General	2Bg	Macroinvertebrates	37
	Modified	2Bm	Macroinvertebrates	24
Low-gradient southern forest streams	Exceptional	2Be	Macroinvertebrates	66
	General	2Bg	Macroinvertebrates	43
	Modified	2Bm	Macroinvertebrates	30
Low-gradient prairie streams	Exceptional	2Be	Macroinvertebrates	69
	General	2Bg	Macroinvertebrates	41
	Modified	2Bm	Macroinvertebrates	22

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 or macroinvertebrates.

Subp. 5. [Repealed, 42 SR 441]

Subp. 6. **Class 2D waters; wetlands.**

A. The quality of class 2D wetlands shall be such as to permit the propagation and maintenance of a healthy community of aquatic and terrestrial species indigenous to wetlands, and their habitats. Wetlands also add to the biological diversity of the landscape. These waters shall be suitable for boating and other forms of aquatic recreation for which the wetland may be usable. The standards for class 2B waters listed under subpart 4 shall apply to these waters except as listed below:

Substance, Characteristic, or Pollutant	Class 2D Standard
Oxygen, dissolved	If background is less than 5.0 mg/L as a daily minimum, maintain background
pH	Maintain background
Temperature	Maintain background

B. "Maintain background," as used in this subpart, means the concentration of the water quality substances, characteristics, or pollutants shall not deviate from the range of natural background concentrations or conditions such that there is a potential significant adverse impact to the designated uses.

C. 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 the standards in this subpart and the wetland standards in parts 7050.0224, subpart 4; 7050.0225, subpart 2; and 7050.0227. All other activities in these wetlands must meet water quality standards.

Subp. 7. **Additional standards; class 2 waters.** The following additional standards and requirements apply to all class 2 waters.

A. No sewage, industrial waste, or other wastes from point or nonpoint sources shall be discharged into any of the waters of this category so as to cause any material change in any other substances, characteristics, or pollutants which may impair the quality of the waters of the state or the aquatic biota of any of the classes in subparts 2 to 6 or in any manner render them unsuitable or objectionable for fishing, fish culture, or recreational uses. Additional selective limits or changes in the discharge bases may be imposed on the basis of local needs.

B. To prevent acutely toxic conditions, concentrations of toxic pollutants from point or nonpoint sources must not exceed the FAV as a one-day average at the point of discharge or in the surface water consistent with parts 7050.0210, subpart 5, item D; 7053.0215, subpart 1; 7053.0225, subpart 6; and 7053.0245, subpart 1.

If a discharge is composed of a mixture of more than one chemical, and the chemicals have the same mode of toxic action, the commissioner has the option to apply an additive model to determine the toxicity of the mixture using the following equation:

$$\frac{C_1}{FAV_1} + \frac{C_2}{FAV_2} + \ldots\ldots + \frac{C_n}{FAV_n}$$ equals a value of one or more, an acutely toxic condition if indicated

where: C_1 .... C_n is the concentration of the first to the n^{th} toxicant.

FAV_1 .... FAV_n is the FAV for the first to the n^{th} toxicant.

C. To prevent chronically toxic conditions, concentrations of toxic pollutants must not exceed the applicable CS or CC and MS or MC in surface waters outside allowable mixing zones as described in part 7050.0210, subpart 5. The CS or CC and MS or MC will be averaged over the following durations: the MS or MC will be a one-day average; the CS or CC, based on toxicity to aquatic life, will be a four-day average; and the CS or CC, based on human health and applied in water or wildlife toxicity, will be a 30-day average.

D. Concentrations of noncarcinogenic or nonlinear carcinogenic (NLC) chemicals in water or fish tissue from point or nonpoint sources, singly or in mixtures, must be below levels expected to produce known adverse effects. This is accomplished through the application of an additive noncancer health risk index using common health risk index endpoints or health endpoints. Mixtures of chemicals with listed CS or site-specific CC are evaluated using the following approach:

Chemicals must be grouped according to medium (water or fish) and each health endpoint. Chemicals for which no health endpoint is specified are not grouped. Chemicals that are also linear carcinogens must be grouped as described under item E. Using the following equation, a noncancer health risk index must be determined for each group of two or more chemicals that have a common health endpoint listed in this part. To meet the protection objectives in part 7050.0217, the noncancer health risk index must not exceed a value of one.

$$\text{Noncancer health risk index by common health endpoint} = \frac{C_1}{CS_1 \text{ or } CC_1} + \frac{C_2}{CS_2 \text{ or } CC_2} + \ldots + \frac{C_n}{CS_n \text{ or } CC_n} \leq 1$$

where: C_n is the concentration of the first to the n^{th} chemical by common health endpoint and medium

CS_1 ... CS_n is the drinking water plus fish consumption and recreation chronic standard (CS_{dfr} or CS_{dev}), fish consumption and recreation chronic standard (CS_{fr}), or fish tissue chronic standard (CS_{ft}) for the first to n^{th} chemical by common health endpoint

CC_1 ... CC_n is the drinking water plus fish consumption and recreation chronic criterion (CC_{dfr} or CC_{dev}), fish consumption and recreation chronic criterion (CC_{fr}), or fish tissue chronic criterion (CC_{ft}) for the first to n^{th} chemical by common health endpoint

E. Concentrations of carcinogenic chemicals from point or nonpoint sources, singly or in mixtures, must not exceed an incremental or additional excess risk level of one in 100,000 (10^{-5}) in surface waters or fish tissue. Carcinogenic chemicals will be considered additive in their effect according to the following equation unless an alternative model is supported by available scientific evidence. The additive equation applies to chemicals that have a human health-based chronic standard (CS) or site-specific chronic criterion (CC) calculated with a cancer potency slope factor. To meet the protection objectives in part 7050.0217, the cancer health risk index must not exceed a value of one.

$$\text{Cancer health risk index} = \frac{C_1}{CS_1 \text{ or } CC_1} + \frac{C_2}{CS_2 \text{ or } CC_2} + \ldots + \frac{C_n}{CS_n \text{ or } CC_n} \leq 1$$

where: C_1 .... C_n is the concentration of the first to the n^{th} carcinogen in water or fish tissue

CS_1 ... CS_n is the drinking water plus fish consumption and recreation chronic standard (CS_{dfr}), fish consumption and recreation chronic standard (CS_{fr}), or fish tissue chronic standard (CS_{ft}) for the first to n^{th} carcinogenic chemical

CC_1 .... CC_n is the drinking water plus fish consumption and recreation chronic criterion (CC_{dfr}) fish consumption and recreation chronic criterion (CC_{fr}), or fish tissue chronic criterion (CC_{ft}) for the first to n^{th} carcinogenic chemical

F. When monitoring indicates that chemical breakdown products or environmental degradates are present in surface water or fish tissue, those products must be considered when meeting the objectives for toxic pollutants in part 7050.0217. When no human health-based CS or other MDH health-based guidance is available for the chemical breakdown product, the CS or CC for the parent chemical must be applied for that product. The parent CS or CC must also be applied to evaluate mixtures of chemicals.

G. This item applies to maximum standards (MS), final acute values (FAV), and double dashes (--) in this part and part 7050.0220 marked with an asterisk (*). For carcinogenic or highly bioaccumulative chemicals with BCFs greater than 5,000 or log K_{ow} values greater than 5.19, the human health-based chronic standard (CS) may be two or more orders of magnitude smaller than the acute toxicity-based MS.

If the ratio of the MS to the CS is greater than 100, the CS times 100 must be substituted for the applicable MS, and the CS times 200 must be substituted for the applicable FAV. Any effluent limit derived using the procedures of this item must only be required after the discharger has been given notice of the specific proposed effluent limits and an opportunity to request a hearing as provided in part 7000.1800.

Subp. 8. [Repealed, 32 SR 1699]

Subp. 9. **Conversion factors for dissolved metal standards.**

Metal	Conversion Factor for CS	Conversion Factor for MS and FAV
Cadmium	0.909 1.1017-[(ln TH, mg/L) (0.0418)]	0.946 1.1367-[(ln TH, mg/L) (0.0418)]
Chromium +3	0.860	0.316
Chromium +6	0.962	0.982
Copper	0.960	0.960
Lead	0.791 1.4620-[(ln TH, mg/L) (0.1457)]	0.791 1.4620-[(ln TH, mg/L) (0.1457)]
Mercury	1.0	0.850
Nickel	0.997	0.998
Silver	0.850	0.850
Zinc	0.986	0.978

Conversion factors for cadmium and lead are hardness (TH) dependent. The factors shown in the table above are for a total hardness of 100 mg/L only. Conversion factors for cadmium and lead for other hardness values shall be calculated using the equations included in the table. The dissolved standard is the total standard times the conversion factor.

Statutory Authority: *MS s 14.06; 115.03; 115.44; 116.07*

History: *18 SR 2195; 19 SR 1310; 24 SR 1105; 27 SR 1217; 32 SR 1699; 39 SR 154; 39 SR 1344; 18 SR 2195; 19 SR 1310; 24 SR 1105; 27 SR 1217; 32 SR 1699; 39 SR 154; 39 SR 1344; 41 SR 545; 18 SR 2195; 19 SR 1310; 24 SR 1105; 27 SR 1217; 32 SR 1699; 39 SR 154; 39 SR 1344; 41 SR 545; 42 SR 441*

Published Electronically: *September 10, 2018*

7050.0223 SPECIFIC WATER QUALITY STANDARDS FOR CLASS 3 WATERS OF THE STATE; INDUSTRIAL CONSUMPTION.

Subpart 1. **General.** The numeric and narrative water quality standards in this part prescribe the qualities or properties of the waters of the state that are necessary for the industrial consumption designated public uses and benefits. If the standards in this part are exceeded in waters of the state that have the class 3 designation, it is considered indicative of a polluted condition which is actually or potentially deleterious, harmful, detrimental, or injurious with respect to the designated uses.

Subp. 2. **Class 3A waters; industrial consumption.** The quality of class 3A waters of the state shall be such as to permit their use without chemical treatment, except softening for groundwater, for most industrial purposes, except food processing and related uses, for which a high quality of water is required. The following standards shall not be exceeded in the waters of the state:

Substance, Characteristic, or Pollutant	Class 3A Standard
Chlorides (Cl)	50 mg/L
Hardness, Ca + Mg as $CaCO_3$	50 mg/L
pH, minimum value	6.5
pH, maximum value	8.5

Subp. 3. **Class 3B waters.** The quality of class 3B waters of the state shall be such as to permit their use for general industrial purposes, except for food processing, with only a moderate degree of treatment. The following standards shall not be exceeded in the waters of the state:

Substance, Characteristic, or Pollutant	Class 3B Standard
Chlorides (Cl)	100 mg/L
Hardness, Ca + Mg as $CaCO_3$	250 mg/L
pH, minimum value	6.0
pH, maximum value	9.0

Subp. 4. **Class 3C waters.** The quality of class 3C waters of the state shall be such as to permit their use for industrial cooling and materials transport without a high degree of treatment being

necessary to avoid severe fouling, corrosion, scaling, or other unsatisfactory conditions. The following standards shall not be exceeded in the waters of the state:

Substance, Characteristic, or Pollutant	Class 3C Standard
Chlorides (Cl)	250 mg/L
Hardness, Ca + Mg as $CaCO_3$	500 mg/L
pH, minimum value	6.0
pH, maximum value	9.0

Subp. 5. **Class 3D waters; wetlands.** The quality of class 3D wetlands shall be such as to permit their use for general industrial purposes, except for food processing, with only a moderate degree of treatment. The following standards apply:

Substance, Characteristic, or Pollutant	Class 3D Standard
Chlorides (Cl)	Maintain background
Hardness, Ca + Mg as $CaCO_3$	Maintain background
pH	Maintain background

For the purposes of this subpart, "maintain background" means the concentration of the water quality substance, characteristic, or pollutant shall not deviate from the range of natural background concentrations or conditions such that there is a potential significant adverse impact to the designated uses.

Subp. 6. **Additional standards.** Additional selective limits may be imposed for any specific waters of the state as needed.

In addition to the standards in subparts 2 to 5, no sewage, industrial waste, or other wastes from point or nonpoint sources, treated or untreated, shall be discharged into or permitted by any person to gain access to any waters of the state classified for industrial purposes so as to cause any material impairment of their use as a source of industrial water supply.

Statutory Authority: *MS s 115.03; 115.44*

History: *18 SR 2195; 32 SR 1699*
Published Electronically: *December 9, 2016*

7050.0224 SPECIFIC WATER QUALITY STANDARDS FOR CLASS 4 WATERS OF THE STATE; AGRICULTURE AND WILDLIFE.

Subpart 1. **General.** The numeric and narrative water quality standards in this part prescribe the qualities or properties of the waters of the state that are necessary for the agriculture and wildlife designated public uses and benefits. Wild rice is an aquatic plant resource found in certain waters within the state. The harvest and use of grains from this plant serve as a food source for wildlife and humans. In recognition of the ecological importance of this resource, and in conjunction with Minnesota Indian tribes, selected wild rice waters have been specifically identified [WR] and listed in part 7050.0470, subpart 1. The quality of these waters and the aquatic habitat necessary to support the propagation and maintenance of wild rice plant species must not be materially impaired or degraded. If the standards in this part are exceeded in waters of the state that have the class 4 designation, it is considered indicative of a polluted condition which is actually or potentially deleterious, harmful, detrimental, or injurious with respect to the designated uses.

Subp. 2. **Class 4A waters.** The quality of class 4A waters of the state shall be such as to permit their use for irrigation without significant damage or adverse effects upon any crops or vegetation usually grown in the waters or area, including truck garden crops. The following standards shall be used as a guide in determining the suitability of the waters for such uses, together with the recommendations contained in Handbook 60 published by the Salinity Laboratory of the United States Department of Agriculture, and any revisions, amendments, or supplements to it:

Substance, Characteristic, or Pollutant	Class 4A Standard
Bicarbonates (HCO_3)	5 milliequivalents per liter
Boron (B)	0.5 mg/L
pH, minimum value	6.0
pH, maximum value	8.5
Specific conductance	1,000 micromhos per centimeter at 25°C
Total dissolved salts	700 mg/L
Sodium (Na)	60% of total cations as milliequivalents per liter
Sulfates (SO_4)	10 mg/L, applicable to water used for production of wild rice during periods when the rice may be susceptible to damage by high sulfate levels.
Radioactive materials	Not to exceed the lowest concentrations permitted to be discharged to an uncontrolled environment as prescribed by the appropriate authority having control over their use.

Subp. 3. **Class 4B waters.** The quality of class 4B waters of the state shall be such as to permit their use by livestock and wildlife without inhibition or injurious effects. The standards for substances, characteristics, or pollutants given below shall not be exceeded in the waters of the state:

Substance, Characteristic, or Pollutant Class 4B Standard

pH, minimum value	6.0
pH, maximum value	9.0
Total salinity	1,000 mg/L
Radioactive materials	Not to exceed the lowest concentrations permitted to be discharged to an uncontrolled environment as prescribed by the appropriate authority having control over their use.
Toxic substances	None at levels harmful either directly or indirectly

Additional selective limits may be imposed for any specific waters of the state as needed.

Subp. 4. **Class 4C waters; wetlands.** The quality of class 4C wetlands shall be such as to permit their use for irrigation and by wildlife and livestock without inhibition or injurious effects and be suitable for erosion control, groundwater recharge, low flow augmentation, storm water retention, and stream sedimentation. The standards for classes 4A and 4B waters shall apply to these waters except as listed below:

Substance, Characteristic, or Pollutant	Class 4C Standard
pH	Maintain background
Settleable solids	Shall not be allowed in concentrations sufficient to create the potential for significant adverse impacts on one or more designated uses.

For the purposes of this subpart, "maintain background" means the concentration of the water quality substance, characteristic, or pollutant shall not deviate from the range of natural background concentrations or conditions such that there is a potential significant adverse impact to the designated uses.

Statutory Authority: *MS s 115.03; 115.44*

History: *18 SR 2195; 22 SR 1466; 24 SR 1105; 32 SR 1699*
Published Electronically: *December 9, 2016*

7050.0225 SPECIFIC WATER QUALITY STANDARDS FOR CLASS 5 WATERS OF THE STATE; AESTHETIC ENJOYMENT AND NAVIGATION.

Subpart 1. **General.** The numeric and narrative water quality standards in this part prescribe the qualities or properties of the waters of the state that are necessary for the aesthetic enjoyment and navigation designated public uses and benefits. If the standards in this part are exceeded in waters of the state that have the class 5 designation, it is considered indicative of a polluted condition which is actually or potentially deleterious, harmful, detrimental, or injurious with respect to the designated uses.

Subp. 2. **Class 5 waters; aesthetic enjoyment and navigation.** The quality of class 5 waters of the state shall be such as to be suitable for aesthetic enjoyment of scenery, to avoid any interference with navigation or damaging effects on property. The following standards shall not be exceeded in the waters of the state:

Substance, Characteristic, or Pollutant	Class 5 Standard	
	For nonwetlands	For wetlands
pH, minimum	6.0	Maintain background
pH, maximum	9.0	Maintain background
Hydrogen sulfide as S	0.02 mg/L	Maintain background

For the purposes of this subpart, "maintain background" means the concentration of the water quality substance, characteristic, or pollutant shall not deviate from the range of natural background concentrations or conditions such that there is a potential significant adverse impact to the designated uses.

Additional selective limits may be imposed for any specific waters of the state as needed.

Statutory Authority: *MS s 115.03; 115.44*

History: *18 SR 2195; 32 SR 1699*

Published Electronically: *December 9, 2016*

7050.0226 SPECIFIC WATER QUALITY STANDARDS FOR CLASS 6 WATERS OF THE STATE; OTHER USES.

Subpart 1. **General.** The numeric and narrative water quality standards in this part prescribe the qualities or properties of the waters of the state that are necessary for other designated public uses and benefits. If the standards in this part are exceeded in waters of the state that have the class 6 designation, it is considered indicative of a polluted condition which is actually or potentially deleterious, harmful, detrimental, or injurious with respect to the designated uses.

Subp. 2. **Class 6 waters; other uses.** The uses to be protected in class 6 waters may be under other jurisdictions and in other areas to which the waters of the state are tributary, and may include any or all of the uses listed in parts 7050.0221 to 7050.0225, plus any other possible beneficial uses. The agency therefore reserves the right to impose any standards necessary for the protection of this class, consistent with legal limitations.

Statutory Authority: *MS s 115.03; 115.44*

History: *18 SR 2195; 32 SR 1699*

Published Electronically: *December 9, 2016*

7050.0227 SPECIFIC WATER QUALITY STANDARDS FOR CLASS 7 WATERS OF THE STATE; LIMITED RESOURCE VALUE WATERS.

Subpart 1. **General.** The numeric and narrative water quality standards in this part prescribe the qualities or properties of the waters of the state that have limited resource value designated public uses and benefits. If the standards in this part are exceeded in waters of the state that have the class 7 designation, it is considered indicative of a polluted condition which is actually or potentially deleterious, harmful, detrimental, or injurious with respect to the designated uses.

Subp. 2. **Class 7 waters; limited resource value waters.** The quality of class 7 waters of the state shall be such as to protect aesthetic qualities, secondary body contact use, and groundwater for use as a potable water supply. Standards for substances, characteristics, or pollutants given below shall not be exceeded in the waters:

Substance, Characteristic, or Pollutant	Class 7 Standard
Escherichia (E.) coli	Not to exceed 630 organisms per 100 milliliters as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than ten percent of all samples taken during any calendar month individually exceed 1,260 organisms per 100 milliliters. The standard applies only between May 1 and October 31.
Oxygen, dissolved	The level of dissolved oxygen must be maintained at concentrations: i. that will avoid odors or putrid conditions in the receiving water; ii. at not less than 1 mg/L (daily average); and iii. above 0 mg/L at all times.
pH, minimum value	6.0
pH, maximum value	9.0
Toxic pollutants	Toxic pollutants shall not be allowed in such quantities or concentrations that will impair the specified uses.

Statutory Authority: *MS s 115.03; 115.44*

History: *18 SR 2195; 24 SR 1105; 32 SR 1699; 42 SR 441*

Published Electronically: *November 20, 2017*

7050.0250 ANTIDEGRADATION PURPOSE.

The purpose of the antidegradation provisions in parts 7050.0250 to 7050.0335 is to achieve and maintain the highest possible quality in surface waters of the state. To accomplish this purpose:

A. existing uses and the level of water quality necessary to protect existing uses shall be maintained and protected;

B. degradation of high water quality shall be minimized and allowed only to the extent necessary to accommodate important economic or social development;

C. water quality necessary to preserve the exceptional characteristics of outstanding resource value waters shall be maintained and protected; and

D. proposed activities with the potential for water quality impairments associated with thermal discharges shall be consistent with section 316 of the Clean Water Act, United States Code, title 33, section 1326.

Statutory Authority: *MS s 115.03; 115.44*

History: *41 SR 545*
Published Electronically: *December 9, 2016*

7050.0255 DEFINITIONS.

Subpart 1. **Applicability.** For purposes of parts 7050.0250 to 7050.0335, the following terms have the meanings given in this part. Terms in parts 7050.0250 to 7050.0335 that are not specifically defined in applicable federal or state law shall be construed in conformance with the context, in relation to the applicable section of the statutes pertaining to the matter and professional usage as of November 21, 2016.

Subp. 2. **Agency.** "Agency" has the meaning given under Minnesota Statutes, section 115.01, subdivision 2, unless otherwise specified.

Subp. 3. **Applicant.** "Applicant" means a person requesting a control document.

Subp. 4. **Beneficial use.** "Beneficial use" means a designated use described under part 7050.0140 and listed under parts 7050.0400 to 7050.0470 for each surface water or segment thereof, whether or not the use is being attained.

Subp. 5. **Calcareous fen.** "Calcareous fen" means an area listed in part 7050.0335, subpart 1, item E, and described under part 8420.0935, subpart 2.

Subp. 6. **Class 2 surface water.** "Class 2 surface water" means a surface water that is protected for aquatic life and recreation beneficial uses and to which water quality standards described in part 7050.0222 apply.

Subp. 7. **Class 7 surface water.** "Class 7 surface water" means a surface water that is protected for limited resource value beneficial uses and to which water quality standards described in part 7050.0227 apply.

Subp. 8. **Clean Water Act.** "Clean Water Act" means the federal Water Pollution Control Act, United States Code, title 33, sections 1251 et seq.

Subp. 9. **Compensatory mitigation.** "Compensatory mitigation" means the restoration, establishment, or enhancement of surface waters to preserve an existing use when there is a physical alteration of a surface water after all prudent and feasible alternatives have been implemented to avoid and minimize degradation.

Subp. 10. **Control document.** "Control document" means an authorization issued by the commissioner that specifies water pollution control conditions under which a regulated activity is allowed to operate. Control document includes Clean Water Act authorizations used to administer NPDES permits and section 401 certifications. For purposes of parts 7050.0250 to 7050.0335, total maximum daily loads are not control documents.

Subp. 11. **Degradation or degrade.** "Degradation" or "degrade" means a measurable change to existing water quality made or induced by human activity resulting in diminished chemical, physical, biological, or radiological qualities of surface waters. For municipal sewage and industrial waste discharges, degradation is calculated at the edge of the mixing zone upon reasonable allowance for dilution of the discharge according to part 7053.0205, subparts 5 to 7.

Subp. 12. **Discharge.** "Discharge" means the addition of pollutants to surface waters.

Subp. 13. **Effective date.** "Effective date" means:

A. for the protection of high water quality:

(1) when applied to a previously unregulated activity, the date when the control document is issued; or

(2) when applied to a currently regulated activity, the date of the most recently issued control document; or

B. for the protection of exceptional characteristics of outstanding resource value waters, except as provided in subitems (1) and (2), the date when the outstanding resource value water was designated in rule.

(1) When the commissioner determines there is an improvement in exceptional characteristics of the outstanding resource value water as a result of changes to water pollution control conditions specified in a reissued control document, the effective date is the date when the control document was reissued.

(2) When the commissioner determines there is an improvement in exceptional characteristics of the outstanding resource value water as a result of a regulated activity ceasing to discharge to or otherwise adversely impact an outstanding resource value water, the effective date is the expiration date of the associated control document.

Subp. 14. **Exceptional characteristics of outstanding resource value waters.** "Exceptional characteristics of outstanding resource value waters" means characteristics for which an outstanding resource value water is designated, including wilderness, scientific, educational, ecological, recreational, cultural, or aesthetic resource characteristics or other special qualities that warrant stringent protection from degradation.

Subp. 15. **Existing uses.** "Existing uses" means those uses actually attained in the surface water on or after November 28, 1975.

Subp. 16. **Existing water quality.** "Existing water quality" means the physical, chemical, biological, and radiological conditions of a surface water, taking into account natural variability, on the effective date. Existing water quality is expressed either as a concentration of a water quality parameter or by other means to describe the condition of a surface water.

Subp. 17. **Feasible alternative.** "Feasible alternative" means a pollution control alternative that is consistent with sound engineering and environmental practices, affordable, and legal and that has supportive governance that can be successfully put into practice to accomplish the task.

Subp. 18. **Federally designated recreational river segment.** "Federally designated recreational river segment" means a surface water or segment thereof designated as a recreational river under the federal Wild and Scenic Rivers Act, United States Code, title 16, sections 1271 to 1287.

Subp. 19. **Federally designated scenic river segment.** "Federally designated scenic river segment" means a surface water or segment thereof designated as a scenic river under the federal Wild and Scenic Rivers Act, United States Code, title 16, sections 1271 to 1287.

Subp. 20. **Federally designated wild river segment.** "Federally designated wild river segment" means a surface water or segment thereof designated as a wild river under the federal Wild and Scenic Rivers Act, United States Code, title 16, sections 1271 to 1287.

Subp. 21. **High water quality or of high quality.** "High water quality" or "of high quality" means water quality that exceeds, on a parameter-by-parameter basis, levels necessary to support the protection and propagation of aquatic life and recreation in and on the water as described in part 7050.0140, subpart 3.

Subp. 22. **Loading.** "Loading" means the quantity of pollutants, expressed as mass, resulting from a discharge or proposed discharge to a surface water.

Subp. 23. **Loading offset.** "Loading offset" means reductions in loading from regulated or unregulated activities, which reductions create additional capacity for proposed net increases in loading. A loading offset must:

A. occur concurrently with or prior to the proposed net increase in loading;

B. be secured with binding legal instruments between any involved persons for the life of the project that is being offset; and

C. occur either adjacent to or upstream of the proposed activity.

Subp. 24. **Measurable change.** "Measurable change" means the practical ability to detect a variation in water quality, taking into account limitations in analytical technique and sampling variability.

Subp. 25. **National pollutant discharge elimination system permit or NPDES permit.** "National pollutant discharge elimination system permit" or "NPDES permit" means an authorization issued by the agency under sections 307, 318, 402, and 405 of the Clean Water Act, United States Code, title 33, sections 1317, 1328, 1342, and 1345. A general NPDES permit means an NPDES permit issued pursuant to Code of Federal Regulations, title 40, section 122.28.

Subp. 26. **Net increase in loading or other causes of degradation.** "Net increase in loading or other causes of degradation" means:

A. when applied to a proposed activity that is not regulated by an existing control document, any loading or other causes of degradation resulting from the proposed activity; or

B. when applied to a proposed activity that is regulated by an existing control document, an increase in loading or other causes of degradation exceeding the maximum loading or other causes of degradation authorized through water pollution control conditions specified in the existing control document as of the effective date. Application of new effluent limitations based on improved monitoring data or new water quality standards that are not a result of changes in loading or other causes of degradation within the existing capacity and processes authorized by an applicable control document is not considered a net increase in loading or other causes of degradation.

Subp. 27. **Outstanding resource value waters.** "Outstanding resource value waters" mean waters of the state designated under part 7050.0335 for their exceptional characteristics.

Subp. 28. **Parameter.** "Parameter" means a chemical, physical, biological, or radiological characteristic used to describe water quality conditions.

Subp. 29. **Person.** "Person" has the meaning given under Minnesota Statutes, section 115.01, subdivision 10.

Subp. 30. **Physical alteration.** "Physical alteration" means a physical change that degrades surface waters, such as the dredging, filling, draining, or permanent inundation of a surface water.

Subp. 31. **Pollutant.** "Pollutant" has the meaning given under Minnesota Statutes, section 115.01, subdivision 12.

Subp. 32. **Prohibited outstanding resource value waters.** "Prohibited outstanding resource value waters" mean surface waters identified in part 7050.0335, subparts 3 and 4.

Subp. 33. **Proposed activity.** "Proposed activity" means a regulated activity for which control document authorization is being requested.

Subp. 34. **Prudent alternative.** "Prudent alternative" means a pollution control alternative selected with care and sound judgment.

Subp. 35. **Regulated activity.** "Regulated activity" means an activity that requires a control document.

Subp. 36. **Restricted outstanding resource value waters.** "Restricted outstanding resource value waters" mean surface waters identified in part 7050.0335, subparts 1 and 2.

Subp. 37. **Scientific and natural areas.** "Scientific and natural areas" mean areas listed in part 7050.0335, subpart 3, item D, and described under Minnesota Statutes, section 86A.05, subdivision 5, paragraph (b).

Subp. 38. **Section 303(d) of the Clean Water Act.** "Section 303(d) of the Clean Water Act" means, pursuant to United States Code, title 33, section 1313(d), a requirement for states, territories, and authorized tribes to develop lists of waters that do not meet applicable water quality standards, establish priority rankings, and develop total maximum daily loads for these waters.

Subp. 39. **Section 401 certification.** "Section 401 certification" means an authorization issued by the commissioner under section 401 of the Clean Water Act, United States Code, title 33, section 1341.

Subp. 40. **Section 404 permit.** "Section 404 permit" means an authorization issued under section 404 of the Clean Water Act, United States Code, title 33, section 1344. A general section 404 permit means a section 404 permit issued pursuant to section 404 of the Clean Water Act, United States Code, title 33, section 1344, paragraph (e).

Subp. 41. **State designated recreational river segment.** "State designated recreational river segment" means a surface water or segment thereof designated as a recreational river under the Minnesota Wild and Scenic Rivers Act, Minnesota Statutes, sections 103F.301 to 103F.345, and described under Minnesota Statutes, section 103F.311, subdivision 4.

Subp. 42. **State designated scenic river segment.** "State designated scenic river segment" means a surface water or segment thereof designated as a scenic river under the Minnesota Wild and Scenic Rivers Act, Minnesota Statutes, sections 103F.301 to 103F.345, and described under Minnesota Statutes, section 103F.311, subdivision 7.

Subp. 43. **State designated wild river segment.** "State designated wild river segment" means a surface water or segment thereof designated as a wild river under the Minnesota Wild and Scenic Rivers Act, Minnesota Statutes, sections 103F.301 to 103F.345, and described under Minnesota Statutes, section 103F.311, subdivision 9.

Subp. 44. **Total maximum daily load or TMDL.** "Total maximum daily load" or "TMDL" has the meaning given under Minnesota Statutes, section 114D.15, subdivision 10.

Subp. 45. **Unregulated activity.** "Unregulated activity" means an activity that does not require a control document.

Subp. 46. **Water pollution control conditions.** "Water pollution control conditions" means effluent limitations as defined in part 7001.1020, subpart 13, or other conditions specified in a control document that limit water pollution as defined in Minnesota Statutes, section 115.01, subdivision 13.

Subp. 47. **Water quality standard.** "Water quality standard" means a parameter concentration, level, or narrative statement representing a quality of water that supports a beneficial use. When water quality standards are met, water quality will generally protect the beneficial use.

Statutory Authority: *MS s 115.03; 115.44*

History: *41 SR 545*
Published Electronically: *December 9, 2016*

7050.0260 DETERMINING EXISTING WATER QUALITY.

Subpart 1. **Methods.** Existing water quality shall be determined using methods described in items A to D. The methods are listed in descending order of priority. Lower priority methods shall be used only if higher priority methods are not reasonably available. More than one method shall be used when a single method does not adequately describe existing water quality.

A. Using commissioner-approved monitoring data that exist at the time the determination of existing water quality is undertaken.

B. Monitoring surface waters, provided that samples are collected in a manner and place and of such type, number, and frequency as may be considered necessary by the commissioner to adequately reflect the condition of the surface waters. Samples must be collected, preserved, and analyzed following accepted quality control and quality assurance methods and according to the procedures in part 7050.0150, subpart 8.

C. Identifying reference surface waters that have similar physical, chemical, and biological characteristics and similar impacts from regulated and unregulated activities.

D. Use of a water quality model to characterize existing conditions in the surface water, provided that the model uses data from the same watershed as the surface water under review for existing conditions.

Subp. 2. **Consideration of existing regulated activities.** For surface waters impacted by activities that are regulated by existing control documents, existing water quality includes surface water conditions that are anticipated at loadings or other causes of degradation authorized in the applicable control document.

Statutory Authority: *MS s 115.03; 115.44*

History: *41 SR 545*
Published Electronically: *December 9, 2016*

7050.0265 ANTIDEGRADATION STANDARDS WHEN CHANGES IN EXISTING WATER QUALITY ARE REASONABLY QUANTIFIABLE.

Subpart 1. **Scope.** This part applies to activities regulated by the following control documents:

A. new, reissued, or modified individual NPDES wastewater permits;

B. new, reissued, or modified individual NPDES storm water permits for industrial activities, as defined under part 7090.0080, subpart 6;

C. new, reissued, or modified individual NPDES storm water permits for construction activities, as defined under part 7090.0080, subpart 4;

D. section 401 certifications for new, reissued, or modified individual federal licenses and permits; and

E. other control documents that authorize net increases in loading or other causes of degradation and where changes in existing water quality of individual surface waters can reasonably be quantified through antidegradation procedures.

Subp. 2. **Protecting existing uses.** The commissioner shall approve a proposed activity only when existing uses and the level of water quality necessary to protect existing uses are maintained and protected.

Subp. 3. **Compensatory mitigation.**

A. The commissioner shall allow compensatory mitigation as a means to preserve an existing use when there is a physical alteration to a surface water only when all of the following conditions are met:

(1) prudent and feasible alternatives are not available to avoid or minimize adverse impacts to the surface water;

(2) the mitigation is sufficient in quality and quantity to ensure replacement of the lost surface water;

(3) the mitigation is accomplished by:

(a) restoring a previously impacted surface water of the same type, or other type if required by statute; or

(b) when restoring is not a prudent or feasible alternative, establishing or enhancing a surface water of the same type, or other type if required by statute;

(4) the mitigation occurs within the same watershed, to the extent prudent and feasible; and

(5) the mitigation is completed before or concurrent with the actual physical alteration, to the extent prudent and feasible.

B. For the purposes of subpart 2 and part 7050.0250, item A, existing uses are maintained and protected when regulated activities involving the physical alterations of surface waters are in compliance with item A.

C. When the physically altered surface water is of high quality, the commissioner shall ensure the requirements specified in subpart 5 are satisfied.

Subp. 4. **Protecting beneficial uses.** The commissioner shall not approve a proposed activity that would permanently preclude attainment of water quality standards.

Subp. 5. **Protecting surface waters of high quality.** Items A to D apply to surface waters the commissioner determines to be of high quality.

A. The commissioner shall not approve a proposed activity when the commissioner makes a finding that prudent and feasible prevention, treatment, or loading offset alternatives exist that would avoid degradation of existing high water quality. When the commissioner finds that prudent and feasible prevention, treatment, or loading offset alternatives are not available to avoid degradation, a proposed activity shall be approved only when the commissioner makes a finding that degradation will be prudently and feasibly minimized.

B. The commissioner shall approve a proposed activity only when the commissioner makes a finding that lower water quality resulting from the proposed activity is necessary to accommodate important economic or social changes in the geographic area in which degradation of existing high water quality is anticipated. The commissioner shall consider the following factors in determining the importance of economic or social changes:

(1) economic gains or losses attributable to the proposed activity, such as changes in the number and types of jobs, median household income, productivity, property values, and recreational, tourism, and other commercial opportunities;

(2) contribution to social services;

(3) prevention or remediation of environmental or public health threats;

(4) trade-offs between environmental media; and

(5) the value of the water resource, including:

(a) the extent to which the resources adversely impacted by the proposed activity are unique or rare within the locality, state, or nation;

(b) benefits associated with high water quality for uses such as ecosystem services and high water quality preservation for future generations to meet their own needs; and

(c) factors, such as aesthetics, that cannot be reasonably quantified; and

(6) other relevant environmental, social, and economic impacts of the proposed activity.

C. A proposed activity that would result in degradation of existing high water quality shall be approved only if the commissioner determines that issuance of the control document will achieve compliance with all applicable state and federal surface water pollution control statutes and rules administered by the commissioner.

D. The commissioner shall provide an opportunity for intergovernmental coordination and public participation before allowing degradation of existing high water quality.

Subp. 6. **Protecting restricted outstanding resource value waters.** The commissioner shall restrict a proposed activity in order to preserve the existing water quality as necessary to maintain and protect the exceptional characteristics for which the restricted outstanding resource value waters identified under part 7050.0335, subparts 1 and 2, were designated.

Subp. 7. **Protecting prohibited outstanding resource value waters.** The commissioner shall prohibit a proposed activity that results in a net increase in loading or other causes of degradation to prohibited outstanding resource value waters identified under part 7050.0335, subparts 3 and 4.

Subp. 8. **Protecting against impairments associated with thermal discharges.** When there is potential for water quality impairment associated with thermal discharges, the commissioner's allowance for existing water quality degradation shall be consistent with section 316 of the Clean Water Act, United States Code, title 33, section 1326. When a variance is granted under section 316(a) of the Clean Water Act, United States Code, title 33, section 1326, antidegradation standards under this part still apply.

Statutory Authority: *MS s 115.03; 115.44*

History: *41 SR 545;*
Published Electronically: *November 20, 2017*

7050.0270 ANTIDEGRADATION STANDARDS WHEN CHANGES IN EXISTING WATER QUALITY ARE NOT REASONABLY QUANTIFIABLE.

Subpart 1. **Scope.** This part applies to activities regulated by the following control documents:

A. new, reissued, or modified individual NPDES storm water permits for municipal separate storm sewer systems, as defined under part 7090.0080, subpart 8;

B. new, reissued, or modified general NPDES permits;

C. section 401 certifications for new, reissued, or modified general federal licenses and permits; and

D. other control documents that authorize net increases in loading or other causes of degradation and where changes in existing water quality of individual surface waters cannot reasonably be quantified through antidegradation procedures.

Subp. 2. **Protecting existing uses.** The commissioner shall issue control documents that will maintain and protect existing uses.

Subp. 3. **Protecting beneficial uses.** The commissioner shall not issue a control document that would permanently preclude attainment of water quality standards.

Subp. 4. **Protecting surface waters of high quality.**

A. For the purpose of this part and on a parameter-by-parameter basis, class 2 surface waters not identified as impaired pursuant to section 303(d) of the Clean Water Act are considered of high quality. Items B to E apply to class 2 surface waters that are of high quality.

B. The commissioner shall not issue a control document when the commissioner makes a finding that prudent and feasible prevention, treatment, or loading offset alternatives exist that would avoid net increases in loading or other causes of degradation. When the commissioner finds that prudent and feasible alternatives are not available to avoid net increases in loading or other causes of degradation, a control document shall only be issued when the commissioner makes a finding that the issuance of the control document will prudently and feasibly minimize net increases in loading or other causes of degradation.

C. The commissioner shall issue a control document that authorizes a net increase in loading or other causes of degradation only when the commissioner makes a finding that issuance of the control document is necessary to accommodate important economic or social change.

D. The commissioner shall issue a control document that would result in a net increase in loading or other causes of degradation to waters of high quality only if the commissioner determines that issuance of the control document will achieve compliance with all applicable state and federal surface water pollution control statutes and rules administered by the commissioner.

E. The commissioner shall provide an opportunity for intergovernmental coordination and public participation before issuing a control document that would result in net increases in loading or other causes of degradation.

Subp. 5. **Protecting restricted outstanding resource value waters.** The commissioner shall issue control documents that restrict net increases in loading or other causes of degradation as necessary to maintain the exceptional characteristics for which the restricted outstanding resource value waters identified under part 7050.0335, subparts 1 and 2, were designated.

Subp. 6. **Protecting prohibited outstanding resource value waters.** The commissioner shall issue control documents that prohibit a net increase in loading or other causes of degradation to prohibited outstanding resource value waters identified under part 7050.0335, subparts 3 and 4.

Subp. 7. **Protecting against impairments associated with thermal discharges.** When there is potential for water quality impairment associated with thermal discharges, a control document that allows a net increase in loading or other causes of degradation must be consistent with section 316 of the Clean Water Act, United States Code, title 33, section 1326. When a variance is granted under section 316(a) of the Clean Water Act, United States Code, title 33, section 1326, antidegradation standards under this part still apply.

Statutory Authority: *MS s 115.03; 115.44*

History: *41 SR 545;*
Published Electronically: *November 20, 2017*

7050.0275 EXEMPTIONS FROM PROCEDURES.

Subpart 1. **Class 7 surface waters.** The procedures specified in parts 7050.0280 and 7050.0285 do not apply to proposed activities resulting in a net increase in loading or other causes of degradation to a class 7 surface water except when, in the commissioner's judgment, there is reasonable risk that the proposed activity would result in:

A. the loss of existing uses and the level of water quality necessary to protect existing uses in the class 7 surface water and downstream surface waters;

B. permanently precluding attainment of water quality standards;

C. degradation of downstream existing high water quality; or

D. degradation of downstream existing water quality essential to preserve the exceptional characteristics of outstanding resource value waters.

Subp. 2. **Temporary and limited degradation.** The procedures specified in parts 7050.0280 and 7050.0285 do not apply to proposed activities that result in temporary and limited degradation of high water quality when the requirements of items A to D are met.

A. The applicant must provide a request for an exemption, on forms developed by the commissioner, before submitting a control document application. The request must include:

(1) identification of surface waters and associated beneficial uses that will be adversely impacted by the regulated activity;

(2) parameters likely to cause degradation;

(3) length of time during which the water quality will be impacted, which must not exceed 12 months from when water quality is initially impacted by the proposed activity;

(4) a description of water quality at the time the exemption is requested using methods described in part 7050.0260 and anticipated net changes to water quality for parameters likely to cause adverse impacts over the time period the surface waters are impacted;

(5) a description of prevention, treatment, or loading offset alternatives that were considered to avoid and minimize net increases in loading or other causes of degradation and the reasons why the selected alternative was chosen;

(6) a description of how water quality will be returned to pre-activity conditions within 12 months from when water quality is initially impacted by the proposed activity; and

(7) a description of any residual long-term impacts on existing uses.

B. The commissioner shall consider subitems (1) to (3) before deciding to approve or deny the requested exemption from antidegradation procedures for the proposed temporary and limited degradation:

(1) information submitted by the applicant under item A;

(2) information on cumulative effects on water quality from multiple exemptions for temporary and limited degradation; and

(3) other reliable information available to the commissioner.

C. The commissioner shall approve a proposed temporary and limited degradation of high water quality only when:

(1) existing uses and the level of water quality necessary to protect the existing uses are maintained and protected;

(2) it would not cause exceedance of water quality standards; and

(3) a prudent and feasible alternative does not exist that would avoid or minimize the degradation.

D. If the temporary and limited degradation exemption is approved, the control document conditions must include an enforceable plan to ensure that water quality is returned to pre-activity conditions within 12 months from when water quality is initially impacted by the activity.

Statutory Authority: *MS s 115.03; 115.44*

History: *41 SR 545;*

Published Electronically: *November 20, 2017*

7050.0280 PROCEDURES FOR INDIVIDUAL NPDES WASTEWATER PERMITS AND INDIVIDUAL NPDES STORM WATER PERMITS FOR INDUSTRIAL AND CONSTRUCTION ACTIVITIES.

Subpart 1. **Antidegradation procedures required.** Except as provided in part 7050.0275, the antidegradation procedures in this part apply to new, reissued, or modified individual NPDES wastewater, industrial storm water, and construction storm water permits that the commissioner anticipates will result in net increases in loading or other causes of degradation to surface waters.

Subp. 2. **Applicant's antidegradation assessment.** The applicant must include the following information with the written permit application specified in part 7001.0050:

A. an analysis of alternatives that avoid net increases in loading or other causes of degradation through prudent and feasible prevention, treatment, or loading offsets;

B. when the commissioner determines there are no prudent and feasible alternatives to avoid net increases in loading or other causes of degradation, an assessment of:

(1) existing uses; and

(2) existing water quality using determination methods described in part 7050.0260.

C. when the commissioner determines there are no prudent and feasible alternatives to avoid net increases in loading or other causes of degradation to existing high water quality:

(1) an analysis of prudent and feasible alternatives that minimize degradation through prudent and feasible prevention, treatment, or loading offsets that identifies the least degrading prudent and feasible alternatives;

(2) the design considerations and constraints, expected performance, construction, operation, and maintenance costs, and reliability of the least degrading prudent and feasible alternatives; and

(3) the following information based on the least degrading prudent and feasible alternatives:

(a) a comparison of loading or other causes of degradation previously authorized by the commissioner in the most recently issued control document to the anticipated loading or other causes of degradation expected when the proposed activity is fully implemented;

(b) a comparison of existing water quality to the anticipated water quality when the proposed activity is fully implemented; and

(c) for the geographic area in which high water quality degradation is reasonably anticipated, a comparison of existing and expected economic conditions and social services when the proposed activity is fully implemented. The comparison must include the factors identified in part 7050.0265, subpart 5, item B, subitems (1) to (6).

Subp. 3. **Antidegradation review.** The commissioner shall conduct an antidegradation review based on the information provided under subpart 2 and other reliable information available to the commissioner concerning the proposed activity and other activities that cause cumulative changes in existing water quality in the surface waters. The purpose of the antidegradation review is to evaluate whether the proposed activity will satisfy the antidegradation standards in part 7050.0265. If, in the commissioner's judgment, the antidegradation standards described in part 7050.0265 will not be satisfied, the commissioner shall provide written notification to the applicant of the deficiencies and provide recommendations necessary to satisfy the antidegradation standards in part 7050.0265.

Subp. 4. **Preliminary antidegradation determination.** Based upon the review described in subpart 3, the commissioner shall prepare a written preliminary antidegradation determination as to whether the antidegradation standards described in part 7050.0265 are satisfied. The preliminary antidegradation determination must be included with the commissioner's preliminary determination to issue or deny the permit according to part 7001.0100. If, in the commissioner's judgment, the antidegradation standards are not satisfied, reasons why they are not satisfied must be included in the preliminary antidegradation determination.

Subp. 5. **Opportunity for comment.** The commissioner shall:

A. include the preliminary antidegradation determination with the public notice to issue or deny the permit according to part 7001.0100, subpart 4;

B. distribute the public notice according to part 7001.0100, subpart 5; and

C. provide opportunity for comment on the preliminary antidegradation determination according to part 7001.0110.

Subp. 6. **Final antidegradation determination.** The commissioner shall consider comments received under subpart 5 before preparing a written final antidegradation determination. The final antidegradation determination must include a statement of whether the proposed activity achieves or fails to achieve the antidegradation standards specified in part 7050.0265. The final antidegradation determination must be included with the commissioner's final determination to authorize or not authorize the proposed activity according to part 7001.0140.

Statutory Authority: *MS s 115.03; 115.44*

History: *41 SR 545*
Published Electronically: *December 9, 2016*

7050.0285 PROCEDURES FOR SECTION 401 CERTIFICATIONS OF INDIVIDUAL FEDERAL LICENSES AND PERMITS.

Subpart 1. **Antidegradation procedures required.** Except as provided in part 7050.0275, the antidegradation procedures in this part apply to section 401 certifications of new, reissued, or modified individual federal licenses and permits that the commissioner anticipates will result in net increases in loading or other causes of degradation to surface waters.

Subp. 2. **Applicant's antidegradation assessment.** The applicant must provide information specified in part 7050.0280, subpart 2, to the commissioner, unless the applicant is notified that the commissioner is waiving the agency's authority to certify the federal license or permit under part 7001.1460. In addition, the applicant may propose compensatory mitigation to the extent allowed by the Clean Water Act to preserve existing uses and the level of water quality necessary to protect the existing uses when there is a physical alteration. In such cases, the applicant must provide a proposed compensatory mitigation plan that includes:

A. a description of existing uses and the level of water quality necessary to protect existing uses of the surface waters that will be physically altered;

B. a description of existing uses and the level of water quality necessary to protect existing uses of the surface waters in which mitigation will occur;

C. a description of how compensatory mitigation will establish sufficient quality and quantity of uses to preserve existing uses and the level of water quality necessary to protect existing uses;

D. a proposal for monitoring and reporting the changes in existing uses and the level of water quality necessary to protect existing uses of the surface waters in which mitigation will occur; and

E. a description of how the compensatory mitigation will be maintained.

Subp. 3. **Antidegradation review.** The commissioner shall conduct an antidegradation review based on the information provided under subpart 2 and other reliable information available to the commissioner concerning the proposed activity and other activities that cause cumulative changes in existing water quality in the surface waters. The purpose of the antidegradation review is to evaluate whether issuing the section 401 certification for the proposed activity will satisfy the antidegradation standards in part 7050.0265.

Subp. 4. **Preliminary antidegradation determination.** Based upon the review described in subpart 3, the commissioner shall prepare a written preliminary antidegradation determination as to whether the antidegradation standards described in part 7050.0265 are satisfied or can be satisfied by issuing a section 401 certification with conditions. The preliminary antidegradation determination must be included with the commissioner's preliminary determination to issue or deny the section 401 certification according to part 7001.0100 and, if applicable, include the conditions necessary to satisfy antidegradation standards. If, in the commissioner's judgment, the antidegradation standards are not satisfied, reasons why they are not satisfied must be included in the preliminary antidegradation determination.

Subp. 5. **Opportunity for comment.** The commissioner shall prepare and distribute a public notice of the preliminary antidegradation determination with the preliminary determination to issue or deny the section 401 certification through the procedures described in part 7001.1440, except that part 7001.1440, subpart 2, does not apply.

Subp. 6. **Final antidegradation determination.** The commissioner shall consider comments received under subpart 5 before preparing a written final antidegradation determination. The final antidegradation determination must include a statement of whether the proposed activity achieves or fails to achieve the antidegradation standards specified in part 7050.0265. The final antidegradation determination must be included with the commissioner's final determination according to part 7001.1450.

Statutory Authority: *MS s 115.03; 115.44*

History: *41 SR 545*

Published Electronically: *December 9, 2016*

7050.0290 PROCEDURES FOR INDIVIDUAL NPDES PERMITS FOR MUNICIPAL SEPARATE STORM SEWER SYSTEMS.

Subpart 1. **Antidegradation procedures required.** The antidegradation procedures in this part apply to new, reissued, or modified individual NPDES permits for municipal separate storm sewer systems, as defined under part 7090.0080, subpart 8, that the commissioner anticipates will result in net increases in loading or other causes of degradation to surface waters.

Subp. 2. **Applicant's antidegradation assessment.** The applicant must include the following information with the written permit application specified in part 7001.0050:

A. a list of class 2 surface waters identified as impaired pursuant to section 303(d) of the Clean Water Act within the applicant's jurisdiction;

B. a list of surface waters listed in part 7050.0335 within the applicant's jurisdiction;

C. an analysis of prudent and feasible prevention, treatment, or loading offset alternatives that avoid or minimize net increases in loading or other causes of degradation to high water quality;

D. identification of prudent and feasible prevention, treatment, or loading offset alternatives that result in the least net increase in loading or other causes of degradation to high water quality; and

E. an evaluation of whether net increases in loading or other causes of degradation to high water quality accommodates important economic or social change in the geographic area in which high water quality degradation is reasonably anticipated.

Subp. 3. **Antidegradation review.** The commissioner shall conduct an antidegradation review based on the information provided under subpart 2 and other reliable information available to the commissioner concerning the proposed activity and other activities that cause cumulative changes in existing water quality in the surface waters. The purpose of the antidegradation review is to evaluate whether the proposed activity will satisfy the antidegradation standards in part 7050.0270. If, in the commissioner's judgment, the antidegradation standards described in part 7050.0270 will not be satisfied, the commissioner shall provide written notification to the applicant of the deficiencies and provide recommendations necessary to satisfy the antidegradation standards in part 7050.0270.

Subp. 4. **Preliminary antidegradation determination.** Based upon the review described in subpart 3, the commissioner shall prepare a written preliminary antidegradation determination as to whether the antidegradation standards described in part 7050.0270 are satisfied. The preliminary antidegradation determination must be included with the commissioner's preliminary determination to issue or deny the permit according to part 7001.0100. If, in the commissioner's judgment, the antidegradation standards are not satisfied, reasons why they are not satisfied must be included in the preliminary antidegradation determination.

Subp. 5. **Opportunity for comment.** The commissioner shall:

A. include the preliminary antidegradation determination with the public notice to issue or deny the permit according to part 7001.0100, subpart 4;

B. distribute the public notice according to part 7001.0100, subpart 5; and

C. provide opportunity for comment on the preliminary antidegradation determination according to part 7001.0110.

Subp. 6. **Final antidegradation determination.** The commissioner shall consider comments received under subpart 5 before preparing a written final antidegradation determination. The final antidegradation determination must include a statement of whether the proposed activity achieves or fails to achieve the antidegradation standards specified in part 7050.0270. The final antidegradation determination must be included with the commissioner's final determination to authorize or not authorize the proposed activity according to part 7001.0140.

Statutory Authority: *MS s 115.03; 115.44*

History: *41 SR 545;*
Published Electronically: *November 20, 2017*

7050.0295 PROCEDURES FOR GENERAL NPDES PERMITS.

Subpart 1. **Antidegradation procedures required.** The antidegradation procedures in this part apply to new, reissued, or modified general NPDES permits that the commissioner anticipates will result in net increases in loading or other causes of degradation to surface waters.

Subp. 2. **Antidegradation review.** The commissioner shall conduct an antidegradation review during the development of general NPDES permits. The purpose of the antidegradation review is to develop permit conditions that will ensure that the antidegradation standards in part 7050.0270 are satisfied.

Subp. 3. **Preliminary antidegradation determination.** Based upon the review described in subpart 2, the commissioner shall prepare a written preliminary antidegradation determination as to whether the permit conditions will satisfy the antidegradation standards described in part 7050.0270. The preliminary antidegradation determination must be included with the commissioner's fact sheet according to part 7001.0100, subpart 3.

Subp. 4. **Opportunity for comment.** The commissioner shall:

A. include the preliminary antidegradation determination with the public notice of intent to issue a general permit according to part 7001.0210, subpart 4;

B. distribute the public notice according to part 7001.0100, subpart 5; and

C. provide opportunity for comment on the preliminary antidegradation determination according to part 7001.0110.

Subp. 5. **Final antidegradation determination.** The commissioner shall consider comments received under subpart 4 before preparing a written final antidegradation determination. The final antidegradation determination must include a statement that issuing the general NPDES permit achieves or fails to achieve the antidegradation standards specified in part 7050.0270. The final antidegradation determination must be included with the commissioner's final determination according to part 7001.0140.

Subp. 6. **Further antidegradation procedures not required.** Except as provided in part 7050.0325, if the commissioner's final antidegradation determination states that issuing a general NPDES permit will achieve the antidegradation standards specified in part 7050.0270, further antidegradation procedures are not required when a person seeking coverage under the general NPDES permit certifies that the permit conditions can and will be met.

Statutory Authority: *MS s 115.03; 115.44*

History: *41 SR 545*
Published Electronically: *December 9, 2016*

7050.0300 [Repealed, 9 SR 913]
Published Electronically: *April 1, 2008*

7050.0305 PROCEDURES FOR SECTION 401 CERTIFICATIONS OF GENERAL SECTION 404 PERMITS.

Subpart 1. **Antidegradation procedures required.** The antidegradation procedures in this part apply to section 401 certifications of new, reissued, or modified general section 404 permits that the commissioner anticipates will result in net increases in loading or other causes of degradation to surface waters, unless the federal permitting authority is notified that the commissioner is waiving the agency's authority to certify the permit under part 7001.1460.

Subp. 2. **Antidegradation review.** Upon public notice of a draft general section 404 permit, the commissioner shall review the determinations specified in Code of Federal Regulations, title 33, part 320, subpart 4, and Code of Federal Regulations, title 40, part 230, subpart 7. The purpose of the antidegradation review is to evaluate whether issuing the section 401 certification for the general section 404 permit will satisfy the antidegradation standards in part 7050.0270.

Subp. 3. **Preliminary antidegradation determination.** Based upon the review described in subpart 2, the commissioner shall prepare a written preliminary antidegradation determination as to whether the antidegradation standards described in part 7050.0270 are satisfied or can be satisfied by issuing a section 401 certification with conditions. The preliminary antidegradation determination must be included with the commissioner's preliminary determination to issue or deny the section 401 certification according to part 7001.0100 and, if applicable, include the conditions necessary to satisfy antidegradation standards. If, in the commissioner's judgment, the antidegradation standards are not satisfied, reasons why they are not satisfied must be included in the preliminary antidegradation determination.

Subp. 4. **Opportunity for comment.** The commissioner shall prepare and distribute a public notice of the preliminary antidegradation determination with the preliminary determination to issue or deny the section 401 certification through the procedures described in part 7001.1440, except that part 7001.1440, subpart 2, does not apply.

Subp. 5. **Final antidegradation determination.** The commissioner shall consider information received under subpart 4 before preparing a written final antidegradation determination. The final antidegradation determination must include a statement of whether issuing the general section 404 permit achieves or fails to achieve the antidegradation standards specified in part 7050.0270. The final antidegradation determination must be included with the commissioner's final determination according to part 7001.1450.

Subp. 6. **Further antidegradation procedures not required.** Except as provided in part 7050.0325, if the commissioner's final antidegradation determination states that issuing a general section 404 permit will achieve the antidegradation standards specified in part 7050.0270, further antidegradation procedures are not required when a person seeking coverage under the general section 404 permit certifies that the permit conditions can and will be met.

Statutory Authority: *MS s 115.03; 115.44*

History: *41 SR 545*

Published Electronically: *December 9, 2016*

7050.0310 [Repealed, 9 SR 913]

Published Electronically: *April 1, 2008*

7050.0315 PROCEDURES FOR SECTION 401 CERTIFICATIONS OF GENERAL FEDERAL LICENSES AND PERMITS OTHER THAN SECTION 404 PERMITS.

Subpart 1. **Antidegradation procedures required.** The antidegradation procedures in this part apply to section 401 certifications of new, reissued, or modified general federal licenses and permits that are not section 404 permits that the commissioner anticipates will result in net increases in loading or other causes of degradation to surface waters, unless the federal licensing or permitting authority is notified that the commissioner is waiving the agency's authority to certify the license or permit under part 7001.1460.

Subp. 2. **Antidegradation review.** Upon public notice of a draft general federal license or permit, the commissioner shall review the draft general federal license or permit to evaluate whether issuing the section 401 certification for the general federal license or permit will satisfy the antidegradation standards in part 7050.0270.

Subp. 3. **Preliminary antidegradation determination.** Based upon the review described in subpart 2, the commissioner shall prepare a written preliminary antidegradation determination as to whether the antidegradation standards described in part 7050.0270 are satisfied or can be satisfied by issuing a section 401 certification with conditions. The preliminary antidegradation determination must be included with the commissioner's preliminary determination to issue or deny the section 401 certification according to part 7001.0100 and, if applicable, include the conditions necessary to satisfy antidegradation standards. If, in the commissioner's judgment, the antidegradation standards are not satisfied, reasons why they are not satisfied must be included in the preliminary antidegradation determination.

Subp. 4. **Opportunity for comment.** The commissioner shall prepare and distribute a public notice of the preliminary antidegradation determination with the preliminary determination to issue or deny the section 401 certification through the procedures described in part 7001.1440, except that part 7001.1440, subpart 2, does not apply.

Subp. 5. **Final antidegradation determination.** The commissioner shall consider information received under subpart 4 before preparing a written final antidegradation determination. The final antidegradation determination must include a statement of whether issuing the general federal license or permit achieves or fails to achieve the antidegradation standards specified in part 7050.0270. The final antidegradation determination must be included with the commissioner's final determination according to part 7001.1450.

Subp. 6. **Further antidegradation procedures not required.** Except as provided in part 7050.0325, if the commissioner's final antidegradation determination states that issuing a general federal license or permit will achieve the antidegradation standards specified in part 7050.0270, further antidegradation procedures are not required when a person seeking coverage under the general federal license or permit certifies that the license or permit conditions can and will be met.

Statutory Authority: *MS s 115.03; 115.44*

History: *41 SR 545*

Published Electronically: *December 9, 2016*

7050.0320 [Repealed, 9 SR 913]

Published Electronically: *April 1, 2008*

7050.0325 PROCEDURES FOR MULTIPLE CONTROL DOCUMENTS.

Items A and B apply to proposed activities requiring more than one control document:

A. when the proposed activity requires compliance with standards in both parts 7050.0265 and 7050.0270, the commissioner shall require procedures for which standards in part 7050.0265 apply; and

B. when the proposed activity requires compliance with standards in part 7050.0265 and is subject to more than one procedure, only the procedure that is most protective of existing water quality, as specified by the commissioner, is required.

Statutory Authority: *MS s 115.03; 115.44*

History: *41 SR 545*
Published Electronically: *December 9, 2016*

7050.0330 [Repealed, 9 SR 913]
Published Electronically: *April 1, 2008*

7050.0335 DESIGNATED OUTSTANDING RESOURCE VALUE WATERS.

Subpart 1. **Restricted outstanding resource value waters.** For the purposes of parts 7050.0250 to 7050.0335, the following surface waters are restricted outstanding resource value waters:

A. Lake Superior, except those portions identified in subpart 3, item B, as a prohibited outstanding resource value waters;

B. those portions of the Mississippi River from Lake Itasca to the southerly boundary of Morrison County that are included in the Mississippi Headwaters Board comprehensive plan dated February 12, 1981;

C. lake trout lakes, both existing and potential, as determined by the commissioner in conjunction with the Department of Natural Resources, outside the boundaries of the Boundary Waters Canoe Area Wilderness and Voyageurs National Park and identified in parts 7050.0460 to 7050.0470;

D. the following state and federal designated scenic or recreational river segments:

(1) Saint Croix River, entire length;

(2) Cannon River from northern city limits of Faribault to its confluence with the Mississippi River;

(3) North Fork of the Crow River from Lake Koronis outlet to the Meeker-Wright county line;

(4) Kettle River from north Pine County line to the site of the former dam at Sandstone;

(5) Minnesota River from Lac qui Parle dam to Redwood County State-Aid Highway 11;

(6) Mississippi River from County State-Aid Highway 7 bridge in Saint Cloud to northwestern city limits of Anoka;

(7) Rum River from State Highway 27 bridge in Onamia to Madison and Rice Streets in Anoka; and

E. the following surface waters associated with calcareous fens. The number following the name of the fen is the occurrence number assigned by the Department of Natural Resources that uniquely identifies the record of information for the particular fen:

(1) Becker County: Spring Creek WMA NHR fen, 34 (T.142, R.42, S.13);

(2) Carver County: Seminary fen, 75 (T.116, R.23, S.35);

(3) Clay County:

(a) Barnesville Moraine fen, 44 (T.137, R.44, S.18);

(b) Barnesville WMA fen, 10 (T.137, R.45, S.1);

(c) Barnesville WMA fen, 43 (T.137, R.44, S.18);

(d) Felton Prairie fen, 28 (T.142, R.46, S.36);

(e) Felton Prairie fen, 36 (T.141, R.46, S.13);

(f) Felton Prairie fen, 48 (T.142, R.45, S.31);

(g) Felton Prairie fen, 53 (T.141, R.46, S.24);

(h) Haugtvedt WPA North Unit fen, 54 (T.137, R.44, S.28, 29); and

(i) Spring Prairie fen, 37 (T.140, R.46, S.11);

(4) Clearwater County: Clearbrook fen, 61 (T.149, R.37, S.17);

(5) Dakota County:

(a) Black Dog Preserve fen, 63 (T.27, R.24, S.34);

(b) Fort Snelling State Park fen, 25 (T.27, R.23, S.4); and

(c) Nicols Meadow fen, 24 (T.27, R.23, S.18);

(6) Goodhue County:

(a) Holden 1 West fen, 3 (T.110, R.18, S.1);

(b) Perched Valley Wetlands fen, 2 (T.112, R.13, S.8); and

(c) Red Wing fen, 72 (T.113, R.15, S.21);

(7) Houston County: Houston fen, 62 (T.104, R.6, S.26);

(8) Jackson County:

(a) Heron Lake fen, 45 (T.103, R.36, S.29); and

(b) Thompson Prairie fen, 20 (T.103, R.35, S.7);

(9) Le Sueur County:

(a) Ottawa Bluff fen, 56 (T.110, R.26, S.3);

(b) Ottawa WMA fen, 7 (T.110, R.26, S.11); and

(c) Ottawa WMA fen, 60 (T.110, R.26, S.14);

(10) Lincoln County: Hole-in-the-Mountain Prairie fen, 6; Pipestone (T.108, R.46, S.1; T.109, R.45, S.31);

(11) Mahnomen County: Waubun WMA fen, 11 (T.143, R.42, S.25);

(12) Marshall County:

(a) Tamarac River fen, 71 (T.157, R.46, S.2);

(b) Viking fen, 68 (T.155, R.45, S.18);

(c) Viking fen, 70 (T.155, R.45, S.20); and

(d) Viking Strip fen, 69 (T.154, R.45, S.4);

(13) Martin County: Perch Creek WMA fen, 33 (T.104, R.30, S.7);

(14) Murray County: Lost Timber Prairie fen, 13 (T.105, R.43, S.2);

(15) Nicollet County:

(a) Fort Ridgely fen, 21 (T.111, R.32, S.6); and

(b) Le Sueur fen, 32 (T.111, R.26, S.16);

(16) Nobles County: Westside fen, 59 (T.102, R.43, S.11);

(17) Norman County:

(a) Agassiz-Olson WMA fen, 17 (T.146, R.45, S.22);

(b) Faith Prairie fen, 15 (T.144, R.43, S.26);

(c) Faith Prairie fen, 16 (T.144, R.43, S.35);

(d) Faith Prairie fen, 27 (T.144, R.43, S.25); and

(e) Green Meadow fen, 14 (T.145, R.45, S.35, 36);

(18) Olmsted County:

(a) High Forest fen, 12 (T.105, R.14, S.14, 15); and

(b) Nelson WMA fen, 5 (T.105, R.15, S.16);

(19) Pennington County:

(a) Sanders East fen, 65 (T.153, R.44, S.7);

(b) Sanders East fen, 74 (T.153, R.44, S.7); and

(c) Sanders fen, 64 (T.153, R.44, S.18, 19);

(20) Pipestone County:

(a) Burke WMA fen, 57 (T.106, R.44, S.28); and

(b) Hole-in-the-Mountain Prairie fen, 6 (see Lincoln County, subitem (10));

(21) Polk County:

(a) Chicog Prairie fen, 39 (T.148, R.45, S.28);

(b) Chicog Prairie fen, 40 (T.148, R.45, S.33);

(c) Chicog Prairie fen, 41 (T.148, R.45, S.20, 29);

(d) Chicog Prairie fen, 42 (T.148, R.45, S.33);

(e) Kittleson Creek Mire fen, 55 (T.147, R.44, S.6, 7);

(f) Tympanuchus Prairie fen, 26 (T.149, R.45, S.17); and

(g) Tympanuchus Prairie fen, 38 (T.149, R.45, S.16);

(22) Pope County:

(a) Blue Mounds fen, 1 (T.124, R.39, S.14, 15);

(b) Lake Johanna fen, 4 (T.123, R.36, S.29); and

(c) Ordway Prairie fen, 35 (T.123, R.36, S.30);

(23) Redwood County:

(a) Swedes Forest fen, 8 (T.114, R.37, S.19, 20); and

(b) Swedes Forest fen, 9 (T.114, R.37, S.22, 27);

(24) Rice County:

(a) Cannon River Wilderness Area fen, 18 (T.111, R.20, S.34); and

(b) Cannon River Wilderness Area fen, 73 (T.111, R.20, S.22);

(25) Scott County:

(a) Savage fen, 22 (T.115, R.21, S.17);

(b) Savage fen, 66 (T.115, R.21, S.16); and

(c) Savage fen, 67 (T.115, R.21, S.17);

(26) Wilkin County:

(a) Anna Gronseth Prairie fen, 47 (T.134, R.45, S.15);

(b) Anna Gronseth Prairie fen, 49 (T.134, R.45, S.10);

(c) Anna Gronseth Prairie fen, 52 (T.134, R.45, S.4);

(d) Rothsay Prairie fen, 46 (T.136, R.45, S.33);

(e) Rothsay Prairie fen, 50 (T.135, R.45, S.15, 16); and

(f) Rothsay Prairie fen, 51 (T.135, R.45, S.9);

(27) Winona County: Wiscoy fen, 58 (T.105, R.7, S.15); and

(28) Yellow Medicine County:

(a) Sioux Nation WMA NHR fen, 29 (T.114, R.46, S.17); and

(b) Yellow Medicine fen, 30 (T.115, R.46, S.18).

Subp. 2. **Unlisted restricted outstanding resource value waters.** Until such time that surface waters identified as state or federally designated scenic or recreational river segments and state designated calcareous fens are designated in rule as restricted outstanding resource value waters, the commissioner shall restrict any proposed activity in order to preserve the existing water quality necessary to maintain and protect their exceptional characteristics.

Subp. 3. **Prohibited outstanding resource value waters.** For the purposes of parts 7050.0250 to 7050.0335, the following surface waters are prohibited outstanding resource value waters:

A. waters within the Boundary Waters Canoe Area Wilderness;

B. those portions of Lake Superior north of latitude 47 degrees, 57 minutes, 13 seconds, east of Hat Point, south of the Minnesota-Ontario boundary, and west of the Minnesota-Michigan boundary;

C. waters within Voyageurs National Park;

D. the following scientific and natural areas:

(1) Boot Lake, Anoka County;

(2) Kettle River in Sections 15, 22, 23, T.41, R.20, Pine County;

(3) Pennington Bog, Beltrami County;

(4) Purvis Lake-Ober Foundation, Saint Louis County;

(5) waters within the borders of Itasca Wilderness Sanctuary, Clearwater County;

(6) Iron Springs Bog, Clearwater County;

(7) Wolsfeld Woods, Hennepin County;

(8) Green Water Lake, Becker County;

(9) Black Dog Preserve, Dakota County;

(10) Prairie Bush Clover, Jackson County;

(11) Black Lake Bog, Pine County;

(12) Pembina Trail Preserve, Polk County; and

(13) Falls Creek, Washington County; and

E. the following state and federal designated wild river segments:

(1) Kettle River from the site of the former dam at Sandstone to its confluence with the Saint Croix River; and

(2) Rum River from Ogechie Lake spillway to the northernmost confluence with Lake Onamia.

Subp. 4. **Unlisted prohibited outstanding resource value waters.** Until such time that surface waters identified as state or federally designated wild river segments and surface waters necessary to maintain state designated scientific and natural areas are designated in rule as prohibited outstanding resource value waters, the commissioner shall prohibit any proposed activity that results in a net increase in loading or other causes of degradation.

Subp. 5. **Public hearing.** The commissioner shall provide an opportunity for a hearing before:

A. identifying and establishing additional outstanding resource value waters; or

B. changing the effective date of an outstanding resource value water according to part 7050.0255, subpart 13, item B, subitems (1) and (2).

Statutory Authority: *MS s 115.03; 115.44*

History: *41 SR 545;*
Published Electronically: *November 18, 2019*

7050.0340 [Repealed, 9 SR 913]
Published Electronically: *April 1, 2008*

7050.0350 [Repealed, 9 SR 913]
Published Electronically: *April 1, 2008*

7050.0360 [Repealed, 9 SR 913]
Published Electronically: *April 1, 2008*

7050.0370 [Repealed, 9 SR 913]
Published Electronically: *April 1, 2008*

7050.0380 [Repealed, 9 SR 913]

Published Electronically: *April 1, 2008*

CLASSIFICATIONS

7050.0400 BENEFICIAL USE CLASSIFICATIONS FOR SURFACE WATERS; SCOPE.

Parts 7050.0405 to 7050.0470 classify all surface waters within or bordering Minnesota and designate appropriate beneficial uses for these waters. The use classifications are defined in part 7050.0140.

Statutory Authority: *MS s 115.03; 115.44*

History: *9 SR 914; 12 SR 1810; 32 SR 1699*
Published Electronically: *April 1, 2008*

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*

7050.0410 LISTED WATERS.

Those waters of the state, except wetlands, that are specifically listed in part 7050.0470 are, in addition to any classifications listed in part 7050.0470, also classified as class 3C, 4A, 4B, 5, and 6 waters. Wetlands that are specifically listed in part 7050.0470 are, in addition to any classifications listed in part 7050.0470, also classified as class 3D, 4C, 5, and 6 waters.

Statutory Authority: *MS s 115.03; 115.44*

History: *9 SR 914; 18 SR 2195*
Published Electronically: *December 9, 2016*

7050.0420 TROUT WATERS.

Trout lakes identified in part 6264.0050, subpart 2, as amended through June 14, 2004, are classified as trout waters and are listed under part 7050.0470. Trout streams and their tributaries within the sections specified that are identified in part 6264.0050, subpart 4, as amended through June 14, 2004, are classified as trout waters. Trout streams are listed in part 7050.0470. Other lakes that are classified as trout waters are listed in part 7050.0470. All waters listed in part 7050.0470 as class 1B, 2A, and 3B are also classified as class 4A, 4B, 5, and 6 waters.

Statutory Authority: *MS s 115.03; 115.44*

History: *9 SR 914; 12 SR 1810; 15 SR 1057; 18 SR 2195; 24 SR 1105; 32 SR 1699*
Published Electronically: *December 9, 2016*

7050.0425 UNLISTED WETLANDS.

Those waters of the state that are wetlands as defined in part 7050.0186, subpart 1a, and that are not listed in part 7050.0470 are classified as class 2D, 3D, 4C, 5, and 6 waters.

Statutory Authority: *MS s 115.03; 115.44*

History: *18 SR 2195; 32 SR 1699*
Published Electronically: *December 9, 2016*

7050.0430 UNLISTED WATERS.

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, 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.

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

C. All wetlands in the Boundary Waters Canoe Area Wilderness [11/5/84P] 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 2Bg, 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.

Statutory Authority: *MS s 115.03; 115.44*

History: *9 SR 914; 12 SR 1810; 18 SR 2195; 32 SR 1699; 42 SR 441*
Published Electronically: *November 20, 2017*

7050.0440 OTHER CLASSIFICATIONS SUPERSEDED.

Parts 7050.0400 to 7050.0470 supersede any other previous classifications and any classifications in other rules.

Statutory Authority: *MS s 115.03; 115.44*

History: *9 SR 914; 12 SR 1810; 32 SR 1699*
Published Electronically: *April 1, 2008*

7050.0450 MULTICLASSIFICATIONS.

All surface waters of the state are classified in more than one class and all the water quality standards for each of the classes apply. If the water quality standards for particular parameters for the various classes are different, the more restrictive of the standards apply.

Statutory Authority: *MS s 115.03; 115.44*

History: *9 SR 914; 32 SR 1699*
Published Electronically: *April 1, 2008*

7050.0460 WATERS SPECIFICALLY CLASSIFIED; EXPLANATION OF LISTINGS IN PART 7050.0470.

Subpart 1. **Explanation of listings.** The waters of the state listed in part 7050.0470 are classified as specified. The location of 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 listed in part 7050.0470. See parts 7050.0425 and 7050.0430 for the classifications of waters not listed.

Subp. 2. **Outstanding international waters.** The waters listed in part 7050.0470, subpart 1, that are not designated as outstanding resource value waters or classified as class 7 waters are designated as outstanding international resource waters under part 7052.0300, subpart 3. Unlisted waters classified in part 7050.0430 and unlisted wetlands classified in part 7050.0425 that are located in the Lake Superior basin are also designated as outstanding international resource waters under part 7052.0300, subpart 3.

Subp. 3. **Abbreviations and symbols.** The listings in part 7050.0470 include the following abbreviations and symbols:

T., R., S. means township, range, and section, respectively.

An asterisk (*) preceding the name of the water body means the water body is an outstanding resource value water.

[month/day/year/letter code] following the name of the outstanding resource value water in brackets is the effective date the water resource was designated as an outstanding resource value water. The letter code (P or R) indicates the applicable discharge restrictions in part 7050.0265, subpart 6 or 7, or 7050.0270, subpart 5 or 6. The letter code P corresponds to the prohibited discharges provision in part 7050.0265, subpart 7, or 7050.0270, subpart 6. The letter code R corresponds to the restricted discharges provision in part 7050.0265, subpart 6, or 7050.0270, subpart 5.

[WR] following the name of the water body means the water body is designated as a wild rice water in part 7050.0470, subpart 1.

Class 2Bd waters are class 2B waters also protected for domestic consumption purposes (class 1). Applicable standards for class 2Bd waters are listed in part 7050.0222, subparts 3 and 3a.

Statutory Authority: *MS s 115.03; 115.44*

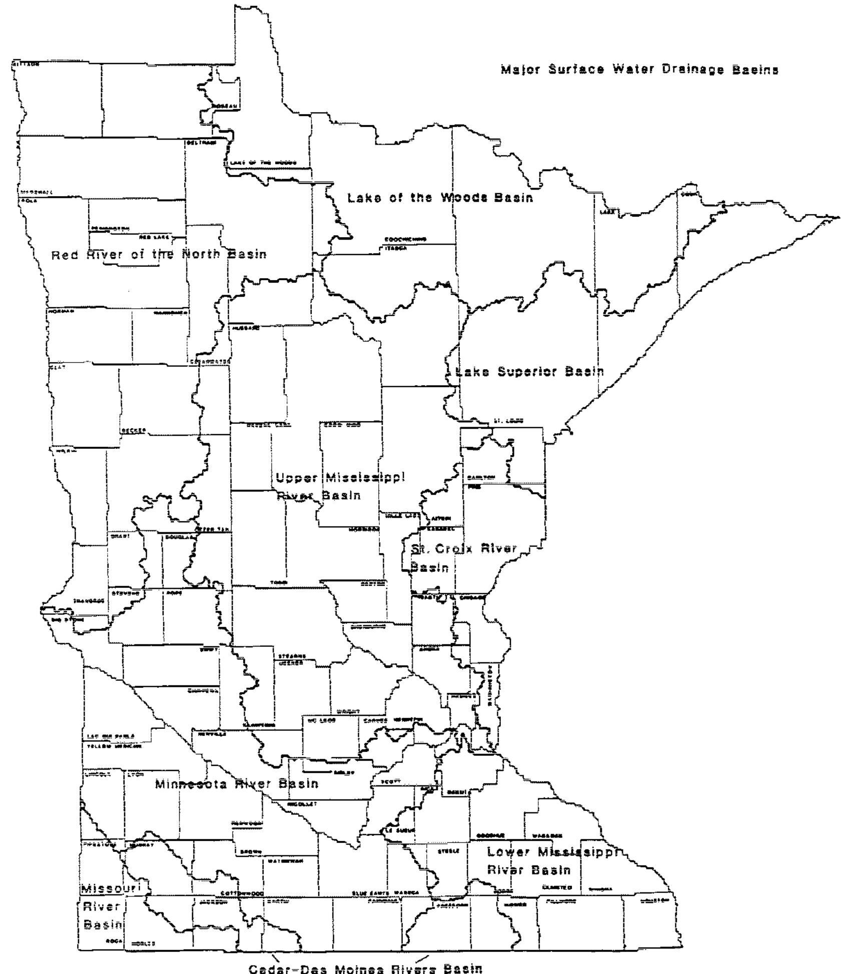
History: *9 SR 914; 12 SR 1810; 15 SR 1057; 18 SR 2195; 22 SR 1466; 32 SR 1699; 9 SR 914; 12 SR 1810; 15 SR 1057; 18 SR 2195; 22 SR 1466; 32 SR 1699; 41 SR 545; 9 SR 914; 12 SR 1810; 15 SR 1057; 18 SR 2195; 22 SR 1466; 32 SR 1699; 41 SR 545; 42 SR 441*

Published Electronically: *November 20, 2017*

7050.0465 [Repealed, 18 SR 2195]

Published Electronically: *April 1, 2008*

7050.0466 MAP: MAJOR SURFACE WATER DRAINAGE BASINS.

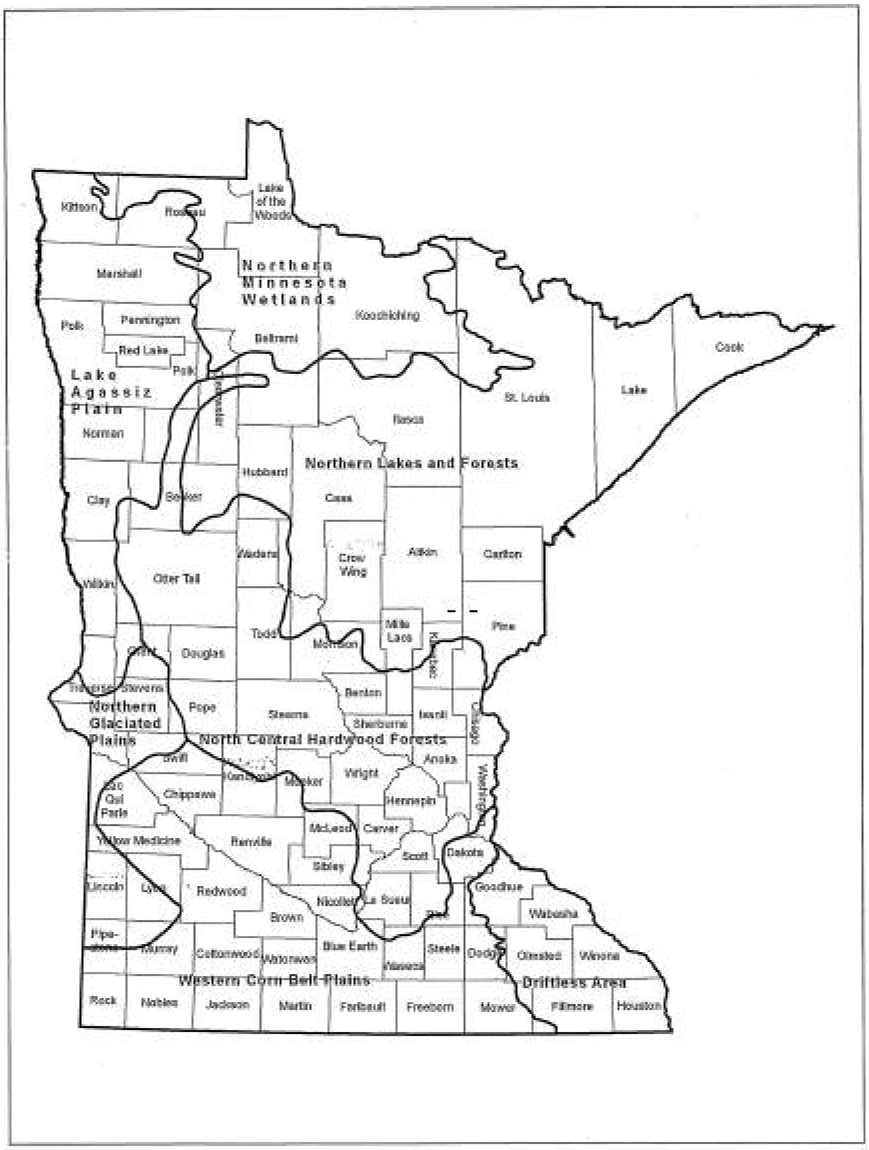


Statutory Authority: *MS s 115.03; 115.44*

History: *18 SR 2195*
Published Electronically: *April 1, 2008*

7050.0467 [Repealed, 39 SR 154]
Published Electronically: *August 14, 2014*

7050.0468 MAP: MINNESOTA ECOREGIONS.



Statutory Authority: *MS s 115.03*

History: *39 SR 154*

Published Electronically: *August 14, 2014*

7050.0469 MAP: MINNESOTA'S MAJOR WATERSHEDS.

Major Watersheds in Minnesota

Statutory Authority: *MS s 115.03; 115.44*

History: *42 SR 441*

Published Electronically: *November 20, 2017*

7050.0470 CLASSIFICATIONS FOR SURFACE WATERS IN MAJOR DRAINAGE BASINS.

Subpart 1. **Lake Superior basin.** The water-use classifications for the stream reaches within each of the major watersheds in the Lake Superior basin listed in item A are found in tables entitled "Beneficial Use Designations for Stream Reaches" published on the website of the Minnesota Pollution Control Agency at www.pca.state.mn.us/regulations/minnesota-rulemaking. 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 Lake Superior basin are as identified in items 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).

A. Streams (by eight-digit hydrologic unit code):

(1) 04010101 Lake Superior - North (August 9, 2016);

(2) 04010102 Lake Superior - South (August 9, 2016);

(3) 04010201 St. Louis River (August 9, 2016);

(4) 04010202 Cloquet River (August 9, 2016); and

(5) 04010301 Nemadji River (August 9, 2016).

B. Lakes:

(1) *Alder Lake, 16-0114-00, [11/5/84P] (T.64, R.1E): 1B, 2A, 3B;

(2) *Alton Lake, 16-0622-00, [11/5/84P] (T.62, 63, R.4, 5): 1B, 2A, 3B;

(3) Artichoke Lake, 69-0623-00, [WR] (T.52, R.17, S.17, 18, 19, 20): 2B, 3B;

(4) Bath Lake, 16-0164-00, (T.62, R.1W, S.5, 6; T.63, R.1W, S.31, 32): 1B, 2A, 3B;

(5) Bean Lake (lower Twin), 38-0409-00, (T.56, R.8W, S.25, 26): 1B, 2A, 3B;

(6) Bear Lake (see Twin Lake, upper);

(7) Bearskin Lake, East, 16-0146-00, (T.64, R.1E, 1W): 1B, 2A, 3B;

(8) *Bearskin Lake, West, 16-0228-00, [3/7/88R] (T.64, 65, R.1): 1B, 2A, 3B;

(9) *Bench Lake, 16-0063-00, [11/5/84P] (T.64, 2E, S.6): 1B, 2A, 3B;

(10) Benson Lake, 38-0018-00, (T.58, R.6W, S.29): 1B, 2A, 3B;

(11) *Birch Lake, 16-0247-00, [3/7/88R] (T.65, R.1, 2): 1B, 2A, 3B;

(12) *Black Lake, 58-0001-00, [3/7/88P] (T.45, R.15): 1B, 2Bd, 3B;

(13) Bluebill Lake, 38-0261-00, [WR] (T.59, R.7, S.15): 2B, 3B;

(14) Bogus Lake, 16-0050-00, (T.62, R.2E, S.12): 1B, 2A, 3B;

(15) Bone Lake, 38-0065-00, (T.61, R.6W, S.13, 14): 1B, 2A, 3B;

(16) Bow Lake, 16-0211-00, (T.64, R.1W, S.15): 1C, 2Bd, 3C;

(17) Boys Lake, 16-0044-00, (T.62, R.2E, S.5, 8): 1B, 2A, 3B;

(18) Breda Lake, 69-0037-00, [WR] (T.56, R.12, S.16): 2B, 3B;

(19) Briar Lake, 69-0128-00, (T.53, R.13W, S.14, 15, 23): 1B, 2A, 3B;

(20) *Brule Lake, 16-0348-00, [11/5/84P] (T.63, R.2, 3): 1B, 2A, 3B;

(21) Cabin Lake, 38-0260-00, [WR] (T.59, R.7, S.13, 14, 23, 24): 2B, 3B;

(22) Canton Mine Pit Lake, 69-1294-00, (T.58, R.16, S.2, 3): 1C, 2Bd, 3C;

(23) Caribou Lake, 16-0360-00, [WR] (T.60, R.3W, S.1, 2, 11, 12; T.61, R.3W, S.35, 36): 2B, 3B;

(24) Carrot Lake, 16-0071-00, (T.64, R.2E, S.17): 1B, 2A, 3B;

(25) Cedar Lake, 69-0431-00, (T.58, R.15W, S.20): 1B, 2A, 3B;

(26) Chester Lake, 69-0033-00, (T.64, R.3E, S.32, 33): 1B, 2A, 3B;

(27) Christine Lake, 16-0373-00, [WR] (T.61, R.3W, S.28, 29, 32): 2B, 3B;

(28) Clearwater Lake (Clear Lake), 69-0397-00, (T.52, R.15W, S.23): 1B, 2A, 3B;

(29) *Clearwater Lake (Emby Lake), 16-0139-00, [11/5/84P] (T.65, R.1E): 1B, 2A, 3B;

(30) Colby Lake, 69-0249-00, (T.58, R.14): 1B, 2Bd, 3C;

(31) *Cone Lake, 16-0412-00, North, [11/5/84P] (T.63, 64, R.3): 1B, 2A, 3B;

(32) Corona Lake, 09-0048-00, (T.48, R.19W, S.11, 12): 1B, 2A, 3B;

(33) Corsica Mine Pit Lake, 69-1316-00, (T.58, R.16, S.18): 1C, 2Bd, 3C;

(34) Crosscut Lake, 38-0257-00, (T.59, R.7W, S.7, 18): 1B, 2A, 3B;

(35) *Crystal Lake, 16-0090-00, [11/5/84P] (T.64, R.1E, 2E): 1B, 2A, 3B;

(36) *Daniels Lake, 16-0150-00, [11/5/84P] (T.65, R.1E, 1W): 1B, 2A, 3B;

(37) *Davis Lake, 16-0435-00, [11/5/84P] (T.64, R.3): 1B, 2A, 3B;

(38) Devilfish Lake, 16-0029-00, (T.64, R.3E): 1B, 2A, 3B;

(39) Divide (Towhey) Lake, 38-0256-00, (T.59, R.7W, S.7, 8): 1B, 2A, 3B;

(40) Duke Lake, 16-0111-00, (T.63, R.1E, S.30): 1B, 2A, 3B;

(41) *Duncan Lake, 16-0232-00, [11/5/84P] (T.65, R.1): 1B, 2A, 3B;

(42) *Dunn Lake, 16-0245-00, [11/5/84P] (T.65, R.1, 2): 1B, 2A, 3B;

(43) East Lake, 38-0020-00, (T.59, R.6W, S.1, 2): 1B, 2A, 3B;

(44) *Echo Lake, 38-0028-00, [3/7/88R] (T.59, R.6, S.14, 15, 22, 23): 1B, 2A, 3B;

(45) Elbow Lake, Little, 69-1329-00, (T.57, R.18W, S.9, 10, 16): 1B, 2A, 3B;

(46) Embarrass Mine Pit (Sabin Lake or Lake Mine), 69-0429-00, (T.58, R.15W, S.5, 6): 1B, 2A, 3B;

(47) Esther Lake, 16-0023-00, (T.63, R.3E, S.6; T.64, R.3E, S.31): 1B, 2A, 3B;

(48) *Fan Lake (West Lily), 16-0084-00, [11/5/84P] (T.65, R.2E): 1B, 2Bd, 3A;

(49) Feather Lake, 16-0905-00, (T.61, R.5W, S.35): 1B, 2A, 3B;

(50) Flour Lake, 16-0147-00, (T.64, R.1E, 1W): 1B, 2A, 3B;

(51) Fourmile Lake, 16-0639-00, [WR] (T.60, R.5W, S.4, 8, 9, 10, 16, 17): 2B, 3B;

(52) Fowl Lake, North, 16-0036-00, (T.64, 65, R.3E): 1B, 2Bd, 3A;

(53) Fowl Lake, South, 16-0034-00, (T.64, 65, R.3E): 1B, 2Bd, 3A;

(54) Fraser Mine Pit Lake, (T.58, R.20, S.23): 1C, 2Bd, 3C, until the city of Chisholm no longer uses Fraser Mine Pit Lake as a water supply source for its public water system, and then the classification is identified in part 7050.0430;

(55) *Gadwall Lake (Gadwell Lake), 16-0060-00, [11/5/84P] (T.64, R.2E, S.3): 1B, 2A, 3B;

(56) *Gaskin Lake, 16-0319-00, [11/5/84P] (T.64, R.2): 1B, 2A, 3B;

(57) *Gogebic Lake, 16-0087-00, [11/5/84P] (T.65, R.2E, S.30, 31): 1B, 2A, 3B;

(58) Goldeneye (Duck) Lake, 38-0029-00, (T.59, R.6W, S.15): 1B, 2A, 3B;

(59) *Greenwood Lake, 16-0077-00, [3/7/88R] (T.64, R.2E): 1B, 2A, 3B;

(60) Hay Lake, 69-0435-00, [WR] (T.59, R.15, S.8): 2B, 3B;

(61) Hungry Jack Lake, 16-0227-00, (T.64, 65, R.1): 1B, 2A, 3B;

(62) Jim Lake (Jerry Lake), 16-0135-00, (T.64, R.1E): 1B, 2A, 3B;

(63) Judson Mine Pit, 69-1295-00, (T.58, R.19W, S.20, 29): 1B, 2A, 3B;

(64) Junco Lake, 16-0159-00, (T.62, R.1W, S.11, 12, 13): 1B, 2A, 3B;

(65) *Kemo Lake, 16-0188-00, [3/7/88R] (T.63, R.1): 1B, 2A, 3B;

(66) Kimball Lake, 16-0045-00, (T.62, R.2E, S.7, 8, 17): 1B, 2A, 3B;

(67) Leo Lake, 16-0198-00, (T.64, R.1W, S.4, 5): 1B, 2A, 3B;

(68) Lieung (Lieuna) Lake, 69-0123-00, [WR] (T.53, R.13, S.3, 4, 9, 10): 2B, 3B;

(69) *Lily Lakes (Vaseux Lake and Fan Lake), 16-0083-00 and 16-0084-00, [11/5/84P] (T.65, R.2E): 1B, 2Bd, 3A;

(70) Lima Lake, 16-0226-00, (T.64, R.1W, S.35): 1B, 2A, 3B;

(71) *Lizz Lake, 16-0199-00, [11/5/84P] (T.64, R.1W, S.7, 18): 1B, 2A, 3B;

(72) Loaine (Sand) Lake, 69-0016-00, (T.54, R.12W, S.16, 17): 1B, 2A, 3B;

(73) Loft Lake, 16-0031-00, (T.64, R.3E, S.21): 1B, 2A, 3B;

(74) Long Lake, 69-0044-00, [WR] (T.57, R.12, S.4, 5; T.58, R.12, S.32, 33): 2B, 3B;

(75) Margaret Lake, 16-0896-00, (T.64, R.3E, S.27, 28, 33, 34): 1B, 2A, 3B;

(76) Marsh Lake, 16-0488-00, [WR] (T.62, R.4W, S.22, 23, 27, 28): 2B, 3B;

(77) McFarland Lake, 16-0027-00, (T.64, R.3E): 1B, 2A, 3B;

(78) Mesabi (Missabe) Mountain Mine Pit Lake, 69-1292-00, (T.58, R.17, S.8): 1C, 2Bd, 3C;

(79) Mink Lake, 16-0046-00, (T.62, R.2E, S.8): 1B, 2A, 3B;

(80) Mirror Lake, 69-0234-00, (T.52, R.14W, S.19, 30): 1B, 2A, 3B;

(81) *Misquah Lake, 16-0225-00, [11/5/84P] (T.64, R.1): 1B, 2A, 3B;

(82) Moore Lake, 16-0489-00, [WR] (T.62, R.4W, S.23, 24): 2B, 3B;

(83) Moosehorn Lake, 16-0015-00, (T.63, R.3E, S.36; T.63, R.4E, S.31): 1B, 2A, 3B;

(84) *Moose Lake, 16-0043-00, [11/5/84P] (T.65, R.2E, 3E): 1B, 2A, 3A;

(85) Morton Mine Pit Lake, 69-1310-00, (T.57, R.21, S.10, 11, 14): 1C, 2Bd, 3C;

(86) *Moss Lake, 16-0234-00, [3/7/88R] (T.65, R.1): 1B, 2A, 3B;

(87) *Mountain Lake, 16-0093-00, [11/5/84P] (T.65, R.1E, 2E): 1B, 2A, 3B;

(88) Muckwa Lake, 16-0105-00, (T.63, R.1E, S.21, 28): 1B, 2A, 3B;

(89) *Mulligan Lake, 16-0389-00, [11/5/84P] (T.63, R.3W, S.1, 12): 1B, 2A, 3B;

(90) Musquash Lake, 16-0104-00, (T.63, R.1E, S.20, 28, 29): 1B, 2A, 3B;

(91) Normanna Lake, 69-0122-00, (T.52, R.13W, S.7, 8): 1B, 2A, 3B;

(92) Northern Light Lake, 16-0089-00, [WR] (T.63, R.2E, S.29, 30, 31, 32, 33; T.63, R.1E, S.25): 2B, 3B;

(93) Olga Lake, 16-0024-00, (T.63, R.3E, S.6; T.64, R.3E, S.31): 1B, 2A, 3B;

(94) Olson Lake, 16-0158-00, (T.62, R.1W, S.9, 16): 1B, 2A, 3B;

(95) *Onega Lake (Omega Lake), 16-0353-00, [11/5/84P] (T.64, R.2, 3): 1B, 2A, 3B;

(96) *Otto Lake, lower (South Otto), 16-0323-00, [11/5/84P] (T.64, R.2): 1B, 2A, 3B;

(97) Pancore (Lost) Lake, 16-0475-00, (T.61, R.4W, S.22, 27): 1B, 2A, 3B;

(98) Papoose Lake, 69-0024-00, [WR] (T.55, R.12, S.9): 2B, 3B;

(99) *Partridge Lake, 16-0233-00, [11/5/84P] (T.65, R.1): 1B, 2A, 3B;

(100) *Pemmican Lake, 16-0085-00, [11/5/84P] (T.65, R.2E, S.22): 1B, 2A, 3B;

(101) *Pike Lake, West, 16-0086-00, [11/5/84P] (T.65, R.2E): 1B, 2A, 3B;

(102) Pine Lake, 16-0194-00, (T.63, R.1W, S.35, 36): 1B, 2A, 3B;

(103) *Pine Lake, 16-0041-00, [11/5/84P] (T.64, 65, R.1E, 2E, 3E): 1B, 2A, 3B;

(104) Pine Mountain Lake, 16-0108-00, (T.63, R.1E, S.26, 27, 34, 35): 1B, 2A, 3B;

(105) Poplar Lake, 16-0239-00, (T.64N, R.1, 2W): 1C, 2Bd, 3C;

(106) *Ptarmigan Lake, 16-0183-00, [11/5/84P] (T.63, R.1, S.20, 29): 1B 2Bd, 3B;

(107) *Ram Lake, 16-0174-00, [11/5/84P] (T.63, R.1W, S.9, 10): 1B, 2A, 3B;

(108) Rice Lake, 16-0453-00, [WR] (T.61 R.3W, S.7; T.61, R.4W, S.2, 11, 12): 2B, 3B;

(109) *Rose Lake, 16-0230-00, [11/5/84P] (T.65, R.1): 1B, 2A, 3B;

(110) Round Island Lake, 38-0417-00 [WR] (T.59, R.8, S.12): 2B, 3B;

(111) Round Lake, 69-0048-00, [WR] (T.58, R.12, S.25, 26): 2B, 3B;

(112) St. James Mine Pit, 69-0428-00, (T.58, R.15W, S.3, 4): 1C, 2Bd, 3C;

(113) Saint Mary's Lake, 69-0651-00, (T.57, R.17, S.9, 16, 17): 1C, 2Bd, 3C;

(114) *Sawbill Lake, 16-0496-00, [11/5/84P] (T.62, 63, R.4): 1B, 2Bd, 3B;

(115) Section 8 Lake, 38-0258-00, (T.59, R.7W, S.8): 1B, 2A, 3B;

(116) Seven Beaver Lake, 69-0002-00, [WR] (T.58, R.11, 12): 2B, 3A;

(117) Shady, North, Lake, 16-0076-00, (T.64, R.2E, S.21, 22): 1B, 2A, 3B;

(118) Shoe Lake, 16-0080-00, (T.64, 2E, S.30): 1B, 2A, 3B;

(119) Sled Lake, 16-0897-00, (T.63, R.1W, S.3): 1B, 2A, 3B;

(120) *Sock Lake, 16-0335-00, [11/5/84P] (T.65, R.2W, S.26): 1B, 2A, 3B;

(121) Sonju Lake, 38-0248-00, (T.58, R.7W, S.27, 28): 1B, 2A, 3B;

(122) *South Lake, 16-0244-00, [11/5/84P] (T.65, R.1, 2): 1B, 2A, 3B;

(123) Spring Hole Lake, 69-1372-00, (T.55, R.14W, S.14): 1B, 2A, 3B;

(124) *State Lake, 16-0293-00, [11/5/84P] (T.63, 64, R.2): 1B, 2A, 3B;

(125) Steer Lake, 38-0920-00, (T.60, R.6W, S.32): 1B, 2A, 3B;

(126) Stone Lake, 69-0686-00, [WR] (T.55, R.17, S.6; T.55, R.18, S.1; T.56, R.17, S.31; T.56, R.18, S.36): 2B, 3B;

(127) Stone Lake (Skibo Lake), 69-0046-00, [WR] (T.58, R.12, S.17, 19, 20): 2B, 3B;

(128) Stone Lake (Murphy Lake or Tommila Lake), 69-0035-00, [WR] (T.56, R.12, S.13, 24): 2B, 3B;

(129) *Superior, Lake, excluding the portions identified in subitem (130) 16-0001-00, [11/5/84R] (T.49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, R.14W-7E): 1B, 2A, 3A;

(130) *Superior, Lake, 16-0001-00, [3/9/98P] (those portions of Lake Superior north of latitude 47 degrees, 57 minutes, 13 seconds, east of Hat Point, south of the Minnesota-Ontario boundary, and west of the Minnesota-Michigan boundary): 1B, 2A, 3A;

(131) Swamp River (Reservoir), 16-0901-00, [WR] (T.63, R.4E, S.4; T.64, R.4E, S.33): 2B, 3B;

(132) *Swan Lake, 16-0268-00, [11/5/84P] (T.63, R.2): 1B, 2A, 3B;

(133) Talus Lake, 16-0187-00, (T.63, R.1W, S.26, 27): 1B, 2A, 3B;

(134) Thompson Lake, 16-0160-00, (T.62, R.1W, S.19, 20, 29, 30): 1B, 2A, 3B;

(135) Thrasher Lake, 16-0192-00, (T.63, R.1W, S.31): 1B, 2A, 3B;

(136) Thrush Lake, 16-0191-00, (T.63, R.1W, S.31): 1B, 2A, 3B;

(137) *Topper Lake, 16-0336-00, [11/5/84P] (T.65, R.2W, S.27): 1B, 2A, 3B;

(138) *Trout Lake, 16-0049-00, [3/7/88R] (T.62, R.2E): 1B, 2A, 3B;

(139) *Trout Lake, Little, 16-0170-00, [11/5/84P] (T.63, R.1): 1B, 2A, 3B;

(140) Turnip Lake, 16-0132-00, (T.64, R.1E, S.24): 1B, 2A, 3B;

(141) Twin Lake, 69-1345-00, (T.50, R.14W, S.28, 33): 1B, 2A, 3B;

(142) *Twin Lake, upper (Bear Lake), 38-0408-00, [3/7/88R] (T.56, R.8, S.25): 1B, 2A, 3B;

(143) unnamed lake, 16-0903-00, (T.63, R.3E, S.20, 21, 28, 29): 1B, 2A, 3B;

(144) unnamed lake, 16-0908-00, (T.63, R.1W, S.31): 1B, 2A, 3B;

(145) *unnamed lake, 16-0237-00, [11/5/84P] (T.63, R.1, S.19, 30; T.63, R.2, S.24, 25): 1B, 2Bd, 3B;

(146) *Vale Lake, 16-0061-00, [11/5/84P] (T.64, R.2E, S.3): 1B, 2A, 3B;

(147) Vaseux Lake (East Lily), see Lily Lakes;

(148) *Vista Lake, 16-0224-00, [11/5/84P] (T.64, R.1): 1B, 2A, 3B;

(149) *Wanihigan Lake (Trap Lake), 16-0349-00, [11/5/84P] (T.63, 64, R.2, 3): 1B, 2A, 3B;

(150) *Wee Lake, 16-0183-00, [11/5/84P] (T.62, R.4W, S.13): 1B, 2A, 3B;

(151) *Wench Lake, 16-0398-00, [11/5/84P] (T.63, R.3W, S.7, 18): 1B, 2A, 3B;

(152) White Pine Lake, 16-0369-00, [WR] (T.61, R.3W, S.19, 20, 29, 30): 2B, 3B; and

(153) *Winchell Lake, 16-0354-00, [11/5/84P] (T.64, R.2, 3): 1B, 2A, 3B.

C. Calcareous fens: none currently listed.

D. Scientific and natural areas: *Black Lake Bog [3/7/88P] waters within the Black Lake Bog Scientific and Natural Area, Pine County, (T.45, R.15, S.18, 19, 30; T.45, R.16, S.13, 24, 25): 2B, 3B, except wetlands, which are 2D.

Subp. 2. **Lake of the Woods basin.** The water-use classifications for the stream reaches within each of the major watersheds in the Lake of the Woods basin listed in item A are found in tables entitled "Beneficial Use Designations for Stream Reaches" published on the website of the Minnesota Pollution Control Agency at www.pca.state.mn.us/regulations/minnesota-rulemaking. 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 Lake of the Woods basin are as identified in items 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).

A. Streams (by eight-digit hydrologic unit code):

(1) 09030001 Rainy River - Headwaters (August 9, 2016);

(2) 09030002 Vermilion River (August 9, 2016);

(3) 09030003 Rainy River - Rainy Lake (August 9, 2016);

(4) 09030005 Little Fork River (August 9, 2016);

(5) 09030006 Big Fork River (August 9, 2016);

(6) 09030007 Rapid River (August 9, 2016);

(7) 09030008 Rainy River - Lower (August 9, 2016); and

(8) 09030009 Lake of the Woods (August 9, 2016).

B. Lakes:

(1) *Adams Lake, 38-0153-00, [11/5/84P] (T.64, R.6): 1B, 2A, 3B;

(2) *Agamok Lake, 38-0011-00, [11/5/84P] (T.65, R.5, 6): 1B, 2A, 3B;

(3) *Ahmakose Lake, 38-0365-00 [11/5/84P] (T.64, R.7): 1B, 2A, 3B;

(4) *Ahsub Lake, 38-0516-00, [11/5/84P] (T.64, R.8W, S.27, 28): 1B, 2A, 3B;

(5) *Alpine Lake, 16-0759-00, [11/5/84P] (T.65, R.5): 1B, 2A, 3B;

(6) *Alruss Lake, 69-0005-00, [11/5/84P] (T.64, R.11W, S.7; T.64, R.12W, S.12): 1B, 2A, 3B;

(7) *Amoeber Lake, 38-0227-00, [11/5/84P] (T.65, R.6, 7): 1B, 2A, 3B;

(8) *Arkose Lake, 38-0382-00, [11/5/84P] (T.64, 65, R.7): 1B, 2A, 3B;

(9) *Ashdick Lake (Caribou Lake), 38-0210-00, [11/5/84P] (T.66, R.6): 1B, 2A, 3B;

(10) *Basswood Lake, 38-0645-00, [11/5/84P] (T.64, 65, R.9, 10): 1B, 2A, 3B;

(11) *Bat Lake, 16-0752-00, [11/5/84P] (T.64, 65, R.5): 1B, 2A, 3B;

(12) *Beartrack Lake, 69-0480-00, [11/5/84P] (T.67, R.15): 1B, 2A, 3B;

(13) *Beaver Lake (Elbow Lake), 38-0223-00, [11/5/84P] (T.63, 64, R.6, 7): 1B, 2A, 3B;

(14) Beaver Hut Lake, 38-0737-00, (T.61, R.10W, S.30, 31; T.61, R.11, S.25, 36): 1B, 2A, 3B;

(15) Beetle Lake, 38-0551-00, (T.60, R.9W, S.7): 1B, 2A, 3B;

(16) Big Lake, 69-0190-00, (T.64, 65, R.13): 1C, 2Bd, 3C;

(17) *Bingshick Lake, 16-0627-00, [11/5/84P] (T.65, R.4, 5): 1B, 2A, 3B;

(18) *Brandt Lake (Brant Lake), 16-0600-00, [11/5/84P] (T.65, R.4): 1B, 2A, 3B;

(19) *Burntside Lake, 69-0118-00, [3/7/88R] (T.63, 64, R.12, 13, 14): 1B, 2A, 3B;

(20) Camp Four (Wessman) Lake, 69-0788-00, (T.59, R.19W, S.4): 1B, 2A, 3B;

(21) *Camp Lake, 38-0789-00, [11/5/84P] (T.64, R.11): 1B, 2Bd, 3B;

(22) *Caribou Lake, 31-0620-00, [3/7/88R] (T.58, R.26): 1B, 2A, 3B;

(23) *Cash Lake, 16-0438-00, [11/5/84P] (T.64, R.3): 1B, 2A, 3B;

(24) Cedar Lake, 38-0810-00, (T.63, R.11, 12): 1C, 2Bd, 3C;

(25) Chant Lake, 69-0172-00, (T.63, R.13W, S.10): 1B, 2A, 3B;

(26) *Cherokee Lake, 16-0524-00, [11/5/84P] (T.63, 64, R.4): 1B, 2A, 3B;

(27) *Cherry Lake, 38-0166-00, [11/5/84P] (T.65, R.6): 1B, 2A, 3B;

(28) *Conchu Lake, 38-0720-00, [11/5/84P] (T.63, R.10W, S.21, 22): 1B, 2A, 3B;

(29) *Crab Lake (includes West Crab Lake, 69-0297-00), 69-0220-00, [11/5/84P] (T.63, R.13, 14): 1B, 2A, 3B;

(30) Crab Lake, 16-0357-00, (T.65, R.2, 3): 1B, 2A, 3B;

(31) Crane Lake, 69-0616-00, (T.67, 68, R.16, 17): 1B, 2A, 3A;

(32) *Crooked Lake, 16-0723-00, [11/5/84P] (T.64, R.5): 1B, 2A, 3B;

(33) *Crooked Lake, 38-0817-00, [11/5/84P] (T.66, R.11, 12): 1B, 2A, 3B;

(34) *Cruiser Lake (Trout Lake), 69-0832-00, [11/5/84P] (T.69, 70, R.19): 1B, 2A, 3B;

(35) Cub Lake, 69-1318-00, (T.61, R.14W, S.2): 1B, 2A, 3B;

(36) Dan Lake, 38-0853-00, (T.63, R.10W, S.17): 1B, 2A, 3B;

(37) Deepwater Lake, 69-0858-00, (T.59, R.20W, S.2): 1B, 2A, 3B;

(38) Dry Lake, 69-0064-00, (T.63, R.12W, S.9): 1B, 2A, 3B;

(39) Dry Lake, Little, 69-1040-00, (T.63, R.12W, S.9): 1B, 2A, 3B;

(40) *Eddy Lake, 38-0187-00, [11/5/84P] (T.65, R.6): 1B, 2A, 3B;

(41) Eikela Lake, 38-0677-00, (T.60, R.10W, S.22): 1B, 2A, 3B;

(42) Ennis Lake, 38-0634-00, (T.64, R.9W, S.33): 1B, 2A, 3B;

(43) Erskine Lake, 31-0311-00, (T.61, R.24W, S.2, 3): 1B, 2A, 3B;

(44) *Ester Lake (Gnig Lake), 38-0207-00, [11/5/84P] (T.65, 66, R.6): 1B, 2A, 3B;

(45) *Eugene Lake, 69-0473-00, [11/5/84P] (T.67, R.15): 1B, 2A, 3B;

(46) *Explorer Lake (South Three Lake), 38-0399-00, [11/5/84P] (T.64, R.7, 8): 1B, 2A, 3B;

(47) Extortion Lake, 16-0450-00, (T.65, R.3W, S.31, 32): 1B, 2A, 3B;

(48) Fall Lake, 38-0811-00, (T.63, 64, R.11, 12): 1B, 2Bd, 3C;

(49) Farm Lake, 38-0779-00, (T.62, 63, R.11): 1C, 2Bd, 3C;

(50) *Fat Lake, 69-0481-00, [11/5/84P] (T.67, R.15): 1B, 2A, 3B;

(51) *Fay Lake, 16-0783-00, [11/5/84P] (T.65, R.5): 1B, 2A, 3B;

(52) Fenske Lake, 69-0085-00, (T.64, R.12, S.29, 30, 32): 1C, 2Bd, 3C;

(53) *Fern Lake, 16-0716-00, [11/5/84P] (T.64, R.5): 1B, 2A, 3B;

(54) *Fern Lake, West, 16-0718-00, [11/5/84P] (T.64, R.5): 1B, 2A, 3B;

(55) *Finger Lake, 69-0348-00, [11/5/84P] (T.67, R.14): 1B, 2A, 3B;

(56) *Fishdance Lake, 38-0343-00, [11/5/84P] (T.63, R.7): 1B, 2A, 3B;

(57) *Found Lake, 38-0620-00, [11/5/84P] (T.64, R.9W, S.10, 15): 1B, 2A, 3B;

(58) *Fraser Lake, 38-0372-00, [11/5/84P] (T.64, R.7): 1B, 2A, 3B;

(59) *French Lake, 16-0755-00, [11/5/84P] (T.64, 65, R.5): 1B, 2A, 3B;

(60) *Frost Lake, 16-0571-00, [11/5/84P] (T.64, R.4): 1B, 2A, 3B;

(61) *Gabimichigami Lake, 16-0811-00, [11/5/84P] (T.64, 65, R.5, 6): 1B, 2A, 3B;

(62) *Ge-Be-On-Equat Lake, 69-0350-00, [11/5/84P] (T.67, R.14): 1B, 2A, 3B;

(63) *Gijikiki Lake (Cedar Lake), 38-0209-00, [11/5/84P] (T.65, 66, R.6): 1B, 2A, 3B;

(64) *Gillis Lake, 16-0753-00, [11/5/84P] (T.64, 65, R.5): 1B, 2A, 3B;

(65) Glacier Pond No. 1, 38-0712-00, (T.63, R. 10W, S.11): 1B, 2A, 3B;

(66) Glacier Pond No. 2, 38-0712-02, (T.63, R.10W, S.11): 1B, 2A, 3B;

(67) *Gordon Lake, 16-0569-00, [11/5/84P] (T.64, R.4): 1B, 2A, 3B;

(68) Gull Lake, 16-0632-00, (T.66, R.4, 5): 1C, 2Bd, 3C;

(69) *Gun Lake, 69-0487-00, [11/5/84P] (T.67, 68, R.15): 1B, 2A, 3B;

(70) *Gunflint Lake, 16-0356-00, [3/7/88R] (T.65, R.2, 3, 4): 1B, 2A, 3B;

(71) Gunflint Lake, Little, 16-0330-00, (T.65, R.2): 1B, 2Bd, 3C;

(72) Gypsy Lake, 38-0665-00, (T.60, R.10W, S.6, 7): 1B, 2A, 3B;

(73) Hanson Lake, 69-0189-00, (T.64, R.13W, S.36): 1B, 2A, 3B;

(74) *Hanson Lake, 38-0206-00, [11/5/84P] (T.65, 66, R.6): 1B, 2A, 3B;

(75) High Lake, 69-0071-00, (T.63, R.12W, S.3, 4, 5; T.64, R.12W, S.33, 34): 1B, 2A, 3B;

(76) Hogback (Twin or Canal) Lake, 38-0057-01 and 38-0057-02, (T.60, R.6W, S.31): 1B, 2A, 3B;

(77) *Holt Lake, 38-0178-00, [11/5/84P] (T.65, R.6): 1B, 2A, 3B;

(78) *Howard Lake, 16-0789-00, [11/5/84P] (T.65, R.5): 1B, 2A, 3B;

(79) *Hustler Lake, 69-0343-00, [11/5/84P] (T.66, 67, R.14): 1B, 2A, 3B;

(80) *Ima Lake (Slate Lake), 38-0400-00, [11/5/84P] (T.64, R.7, 8): 1B, 2A, 3B;

(81) Indian Lake, 38-0440-00, (T.60, R.8W, S.35): 1B, 2A, 3B;

(82) *Jacob (Louis) Lake, 69-0077-00, [11/5/84P] (T.64, R.12W, S.11, 12): 1B, 2A, 3B;

(83) James (Jammer) Lake, 69-0734-00, (T.60, R.18W, S.27): 1B, 2A, 3B;

(84) Jasper Lake, 38-0641-00, (T.63, 64, R.9, 10): 1C, 2Bd, 3C;

(85) *Jasper Lake, 16-0768-00, [11/5/84P] (T.65, R.5): 1B, 2A, 3B;

(86) *Johnson Lake, 69-0691-00, [3/7/88R] (T.67, 68, R.17, 18): 1B, 2A, 3B;

(87) Jouppi Lake, 38-0909-00, (T.59, R.8W, S.14, 22, 23): 1B, 2A, 3B;

(88) Judd Lake, 38-0615-00, (T.63, R.9W, S.4, 5; T.64, R.9W, S.32, 33): 1B, 2A, 3B;

(89) *Kabetogama Lake, 69-0845-00, [11/5/84P] (T.69, 70, R.19, 20, 21, 22): 1B, 2Bd, 3A;

(90) *Karl Lake, 16-0461-00, [11/5/84P] (T.64, R.3, 4): 1B, 2A, 3B;

(91) *Kek Lake, Little, 38-0228-00, [11/5/84P] (T.65, R.6, 7): 1B, 2A, 3B;

(92) *Kekekabic Lake, 38-0226-00, [11/5/84P] (T.64, 65, R.6, 7): 1B, 2A, 3B;

(93) *Knife Lake, 38-0404-00, [11/5/84P] (T.65, R.6, 7, 8): 1B, 2A, 3B;

(94) *Lake of the Clouds Lake (Dutton Lake), 38-0169-00, [11/5/84P] (T.65, R.6): 1B, 2A, 3B;

(95) Lake of the Woods, 39-0002-00, (T.161, 162, 163, 164, 165, 166, 167, 168, R.30, 31, 32, 33, 34, 35, 36): 1B, 2Bd, 3A;

(96) Lake Vermilion, 69-0378-00, (T.61, 62, 63, R.14, 15, 16, 17, 18): 1C, 2Bd, 3C;

(97) *Larson Lake, 31-0317-00, [3/7/88R] (T.61, R.24W, S.16, 21): 1B, 2A, 3B;

(98) Little Long Lake, 69-0066-00, (T.63, R.12): 1C, 2Bd, 3C;

(99) *Long Island Lake, 16-0460-00, [11/5/84P] (T.64, R.3, 4): 1B, 2A, 3B;

(100) *Loon Lake, 16-0448-00, [3/7/88R] (T.65, R.3): 1B, 2A, 3B;

(101) *Loon Lake, 69-0470-00, [11/5/84P] (T.66, 67, R.15): 1B, 2A, 3B;

(102) *Lunar Lake (Moon Lake), 38-0168-00, [11/5/84P] (T.65, R.6): 1B, 2A, 3B;

(103) *Lynx Lake, 69-0383-00, [11/5/84P] (T.66, R.14, 15): 1B, 2A, 3B;

(104) *Magnetic Lake, 16-0463-00, [3/7/88R] (T.65, R.3, 4): 1B, 2A, 3B;

(105) *Makwa Lake (Bear Lake), 38-0147-00, [11/5/84P] (T.64, R.6): 1B, 2A, 3B;

(106) *Marble Lake, 38-0109-00, [11/5/84P] (T.64, R.6): 1B, 2A, 3B;

(107) *Mavis Lake, 16-0528-00, [11/5/84P] (T.64, R.4W, S.4): 1B, 2A, 3B;

(108) *Mayhew Lake, 16-0337-00, [3/7/88R] (T.65, R.2): 1B, 2A, 3B;

(109) *Meditation Lake, 16-0583-00, [11/5/84P] (T.65, R.4W, S.7, 8): 1B, 2A, 3B;

(110) *Mesaba Lake, 16-0673-00, [11/5/84P] (T.63, R.5): 1B, 2A, 3B;

(111) Miner's Mine Pit, 69-1293-00, (T.63, R.12W, S.26, 27, 28): 1B, 2A, 3B;

(112) *Missing Link Lake, 16-0529-00, [11/5/84P] (T.64, R.4W, S.4): 1B, 2A, 3B;

(113) *Missionary Lake (East Three Lake), 38-0398-00, [11/5/84P] (T.64, R.7, 8): 1B, 2A, 3B;

(114) *Moose Lake, 38-0644-00, [11/5/84P] (T.64, R.9, 10): 1B, 2Bd, 3B;

(115) *Mora Lake, 16-0732-00, [11/5/84P] (T.64, R.5): 1B, 2A, 3B;

(116) *Mukooda Lake, 69-0684-00, [11/5/84P] (T.68, R.17): 1B, 2A, 3B;

(117) *Namakan Lake, 69-0693-00, [11/5/84P] (T.69, 70, R.17, 18, 19): 1B, 2Bd, 3A;

(118) *Neglige Lake, 38-0492-00, [11/5/84P] (T.64, R.8W, S.1, 2, 11, 12): 1B, 2A, 3B;

(119) Nickel (Nichols) Lake, 31-0470-00, (T.59, R.25W, S.12): 1B, 2A, 3B;

(120) Norberg Lake, 69-1312-00, (T.61, R.14W, S.1): 1B, 2A, 3B;

(121) *North Lake, 16-0331-00, [3/7/88R] (T.65, R.2): 1B, 2A, 3B;

(122) North Lake, Little, 16-0329-00, (T.65, R.2): 1B, 2Bd, 3C;

(123) Norway Lake, 38-0688-00, (T.61, R.10W, S.3): 1B, 2A, 3B;

(124) *Ogishkemuncie Lake, 38-0180-00, [11/5/84P] (T.65, R.6): 1B, 2A, 3B;

(125) *Ojibway Lake (upper Twin), 38-0640-00, [3/7/88R] (T.63, R.9, 10): 1B, 2A, 3B;

(126) *Owl Lake, 16-0726-00, [11/5/84P] (T.64, R.5): 1B, 2A, 3B;

(127) *Oyster Lake, 69-0330-00, [11/5/84P] (T.66, R.14): 1B, 2A, 3B;

(128) *Paulson Lake, 16-0626-00, [11/5/84P] (T.65, R.4W, S.19; T.65, R.5W, S.24): 1B, 2A, 3B;

(129) Peanut Lake, 38-0662-00, (T.60, R.10W, S.5): 1B, 2A, 3B;

(130) Pelican Lake, 69-0841-00, (T.64, 65, R.19, 20, 21): 1C, 2Bd, 3C;

(131) *Pellet Lake, 16-0592-00, [11/5/84P] (T.65, R.4, S.19, 20): 1B, 2Bd, 3B;

(132) *Peter Lake, 16-0757-00, [11/5/84P] (T.64, 65, R.5): 1B, 2A, 3B;

(133) Pickerel Lake, 69-0934-00, (T.60, R.21W, S.17): 1B, 2A, 3B;

(134) Portage Lake, 16-0327-00, (T.64, R. 2W, S.3, 4, 5; T.65, R.2W, S.33): 1B, 2A, 3B;

(135) *Portage Lake, 38-0524-00, [11/5/84P] (T.65, R.8): 1B, 2A, 3B;

(136) Portage Lake, Little, 16-0297-00, (T.64, R.2W, S.3): 1B, 2A, 3B;

(137) *Powell Lake, 16-0756-00, [11/5/84P] (T.64, 65, R.5): 1B, 2A, 3B;

(138) *Rabbit Lake, 38-0214-00, [11/5/84P] (T.66, R.6): 1B, 2A, 3B;

(139) *Rainy Lake, 69-0694-00, [11/5/84P] (T.70, 71, R.18, 19, 20, 21, 22, 23): 1B, 2Bd, 3A;

(140) *Raven Lake (Lynx Lake), 38-0113-00, [11/5/84P] (T.64, R.6): 1B, 2A, 3B;

(141) *Red Rock Lake, 16-0793-00, [11/5/84P] (T.65, 66, R.5): 1B, 2A, 3B;

(142) Regenbogan Lake, 69-0081-00, (T.64, R.12W, S.18): 1B, 2A, 3B;

(143) *Rog Lake, 16-0765-00, [11/5/84P] (T.65, R.5W, S.16, 17): 1B, 2A, 3B;

(144) *Ruby Lake, Big, 16-0333-00, [11/5/84P] (T.66, R.14): 1B, 2A, 3B;

(145) *Saganaga Lake, 16-0633-00, [11/5/84P] (T.66, 67, R.4, 5): 1B, 2A, 3B;

(146) *Saganaga Lake, Little, 16-0890-00, [11/5/84P] (T.64, R.5, 6): 1B, 2A, 3B;

(147) *Sand Point Lake, 69-0617-00, [11/5/84P] (T.67, 68, 69, R.16, 17): 1B, 2A, 3A;

(148) Scarp (Cliff) Lake, 38-0058-00, (T.60, R.6W, S.31, 32): 1B, 2A, 3B;

(149) *Sea Gull Lake, 16-0629-00, [11/5/84P] (T.65, 66, R.4, 5): 1B, 2A, 3B;

(150) *Sema Lake (Coon Lake), 38-0386-00, [11/5/84P] (T.65, R.7): 1B, 2A, 3B;

(151) Shoo-fly Lake, 38-0422-00, (T.59, R.8W, S.1; T.60, R.8W, S.36): 1B, 2A, 3B;

(152) *Skull Lake, 38-0624-00, [11/5/84P] (T.64, R.9W, S.14): 1B, 2A, 3B;

(153) *Snowbank Lake, 38-0529-00, [11/5/84P] (T.63, 64, R.8, 9): 1B, 2A, 3B;

(154) *Spoon Lake (Fames Lake), 38-0388-00, [11/5/84P] (T.65, R.7): 1B, 2A, 3B;

(155) *Spring Lake, 69-0761-00, [3/7/88R] (T.68, R.18): 1B, 2A, 3B;

(156) Steamhaul Lake, 38-0570-00, (T.60, R.9W, S.23): 1B, 2A, 3B;

(157) *Strup Lake, 38-0360-00, [11/5/84P] (T.64, R.7): 1B, 2A, 3B;

(158) *Sumpet Lake, 38-0283-00, [11/5/84P] (T.61, R.7): 1B, 2Bd, 3B;

(159) Surber Lake, 16-0343-00, (T.65, R.2W, S.34): 1B, 2A, 3B;

(160) *Takucmich Lake, 69-0369-00, [11/5/84P] (T.67, 68, R.14): 1B, 2A, 3B;

(161) *Tarry Lake, 16-0731-00, [11/5/84P] (T.64, R.5): 1B, 2A, 3B;

(162) *Thomas Lake, 38-0351-00, [11/5/84P] (T.63, 64, R.7): 1B, 2A, 3B;

(163) *Thumb Lake, 69-0352-00, [11/5/84P] (T.67, R.14): 1B, 2A, 3B;

(164) Tofte Lake, 38-0724-00, (T.63, R.10W, S.2, 3, 10, 11; T.64, R.10W, S.35): 1B, 2A, 3B;

(165) *Topaz Lake (Star Lake), 38-0172-00, [11/5/84P] (T.65, R.6): 1B, 2A, 3B;

(166) *Town Lake, 16-0458-00, [11/5/84P] (T.63, 64, R.3, 4): 1B, 2A, 3B;

(167) Trappers Lake, 38-0431-00, (T.60, R.8W, S.27, 34): 1B, 2A, 3B;

(168) Trip Lake, 16-0451-00, (T.65, R.3W, S.32): 1B, 2A, 3B;

(169) *Trout Lake, Big, 69-0498-00, [11/5/84P] (T.63, 64, R.15, 16): 1B, 2A, 3B;

(170) *Trout Lake, Little (Pocket Lake), 69-0682-00, [11/5/84P] (T.68, R.17): 1B, 2A, 3B;

(171) *Trygg (Twigg) Lake, 69-0389-00, [11/5/84P] (T.68, R.14W, S.31; T.68, R.15W, S.36): 1B, 2A, 3B;

(172) *Tucker Lake (Trucker Lake), 16-0417-00, [11/5/84P] (T.64, R.3): 1B, 2Bd, 3B;

(173) *Tuscarora Lake, 16-0623-00, [11/5/84P] (T.64, R.4, 5): 1B, 2A, 3B;

(174) unnamed (Pear) lake, 38-0769-00, (T.60, R.11W, S.4): 1B, 2A, 3B;

(175) *unnamed lake, 16-0598-00, [11/5/84P] (T.65, R.4, S.29, 30): 1B, 2Bd, 3B;

(176) unnamed swamp, Winton, (T.63, R.11, S.19; T.63, R.12, S.24): 7;

(177) *Vera Lake, 38-0491-00, [11/5/84P] (T.64, R.8): 1B, 2A, 3B;

(178) Vermilion, Lake, 69-0378-00, (see Lake Vermilion);

(179) *Virgin Lake, 16-0719-00, [11/5/84P] (T.64, R.5): 1B, 2A, 3B;

(180) West Crab Lake, 69-0220-00, (see Crab Lake);

(181) White Iron Lake, 69-0004-00, (T.62, 63, R.11, 12): 1C, 2Bd, 3C;

(182) *Wine Lake, 16-0686-00, [11/5/84P] (T.63, R.5): 1B, 2A, 3B;

(183) *Wisini Lake, 38-0361-00, [11/5/84P] (T.64, R.7): 1B, 2A, 3B; and

(184) Woods, Lake of the, 39-0002-00, (see Lake of the Woods).

C. Calcareous fens: none currently listed.

D. Scientific and natural areas: *Purvis Lake-Ober, [11/5/84P] waters within the Purvis Lake-Ober Foundation Scientific and Natural Area, Saint Louis County, (T.62, R.13): 2B, 3B, except wetlands, which are 2D.

Subp. 3. **Red River of the North basin.** The water-use classifications for the stream reaches within each of the major watersheds in the Red River of the North basin listed in item A are found in tables entitled "Beneficial Use Designations for Stream Reaches" published on the website of the Minnesota Pollution Control Agency at www.pca.state.mn.us/regulations/minnesota-rulemaking. 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 Red River of the North basin are as identified in items 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).

A. Streams (by eight-digit hydrologic unit code):

(1) 09020101 Bois de Sioux River (August 9, 2016);

(2) 09020102 Mustinka River (August 9, 2016);

(3) 09020103 Otter Tail River (August 9, 2016);

(4) 09020104 Upper Red River of the North (August 9, 2016);

(5) 09020106 Buffalo River (August 9, 2016);

(6) 09020107 Red River of the North - Marsh River (August 9, 2016);

(7) 09020108 Wild Rice River (August 9, 2016);

(8) 09020301 Red River of the North - Sandhill River (August 9, 2016);

(9) 09020302 Upper/Lower Red Lake (August 9, 2016);

(10) 09020303 Red Lake River (August 9, 2016);

(11) 09020304 Thief River (August 9, 2016);

(12) 09020305 Clearwater River (August 9, 2016);

(13) 09020306 Red River of the North - Grand Marais Creek (August 9, 2016);

(14) 09020309 Snake River (August 9, 2016);

(15) 09020311 Red River of the North - Tamarac River (August 9, 2016);

(16) 09020312 Two Rivers (August 9, 2016); and

(17) 09020314 Roseau River (August 9, 2016).

B. Lakes:

(1) Bass Lake, 56-0722-00, (T.135, R.42W, S.10, 11): 1B, 2A, 3B;

(2) Hanson Lake, 03-0177-00, (T.139, R.39W, S.6): 1B, 2A, 3B;

(3) Hoot Lake, 56-0782-00, (T.133, R.42, 43): 1C, 2Bd, 3C;

(4) Lake Bronson, 35-0003-00, (T.160, 161, R.46): 1C, 2Bd, 3C;

(5) Twin Lake, East, 03-0362-00, (T.138, R.41): 1B, 2A, 3B;

(6) unnamed slough, Vergas, (T.137, R.40, S.18; T.137, R.41, S.13, 24): 7;

(7) Wapatus (Island) Lake, 15-0127-00, (T.144, R.38W, S.21, 28): 1B, 2A, 3B; and

(8) Wright Lake, 56-0783-00, (T.133, R.42, 43): 1C, 2Bd, 3C.

C. Calcareous fens:

(1) *Agassiz-Olson WMA fen, 17, Norman [4/18/94R] (T.146, R.45, S.22): 2D;

(2) *Anna Gronseth Prairie fen, 47, Wilkin [4/18/94R] (T.134, R.45, S.15): 2D;

(3) *Anna Gronseth Prairie fen, 49, Wilkin [4/18/94R] (T.134, R.45, S.10): 2D;

(4) *Anna Gronseth Prairie fen, 52, Wilkin [4/18/94R] (T.134, R.45, S.4): 2D;

(5) *Barnesville Moraine fen, 44, Clay [4/18/94R] (T.137, R.44, S.18): 2D;

(6) *Barnesville WMA fen, 10, Clay [3/7/88R] (T.137, R.45, S.1): 2D;

(7) *Barnesville WMA fen, 43, Clay [4/18/94R] (T.137, R.44, S.18): 2D;

(8) *Chicog Prairie fen, 39, Polk [4/18/94R] (T.148, R.45, S.28): 2D;

(9) *Chicog Prairie fen, 40, Polk [3/7/88R] (T.148, R.45, S.33): 2D;

(10) *Chicog Prairie fen, 41, Polk [3/7/88R] (T.148, R.45, S.20, 29): 2D;

(11) *Chicog Prairie fen, 42, Polk [3/7/88R] (T.148, R.45, S.33): 2D;

(12) *Clearbrook fen, 61, Clearwater [3/7/88R] (T.149, R.37, S.17): 2D;

(13) *Faith Prairie fen, 15, Norman [4/18/94R] (T.144, R.43, S.26): 2D;

(14) *Faith Prairie fen, 16, Norman [4/18/94R] (T.144, R.43, S.35): 2D;

(15) *Faith Prairie fen, 27, Norman [3/7/88R] (T.144, R.43, S.25): 2D;

(16) *Felton Prairie fen, 28, Clay [3/7/88R] (T.142, R.46, S.36): 2D;

(17) *Felton Prairie fen, 36, Clay [3/7/88R] (T.141, R.46, S.13): 2D;

(18) *Felton Prairie fen, 48, Clay [4/18/94R] (T.142, R.45, S.31): 2D;

(19) *Felton Prairie fen, 53, Clay [4/18/94R] (T.141, R.46, S.24): 2D;

(20) *Green Meadow fen, 14, Norman [4/18/94R] (T.145, R.45, S.35, 36): 2D;

(21) *Haugtvedt WPA North Unit, 54, Clay [4/18/94R] (T.137, R.44, S.28, 29): 2D;

(22) *Kittleson Creek Mire fen, 55, Polk [4/18/94R] (T.147, R.44, S.6, 7): 2D;

(23) *Rothsay Prairie fen, 46, Wilkin [4/18/94R] (T.136, R.45, S.33): 2D;

(24) *Rothsay Prairie fen, 50, Wilkin [4/18/94R] (T.135, R.45, S.15, 16): 2D;

(25) *Rothsay Prairie fen, 51, Wilkin [4/18/94R] (T.135, R.45, S.9): 2D;

(26) *Sanders East fen, 65, Pennington [4/18/94R] (T.153, R.44, S.7): 2D;

(27) *Sanders East fen, 74, Pennington [4/18/94R] (T.153, R.44, S.7): 2D;

(28) *Sanders fen, 64, Pennington [4/18/94R] (T.153, R.44, S.18, 19): 2D;

(29) *Spring Creek WMA NHR fen, 34, Becker [3/7/88R] (T.142, R.42, S.13): 2D;

(30) *Spring Prairie fen, 37, Clay [3/7/88R] (T.140, R.46, S.11): 2D;

(31) *Tamarac River fen, 71, Marshall [4/18/94R] (T.157, R.46, S.2): 2D;

(32) *Tympanuchus Prairie fen, 26, Polk [3/7/88R] (T.149, R.45, S.17): 2D;

(33) *Tympanuchus Prairie fen, 38, Polk [3/7/88R] (T.149, R.45, S.16): 2D;

(34) *Viking fen, 68, Marshall [4/18/94R] (T.155, R.45, S.18): 2D;

(35) *Viking fen, 70, Marshall [4/18/94R] (T.155, R.45, S.20): 2D;

(36) *Viking Strip fen, 69, Marshall [4/18/94R] (T.154, R.45, S.4): 2D; and

(37) *Waubun WMA fen, 11, Mahnomen [3/7/88R] (T.143, R.42, S.25): 2D.

D. Scientific and natural areas:

(1) *Green Water Lake, [11/5/84P] waters within the Green Water Lake Scientific and Natural Area, Becker County, (T.141, R.38, S.28, 33, 34): 2B, 3B, except wetlands, which are 2D; and

(2) *Pembina Trail Preserve, [3/7/88P] waters within the Pembina Trail Preserve Scientific and Natural Area, Polk County, (T.148, R.45, S.1, 2; T.149, R.44, S.18, 19, 30, 31; T.149, R.45, S.13, 24, 25, 36): 2B, 3B, except wetlands, which are 2D.

Subp. 4. **Upper Mississippi River basin (headwaters to the confluence with the St. Croix River).** The water-use classifications for the stream reaches within each of the major watersheds in the upper Mississippi River basin from the headwaters to the confluence with the St. Croix River listed in item A are found in tables entitled "Beneficial Use Designations for Stream Reaches" published on the website of the Minnesota Pollution Control Agency at www.pca.state.mn.us/regulations/minnesota-rulemaking. 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 upper Mississippi River basin from the headwaters to the confluence with the St. Croix River are as identified in items 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).

A. Streams (by eight-digit hydrologic unit code):

(1) 07010101 Mississippi River - Headwaters (August 9, 2016);

(2) 07010102 Leech Lake River (August 9, 2016);

(3) 07010103 Mississippi River - Grand Rapids (August 9, 2016);

(4) 07010104 Mississippi River - Brainerd (August 9, 2016);

(5) 07010105 Pine River (August 9, 2016);

(6) 07010106 Crow Wing River (August 9, 2016);

(7) 07010107 Redeye River (August 9, 2016);

(8) 07010108 Long Prairie River (August 9, 2016);

(9) 07010201 Mississippi River - Sartell (August 9, 2016);

(10) 07010202 Sauk River (August 9, 2016);

(11) 07010203 Mississippi River - St. Cloud (August 9, 2016);

(12) 07010204 North Fork Crow River (August 9, 2016);

(13) 07010205 South Fork Crow River (August 9, 2016);

(14) 07010206 Mississippi River - Twin Cities (August 9, 2016); and

(15) 07010207 Rum River (August 9, 2016).

B. Lakes:

(1) Allen Lake, 18-0208-00, (T.138, R.26W, S.5): 1B, 2A, 3B;

(2) Bald Eagle Lake, 62-0002-00, (T.30, 31, R.21, 22): 1C, 2Bd, 3C;

(3) Bee Cee Lake, 31-0443-00, (T.58, R.25W, S.28, 33): 1B, 2A, 3B;

(4) Benedict Lake, 29-0048-00, (T.142, R.32): 1B, 2A, 3B;

(5) Benjamin Lake, 04-0033-00, (T.148, R.30W, S.7, 18; T.148, R.31W, S.13): 1B, 2A, 3B;

(6) Blacksmith Lake, 29-0275-00, (T.142, R.35W, S.13): 1B, 2A, 3B;

(7) *Blue Lake, 01-0181-00, [3/7/88R] (T.46, 47, R.27): 1B, 2A, 3B;

(8) *Blue Lake, 29-0184-00, [3/7/88R] (T.141, R.34): 1B, 2A, 3B;

(9) *Bluewater Lake, 31-0395-00, [3/7/88R] (T.57, R.25): 1B, 2A, 3B;

(10) Cenaiko Lake (unnamed), 02-0654-00, (T.31, R.24W, S.26): 1B, 2A, 3B;

(11) Centerville Lake, 02-0006-00, (T.31, R.22): 1C, 2Bd, 3C;

(12) Charley Lake, 62-0062-00, (T.30, R.23): 1C, 2Bd, 3C;

(13) Crappie Lake, 29-0127-00, (T.143, R.33W, S.31):1B, 2A, 3B;

(14) Deep Lake, 62-0018-00, (T.30, R.22): 1C, 2Bd, 3C;

(15) Diamond Lake, 11-0396-00, (T.141, R.30W, S.26, 27, 34): 1B, 2A, 3B;

(16) Hazel Lake, 11-0295-00, (T.141, R.29W, S.25): 1B, 2A, 3B;

(17) Hay Lake, lower, 18-0378-00, (T.137, R.28, 29): 1B, 2A, 3B;

(18) *Kabekona Lake, 29-0075-00, [3/7/88R] (T.142, 143, R.32, 33): 1B, 2A, 3B;

(19) Kennedy Lake, 31-0137-00, (T.58, R.23): 1B, 2A, 3B;

(20) Kremer Lake, 31-0645-00, (T.58, R.26W, S.33, 34): 1B, 2A, 3B;

(21) LaSalle Lake, lower, 29-0309-00, (T.145, R.35): 1B, 2A, 3B;

(22) Loon (Townline) Lake, 01-0024-00, (T.50, R.22W, S.7; T.50, R.23W, S.12, 13): 1B, 2A, 3B;

(23) Lucky Lake, 31-0603-00, (T.57, R.26W, S.14): 1B, 2A, 3B;

(24) Mallen Mine Pit, 18-0740-00, (T.46, R.29W, S.17): 1B, 2A, 3B;

(25) Manuel (South Yawkey) Mine Pit, 18-0435-00, (T.46, R.29W, S.1): 1B, 2A, 3B;

(26) Margaret Lake, 11-0045-00, (T.139, R.26W, S.16): 1B, 2A, 3B;

(27) Marion Lake, 11-0046-00, (T.139, R.26W, S.16, 17): 1B, 2A, 3B;

(28) Martin (Huntington, Feigh) Mine Pit, 18-0441-00, (T.46, R.29W, S.9, 10, 16): 1B, 2A, 3B;

(29) Moonshine Lake, Little (Moonshine), 31-0444-00, (T.58, R.25W, S.28, 33): 1B, 2A, 3B;

(30) Newman (Putnam) Lake, 29-0237-00, (T.145, R.34W, S.10, 11): 1B, 2A, 3B;

(31) Otter Lake, 02-0003-00, (T.30, 31, R.22): 1C, 2Bd, 3C;

(32) Pennington (Mahnomen, Alstead, Arco) Mine Pit, 18-0439-00, (T.46, R.29W, S.3, 9, 10, 11): 1B, 2A, 3B;

(33) Perch Lake, 11-0826-00, (T.139, R.31W, S.33): 1B, 2A, 3B;

(34) Pleasant Lake, 62-0046-00, (T.30, R.22, 23): 1C, 2Bd, 3C;

(35) Pleasant Lake, 18-0278-00, (T.137, R.27W, S.19): 1B, 2A, 3B;

(36) *Pokegama Lake, 31-0532-01 and 31-0532-02, [3/7/88R] (T.54, 55, R.25, 26): 1B, 2A, 3B;

(37) Portsmouth Mine Pit, 18-0437-00, (T.46, R.29W, S.1, 2, 11): 1B, 2A, 3B;

(38) *Roosevelt Lake, 11-0043-00, [3/7/88R] (T.138, 139, R.26): 1B, 2A, 3B;

(39) Sagamore Mine Pit, 18-0523-00, (T.46, R.29W, S.19; T.46, R.30W, S.24): 1B, 2A, 3B;

(40) Section 6 Mine Pit, 18-0667-00, (T.46, R.29W, S.6): 1B, 2A, 3B;

(41) Snoshoe Mine Pit, 18-0524-00, (T.46, R.29W, S.17, 18): 1B, 2A, 3B;

(42) Snowshoe (Little Andrus) Lake, 11-0054-00, (T.139, R.26W, S.29, 30): 1B, 2A, 3B;

(43) Strawberry Lake, 18-0363-00, (T.137, R.28W, S.27, 34): 1B, 2A, 3B;

(44) Sucker Lake, 62-0028-00, (T.30, R.22): 1C, 2Bd, 3C;

(45) Taylor Lake, 01-0109-00, (T.52, R.25W, S.16): 1B, 2A, 3B;

(46) Teepee Lake, 11-0312-00, (T.141, R.29W, S.30; T.141, R.30W, S.25): 1B, 2A, 3B;

(47) Tioga Mine Pit, 31-0946-00, (T.55, R.26W, S.26): 1B, 2A, 3B;

(48) Trout Lake, 31-0216-00, (T.55, 56, R.24): 1B, 2A, 3B;

(49) *Trout Lake, Big, 31-0410-00, [3/7/88R] (T.57, 58, R.25): 1B, 2A, 3B;

(50) *Trout Lake, Big, 18-0315-00, [3/7/88R] (T.137, 138, R.27, 28): 1B, 2A, 3B;

(51) *Trout Lake, Little, 31-0394-00, [3/7/88R] (T.57, R.25): 1B, 2A, 3B;

(52) unnamed swamp, Flensburg, (T.129, R.31, S.25): 7;

(53) unnamed slough, Miltona, (T.130, R.37, S.26, 35, 36): 7;

(54) unnamed swamp, Staples, (T.133, R.33, S.1): 7;

(55) unnamed swamp, Taconite, (T.56, R.24, S.22): 7;

(56) Vadnais Lake, 62-0038-00, (T.30, R.22): 1C, 2Bd, 3C;

(57) Wabana Lake, 31-0392-00, (T.57, R.25): 1B, 2A, 3B;

(58) Watab Lake, Big, 73-0102-00, (T.124, R.30): 1B, 2A, 3B;

(59) Wilkinson Lake, 62-0043-00, (T.30, R.22): 1C, 2Bd, 3C;

(60) Willard Lake, 11-0564-00, (T.139, R.30W, S.15): 1B, 2A, 3B; and

(61) Yawkey (North Yawkey) Mine Pit, 18-0434-00, (T.46, R.29W, S.1): 1B, 2A, 3B.

C. Calcareous fens: none currently listed.

D. Scientific and natural areas:

(1) *Itasca Wilderness Sanctuary, [11/5/84P] waters within the Itasca Wilderness Sanctuary, Clearwater County, (T.143, R.36): 2B, 3B, except wetlands, which are 2D;

(2) *Iron Springs Bog, [11/5/84P] waters within the Iron Springs Bog Scientific and Natural Area, Clearwater County, (T.144, R.36): 2B, 3B, except wetlands, which are 2D;

(3) *Pennington Bog, [11/5/84P] waters within the Pennington Bog Scientific and Natural Area, Beltrami County, (T.146, R.30): 2B, 3B, except wetlands, which are 2D; and

(4) *Wolsfeld Woods, [11/5/84P] waters within the Wolsfeld Woods Scientific and Natural Area, Hennepin County, (T.118, R.23): 2B, 3B, except wetlands, which are 2D.

Subp. 5. **Minnesota River basin.** The water-use classifications for the stream reaches within each of the major watersheds in the Minnesota River basin listed in item A are found in tables entitled "Beneficial Use Designations for Stream Reaches" published on the website of the Minnesota Pollution Control Agency at www.pca.state.mn.us/regulations/minnesota-rulemaking. 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 Minnesota River basin are as identified in items 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).

A. Streams (by eight-digit hydrologic unit code):

(1) 07020001 Minnesota River - Headwaters (August 9, 2016);

(2) 07020002 Pomme de Terre River (August 9, 2016);

(3) 07020003 Lac qui Parle River (August 9, 2016);

(4) 07020004 Minnesota River - Yellow Medicine River (August 9, 2016);

(5) 07020005 Chippewa River (August 9, 2016);

(6) 07020006 Redwood River (August 9, 2016);

(7) 07020007 Minnesota River - Mankato (August 9, 2016);

(8) 07020008 Cottonwood River (August 9, 2016);

(9) 07020009 Blue Earth River (August 9, 2016);

(10) 07020010 Watonwan River (August 9, 2016);

(11) 07020011 Le Sueur River (August 9, 2016); and

(12) 07020012 Lower Minnesota River (August 9, 2016).

B. Lakes:

(1) Amber Lake, 46-0034-00, (T.102, R.30): 1C, 2Bd, 3C;

(2) Bardwell Lake, 46-0023-00, (T.102, R.30): 1C, 2Bd, 3C;

(3) Budd Lake, 46-0030-00, (T.102, R.30): 1C, 2Bd, 3C;

(4) Courthouse Lake, 10-0005-00, (T.115, R.23W, S.9): 1B, 2A, 3B;

(5) George Lake, 46-0024-00, (T.102, R.30): 1C, 2Bd, 3C;

(6) Hall Lake, 46-0031-00, (T.102, R.30): 1C, 2Bd, 3C;

(7) Mud Lake, 46-0035-00, (T.102, R.30): 1C, 2Bd, 3C;

(8) One Hundred Acre Slough, Saint James, (T.106, R.31, S.7): 7;

(9) Silver Lake, North, 46-0016-00, (T.101, R.30): 1C, 2Bd, 3C;

(10) Sisseton Lake, 46-0025-00, (T.102, R.30): 1C, 2Bd, 3C;

(11) unnamed marsh, Barry, (T.124, R.47, S.8): 7;

(12) unnamed slough, Kensington, (T.127, R.40, S.34): 7;

(13) unnamed slough, Brandon, (T.129, R.39, S.21, 22): 7;

(14) unnamed swamp, Minnesota Lake, (T.104, R.25, S.3, 4): 7;

(15) unnamed swamp (Skauby Lake), 17-0035-00, Storden, (T.107, R.37, S.30): 7;

(16) unnamed swamp, Sunburg, Sunburg Coop Cry., (T.122, R.36, S.30): 7;

(17) unnamed swamp, Lowry, (T.126, R.39, S.35, 36): 7; and

(18) Wilmert Lake, 46-0014-00, (T.101, R.30): 1C, 2Bd, 3C.

C. Calcareous fens:

(1) *Blackdog Preserve fen, 63, Dakota [3/7/88R] (T.27, R.24, S.27, 34): 2D;

(2) *Blue Mounds fen, 1, Pope [4/18/94R] (T.124, R.39, S.14, 15): 2D;

(3) *Fort Ridgely fen, 21, Nicollet [3/7/88R] (T.111, R.32, S.6): 2D;

(4) *Fort Snelling State Park fen, 25, Dakota [3/7/88R] (T.27, R.23, S.4): 2D;

(5) *Lake Johanna fen, 4, Pope [4/18/94R] (T.123, R.36, S.29): 2D;

(6) *Le Sueur fen, 32, Nicollet [3/7/88R] (T.111, R.26, S.16): 2D;

(7) *Nicols Meadow fen, 24, Dakota [3/7/88R] (T.27, R.23, S.18): 2D;

(8) *Ordway Prairie fen, 35, Pope [3/7/88R] (T.123, R.36, S.30): 2D;

(9) *Ottawa Bluffs fen, 56, Le Sueur [4/18/94R] (T.110, R.26, S.3): 2D;

(10) *Ottawa WMA fen, 7, Le Sueur [3/7/88R] (T.110, R.26, S.11): 2D;

(11) *Ottawa WMA fen, 60, Le Sueur, [3/7/88R] (T.110, R.26, S.14): 2D;

(12) *Perch Creek WMA fen, 33, Martin [3/7/88R] (T.104, R.30, S.7): 2D;

(13) *Savage fen, 22, Scott [3/7/88R] (T.115, R.21, S.17): 2D;

(14) *Savage fen, 66, Scott [3/7/88R] (T.115, R.21, S.16, 17): 2D;

(15) *Savage fen, 67, Scott [3/7/88R] (T.115, R.21, S.17): 2D;

(16) *Seminary fen, 75, Carver [4/18/94R] (T.116, R.23, S.35): 2D;

(17) *Sioux Nation WMA NHR fen, 29, Yellow Medicine [3/7/88R] (T.114, R.46, S.17): 2D;

(18) *Swedes Forest fen, 8, Redwood [4/18/94R] (T.114, R.37, S.19, 20): 2D;

(19) *Swedes Forest fen, 9, Redwood [4/18/94R] (T.114, R.37, S.22, 27): 2D; and

(20) *Yellow Medicine fen, 30, Yellow Medicine [4/18/94R] (T.115, R.46, S.18): 2D.

D. Scientific and natural areas: *Blackdog Preserve, [3/7/88P] waters within the Blackdog Preserve Scientific and Natural Area, Dakota County (T.27, R.24, S.27, 34): 2B, 3B, except wetlands, which are 2D.

Subp. 6. **Saint Croix River basin.** The water-use classifications for the stream reaches within each of the major watersheds in the Saint Croix River basin listed in item A are found in tables entitled "Beneficial Use Designations for Stream Reaches" published on the website of the Minnesota Pollution Control Agency at www.pca.state.mn.us/regulations/minnesota-rulemaking. 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 Saint Croix River basin are as identified in items 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).

A. Streams (by eight-digit hydrologic unit code):

(1) 07030001 Upper St. Croix River (August 9, 2016);

(2) 07030003 Kettle River (August 9, 2016);

(3) 07030004 Snake River (August 9, 2016); and

(4) 07030005 Lower St. Croix River (August 9, 2016).

B. Lakes:

(1) *Grindstone Lake, 58-0123-00, [3/7/88R] (T.42, R.21): 1B, 2A, 3B; and

(2) unnamed swamp, Shafer, (T.34, R.19, S.31, 32): 7.

C. Calcareous fens: none currently listed.

D. Scientific and natural areas:

(1) *Boot Lake, [11/5/84P] waters within the Boot Lake Scientific and Natural Area, Anoka County, (T.33, R.22): 2B, 3B, except wetlands, which are 2D;

(2) *Falls Creek, [4/18/94P] (trout designated waters within Washington County), (T.32, R.19, S.7; T.32, R.20, S.12): 1B, 2A, 3B;

(3) *Falls Creek, [4/18/94P] waters within the Falls Creek Scientific and Natural Area, Washington County, (T.32, R.19, S.7; T.32, R.20, S.12): 2B, 3B, except wetlands, which are 2D; and

(4) *Kettle River, [11/5/84P] waters within the Kettle River Scientific and Natural Area, Pine County, (T.41, R.20): 2B, 3B.

Subp. 7. **Lower Mississippi River basin (from the confluence with the St. Croix River to the Iowa border).** The water-use classifications for the stream reaches within each of the major watersheds in the lower Mississippi River basin from the confluence with the Saint Croix River to the Iowa border listed in item A are found in tables entitled "Beneficial Use Designations for Stream Reaches" published on the website of the Minnesota Pollution Control Agency at www.pca.state.mn.us/regulations/minnesota-rulemaking. 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 lower Mississippi River basin from the confluence with the St. Croix River to the Iowa border are as identified in items 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).

A. Streams (by eight-digit hydrologic unit code):

(1) 07040001 Mississippi River - Lake Pepin (August 9, 2016);

(2) 07040002 Cannon River (August 9, 2016);

(3) 07040003 Mississippi River - Winona (August 9, 2016);

(4) 07040004 Zumbro River (August 9, 2016);

(5) 07040006 Mississippi River - La Crescent (August 9, 2016);

(6) 07040008 Root River (August 9, 2016);

(7) 07060001 Mississippi River - Reno (August 9, 2016); and

(8) 07060002 Upper Iowa River (August 9, 2016).

B. Lakes:

(1) unnamed marsh, Kilkenny, (T.110, R.23, S.22, 23): 7; and

(2) unnamed swamp, Hampton, (T.113, R.18, S.8): 7.

C. Calcareous fens:

(1) *Cannon River Wilderness Area fen, 18, Rice [3/7/88R] (T.111, R.20, S.34): 2D;

(2) *Cannon River Wilderness Area fen, 73, Rice [4/18/94R] (T.111, R.20, S.22): 2D;

(3) *High Forest fen, 12, Olmsted [4/18/94R] (T.105, R.14, S.14, 15): 2D;

(4) *Holden 1 West fen, 3, Goodhue [4/18/94R] (T.110, R.18, S.1): 2D;

(5) *Houston fen, 62, Houston [4/18/94R] (T.104, R.6, S.26): 2D;

(6) *Nelson WMA fen, 5, Olmsted [3/7/88R] (T.105, R.15, S.16): 2D;

(7) *Perched Valley Wetlands fen, 2, Goodhue [3/7/88R] (T.112, R.13, S.8): 2D;

(8) *Red Wing fen, 72, Goodhue [4/18/94R] (T.113, R.15, S.21): 2D; and

(9) *Wiscoy fen, 58, Winona [3/7/88R] (T.105, R.7, S.15): 2D.

D. Scientific and natural areas: none currently listed.

Subp. 8. **Cedar-Des Moines Rivers basin.** The water-use classifications for the stream reaches within each of the major watersheds in the Cedar-Des Moines Rivers basin listed in item A are found in tables entitled "Beneficial Use Designations for Stream Reaches" published on the website of the Minnesota Pollution Control Agency at www.pca.state.mn.us/regulations/minnesota-rulemaking. 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 Cedar-Des Moines Rivers basin are as identified in items 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).

A. Streams (by eight-digit hydrologic unit code):

(1) 07080102 Upper Wapsipinicon River (August 9, 2016);

(2) 07080201 Cedar River (August 9, 2016);

(3) 07080202 Shell Rock River (August 9, 2016);

(4) 07080203 Winnebago River (August 9, 2016);

(5) 07100001 Des Moines River - Headwaters (August 9, 2016);

(6) 07100002 Lower Des Moines River (August 9, 2016); and

(7) 07100003 East Fork Des Moines River (August 9, 2016).

B. Lakes: none currently listed.

C. Calcareous fens:

(1) *Heron Lake fen, 45, Jackson [3/7/88R] (T.103, R.36, S.29): 2D; and

(2) *Thompson Prairie fen, 20, Jackson [3/7/88R] (T.103, R.35, S.7): 2D.

D. Scientific and natural areas: *Prairie Bush Clover, [3/7/88P] waters within the Prairie Bush Clover Scientific and Natural Area, Jackson County, (T.103, R.35, S.17): 2B, 3B, except wetlands, which are 2D.

Subp. 9. **Missouri River basin.** The water-use classifications for the stream reaches within each of the major watersheds in the Missouri River basin listed in item A are found in tables entitled "Beneficial Use Designations for Stream Reaches" published on the website of the Minnesota Pollution Control Agency at www.pca.state.mn.us/regulations/minnesota-rulemaking. 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 Missouri River basin are as identified in items 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).

A. Streams (by eight-digit hydrologic unit code):

(1) 10170202 Upper Big Sioux River (August 9, 2016);

(2) 10170203 Lower Big Sioux River (August 9, 2016);

(3) 10170204 Rock River (August 9, 2016); and

(4) 10230003 Little Sioux River (August 9, 2016).

B. Lakes: none currently listed.

C. Calcareous fens:

(1) *Burke WMA fen, 57, Pipestone [11/12/90R] (T.106, R.44, S.28): 2D;

(2) *Hole-in-the-Mountain Prairie fen, 6, Pipestone [11/12/90R] (T.108, R.46, S.1; T.109, R.45, S.31): 2D;

(3) *Lost Timber Prairie fen, 13, Murray [4/18/94R] (T.105, R.43, S.2): 2D; and

(4) *Westside fen, 59, Nobles [11/12/90R] (T.102, R.43, S.11): 2D.

D. Scientific and natural areas: none currently listed.

Statutory Authority: *MS s 115.03; 115.44*

History: *9 SR 914; 12 SR 1810; 15 SR 1057; 18 SR 2195; 22 SR 1466; 24 SR 1105; 24 SR 1133; 27 SR 1217; 32 SR 1699; 42 SR 441*

Published Electronically: *September 10, 2018*

7050.0480 [Renumbered 7050.0465]

Published Electronically: *April 1, 2008*

APPENDIX E-13 Mississippi River Historic Water Quality Data

Environmental Data Access

Print Report New Search

Biological Station Information

Stream Name:	MISSISSIPPI RIVER
Waterbody Name:	Mississippi River
Data Steward Org:	MPCA
Station ID:	13UM009
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	07010201-631
Period of Record:	2013 through 2013
Predominant substrate:	
Mean Depth (cm):	
Mean Width (meters):	
Drainage Area (square miles)	12,356.92
Land Use	Agricultural 9.0% Forest 49.8% Range 14.0 % Urban 3.4 % Water 8.7 % Wetland 15.0 % Other 0.1 %
Lat/Lon	45.73101,-94.23865

Index of Biological Integrity | Chemical | Projects | Aquatic Life | Species Attributes

Year 2013 Data

Site Index of Biological Integrity

Category	IBI/Rating
Visit Year	2013
Fish IBI	75
Fish Rating	Good = Above upper confid
Invertebrate IBI	16
Invertebrate Rating	Poor = Below lower confid
Visit Year	2013
Fish IBI	75
Fish Rating	Good = Above upper confid
Invertebrate IBI	16
Invertebrate Rating	Poor = Below lower confid

Environmental Data Access

Print Report New Search

Biological Station Information

Stream Name:	MISSISSIPPI RIVER
Waterbody Name:	Mississippi River
Data Steward Org:	MPCA
Station ID:	13UM009
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	07010201-631
Period of Record:	2013 through 2013
Predominant substrate:	
Mean Depth (cm):	
Mean Width (meters):	
Drainage Area (square miles)	12,356.92
Land Use	Agricultural 9.0% Forest 49.8% Range 14.0 % Urban 3.4 % Water 8.7 % Wetland 15.0 % Other 0.1 %
Lat/Lon	45.73101,-94.23865

Index of Biological Integrity | Chemical | Projects | Aquatic Life | Species Attributes

Data collected from August 13, 2013

Site Visit Date	13-AUG-13
Water Temperature °C	22.6°
Conductivity µmhos/cm	323
Field Turbidity NTU	
Dissolved Oxygen mg/L	10.75
PH	8.8
Flow m3/sec	
Nitrogen mg/L	0.07
Total Phosphorus mg/L	0.022
Total Suspended Solids mg/L	7.2
Ammonia mg/L	< 0.05
Fish Rating	

Environmental Data Access

Print Report New Search

Biological Station Information

Stream Name:	MISSISSIPPI RIVER
Waterbody Name:	Mississippi River
Data Steward Org:	MPCA
Station ID:	13UM009
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	07010201-631
Period of Record:	2013 through 2013
Predominant substrate:	
Mean Depth (cm):	
Mean Width (meters):	
Drainage Area (square miles)	12,356.92

Land Use

Agricultural	9.0%
Forest	49.8%
Range	14.0 %
Urban	3.4 %
Water	8.7 %
Wetland	15.0 %
Other	0.1 %

Lat/Lon 45.73101,-94.23865

Index of Biological Integrity | Chemical | Projects | Aquatic Life | Species Attributes

Year 2013 Data

Fish that were found at this site

Species	Count	Min Length(mm)	Max Length(mm)
Black Crappie	5	43	160
Black Crappie	5	43	160
Bluegill	24	29	116
Bluegill	24	29	116
Burbot	1	250	250
Burbot	1	250	250
Common Shiner	26	34	84
Common Shiner	26	34	84
Creek Chub	2	44	56
Creek Chub	2	44	56
Greater Redhorse	1	642	642
Greater Redhorse	1	642	642
Hybrid Sunfish	1	83	83
Hybrid Sunfish	1	83	83
Johnny Darter	20	31	61
Johnny Darter	20	31	61
Largemouth Bass	4	60	79
Largemouth Bass	4	60	79
Logperch	45	50	101
Logperch	45	50	101
Northern Pike	4	141	505
Northern Pike	4	141	505
Pumpkinseed	2	73	221
Pumpkinseed	2	73	221

Rock Bass	14	91	260
Rock Bass	14	91	260
Shorthead Redhorse	19	40	482
Shorthead Redhorse	19	40	482
Silver Redhorse	14	391	632
Silver Redhorse	14	391	632
Smallmouth Bass	83	48	475
Smallmouth Bass	83	48	475
Spotfin Shiner	12	48	86
Spotfin Shiner	12	48	86
Spottail Shiner	1	105	105
Spottail Shiner	1	105	105
Walleye	3	95	130
Walleye	3	95	130
White Sucker	2	433	470
White Sucker	2	433	470
Yellow Perch	14	47	128
Yellow Perch	14	47	128

Environmental Data Access

Print Report New Search

Stream Station Information

Station Name:	MISSISSIPPI RIVER
Waterbody Name:	
Data Steward Org:	MPCA
Station ID:	S006-059
Hydrologic Unit Code (HUC):	
Assessment Unit:	
Period of Record:	2009 through 2013
Lat/Lon	45.718122,-94.219906

Chemical Projects

Download this station

Year 2013 Data

Station Data

Sample Date	Type Information	Temp	BOD	Chl-a	Stream Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli
02-OCT-13	Routine	16.89			59										
25-SEP-13	Routine	19.44			58										
18-SEP-13	Routine	21.67			57										
11-SEP-13	Routine	25.56			58										
04-SEP-13	Routine	27.33			48										
26-AUG-13	Routine	25.00			49										
14-AUG-13	Routine	21.89			47										

09-AUG-13	Routine	25.00	48
31-JUL-13	Routine	26.22	48
24-JUL-13	Routine	26.89	49
17-JUL-13	Routine	26.11	49
10-JUL-13	Routine	25.56	49
03-JUL-13	Routine	25.22	48
26-JUN-13	Routine	23.67	48
17-JUN-13	Routine	20.00	44
29-MAY-13	Routine		39
22-MAY-13	Routine		38
18-MAY-13	Routine		32
08-MAY-13	Routine		28

Year 2012 Data

Year 2011 Data

Year 2010 Data

Year 2009 Data

Environmental Data Access

Print Report New Search

Stream Station Information

Station Name:	MISSISSIPPI RIVER
Waterbody Name:	
Data Steward Org:	MPCA
Station ID:	S006-059
Hydrologic Unit Code (HUC):	
Assessment Unit:	
Period of Record:	2009 through 2013
Lat/Lon	45.718122,-94.219906

Chemical Projects

Download this station

Year 2013 Data

Year 2012 Data

Station Data

Sample Date	Type Information	Temp	BOD	Chl-a	Stream Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli
03-SEP-12	Routine	23.4			17										
23-AUG-12	Routine				17										
18-AUG-12	Routine	23.3													
08-AUG-12	Routine	23.9													
31-JUL-12	Routine	25.2													

24-JUL-12	Routine	26.8	26
22-MAY-12	Routine	19.1	
15-MAY-12	Routine	17	34
08-MAY-12	Routine	14.4	33
01-MAY-12	Routine		39

Year 2011 Data

Year 2010 Data

Year 2009 Data

Environmental Data Access

Print Report New Search

Stream Station Information

Station Name:	MISSISSIPPI RIVER
Waterbody Name:	
Data Steward Org:	MPCA
Station ID:	S006-059
Hydrologic Unit Code (HUC):	
Assessment Unit:	
Period of Record:	2009 through 2013
Lat/Lon	45.718122,-94.219906

Chemical Projects

Download this station

Year 2013 Data

Year 2012 Data

Year 2011 Data

Station Data

Sample Date	Type	Temp	BOD	Chl-a	Stream Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli
	Information														
10-OCT-11	Routine	12.2													
26-SEP-11	Routine	13.9			> 60										
19-SEP-11	Routine	16.7			> 60										

12-SEP-11	Routine	18.9	> 60
05-SEP-11	Routine	20.6	> 60
29-AUG-11	Routine	22.2	52
22-AUG-11	Routine	22.2	52
16-AUG-11	Routine	23.9	52
08-AUG-11	Routine	25.6	
01-AUG-11	Routine	26.1	49
25-JUL-11	Routine	27.8	35
19-JUL-11	Routine	25.6	28
11-JUL-11	Routine	24.4	25
04-JUL-11	Routine	25.0	27
28-JUN-11	Routine	16.7	38
20-JUN-11	Routine	16.7	51
13-JUN-11	Routine	14.4	48
06-JUN-11	Routine	13.3	46
30-MAY-11	Routine	11.1	45
24-MAY-11	Routine		45
16-MAY-11	Routine		42
09-MAY-11	Routine		41
25-APR-11	Routine		40
18-APR-11	Routine		42

Year 2010 Data

Year 2009 Data

Environmental Data Access

Print Report New Search

Stream Station Information

Station Name:	MISSISSIPPI RIVER
Waterbody Name:	
Data Steward Org:	MPCA
Station ID:	S006-059
Hydrologic Unit Code (HUC):	
Assessment Unit:	
Period of Record:	2009 through 2013
Lat/Lon	45.718122,-94.219906

Chemical Projects

Download this station

Year 2013 Data

Year 2012 Data

Year 2011 Data

Year 2010 Data

Station Data

Sample Date	Type	Temp	BOD	Chl-a	Stream Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli
	Information														
22-OCT-10	Routine	8.89			> 60										

15-OCT-10	Routine	11.11	> 60
01-OCT-10	Routine	12.22	> 60
24-SEP-10	Routine	13.33	> 60
17-SEP-10	Routine	16.11	> 60
10-SEP-10	Routine	18.33	> 60
03-SEP-10	Routine	23.33	> 60
27-AUG-10	Routine	25.78	> 60
20-AUG-10	Routine	26.11	> 60
13-AUG-10	Routine	25.78	51
06-AUG-10	Routine	26.44	> 60
30-JUL-10	Routine	26.11	> 60
23-JUL-10	Routine	22.72	> 60
15-JUL-10	Routine	26.11	> 60
08-JUL-10	Routine	25.22	> 60
02-JUL-10	Routine	7.78	> 60
25-JUN-10	Routine	23.33	> 60
18-JUN-10	Routine	22.78	> 60
12-JUN-10	Routine	16.11	> 60
04-JUN-10	Routine		> 60
28-MAY-10	Routine		> 60
21-MAY-10	Routine		> 60
13-MAY-10	Routine		41
06-MAY-10	Routine		53
29-APR-10	Routine		53
22-APR-10	Routine		46
14-APR-10	Routine		45

Year 2009 Data

Environmental Data Access

Print Report New Search

Stream Station Information

Station Name:	MISSISSIPPI RIVER
Waterbody Name:	
Data Steward Org:	MPCA
Station ID:	S006-059
Hydrologic Unit Code (HUC):	
Assessment Unit:	
Period of Record:	2009 through 2013
Lat/Lon	45.718122,-94.219906

Chemical Projects

Download this station

Year 2013 Data

Year 2012 Data

Year 2011 Data

Year 2010 Data

Year 2009 Data

Station Data

Sample Date	Type	Temp	BOD	Chl-a	Stream Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli
	Information														

05-OCT-09	Routine	11.1	> 60
28-SEP-09	Routine	20	> 60
21-SEP-09	Routine	22.8	> 60
14-SEP-09	Routine	23.4	> 60
07-SEP-09	Routine	22.8	> 60
31-AUG-09	Routine	23.3	> 60
24-AUG-09	Routine	23.4	> 60
17-AUG-09	Routine	23.3	> 60
10-AUG-09	Routine	23.4	> 60
03-AUG-09	Routine	23.5	> 60
27-JUL-09	Routine	23.6	> 60
20-JUL-09	Routine	23.1	> 60
13-JUL-09	Routine	22.2	> 60
06-JUL-09	Routine	22.4	> 60
29-JUN-09	Routine	21.7	> 60
22-JUN-09	Routine	21.1	> 60
15-JUN-09	Routine		> 60
02-JUN-09	Routine		52

Environmental Data Access

Print Report New Search

Stream Station Information

Station Name:	MISSISSIPPI RIVER
Waterbody Name:	Mississippi River
Data Steward Org:	MPCA
Station ID:	S004-320
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	07010201-631
Period of Record:	2006 through 2008
Lat/Lon	45.67889,-94.18804

Chemical Projects

Download this station

Year 2008 Data

Station Data

Sample Date	Type	Temp	BOD	Chl-a	Stream Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli
	Information														
15-OCT-08	Routine						0.60	0.18			0.032	3.2	3.3		
15-OCT-08	Routine	11.81				10.46							2.3		
15-OCT-08	Routine	11.82				10.52							2.5		
15-OCT-08	Routine	11.84				10.59							2.2		
15-OCT-08	Routine	11.82				10.47							2.5		
15-OCT-08	Routine	11.84				10.59							2.3		
30-SEP-08	Routine	16.02				9.23							1.9		
30-SEP-08	Routine	16.03				9.26							1.8		
30-SEP-08	Routine	16.11				9.30							1.7		
30-SEP-08	Routine	16.15				9.32							1.6		
30-SEP-08	Routine						3.02	0.13			0.024	2.4	2.1		
30-SEP-08	Routine	16.02				9.21							1.9		
30-SEP-08	Routine	16.11				9.37							1.7		
15-SEP-08	Routine						0.51	0.14			0.034	1.6	2.7		
15-SEP-08	Routine	15.79				8.89							2.1		
15-SEP-08	Routine	15.93				8.96							2.0		
15-SEP-08	Routine	15.87				8.93							2.1		
15-SEP-08	Routine	15.81				8.91							2.2		
15-SEP-08	Routine	15.97				8.97							1.8		
15-SEP-08	Routine	15.78				8.89							2.3		
03-SEP-08	Routine						0.69	< 0.05			0.04	5.2	4.3		
03-SEP-08	Routine	21.47				9.43							3.1		
03-SEP-08	Routine	21.42				9.41							3.6		
03-SEP-08	Routine	21.52				9.73							2.8		
03-SEP-08	Routine	21.36				9.20							3.7		
03-SEP-08	Routine	21.33				8.99							3.9		
19-AUG-08	Routine	24.41				8.70							3.5		

19-AUG-08	Routine	24.84	9.94					42.0
19-AUG-08	Routine	25.88	9.97					2.3
19-AUG-08	Routine	24.43	8.72					3.7
19-AUG-08	Routine	24.46	8.88					3.3
19-AUG-08	Routine	25.68	10.16					2.8
19-AUG-08	Routine			0.76	< 0.05	0.045	5.2	4.3
07-AUG-08	Routine			0.67	0.16	0.049	4.0	4.1
07-AUG-08	Routine	24.05	7.28					3.9
07-AUG-08	Routine	24.54	7.67					2.9
07-AUG-08	Routine	24.07	7.34					3.7
07-AUG-08	Routine	24.06	7.29					3.9
07-AUG-08	Routine	24.11	7.39					3.5
07-AUG-08	Routine	24.74	7.74					3.0
28-JUL-08	Routine	24.43	8.22					3.3
28-JUL-08	Routine			0.82	0.13	0.047	3.2	2.9
28-JUL-08	Routine	24.41	8.22					3.5
28-JUL-08	Routine	24.46	8.27					3.1
28-JUL-08	Routine	24.56	8.35					2.8
28-JUL-08	Routine	25.81	8.76					2.1
28-JUL-08	Routine	25.89	8.74					2.1
15-JUL-08	Routine	24.07	7.82					4.9
15-JUL-08	Routine			0.66	0.24	0.061	6.0	5.7
15-JUL-08	Routine	23.17	7.49					6.0
15-JUL-08	Routine	23.18	7.53					5.9
15-JUL-08	Routine	24.63	8.03					4.8
15-JUL-08	Routine	24.82	8.19					4.3

Year 2006 Data

Environmental Data Access

Print Report New Search

Biological Station Information

Stream Name:	MISSISSIPPI RIVER
Waterbody Name:	Mississippi River
Data Steward Org:	MPCA
Station ID:	07UM283
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	07010201-631
Period of Record:	2007 through 2007
Predominant substrate:	
Mean Depth (cm):	
Mean Width (meters):	
Drainage Area (square miles)	12,482.08
Land Use	Agricultural 9.3% Forest 49.5% Range 14.1 % Urban 3.4 % Water 8.6 % Wetland 15.0 % Other 0.1 %
Lat/Lon	45.67106641,-94.19485567

Index of Biological Integrity | Chemical | Projects | Aquatic Life | Species Attributes

Year 2007 Data

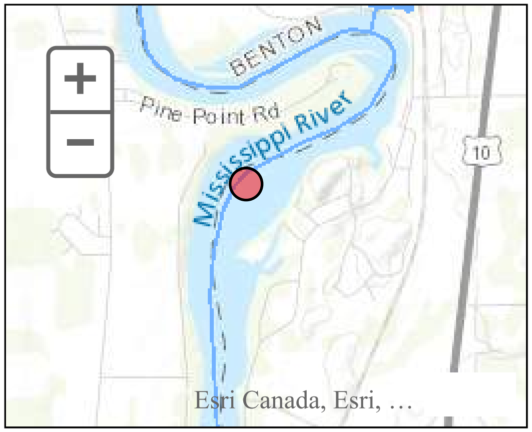
Site Index of Biological Integrity

Category	IBI/Rating
Visit Year	2007

Fish IBI	46
Fish Rating	Fair = Within confidence
Invertebrate IBI	No Visit
Invertebrate Rating	
Visit Year	2007
Fish IBI	46
Fish Rating	Fair = Within confidence
Invertebrate IBI	No Visit
Invertebrate Rating	

Environmental Data Access

Print Report New Search



Biological Station Information

Stream Name:	MISSISSIPPI RIVER
Waterbody Name:	Mississippi River
Data Steward Org:	MPCA
Station ID:	07UM283
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	07010201-631
Period of Record:	2007 through 2007
Predominant substrate:	
Mean Depth (cm):	
Mean Width (meters):	
Drainage Area (square miles)	12,482.08
Land Use	Agricultural 9.3% Forest 49.5% Range 14.1 % Urban 3.4 % Water 8.6 % Wetland 15.0 % Other 0.1 %
Lat/Lon	45.67106641,-94.19485567

Index of Biological Integrity | Chemical | Projects | Aquatic Life | Species Attributes

Year 2007 Data

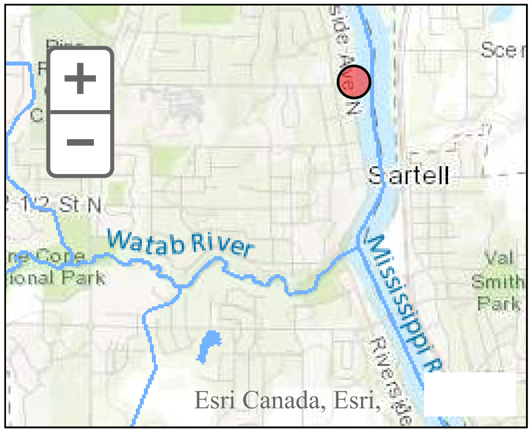
Fish that were found at this site

Species	Count	Min Length(mm)	Max Length(mm)
Black Crappie	2		

Black Crappie	2
Bluegill	80
Bluegill	80
Bluntnose Minnow	5
Bluntnose Minnow	5
Central Stoneroller	1
Central Stoneroller	1
Common Carp	12
Common Carp	12
Common Shiner	1
Common Shiner	1
Hornyhead Chub	5
Hornyhead Chub	5
Johnny Darter	2
Johnny Darter	2
Largemouth Bass	3
Largemouth Bass	3
Logperch	8
Logperch	8
Northern Pike	6
Northern Pike	6
Pumpkinseed	1
Pumpkinseed	1
Rock Bass	8
Rock Bass	8
Shorthead Redhorse	3
Shorthead Redhorse	3
Silver Redhorse	3
Silver Redhorse	3
Smallmouth Bass	18
Smallmouth Bass	18
Spotfin Shiner	3
Spotfin Shiner	3
Spottail Shiner	9
Spottail Shiner	9
Walleye	1
Walleye	1
White Sucker	25
White Sucker	25
Yellow Perch	16
Yellow Perch	16

Environmental Data Access

Print Report New Search



Stream Station Information

Station Name:	MISSISSIPPI RIVER
Waterbody Name:	Mississippi River
Data Steward Org:	MPCA
Station ID:	S006-147
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	07010201-631
Period of Record:	2010 through 2011
Lat/Lon	45.630045,-94.204434

Chemical Projects

Download this station

Year 2011 Data

Station Data

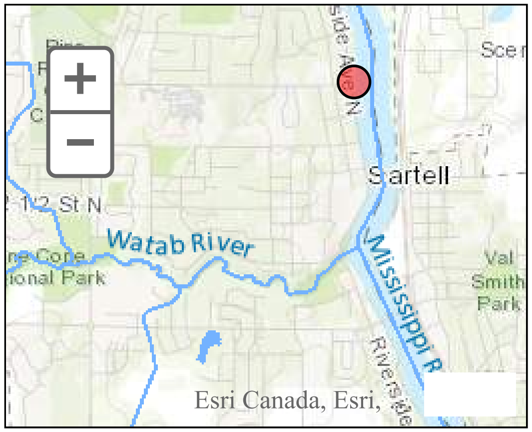
Sample Date	Type	Temp	BOD	Chl-a	Stream Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli
	Information														
26-OCT-11	Routine														12
18-OCT-11	Routine														9
13-OCT-11	QC-FR														27
13-OCT-11	Routine														17
11-OCT-11	Routine	16.86				8.65							5.3		5
27-SEP-11	Routine														5
13-SEP-11	Routine														11

08-SEP-11	Routine				18
23-AUG-11	Routine				26
09-AUG-11	Routine				30
02-AUG-11	Routine				100
26-JUL-11	Routine	26.63	7.34	3.7	6
21-JUN-11	Routine				23
14-JUN-11	Routine				5
08-JUN-11	Routine				10
31-MAY-11	Routine	17.23	8.78		15
24-MAY-11	Routine				150
22-MAY-11	Routine				66
09-MAY-11	Routine				78
05-MAY-11	Routine				5
27-APR-11	Routine	8.18	11.18	4.5	12
21-APR-11	Routine				13
12-APR-11	Routine	7.14	11.82	14.2	12
06-APR-11	Routine				17

Year 2010 Data

Environmental Data Access

Print Report New Search



Stream Station Information

Station Name:	MISSISSIPPI RIVER
Waterbody Name:	Mississippi River
Data Steward Org:	MPCA
Station ID:	S006-147
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	07010201-631
Period of Record:	2010 through 2011
Lat/Lon	45.630045,-94.204434

Chemical Projects

Download this station

Year 2011 Data

Year 2010 Data

Station Data

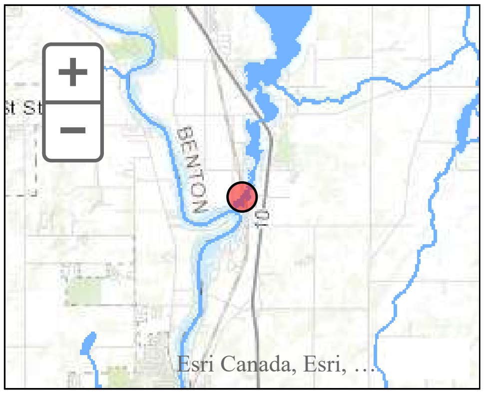
Sample Date	Type	Temp	BOD	Chl-a	Stream Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli
	Information														
26-OCT-10	Routine	10.36				10.34							3.7		
12-OCT-10	Routine	15.41				9.44									10
28-SEP-10	Routine	14.47				10.08							3.3		16
14-SEP-10	Routine	17.77				9.54							2.7		12
31-AUG-10	Routine	23.76				7.66							2.6		26

19-AUG-10	Routine	21.94	7.91		5.1	20
02-AUG-10	Routine	26.08	7.4			30
20-JUL-10	Routine	24.35	6.78		1.2	21
07-JUL-10	Routine	26.02	6.18		2.9	7
22-JUN-10	Routine					14
10-JUN-10	Routine	19.92	7.67			25
25-MAY-10	Routine					130
13-MAY-10	Routine	10.57	10.81		0	91
29-APR-10	Routine					2
19-APR-10	Routine					1

APPENDIX E-14 Little Rock Creek Historic Water Quality Data

Environmental Data Access

Print Report New Search



Stream Station Information

Station Name:	LITTLE ROCK CREEK
Waterbody Name:	Little Rock Creek
Data Steward Org:	MPCA
Station ID:	S005-004
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	07010201-577
Period of Record:	2008 through 2008
Lat/Lon	45.68411,-94.18145

Chemical Projects

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Year 2008 Data

Station Data

Sample Date	Type Information	Temp	BOD	Chl-a	Stream Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli
15-OCT-08	Routine	11.93				11.53							6.2		
15-OCT-08	Routine	11.95				11.55							17.0		
15-OCT-08	Routine						1.20	< 0.05			0.085	12	7.7		
15-OCT-08	Routine	11.94				11.55							6.4		
15-OCT-08	Routine	11.95				11.53							6.3		
30-SEP-08	Routine	15.25				11.02							11.9		
30-SEP-08	Routine	15.28				10.99							11.5		
30-SEP-08	Routine						1.44	< 0.05			0.102	23	12		
30-SEP-08	Routine	15.30				11.02							11.7		
30-SEP-08	Routine	15.24				11.01							12.4		
30-SEP-08	Routine	15.25				10.96							13.0		
30-SEP-08	Routine	15.26				10.96							11.6		
15-SEP-08	Routine						1.96	< 0.05			0.203	36	24		
15-SEP-08	Routine	14.73				10.05							24.5		
15-SEP-08	Routine	14.74				10.25							26.6		
15-SEP-08	Routine	15.12				10.83							36.0		
15-SEP-08	Routine	15.01				10.79							30.0		
15-SEP-08	Routine	14.73				10.00							26.5		
15-SEP-08	Routine	14.79				10.39							25.7		
03-SEP-08	Routine	20.36				8.84							31.2		
03-SEP-08	Routine	20.35				7.72							27.6		
03-SEP-08	Routine	20.37				7.66							27.8		
03-SEP-08	Routine						1.69	< 0.05			0.201	34	26		
03-SEP-08	Routine	20.05				6.68							26.8		
19-AUG-08	Routine	25.14				10.37							8.1		
19-AUG-08	Routine	25.69				10.49							7.1		
19-AUG-08	Routine	23.94				8.30							18.4		

19-AUG-08	Routine	25.92	10.42					8.3
19-AUG-08	Routine			1.06	< 0.05	0.089	15	18
19-AUG-08	Routine	23.85	7.87					20.3
07-AUG-08	Routine	25.14	13.39					39.9
07-AUG-08	Routine	25.61	10.96					57.1
07-AUG-08	Routine			2.05	< 0.05	0.234	33	27
07-AUG-08	Routine	24.63	11.30					39.5
07-AUG-08	Routine	24.90	12.41					34.0
28-JUL-08	Routine	24.35	8.28					12.5
28-JUL-08	Routine			1.04	0.09	0.087	12	12
28-JUL-08	Routine	24.71	8.64					9.9
28-JUL-08	Routine	25.58	9.10					9.2
28-JUL-08	Routine	25.73	9.12					10.0
28-JUL-08	Routine	24.59	8.56					10.8
15-JUL-08	Routine	22.89	8.71					61.3
15-JUL-08	Routine	26.26	13.82					32.5
15-JUL-08	Routine			2.53	< 0.05	0.240	31	26
15-JUL-08	Routine	23.65	12.56					50.2
15-JUL-08	Routine	25.53	14.28					26.7

Environmental Data Access

Print Report New Search

Lake Station Information

Station Name:	UNNAMED
Waterbody Name:	Unnamed
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0012-00-201
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0012-00
Period of Record:	2007 through 2008
Lat/Lon	45.704325,-94.175283

Chemical | Projects | Other Stations

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Year 2008 Data

Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
10-08-08	Routine	0 m				10.66		< 0.05			0.099		11.3			
08-20-08	Routine	0 m				9.64		< 0.05			0.348		55.7			
04-23-08	Routine	0 m				13.8		1.5			0.106					

Year 2007 Data

Environmental Data Access

Print Report New Search

Lake Station Information

Station Name:	UNNAMED
Waterbody Name:	Unnamed
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0012-00-201
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0012-00
Period of Record:	2007 through 2008
Lat/Lon	45.704325,-94.175283

Chemical | Projects | Other Stations

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Year 2008 Data

Year 2007 Data

Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
07-25-07	Routine	0 m				13.3										
07-25-07	Routine	.1 m		127						5.52	0.431					

Environmental Data Access

Print Report New Search

Lake Station Information

Station Name:	UNNAMED
Waterbody Name:	Unnamed
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0012-00-209
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0012-00
Period of Record:	1999 through 2003
Lat/Lon	45.699985,-94.176718

Chemical | Projects | Other Stations

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Year 2003 Data

Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
10-15-03	Routine	0 m		34		10.7	3.2				0.115					1.2
10-15-03	Routine	1 m				10.2										
08-21-03	Routine	0 m		139		8.9					0.187					0.6
08-21-03	Routine	1 m				8.8										
07-24-03	Routine	0 m		47		10.6					0.166					0.8
07-24-03	Routine	1 m				10.7										
06-21-03	Routine	0 m		40		9.5	2.7				0.107					0.9
06-21-03	Routine	1 m				9.3										
05-21-03	Routine	0 m		21		11.5	1.3				0.056					1.4
05-21-03	Routine	1 m				11.2										

Year 1999 Data

Environmental Data Access

Print Report New Search

Lake Station Information

Station Name:	UNNAMED
Waterbody Name:	Unnamed
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0012-00-209
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0012-00
Period of Record:	1999 through 2003
Lat/Lon	45.699985,-94.176718

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Year 2003 Data

Year 1999 Data

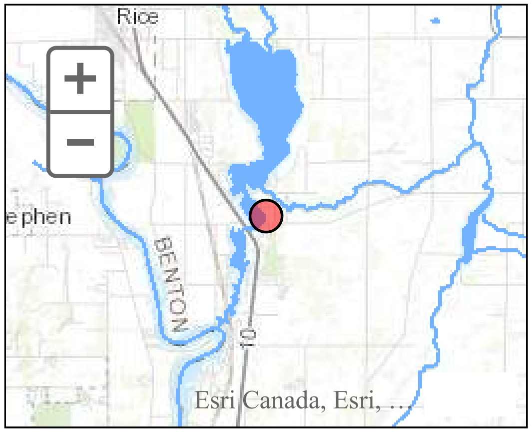
Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
09-10-99	Routine	0 m														0.46
08-16-99	Routine	0 m														0.76
07-13-99	Routine	0 m														0.30
06-15-99	Routine	0 m														0.46

APPENDIX E-15 Little Rock Lake Historic Water Quality Data

Environmental Data Access

Print Report New Search



* Does not reflect exact sampling location

Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-100 *
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	2007 through 2007
Lat/Lon	45.7072,-94.1679

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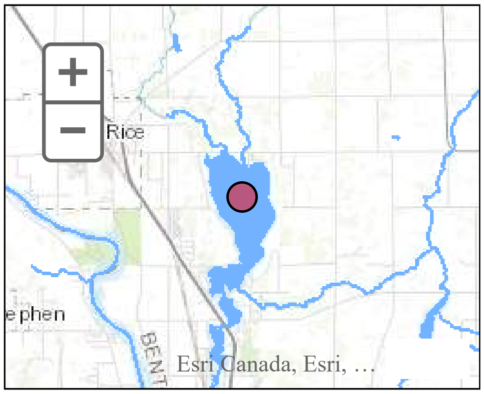
Year 2007 Data

Station Data

Sample Date	Type	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
	Info															
07-12-07	Routine	0 m		501						24.7	0.594					

Environmental Data Access

Print Report New Search



Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-101
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	1990 through 1990
Lat/Lon	45.738061,-94.167748

Chemical | Projects | Other Stations

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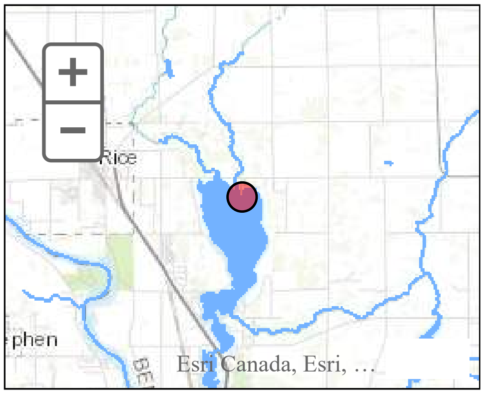
Year 1990 Data

Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
09-19-90	Routine	0 m					2.66	< 0.01			0.173	23	15			0.39
08-28-90	Routine	0 m		85.7		10.8	4	< 0.01		< 0.8	0.286	28	19			0.46
08-28-90	Routine	1 m				11.4										
08-28-90	Routine	2 m				10.4										
08-28-90	Routine	3 m				3.1										
07-30-90	Routine	0 m		127		10.1	2.98	< 0.01		3.2	0.205	35	22			0.38
07-30-90	Routine	1 m				9.8										
07-30-90	Routine	2 m				8.8										
07-30-90	Routine	3 m				7.2										
06-25-90	Routine	0 m		38.5		15	1.83	< 0.01		4.11	0.101	18	12			
06-25-90	Routine	1 m				7										
06-25-90	Routine	2 m				6.4										
06-25-90	Routine	3 m				4										
05-22-90	Routine	0 m		16.7		11.1	1.5	0.67		3.2	0.06	7.4	4.2			1.3
05-22-90	Routine	1 m				11.1										
05-22-90	Routine	2 m				11.1										
05-22-90	Routine	3 m				10.6										

Environmental Data Access

Print Report New Search



Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-102
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	1990 through 2007
Lat/Lon	45.744741,-94.164937

Chemical | Projects | Other Stations

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Year 2007 Data

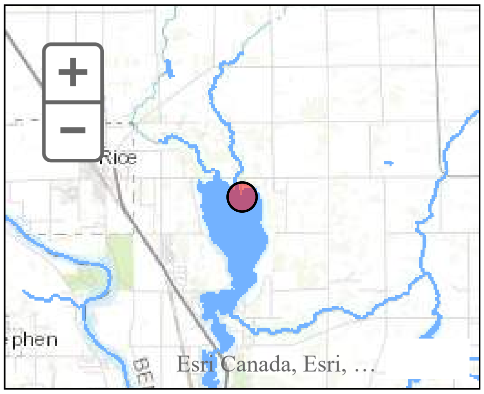
Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
07-25-07	Routine	0 m				13.4										
07-25-07	Routine	.1 m		120						4.01	0.271					

Year 1990 Data

Environmental Data Access

Print Report New Search



Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-102
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	1990 through 2007
Lat/Lon	45.744741,-94.164937

Chemical | Projects | Other Stations

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Year 2007 Data

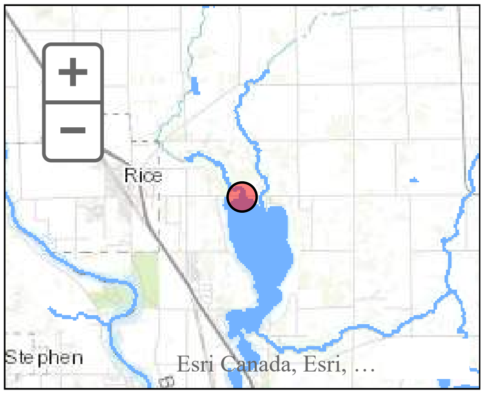
Year 1990 Data

Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
08-28-90	Routine	0 m														0.4
07-30-90	Routine	0 m		141						< 1.6						0.31
06-25-90	Routine	0 m		36.7						4.7						
05-22-90	Routine	0 m		15.4		10.4	1.5			6.41	0.061					1.5
05-22-90	Routine	1 m				10.4										
05-22-90	Routine	2 m				10.4										
05-22-90	Routine	3 m				9.1										

Environmental Data Access

Print Report New Search



Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-103
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	1990 through 2007
Lat/Lon	45.749447,-94.174688

Chemical | Projects | Other Stations

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Year 2007 Data

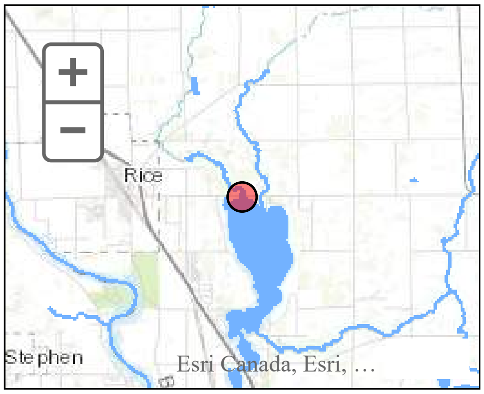
Station Data

Sample Date	Type	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
	Info															
07-25-07	Routine	0 m				0.2										

Year 1990 Data

Environmental Data Access

Print Report New Search



Lake Station Information

Station Name: LITTLE ROCK
Waterbody Name: Little Rock
Data Steward Org: MPCA
Station ID: (Lake ID) 05-0013-00-103
Hydrologic Unit Code (HUC): 07010201
Assessment Unit: 05-0013-00
Period of Record: 1990 through 2007
Lat/Lon 45.749447,-94.174688

Chemical | Projects | Other Stations

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Year 2007 Data

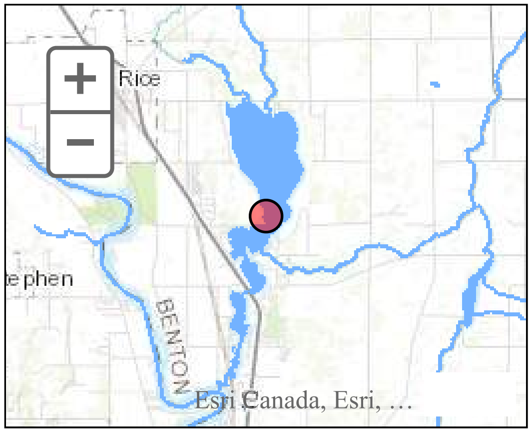
Year 1990 Data

Station Data

Sample Date	Type	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
	Info															
09-19-90	Routine	0 m					2.1				0.127					0.46
08-28-90	Routine	0 m		77.7		12	2.55			< 0.8	0.169					0.31
08-28-90	Routine	1 m				10										
07-30-90	Routine	0 m		125		9.8	3.15			< 1.6	0.213					0.38
07-30-90	Routine	1 m				9.6										
06-25-90	Routine	0 m		96.5		15.6	2.43			8.54	0.16					
06-25-90	Routine	1 m				14.2										
05-22-90	Routine	0 m				11.2	1.57				0.072					1.3
05-22-90	Routine	1 m				11.2										

Environmental Data Access

Print Report New Search



Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-202
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	1979 through 1981
Lat/Lon	45.722325,-94.167948

Chemical | Projects | Other Stations

Download this station

Year 1981 Data

Station Data

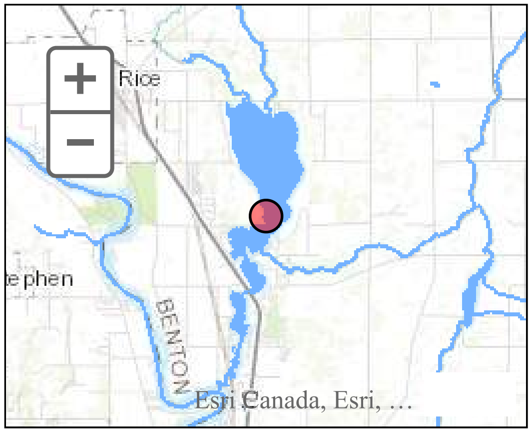
Sample Date	Type	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
	Info															
07-28-81	Routine	0 m					1.58				0.089					

Year 1980 Data

Year 1979 Data

Environmental Data Access

Print Report New Search



Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-202
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	1979 through 1981
Lat/Lon	45.722325,-94.167948

Chemical | Projects | Other Stations

Download this station

Year 1981 Data

Year 1980 Data

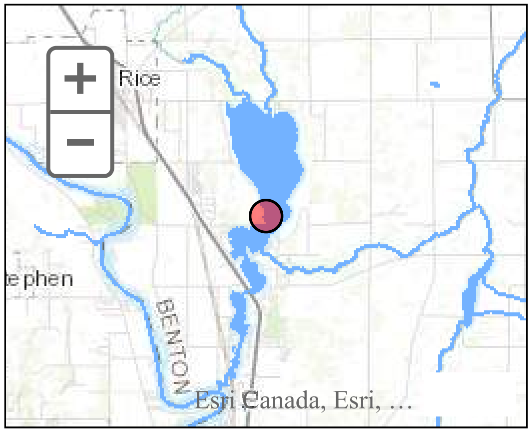
Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
07-29-80	Routine	0 m					1.67				0.144					

Year 1979 Data

Environmental Data Access

Print Report New Search



Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-202
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	1979 through 1981
Lat/Lon	45.722325,-94.167948

Chemical | Projects | Other Stations

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Year 1981 Data

Year 1980 Data

Year 1979 Data

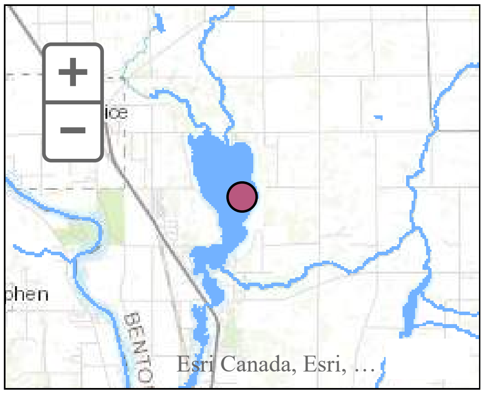
Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
09-23-79	Routine	0 m														0.53
09-16-79	Routine	0 m					1.42				0.122					0.48
09-07-79	Routine	0 m														0.48
08-31-79	Routine	0 m														0.46
08-25-79	Routine	0 m					1.56				0.167					

08-18-79	Routine	0 m			0.43
08-12-79	Routine	0 m			0.38
07-31-79	Routine	0 m	0.98	0.087	
07-31-79	Routine	0 m			0.28
07-25-79	Routine	0 m			0.40
07-15-79	Routine	0 m			0.46

Environmental Data Access

Print Report New Search



Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-203
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	1980 through 2016
Lat/Lon	45.732752,-94.161343

Chemical | Projects | Other Stations

Download this station

Year 2016 Data

Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
09-29-16	Routine	0 m		177		10.35	2.91			19.9	0.235	57				0.3
09-29-16	QC-FR	0 m		183						18.8	0.246					
09-29-16	Routine	1 m				9.2										
09-29-16	Routine	2 m				8.2										
09-29-16	Routine	3 m				8.13										
09-29-16	Routine	4 m				8.49										
09-29-16	Routine	5 m				1.45										
08-23-16	Routine	0 m		198		9.17	3.98			12.1	0.322	55				0.2
08-23-16	Routine	1 m				9.13										
08-23-16	Routine	2 m				9.15										
08-23-16	Routine	3 m				8.9										
08-23-16	Routine	4 m				8.65										
08-23-16	Routine	5 m				6.92										
07-21-16	Routine	0 m		93.0		10.34	1.99			9.09	0.224	27				0.4
07-21-16	QC-FR	0 m		91.6						8.06	0.162					
07-21-16	Routine	1 m				10										
07-21-16	Routine	2 m				9.45										
07-21-16	Routine	3 m				9.17										
07-21-16	Routine	4 m				2.51										
07-21-16	Routine	5 m				0.99										
07-21-16	Routine	5 m									0.163					
07-21-16	Routine	5.4 m				0.37										
06-16-16	Routine	0 m				4.53										0.6
06-16-16	Routine	1 m				4.4										
06-16-16	Routine	2 m				3.69										
06-16-16	Routine	3 m				3.9										
06-16-16	Routine	4 m				3.79										
06-16-16	Routine	4.8 m				1.99										
06-15-16	Routine	0 m		32.5			2.76			5.68	0.112	16				

06-15-16	Routine	4.5 m					0.131		
05-19-16	Routine	0 m	2.62	9.22	1.33	2.33	0.036	3.2	3.8
05-19-16	QC-FR	0 m	2.64			2.48	0.029		
05-19-16	Routine	1 m		9.32					
05-19-16	Routine	2 m		9.34					
05-19-16	Routine	3 m		9.34					
05-19-16	Routine	4 m		7.64					
05-19-16	Routine	4.5 m					0.080		
05-19-16	Routine	5 m		7.45					

Year 2014 Data

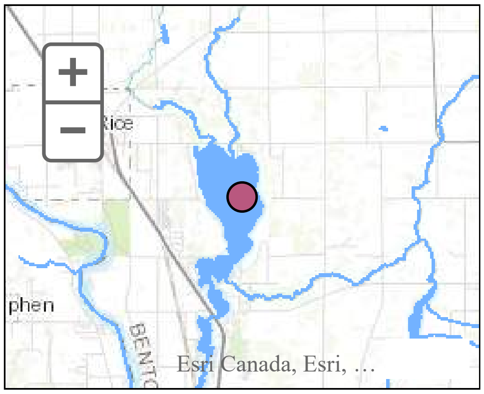
Year 1982 Data

Year 1981 Data

Year 1980 Data

Environmental Data Access

Print Report New Search



Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-204
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	1989 through 2019
Lat/Lon	45.735775,-94.163233

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Year 2012 Data

Year 2008 Data

Station Data

Sample Date	Type	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
	Info															
10-29-08	Routine	0 m		56.8		13.31	1.99	0.44			0.137	23	12			0.7
10-29-08	Routine	.6 m				13.24							13.0			
10-29-08	Routine	1.2 m				12.97							12.7			
10-29-08	Routine	1.8 m				12.81							12.7			
10-29-08	Routine	2.4 m				12.79							14.6			
10-29-08	Routine	3 m				12.72							13.9			
10-29-08	Routine	3.7 m				12.73							15.3			
10-29-08	Routine	4.267 m				12.70							14.6			
10-29-08	Routine	4.57 m					2.07	0.43			0.158	37	18			
10-29-08	Routine	4.9 m				12.52							20.5			
10-15-08	Routine	0 m		70.3		10.30	2.30	0.23			0.162	23	23.7			0.8
10-15-08	Routine	.6 m				10.29							23.1			
10-15-08	Routine	1.2 m				10.30							24.7			
10-15-08	Routine	1.8 m				10.31							23.5			
10-15-08	Routine	2.4 m				10.32							21.5			

10-15-08	Routine	3 m		10.32					20.6	
10-15-08	Routine	3.7 m		10.32					22.2	
10-15-08	Routine	4.267 m		10.06					23.9	
10-15-08	Routine	4.57 m			2.20	0.22	0.204	25	19	
09-30-08	Routine	0 m	219	10.71	3.00	< 0.05	0.303	60	51.8	0.3
09-30-08	Routine	.6 m		10.69					53.7	
09-30-08	Routine	1.2 m		10.64					54.7	
09-30-08	Routine	1.8 m		10.61					52.1	
09-30-08	Routine	2.4 m		10.61					52.7	
09-30-08	Routine	3 m		10.61					52.1	
09-30-08	Routine	3.7 m		10.63					54.3	
09-30-08	Routine	4.26 m			4.25	< 0.05	0.358	110	61	
09-30-08	Routine	4.267 m		10.62					52.6	
09-15-08	Routine	0 m	184	7.02	2.61	0.10	0.310	43	78.6	0.3
09-15-08	Routine	.6 m		7.09					86.2	
09-15-08	Routine	1.2 m		6.91					46.5	
09-15-08	Routine	1.8 m		6.90					46.7	
09-15-08	Routine	2.4 m		6.86					50.0	
09-15-08	Routine	3 m		6.82					44.6	
09-15-08	Routine	3.7 m		6.79					43.9	
09-15-08	Routine	4.26 m			2.68	0.10	0.329	54	45	
09-15-08	Routine	4.267 m		6.78					41.4	
09-15-08	Routine	4.9 m		6.54					39.5	
09-03-08	Routine	0 m	260	5.82	3.74	< 0.05	0.509	74	94.1	0.2
09-03-08	Routine	.6 m		5.86					90.6	
09-03-08	Routine	1.2 m		5.79					92.5	
09-03-08	Routine	1.8 m		5.71					90.1	
09-03-08	Routine	2.4 m		5.60					88.5	
09-03-08	Routine	3 m		5.50					92.8	
09-03-08	Routine	3.7 m		5.50					90.3	
09-03-08	Routine	4.26 m			3.69	< 0.05	0.458	210	74	
09-03-08	Routine	4.267 m		5.42					88.0	
09-03-08	Routine	4.9 m		5.43					86.9	
08-19-08	Routine	0 m	195	9.43	2.59	< 0.05	0.393	37	70.2	0.3
08-19-08	Routine	.6 m		9.28					68.4	
08-19-08	Routine	1.2 m		9.06					67.5	
08-19-08	Routine	1.8 m		8.59					65.6	
08-19-08	Routine	2.4 m		4.50					67.6	
08-19-08	Routine	3 m		4.52					69.5	
08-19-08	Routine	3.7 m		2.58					77.3	
08-19-08	Routine	4.3 m		0.44	4.1	< 0.05	0.639	200	174.0	
08-07-08	Routine	0 m	151	7.32	3.41	< 0.05	0.477	82	85.9	0.2
08-07-08	Routine	.6 m		7.39					83.9	
08-07-08	Routine	1.2 m		7.28					87.3	
08-07-08	Routine	1.8 m		6.88					90.2	
08-07-08	Routine	2.4 m		6.44					90.6	
08-07-08	Routine	3 m		6.29					92.4	
08-07-08	Routine	4.3 m		7.38	3.52	< 0.05	0.538	130	81.2	
08-07-08	Routine	4.9 m		7.41					79.7	
08-07-08	Routine	6.7 m		6.90					88.1	
07-28-08	Routine	0 m	202	9.90	2.62	< 0.05	0.35	43	53.2	0.3
07-28-08	Routine	.6 m		9.84					57.4	
07-28-08	Routine	1.2 m		9.63					55.9	
07-28-08	Routine	1.8 m		9.31					54.0	
07-28-08	Routine	2.4 m		9.36					53.7	
07-28-08	Routine	3 m		9.40					34.0	
07-28-08	Routine	4.3 m		2.99	2.5	< 0.05	0.428	54	64	
07-28-08	Routine	4.9 m		1.93					56.5	
07-28-08	Routine	6.7 m		4.60					35.1	

07-15-08	Routine	0 m		16.73	2.26	< 0.05	0.264	28	73.5	0.9
07-15-08	Routine	.6 m		10.42					48.9	
07-15-08	Routine	1.2 m		8.94					33.0	
07-15-08	Routine	1.8 m		8.26					30.1	
07-15-08	Routine	2.4 m		7.24					29.7	
07-15-08	Routine	3 m		6.60					30.1	
07-15-08	Routine	4.3 m		4.37					43.7	
07-15-08	Routine	4.9 m		4.25					52.1	
07-15-08	Routine	6.7 m		5.38					35.1	
06-12-08	Routine	0 m	28.6	8.6			0.135		21.5	1.1
06-12-08	Routine	.6 m		8.66					13.3	
06-12-08	Routine	1.2 m		8.69					18.8	
06-12-08	Routine	1.8 m		8.6					17.8	
06-12-08	Routine	2.4 m		8.8					17.1	
06-12-08	Routine	3 m		8.8					11.3	
06-12-08	Routine	3.7 m		8.04					9.7	
06-12-08	Routine	4.3 m		7.96					10.1	
06-12-08	Routine	4.9 m		7.99					9.8	

Year 2007 Data

Year 2006 Data

Year 2003 Data

Year 1990 Data

Year 1989 Data

Environmental Data Access

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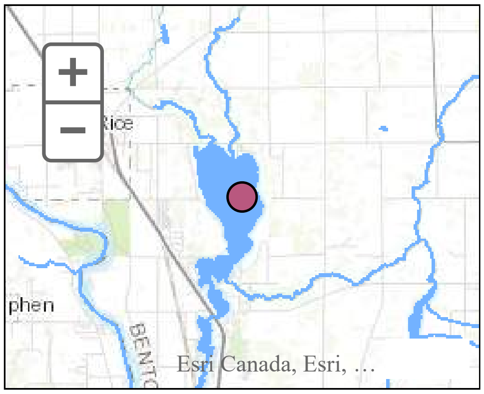

Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-204
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	1989 through 2019
Lat/Lon	45.735775,-94.163233

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Year 2019 Data

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Year 2015 Data

Year 2013 Data

Year 2012 Data

Year 2008 Data

Year 2007 Data

Station Data

Sample Date	Type	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
	Info															
10-17-07	Routine	0 m		122		10.23					0.285		48.8			0.4572
10-17-07	Routine	1 m				9.98							47.8			0.4572
10-17-07	Routine	2 m				9.89							44.5			0.4572
10-17-07	Routine	3.05 m				9.76							41.9			0.4572
09-04-07	Routine	0 m		75.2		13.96					0.244		34			0.6096
09-04-07	Routine	1 m				10.45							44.4			0.6096
09-04-07	Routine	2 m				7.67							37.5			0.6096
09-04-07	Routine	2.44 m				6.42							36.8			0.6096
07-17-07	Routine	0 m		73.9		11.24					0.269		63.9			0.3048
07-17-07	Routine	1 m				10.94							71.7			0.3048
07-17-07	Routine	2 m				8.92							43.1			0.3048
07-17-07	Routine	3.05 m				3.35							44.9			0.3048

06-19-07	Routine	0 m	374	9.88	0.322	146.5	0.1524
06-19-07	Routine	1 m		10.15		150.2	0.1524
06-19-07	Routine	1.83 m		10.15		153.1	0.1524
05-02-07	Routine	0 m	71.9	10.44	0.121	15.5	0.4572
05-02-07	Routine	1 m		10.04		16.1	0.4572
05-02-07	Routine	2 m		9.75		17.3	0.4572
05-02-07	Routine	3 m		9.58		18.1	0.4572
05-02-07	Routine	3.96 m		8.56		15.9	0.4572

Year 2006 Data

Year 2003 Data

Year 1990 Data

Year 1989 Data

Environmental Data Access

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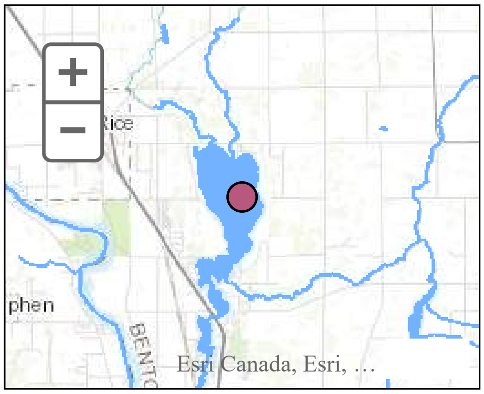

Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-204
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	1989 through 2019
Lat/Lon	45.735775,-94.163233

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Year 2019 Data

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Year 2007 Data

Year 2006 Data

Station Data

Sample Date	Type	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
	Info															
10-10-06	Routine	0 m		364		6.79					0.206		84.9			0.3048
10-10-06	Routine	3 m				6.6							86			
10-10-06	Routine	6 m				6.49							90.4			
10-10-06	Routine	9 m				6.34							86.6			
10-10-06	Routine	12 m				6.31							81.5			
10-10-06	Routine	14 m				6.28							98.2			
09-28-06	Routine	0 m		80.4		10.16					0.216		101.1			0.20117
09-28-06	Routine	3 m				9.84							90.6			
09-28-06	Routine	6 m				9.77							93.7			
09-28-06	Routine	9 m				9.72							96.9			
09-28-06	Routine	12 m				9.69							96.8			
09-28-06	Routine	15 m				9.68							93.6			

08-28-06	Routine	0 m	328	12.3	0.623	63.1	0.4572
08-28-06	Routine	3 m		12.99		62.7	
08-28-06	Routine	6 m		5.07		121.6	
08-28-06	Routine	9 m		1.65		160.9	
08-28-06	Routine	12 m		0.51		204.3	
08-28-06	Routine	14 m		0.84		530.1	
08-28-06	Routine	15 m		0.16		759	
08-08-06	Routine	0 m	117	9.72	0.183	89.6	0.3048
08-08-06	Routine	3 m				90.8	
08-08-06	Routine	6 m		9.84		95.7	
08-08-06	Routine	9 m		7.57		108.1	
08-08-06	Routine	12 m		4.56		116.6	
08-08-06	Routine	15 m		2.69		135.8	
07-13-06	Routine	0 m	90.4	4.99	0.098		0.45719
07-13-06	Routine	3 m		5.03			
07-13-06	Routine	6 m		4.57			
07-13-06	Routine	9 m		3.8			
07-13-06	Routine	12 m		2.82			
07-13-06	Routine	15 m		1.75			
06-21-06	Routine	0 m	64.4	8.78	0.092	22.1	0.61
06-21-06	Routine	3 m		8.92		23.2	
06-21-06	Routine	6 m		9.4		22.3	
06-21-06	Routine	9 m		9.51		23	
06-21-06	Routine	12 m		8.8		22	
06-21-06	Routine	15 m		8.8		22	
05-17-06	Routine	0 m	81.2	12.4	0.199	13.8	
05-17-06	Routine	3 m		13		14.6	
05-17-06	Routine	6 m		11.5		14.8	
05-17-06	Routine	9 m		12.9		14.2	
05-17-06	Routine	12 m		12.8		15	

Year 2003 Data

Year 1990 Data

Year 1989 Data

Environmental Data Access

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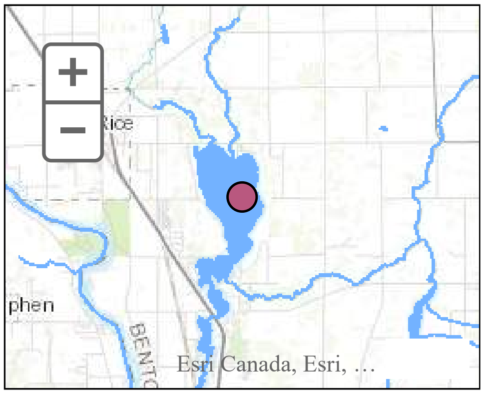

Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-204
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	1989 through 2019
Lat/Lon	45.735775,-94.163233

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Year 2019 Data
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Year 2008 Data
Year 2007 Data
Year 2006 Data
Year 2003 Data

Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
10-15-03	Routine	0 m		34			2.9				0.082					
10-15-03	Routine	0 m				8.01										3.05
10-15-03	Routine	1 m				7.85										
10-15-03	Routine	2 m				7.8										
10-15-03	Routine	3 m				7.73										
08-21-03	Routine	0 m		145		7.04					0.203					0.76
08-21-03	Routine	1 m				7.16										
08-21-03	Routine	2 m				7.04										
08-21-03	Routine	3 m				7.27										
08-21-03	Routine	4 m				1.23										
07-24-03	Routine	0 m		12		6.8					0.061					1.98

07-24-03	Routine	1 m		6.8			
07-24-03	Routine	2 m		6.2			
07-24-03	Routine	3 m		0.6			
06-21-03	Routine	0 m	29	8.4	2.3	0.077	1.6
06-21-03	Routine	1 m		8.4			
06-21-03	Routine	2 m		8.2			
06-21-03	Routine	3 m		8			
05-21-03	Routine	0 m	3		1.6	0.076	
05-21-03	Routine	0 m		8			2.59
05-21-03	Routine	1 m		7.9			
05-21-03	Routine	2 m		7.8			
05-21-03	Routine	3 m		7.8			

Year 1990 Data

Year 1989 Data

Environmental Data Access

Print Report New Search

Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-205
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	1989 through 2019
Lat/Lon	45.744882,-94.174491

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Year 2019 Data

Year 2017 Data

Year 2016 Data

Year 2015 Data

Year 2013 Data

Year 2012 Data

Year 2008 Data

Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
10-29-08	Routine	0 m				12.55							10.1			0.8
10-29-08	Routine	.6 m				12.52							10.7			
10-29-08	Routine	1.2 m				12.51							10.7			
10-29-08	Routine	1.8 m				12.56							10.7			
10-29-08	Routine	2.4 m				11.92							15.1			
10-29-08	Routine	3 m				11.91							17.9			
10-15-08	Routine	0 m				10.53					0.166		18.9			0.8
10-15-08	Routine	.6 m				10.58							19.0			
10-15-08	Routine	1.2 m				10.62							17.7			
10-15-08	Routine	1.8 m				10.64							20.0			
10-15-08	Routine	2.4 m				10.40							0.6			
10-15-08	Routine	3 m				8.29							-0.4			
09-30-08	Routine	0 m				10.40					0.309		55.9			0.3
09-30-08	Routine	.6 m				10.44							53.9			
09-30-08	Routine	1.2 m				10.33							53.3			
09-30-08	Routine	1.8 m				10.32							51.7			
09-30-08	Routine	2.4 m				10.29							55.0			

09-30-08	Routine 3 m		10.20		55.7	
09-15-08	Routine 0 m		7.03	0.276	33.6	0.4
09-15-08	Routine .6 m		6.90		32.5	
09-15-08	Routine 1.2 m		6.82		32.7	
09-15-08	Routine 1.8 m		6.76		33.0	
09-15-08	Routine 2.4 m		6.82		31.8	
09-15-08	Routine 3 m		6.54		33.9	
09-03-08	Routine 0 m		5.79	0.428	93.9	0.2
09-03-08	Routine .6 m		5.65		90.2	
09-03-08	Routine 1.2 m		5.63		90.9	
09-03-08	Routine 1.8 m		5.46		87.3	
09-03-08	Routine 2.4 m		5.47		88.9	
09-03-08	Routine 3 m		5.38		88.7	
08-19-08	Routine 0 m		10.11	0.417	90.3	0.3
08-19-08	Routine .6 m		10.11		92.3	
08-19-08	Routine 1.2 m		9.99		89.0	
08-19-08	Routine 1.8 m		9.73		86.3	
08-19-08	Routine 2.4 m		9.11		96.5	
08-19-08	Routine 3 m		8.76		97.2	
08-07-08	Routine 0 m		5.31	0.415	78.3	0.2
08-07-08	Routine .6 m		5.05		76.0	
08-07-08	Routine 1.2 m		4.82		75.0	
08-07-08	Routine 1.8 m		4.67		74.2	
08-07-08	Routine 2.4 m		4.74		75.1	
08-07-08	Routine 3 m		3.57		68.6	
07-28-08	Routine 0 m	152	10.86	0.338	54.0	0.3
07-28-08	Routine .6 m		11.89		64.0	
07-28-08	Routine 1.2 m		11.93		58.0	
07-28-08	Routine 1.8 m		12.09		59.5	
07-28-08	Routine 2.4 m		12.30		66.6	
07-28-08	Routine 3 m		8.69		69.4	
07-15-08	Routine 0 m		15.93	0.251	162.0	0.1
07-15-08	Routine .6 m		16.33		85.1	
07-15-08	Routine 1.2 m		11.11		40.2	
07-15-08	Routine 1.8 m		10.42		34.0	
07-15-08	Routine 2.4 m		9.80		28.2	
07-15-08	Routine 3 m		9.10		24.1	

Year 1990 Data

Year 1989 Data

Environmental Data Access

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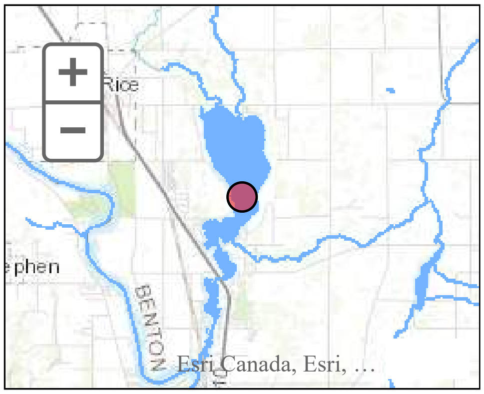

Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-209
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	2008 through 2008
Lat/Lon	45.725695,-94.165836

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Year 2008 Data

Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
10-29-08	Routine	0 m				13.85							10.7			0.8
10-29-08	Routine	.6 m				13.82							10.3			
10-29-08	Routine	1.2 m				13.82							10.8			
10-29-08	Routine	1.8 m				13.36							11.2			
10-29-08	Routine	2.4 m				13.22							14.8			
10-29-08	Routine	3 m				12.89							15.6			
10-15-08	Routine	0 m				10.31					0.155		18.3			0.8
10-15-08	Routine	.6 m				10.31							17.1			
10-15-08	Routine	1.2 m				10.28							15.9			
10-15-08	Routine	1.8 m				10.28							18.0			
10-15-08	Routine	2.4 m				10.26							18.5			
10-15-08	Routine	3 m				10.24							19.0			
09-30-08	Routine	0 m				11.37					0.284		54.0			0.3
09-30-08	Routine	.6 m				11.38							54.0			
09-30-08	Routine	1.2 m				11.30							53.4			
09-30-08	Routine	1.8 m				11.25							53.8			
09-30-08	Routine	2.4 m				10.82							51.0			
09-30-08	Routine	3 m				10.44							52.4			
09-15-08	Routine	0 m				7.82					0.328		60.6			0.3
09-15-08	Routine	.6 m				7.73							63.0			
09-15-08	Routine	1.2 m				7.71							57.6			
09-15-08	Routine	1.8 m				7.63							54.5			
09-15-08	Routine	2.4 m				7.63							46.5			
09-15-08	Routine	3 m				7.56							36.3			
09-03-08	Routine	0 m				7.03							115.8			0.2
09-03-08	Routine	.6 m				6.95							114.2			
09-03-08	Routine	1.2 m				6.78							115.6			
09-03-08	Routine	1.8 m				6.54							106.3			
09-03-08	Routine	2.4 m				6.56							98.6			

09-03-08	Routine 3 m		5.67		74.0	
08-19-08	Routine 0 m		7.69	0.411	66.0	0.3
08-19-08	Routine .6 m		7.45		70.5	
08-19-08	Routine 1.2 m		6.49		70.9	
08-19-08	Routine 1.8 m		6.34		63.3	
08-19-08	Routine 2.4 m		5.97		66.0	
08-19-08	Routine 3 m		1.77		121.3	
08-07-08	Routine 0 m		8.51	0.450	91.1	0.2
08-07-08	Routine .6 m		8.49		93.1	
08-07-08	Routine 1.2 m		8.41		90.1	
08-07-08	Routine 1.8 m		8.38		91.3	
08-07-08	Routine 2.4 m		7.88		84.1	
08-07-08	Routine 3 m		6.90		91.1	
07-28-08	Routine 0 m	101	7.39	0.339	46.2	0.4
07-28-08	Routine .6 m		7.36		49.9	
07-28-08	Routine 1.2 m		7.46		50.6	
07-28-08	Routine 1.8 m		7.64		50.0	
07-28-08	Routine 2.4 m		8.02		50.3	
07-28-08	Routine 3 m		6.46		56.1	
07-15-08	Routine 0 m		13.14	0.240	40.9	0.3
07-15-08	Routine .6 m		13.14		38.8	
07-15-08	Routine 1.2 m		9.45		45.8	
07-15-08	Routine 1.8 m		7.77		27.1	
07-15-08	Routine 2.4 m		7.20		27.7	
07-15-08	Routine 3 m		5.41		29.4	

Environmental Data Access

Print Report New Search

Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-211
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	2008 through 2008
Lat/Lon	45.717572,-94.175931

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Year 2008 Data

Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
10-29-08	Routine	0 m				13.98	1.81	0.30			0.123	18	8.3			0.8
10-29-08	Routine	.6 m				14.02							8.9			
10-29-08	Routine	1.2 m				13.99							10.0			
10-15-08	Routine	0 m				10.78	1.86	0.10			0.140	20	15			0.9
10-15-08	Routine	.6 m				10.78							15.4			
10-15-08	Routine	1.2 m				10.76							14.3			
10-15-08	Routine	1.5 m				10.76							40.4			
09-30-08	Routine	0 m				13.75	2.57	0.05			0.236	61	43.3			0.5
09-30-08	Routine	.6 m				13.73							40.7			
09-30-08	Routine	1.2 m				13.60							37.5			
09-15-08	Routine	0 m				9.34	4.18	< 0.05			0.396	76	65.7			0.3
09-15-08	Routine	.6 m				9.09							78.3			
09-15-08	Routine	1.2 m				8.32							83.8			
09-03-08	Routine	0 m				7.06	1.88	< 0.05			0.371	38	55.1			0.3
09-03-08	Routine	.6 m				7.10							55.7			
09-03-08	Routine	1.2 m				7.04							56.0			
08-19-08	Routine	0 m				8.72	2.39	< 0.05			0.415	61	65.2			0.3
08-19-08	Routine	.6 m				8.56							66.1			
08-19-08	Routine	1.2 m				8.16							65.0			
08-19-08	Routine	1.8 m				6.55							133.2			
08-07-08	Routine	0 m				8.97	3.48	< 0.05			0.489	90	89.9			0.2
08-07-08	Routine	.6 m				8.61							94.0			
08-07-08	Routine	1.2 m				7.10							91.1			
08-07-08	Routine	1.5 m				5.65							98.0			
07-28-08	Routine	0 m				8.65	4.38	0.05			0.543	81	97.0			0.2
07-28-08	Routine	.6 m				8.48							96.5			
07-28-08	Routine	1.2 m				8.20							75.9			
07-28-08	Routine	1.5 m				8.22							103.6			
07-15-08	Routine	0 m				11.90	2.16	< 0.05			0.241	24	30.1			0.5

07-15-08	Routine	.6 m	12.06	25.7
07-15-08	Routine	1.2 m	8.11	25.6
07-15-08	Routine	1.5 m	5.05	26.1

Environmental Data Access

Print Report New Search

Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-212
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	2008 through 2019
Lat/Lon	45.703855,-94.173282

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Year 2019 Data

Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
07-24-19	Routine	0 m														0.6
06-24-19	Routine	0 m														0.5
05-23-19	Routine	0 m														1.1

Year 2017 Data

Year 2016 Data

Year 2015 Data

Year 2013 Data

Year 2012 Data

Year 2008 Data

Environmental Data Access

Print Report New Search

Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-212
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	2008 through 2019
Lat/Lon	45.703855,-94.173282

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Year 2019 Data

Year 2017 Data

Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
09-12-17	Routine	0 m		33.8							0.072					
08-22-17	Routine	0 m		247							0.16					0.3048
07-17-17	Routine	0 m		88.1							0.148					0.4572
06-12-17	Routine	0 m		61.4							0.085					0.762
05-21-17	Routine	0 m		8.01							0.051					1.9812

Year 2016 Data

Year 2015 Data

Year 2013 Data

Year 2012 Data

Year 2008 Data

Environmental Data Access

Print Report New Search

Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-212
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	2008 through 2019
Lat/Lon	45.703855,-94.173282

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Year 2019 Data

Year 2017 Data

Year 2016 Data

Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
09-27-16	Routine	0 m		199							0.346					0.3
08-22-16	Routine	0 m		141							0.35					0.3
07-27-16	Routine	0 m		77.4							0.243					0.5
06-29-16	Routine	0 m		76.5							0.233					0.3
05-23-16	Routine	0 m		12.5							0.12					1.2

Year 2015 Data

Year 2013 Data

Year 2012 Data

Year 2008 Data

Environmental Data Access

Print Report New Search

Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-212
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	2008 through 2019
Lat/Lon	45.703855,-94.173282

Chemical Projects Other Stations

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Year 2019 Data

Year 2017 Data

Year 2016 Data

Year 2015 Data

Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
09-29-15	Routine	0 m		69							0.12					0.5
08-24-15	Routine	0 m		243							0.374					0.3
07-15-15	Routine	0 m		135							0.139					0.3
06-15-15	Routine	0 m		56							0.092					0.8
05-20-15	Routine	0 m		46							0.118					0.6

Year 2013 Data

Year 2012 Data

Year 2008 Data

Environmental Data Access

Print Report New Search

Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-212
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	2008 through 2019
Lat/Lon	45.703855,-94.173282

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Year 2019 Data

Year 2017 Data

Year 2016 Data

Year 2015 Data

Year 2013 Data

Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
09-23-13	Routine	0 m		53							0.129					0.61
08-19-13	Routine	0 m		160							0.316					
07-08-13	Routine	0 m		110							0.390					0.5
06-12-13	Routine	0 m		24							0.057					0.9
05-14-13	Routine	0 m		86							0.095					> 0.9

Year 2012 Data

Year 2008 Data

Environmental Data Access

Print Report New Search

Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-212
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	2008 through 2019
Lat/Lon	45.703855,-94.173282

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Year 2019 Data

Year 2017 Data

Year 2016 Data

Year 2015 Data

Year 2013 Data

Year 2012 Data

Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
09-17-12	Routine	0 m		62							0.163					0.5
09-11-12	Routine	0 m		66							0.129					
09-05-12	Routine	0 m		57							0.161					
08-20-12	Routine	0 m		223							0.332					0.2
08-15-12	Routine	0 m		109							0.341					0.2
07-25-12	Routine	0 m		155							0.244					
07-12-12	Routine	0 m		174							0.268					0.3

Year 2008 Data

Environmental Data Access

Print Report New Search

Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-212
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	2008 through 2019
Lat/Lon	45.703855,-94.173282

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Year 2019 Data

Year 2017 Data

Year 2016 Data

Year 2015 Data

Year 2013 Data

Year 2012 Data

Year 2008 Data

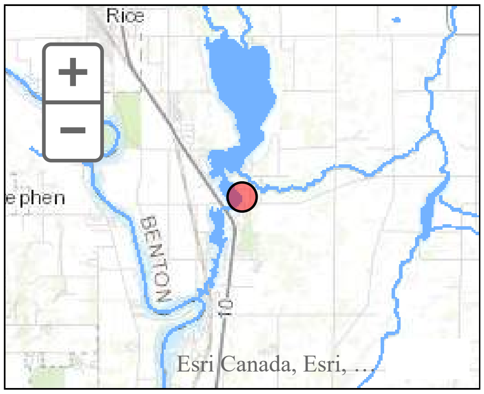
Station Data

Sample Date	Type Info	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
10-29-08	Routine	0 m				13.59					0.098		6.2			1.1
10-29-08	Routine	.6 m				13.62							8.9			
10-29-08	Routine	1.2 m				13.64							6.7			
10-29-08	Routine	1.8 m				13.70							6.6			
10-29-08	Routine	2.4 m				13.65							8.2			
10-29-08	Routine	3 m				13.65							7.8			
10-29-08	Routine	3.7 m				13.50							9.3			
10-29-08	Routine	4.3 m				13.57							8.0			
10-29-08	Routine	4.9 m				13.63							8.0			
10-15-08	Routine	0 m				11.36					0.099		10.4			0.9
10-15-08	Routine	.6 m				11.37							10.5			
10-15-08	Routine	1.2 m				11.38							10.5			
10-15-08	Routine	1.8 m				11.34							11.3			
10-15-08	Routine	2.4 m				11.29							11.4			
10-15-08	Routine	3 m				11.29							11.1			
10-15-08	Routine	3.7 m				11.29							12.4			
10-15-08	Routine	4.3 m				11.28							11.6			

09-30-08	Routine	0 m		0.153		
09-15-08	Routine	0 m	10.90	0.255	46.9	0.4
09-15-08	Routine	.6 m	10.87		43.7	
09-15-08	Routine	1.2 m	10.68		41.5	
09-15-08	Routine	1.8 m	9.68		43.5	
09-15-08	Routine	2.4 m	9.47		46.3	
09-15-08	Routine	3 m	9.35		44.2	
09-15-08	Routine	3.7 m	9.33		46.3	
09-15-08	Routine	4.3 m	9.31		63.0	
09-15-08	Routine	4.9 m	9.27		55.1	
09-03-08	Routine	0 m	7.91	0.366	65.5	0.2
09-03-08	Routine	.6 m	7.78		65.5	
09-03-08	Routine	1.2 m	7.65		61.4	
09-03-08	Routine	1.8 m	7.58		61.1	
09-03-08	Routine	2.4 m	7.39		61.1	
09-03-08	Routine	3 m	7.3		65.6	
09-03-08	Routine	3.7 m	7.21		64.6	
09-03-08	Routine	4.3 m	7.06		68.3	
08-19-08	Routine	0 m	10.41	0.299	42.3	0.3
08-19-08	Routine	.6 m	10.29		45.3	
08-19-08	Routine	1.2 m	9.00		46.6	
08-19-08	Routine	1.8 m	8.23		48.1	
08-19-08	Routine	2.4 m	8.03		47.5	
08-19-08	Routine	3 m	7.87		50.7	
08-07-08	Routine	0 m	12.96	0.487	107.1	0.2
08-07-08	Routine	.6 m	10.86		103.9	
08-07-08	Routine	1.2 m	10.05		102.9	
08-07-08	Routine	1.8 m	9.49		99.2	
08-07-08	Routine	2.4 m	9.39		97.9	
08-07-08	Routine	3 m	9.22		98.5	
08-07-08	Routine	3.7 m	9.20		100.9	
08-07-08	Routine	4.3 m	3.84		84.2	
08-07-08	Routine	4.9 m	0.91		103.5	
07-28-08	Routine	0 m	10.70	0.412	69.2	0.3
07-28-08	Routine	.6 m	10.74		66.6	
07-28-08	Routine	1.2 m	10.57		73.8	
07-28-08	Routine	1.8 m	10.47		72.4	
07-28-08	Routine	2.4 m	10.44		73.1	
07-28-08	Routine	3 m	10.49		66.0	
07-15-08	Routine	0 m	13.09	0.266	71.2	0.3
07-15-08	Routine	.6 m	13.50		33.5	
07-15-08	Routine	1.2 m	9.95		45.5	
07-15-08	Routine	1.8 m	8.16		48.0	
07-15-08	Routine	2.4 m	7.69		48.0	

Environmental Data Access

Print Report New Search



* Does not reflect exact sampling location

Lake Station Information

Station Name:	LITTLE ROCK
Waterbody Name:	Little Rock
Data Steward Org:	MPCA
Station ID: (Lake ID)	05-0013-00-100 *
Hydrologic Unit Code (HUC):	07010201
Assessment Unit:	05-0013-00
Period of Record:	2007 through 2007
Lat/Lon	45.7072,-94.1679

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Year 2007 Data

Station Data

Sample Date	Type	Depth	BOD	Chl-a	Trans	DO	TKN	NO2NO3	pH	Pheo	TP	TSS	Turb	FC	Ecoli	Secchi
	Info															
07-12-07	Routine	0 m		501						24.7	0.594					