Appendix A. Planning Memorandum of Agreement

MEMORANDUM OF AGREEMENT TO DEVELOP A JOINT, COMPREHENSIVE WATERSHED MANAGEMENT PLAN FOR THE SOUTH FORK OF THE CROW RIVER (ONE WATERSHED ONE PLAN PLANNING AREA 13)

This Agreement is made and entered into by and between:

The Counties of McLeod, Renville, Meeker, Kandiyohi and Wright, by and through their respective Boards of Commissioners; and

The McLeod, Renville, Meeker, Kandiyohi, Wright and Carver Soil and Water Conservation Districts, by and through their respective Boards of Supervisors; and

The City of Winsted, by and through its Council; and

The Buffalo Creek Watershed District, by and through its Board of Managers.

Collectively referred to as the "Parties."

The County-parties to this Agreement are political subdivisions of the State of Minnesota with water resource planning authority and obligations under Minnesota Statutes Chapter 103B; authority to carry out environmental programs and implement land use controls under Minnesota Statutes Chapter 375; and other water resource management and project authorities as otherwise provided by law.

The Soil and Water Conservation District (SWCD)-parties to this Agreement are political subdivisions of the State of Minnesota with water resource planning authority and obligations as well as authority to carry out erosion control and other soil and water conservation programs, pursuant to Minnesota Statutes Chapter 103C and as otherwise provided by law.

The City-party to this Agreement is a political subdivision of the State of Minnesota with authority, pursuant to statutes chapter 462, to regulate land uses; acquire property interests for conservation purposes; provide for the protection of recreation, agriculture, forestry, soil conservation, water supply conservation, conservation of shorelands and flood control; and to plan for, adopt goals and objectives for, and establish standards, procedures and regulations for the preservation of agricultural, forest, wildlife, and open space land and the minimization of development in sensitive shoreland areas.

The Watershed District-party to this Agreement is a special purpose unit of local government with water resource planning authority and obligations; authority to carry out environmental programs and implement land use controls; and other water resource management and project authorities as provided in Minnesota Statutes Chapter 103D and as otherwise provided by law.

The Parties have a common interest in developing a comprehensive watershed management plan for the South Fork of the Crow River (One Watershed One Plan Planning Area 13) Watershed to conserve soil and water resources through the implementation of practices, programs, and regulatory controls that effectively control or prevent erosion, sedimentation, siltation and related pollution in order to preserve natural resources, ensure continued soil productivity, protect water quality, reduce damages caused by floods, preserve wildlife, protect the tax base, and protect public lands and waters.

The Parties enter this Agreement for the specific goal of developing a plan pursuant to Minnesota Statutes § 103B.801, Comprehensive Watershed Management Planning, also known as *One Watershed, One Plan*.

Based on the foregoing, which shall be incorporated into and made part of this Agreement, the Parties agree as follows:

1. **Purpose:** The Parties to this Agreement recognize the importance of partnerships to plan and implement protection and restoration efforts for the South Fork of the Crow River (One Watershed One Plan Planning Area 13) Watershed. The purpose of this Agreement is to collectively develop and adopt, as local government units, a coordinated and comprehensive watershed management plan (the Plan) for implementation per the provisions of the Plan. Parties signing this agreement will be collectively referred to as the South Fork of the Crow River Watershed Planning Group.

2. **Term:** This Agreement is effective upon signature of all Parties and the award of a planning grant for development of the Plan, in consideration of the Board of Water and Soil Resources (BWSR) Operating Procedures for One Watershed, One Plan. This Agreement will remain in effect until adoption of a Plan by all parties, unless canceled according to the provisions of this Agreement or earlier terminated by law.

3. **Adding Additional Parties:** A qualifying party desiring to become a member of this Agreement shall indicate its intent by adoption of a board resolution prior to December 31, 2021. Each additional party, if any, agrees to abide by the terms and conditions of this Agreement; including but not limited to the bylaws, policies and procedures adopted by the Policy Committee as established herein.

4. **Withdrawal of Parties:** A Party desiring to withdraw from this Agreement shall indicate its intent in writing to the Policy Committee in the form of an official resolution of its governing body. Notice must be made at least 30 days in advance of the intended date of withdrawal.

5. **General Provisions**:

    a. **Compliance with Laws/Standards:** The Parties agree to abide by all federal, state, and local laws; statutes, ordinances, rules and regulations now in effect or hereafter adopted

pertaining to this Agreement or to the facilities, programs, and staff for which the Agreement is responsible.

b. **Indemnification:** Each party to this Agreement shall be liable for the acts of its officers, employees or agents and the results thereof to the extent authorized or limited by law and shall not be responsible for the acts of any other party, its officers, employees or agents. The provisions of the Municipal Tort Claims Act, Minnesota Statute Chapter 466 and other applicable laws govern liability of the Parties. To the full extent permitted by law, actions by the Parties, their respective officers, employees, and agents pursuant to this Agreement are intended to be and shall be construed as a "cooperative activity." It is the intent of the Parties that they shall be deemed a "single governmental unit" for the purpose of liability, as set forth in Minnesota Statutes § 471.59, subd. 1a(a). For purposes of Minnesota Statutes § 471.59, subd. 1a(a) it is the intent of each party that this Agreement does not create any liability or exposure of one party for the acts or omissions of any other party.

c. **Records Retention and Data Practices:** The Parties agree that records created pursuant to the terms of this Agreement will be retained in a manner that meets their respective entity's records retention schedules that have been reviewed and approved by the State in accordance with Minnesota Statutes Section 138.17. The Parties further agree that records prepared or maintained in furtherance of the agreement shall be subject to the Minnesota Government Data Practices Act, Minnesota Statutes Chapter 13. At the time this agreement expires, all records will be turned over to the McLeod County SWCD for continued retention in accordance with its records retention policies.

d. **Timeliness:** The Parties agree to perform obligations under this Agreement in a timely manner and keep each other informed about any delays that may occur.

e. **Extension:** The Parties may extend the termination date of this Agreement upon agreement by all Parties.

6. **Administration:**

a. **Establishment of Committees for Development of the Plan.** At a minimum, the Parties shall establish a Policy Committee and an Advisory Committee. Each Party agrees to designate one representative, who must be an elected or appointed member of its governing board, to the Policy Committee for development of the Plan and may appoint one or more technical representatives to the Advisory Committee for development of the Plan in consideration of the BWSR Operating Procedures for One Watershed, One Plan.

i. The Policy Committee members will meet as needed to decide on the content of the Plan, serve as a liaison to their respective Boards, and act on behalf of their Board. Actions and decisions of the Policy Committee shall be by consensus.

ii. Each Party may choose one alternate to serve on the Policy Committee as needed in the absence of the designated member. Alternative Policy Committee members may attend all meetings but may only act in the absence of the primary member.

iii. The Policy Committee will establish bylaws within six (6) months of the effective date of this agreement to describe its function and operation including that of any subcommittees.

iv. The Advisory Committee will meet monthly or as needed to assist and provide technical support and make recommendations to the Policy Committee on the development and content of the plan. Members of the Advisory Committee may not be a current board member of any of the Parties.

b. **Submittal of the Plan.** The Policy Committee will recommend the plan to the Parties of this agreement. The Policy Committee will be responsible for initiating a formal review process for the watershed-based plan conforming to Minnesota Statutes Chapters 103B and 103D, including public hearings. Upon completion of local review and comment, and approval of the Plan for submittal by each Party, the Policy Committee will submit the Plan to BWSR for review and approval.

c. **Adoption of the Plan.** The Parties agree to adopt and begin implementation of the Plan within 120 days of receiving notice of state approval, and provide notice of plan adoption pursuant to Minnesota Statutes Chapters 103B and 103D.

7. **Fiscal Agent:** The McLeod SWCD and its designated agent will act as the fiscal agent for the purposes of this Agreement and agrees to:

a. Accept all responsibilities associated with the implementation of the BWSR grant agreement for developing the Plan.

b. Perform financial transactions as part of grant agreement and contract implementation.

c. Annually provide a full and complete audit report.

d. Provide the Policy Committee with the records necessary to describe the financial condition of the BWSR grant agreement.

e. Retain fiscal records consistent with the agent's records retention schedule until termination of the grant agreement.

8. **Grant Administration**: The McLeod SWCD and its designated agent will act as the grant administrator for the purposes of this Agreement and agrees to provide the following services:

    a. Accept all day-to-day responsibilities associated with the implementation of the BWSR grant agreement for developing the Plan, including being the primary BWSR contact for the Grant Agreement and being responsible for BWSR reporting requirements associated with the grant agreement.

    b. Provide the Policy Committee with the records necessary to describe the planning condition of the BWSR grant agreement.

    c. Provide the additional services set forth in Attachment B.

9. **Authorized Representatives:** The following persons listed in Attachment C will be the primary contacts for all matters concerning this Agreement.

10. **Execution in Counterparts:** This Agreement may be executed in any number of counterparts all of which, together, shall constitute the entire agreement.

IN TESTIMONY WHEREOF the Parties have duly executed this agreement by their duly authorized officers and upon authorizing action of their governing bodies.

McLeod County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: 6-18-21

Renville County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Meeker County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Kandiyohi County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Wright County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Buffalo Creek Watershed District

By _____
Its Board President

Approved as to form:

By _____
Its Attorney

Dated: _____

IN TESTIMONY WHEREOF the Parties have duly executed this agreement by their duly authorized officers and upon authorizing action of their governing bodies.

McLeod County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Renville County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Meeker County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: 7 · 20 · 2021

Kandiyohi County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Wright County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Buffalo Creek Watershed District

By _____
Its Board President

Approved as to form:

By _____
Its Attorney

Dated: _____

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IN TESTIMONY WHEREOF the Parties have duly executed this agreement by their duly authorized officers and upon authorizing action of their governing bodies.

McLeod County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Renville County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Meeker County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Kandiyohi County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Wright County

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By _____
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Its Board Chair

Approved as to form:

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By _____
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Its Attorney

Dated: 7/6/2021

Buffalo Creek Watershed District

By _____
Its Board President

Approved as to form:

By _____
Its Attorney

Dated: _____

IN TESTIMONY WHEREOF the Parties have duly executed this agreement by their duly authorized officers and upon authorizing action of their governing bodies.

McLeod County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Renville County

By Bob Fox
Its Board Chair

Approved as to form:

By David Torgelson
Its Attorney

Dated: 6-23-2021

Meeker County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Kandiyohi County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Wright County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Buffalo Creek Watershed District

By _____
Its Board President

Approved as to form:

By _____
Its Attorney

Dated: _____

IN TESTIMONY WHEREOF the Parties have duly executed this agreement by their duly authorized officers and upon authorizing action of their governing bodies.

McLeod County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Renville County

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Its Board Chair

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Its Attorney

Dated: _____

Meeker County

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Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Kandiyohi County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: 6/15/21

Wright County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Buffalo Creek Watershed District

By _____
Its Board President

Approved as to form:

By _____
Its Attorney

Dated: _____

IN TESTIMONY WHEREOF the Parties have duly executed this agreement by their duly authorized officers and upon authorizing action of their governing bodies.

McLeod County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Renville County

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Its Board Chair

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Its Attorney

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Meeker County

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Its Board Chair

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Its Attorney

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Kandiyohi County

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Its Board Chair

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Its Attorney

Dated: _____

Wright County

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Buffalo Creek Watershed District

By Dan Belter
Its Board President

Approved as to form:

By Joel C. Kalb
Its Attorney

Dated: 6-1-2021

McLeod County SWCD

By _____
Its Board Chair

Approved as to form:

By _____ 6.23.21
Its Attorney

Dated: _____

Renville County SWCD

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Meeker County SWCD

By _____
Its Board Chair

Approved as to form:

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Its Attorney

Dated: _____

Kandiyohi County SWCD

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Its Board Chair

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Its Attorney

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Wright County SWCD

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Carver County SWCD

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Its Board Chair

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Its Attorney

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McLeod County SWCD

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Renville County SWCD

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Its Board Chair

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Its Attorney

Dated: _____

Meeker County SWCD

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: 7.21.2021

Kandiyohi County SWCD

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Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Wright County SWCD

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Its Board Chair

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Carver County SWCD

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Meeker County SWCD

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Its Attorney

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Wright County SWCD

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Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: 6-24-2021

Carver County SWCD

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Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

McLeod County SWCD

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Renville County SWCD

By Dan Sehr June 10-21
Its Board Chair

Approved as to form:

By David Torgeson
Its Attorney

Dated: 9-3-21

Meeker County SWCD

By _____
Its Board Chair

Approved as to form:

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Its Attorney

Dated: _____

Kandiyohi County SWCD

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Its Attorney

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Wright County SWCD

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Carver County SWCD

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Meeker County SWCD

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Its Board Chair

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By _____
Its Attorney

Dated: _____

Kandiyohi County SWCD

By Douglas L Hanson
Its Board Chair

Approved as to form:

By Shane P. Bohm
Its Attorney

Dated: 6-5-2024

Wright County SWCD

By _____
Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Carver County SWCD

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Its Attorney

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McLeod County SWCD

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Renville County SWCD

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Wright County SWCD

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Its Board Chair

Approved as to form:

By _____
Its Attorney

Dated: _____

Carver County SWCD

By _____
Its Board Chair

Approved as to form:

By Patrick Conness
Its Attorney

Dated: 7/15/21

City of Winsted, Minnesota

By _____
Its Mayor

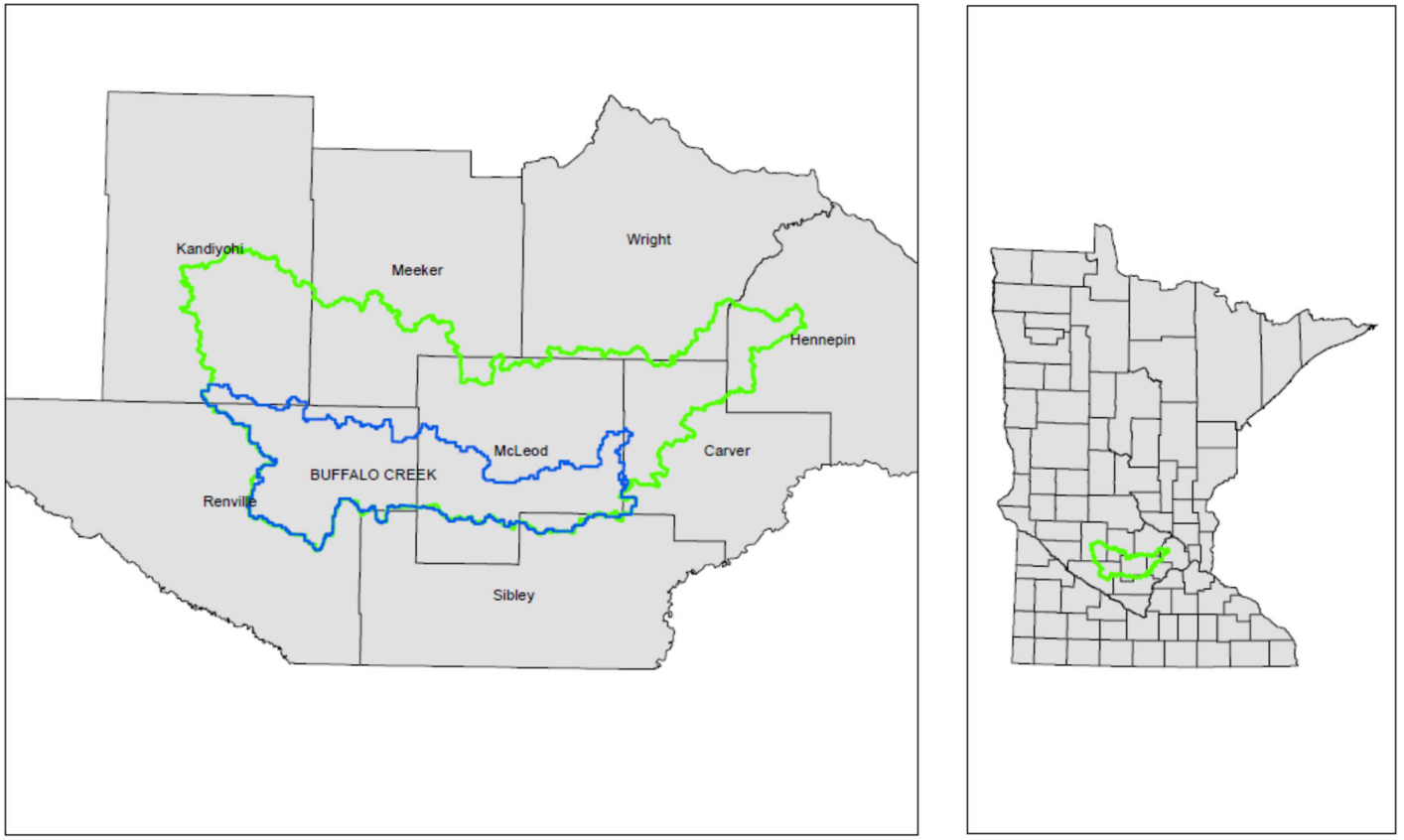
Approved as to form:

By _____
Its Attorney

Dated: June 15, 2021

Attachment A

South Fork Crow River Planning Area 13



Legend

- Buffalo Creek Watershed
- South Fork Crow River Planning Boundary
- South Fork Crow River Counties

Attachment B

Scope of Services

1. Coordination of Policy Committee meetings, including:
    a. Provide advance notice of meetings;
    b. Prepare and distribute the Agenda and related materials;
    c. Prepare and distribute Policy Committee Minutes;
    d. Maintain all records and documentation of the Policy Committee;
    e. Provide public notices to the counties and watershed district for publication; and
    f. Gather public comments from public hearing and prepare for submittal.

2. Coordination of Advisory Committee meetings, including the technical and citizen subcommittees, including:
    a. Provide advance notice of meetings;
    b. Prepare and Distribute the Agenda and related materials;
    c. Prepare and Distribute Minutes; and
    d. Maintain all records and documentation of the committees.

3. Administration of the grant with BWSR for the purposes of developing a watershed-based plan, including:
    a. Submit this Agreement, work plan, and other documents as required;
    b. Execute the grant agreement;
    c. Account for grant funds and prompt payment of bills incurred;
    d. Complete annual eLINK reporting;
    e. Present an annual audit of grant funds and their usage; and
    f. Maintain all financial records and accounting.

4. Contracting for Services with the chosen consultant for plan preparation and writing of the watershed-based plan, including:
    a. Execute the Contract for Services agreement;
    b. Oversee expenditures incurred by the consultant;
    c. Provide prompt payment for services rendered; and
    d. Serve as primary contact person with the consultant.

Attachment C

Points of Contact

McLeod County

Marc Telecky
1065 5th Avenue SE
Hutchinson, MN 55350
320-484-4315
Marc.telecky@co.mcleod.mn.us

Renville County

Diane Mitchell
105 South 5th St. Suite 311
Olivia, MN 56277
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Meeker County

Greg Schultz
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Litchfield, MN 55355
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Kandiyohi County

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Wright County

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Buffalo, MN 55313
763-682-1970
Bill.stephens@co.wright.mn.us

Buffalo Creek Watershed District

Larry Phillips
8495 Ideal Avenue
Glencoe, MN 55336
(320) 864-4142
larryp@bcwatershed.org

McLeod County SWCD

Ryan Freitag
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Ryan.Freitag@co.mcleod.mn.us

Renville County SWCD

Holly Hatlewick
1008 W. Lincoln Ave.
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hollyh@renvilleswcd.org

Meeker County SWCD

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Kandiyohi County SWCD

Rick Reimer
1005 High Avenue NE.
Wilmar, MN 56201
320-235-3906
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Wright County SWCD

Alicia O'Hare
311 Brighton Ave. S. #C
Buffalo, MN 55313
763-682-1970
Alicia.ohare@mn.nacdnet.net

Carver County SWCD

Mike Wanous
11360 US – 212
Cologne, MN 55322
952-466-5230
mwanous@co.carver.mn.us

City of Winsted, Minnesota

Adam Birkholz
201 1st St. N.
Winsted, MN 55395
320-485-2366
Adam.birkholz@winsted.mn.us

Appendix B. Impaired Waters and Total Maximum Daily Loads

Water Quality Impairments and Total Maximum Daily Load Tables

Impairments

Below is a summary of all impairments in the MPCA 2022 Impaired Waters List.

Lakes

Name	AUID	Pollutant or Stressor
Ardmore	27-0153-00	Nutrients
Bear	43-0076-00	Nutrients
Belle Lake	47-0049-01	Nutrients
Big Kandiyohi	34-0086-00	Mercury in fish tissue; Nutrients
Boon	65-0013-00	Nutrients
Cedar	43-0115-00	Nutrients
Eagle	10-0121-00	Mercury in fish tissue; Nutrients
Elizabeth (Main Lake)	34-0022-02	Mercury in fish tissue
Goose	47-0127-00	Nutrients
Greenleaf	47-0062-00	Nutrients
Half Moon	27-0152-00	Mercury in fish tissue; Nutrients
Hoff	47-0106-00	Nutrients
Independence	27-0176-00	Mercury in fish tissue, Nutrients
Irene, Lake	27-0189-00	Nutrients

Johnson	34-0012-00	Nutrients
Kasota	34-0105-00	Nutrients
Lillian	34-0072-00	Nutrients
Little Kandiyohi	34-0096-00	Nutrients
Marion	43-0084-00	Mercury in fish tissue; Nutrients
Minnetaga	34-0076-00	Nutrients
Mud	10-0094-00	Nutrients
North Little Long	27-0179-01	Mercury in fish tissue
North Whaletail	27-0184-01	Mercury in fish tissue; Nutrients
Oak	10-0093-00	Mercury in fish tissue; Nutrients
PETER (NORTH BAY)	27-0147-02	Nutrients
Preston	65-0002-00	Mercury in fish tissue; Nutrients
Rebecca	27-0192-00	Mercury in fish tissue
Rice	86-0032-00	Nutrients
Silver	43-0034-00	Nutrients
South	43-0014-00	Nutrients
South Little Long	27-0179-02	Mercury in fish tissue
South Whaletail	27-0184-02	Mercury in fish tissue; Nutrients

Spurzem	27-0149-00	Mercury in fish tissue; Nutrients
Stahl's	43-0104-00	Mercury in fish tissue
Star	47-0129-00	Nutrients
Swede	10-0095-00	Nutrients
Thompson	47-0159-00	Nutrients
Wakanda, Lake (Main Basin)	34-0169-03	Nutrients
Willie	47-0061-00	Mercury in fish tissue; Nutrients
Winsted	43-0012-00	Mercury in fish tissue; Nutrients

Streams

Name	AUID	Pollutant or Stressor
Bear Creek	07010205-515	Benthic macroinvertebrates bioassessments
Bear Creek	07010205-515	Fish bioassessments
Belle Creek	07010205-549	Benthic macroinvertebrates bioassessments; Fish bioassessments
Buffalo Creek	07010205-502	Benthic macroinvertebrates bioassessments; Fish bioassessments; Fecal coliform

Name	AUID	Pollutant or Stressor
Buffalo Creek	07010205-638	Benthic macroinvertebrates bioassessments; Dissolved oxygen; Fish bioassessments; Fecal coliform
County Ditch 18	07010205-609	Benthic macroinvertebrates bioassessments; fish bioassessments
County Ditch 24A	07010205-610	Fish bioassessments
County Ditch 26/27	07010205-611	Benthic macroinvertebrates bioassessments; Fish bioassessments
County Ditch 33	07010205-645	Benthic macroinvertebrates bioassessments; Fish bioassessments
County Ditch 4	07010205-528	Benthic macroinvertebrates bioassessments; Fish bioassessments
County Ditch 7A	07010205-631	Benthic macroinvertebrates bioassessments; Fish bioassessments
County Ditch 9	07010205-648	Benthic macroinvertebrates bioassessments; Fish bioassessments
Crow River, South Fork	07010205-508	Mercury in fish tissue; Benthic macroinvertebrates bioassessments; Fish bioassessments; Nutrients, Turbidity; Fecal coliform

Name	AUID	Pollutant or Stressor
Crow River, South Fork	07010205-510	Mercury in fish tissue, Benthic macroinvertebrate bioassessments; Dissolved oxygen; Fish bioassessments; Nutrients, Escherichia coli (E. coli)
Crow River, South Fork	07010205-511	Mercury in fish tissue; Benthic macroinvertebrates bioassessments; Fish bioassessments; Nutrients, Turbidity; Escherichia coli (E. coli)
Crow River, South Fork	07010205-512	Mercury in fish tissue
Crow River, South Fork	07010205-658	Mercury in fish tissue; Fish bioassessments; Nutrients, Turbidity; Escherichia coli (E. coli)
Crow River, South Fork	07010205-659	Mercury in fish tissue; Benthic macroinvertebrates bioassessments; Fish bioassessments; Nutrients, Turbidity; Escherichia coli (E. coli)
Deer Creek	07010205-594	Dissolved oxygen; Escherichia coli (E. coli)
Judicial Ditch 1	07010205-572	Benthic macroinvertebrates bioassessments; Fish bioassessments; Escherichia coli (E. coli)

Name	AUID	Pollutant or Stressor
Judicial Ditch 15	07010205-509	Benthic macroinvertebrates bioassessments; Fish bioassessments
Judicial Ditch 15	07010205-513	Escherichia coli (E. coli)
Judicial Ditch 15 branch	07010205-626	Fish bioassessments
Judicial Ditch 15 branch	07010205-627	Fish bioassessments
Judicial Ditch 15 branch	07010205-628	Benthic macroinvertebrates bioassessments; Fish bioassessments
Judicial Ditch 18	07010205-550	Fish bioassessments
Judicial Ditch 67	07010205-504	Benthic macroinvertebrates bioassessments; Fish bioassessments
Judicial Ditch 8	07010205-591	Benthic macroinvertebrates bioassessments; Fish bioassessments
Judicial Ditch 9	07010205-625	Benthic macroinvertebrates bioassessments; Fish bioassessments
King Creek	07010205-613	Fish bioassessments
Otter Creek	07010205-642	Fish bioassessments
Otter Creek	07010205-643	Fish bioassessments; Escherichia coli (E. coli)

Name	AUID	Pollutant or Stressor
Pioneer Creek	07010205-653	Dissolved oxygen; Escherichia coli (E. coli)
Pioneer Creek	07010205-654	Benthic macroinvertebrates bioassessments; Fish bioassessments
Silver Creek (County Ditch 13)	07010205-641	Benthic macroinvertebrates bioassessments; Fish bioassessments
State Ditch Branch 2	07010205-608	Benthic macroinvertebrates bioassessments; Fish bioassessments
Unnamed creek	07010205-533	Benthic macroinvertebrates bioassessments; Fish bioassessments
Unnamed creek	07010205-585	Fish bioassessments
Unnamed creek	07010205-593	Dissolved oxygen; Escherichia coli (E. coli)
Unnamed creek	07010205-614	Fish bioassessments
Unnamed creek	07010205-615	Fish bioassessments

Unnamed creek	07010205-617	Fish bioassessments
Unnamed creek	07010205-618	Benthic macroinvertebrates bioassessments; Fish bioassessments
Unnamed creek	07010205-621	Benthic macroinvertebrates bioassessments
Unnamed creek	07010205-622	Fish bioassessments
Unnamed creek	07010205-623	Benthic macroinvertebrates bioassessments; Fish bioassessments
Unnamed creek	07010205-624	Benthic macroinvertebrates bioassessments; Fish bioassessments
Unnamed creek	07010205-656	Benthic macroinvertebrates bioassessments; Fish bioassessments
Unnamed ditch	07010205-630	Benthic macroinvertebrates bioassessments; Fish bioassessments

Total Maximum Daily Load (TMDL) Load Reduction Tables

Below is a summary of TMDL load reductions (percent reduction) for all impairments as summarized in the South Fork Crow River Watershed TMDL and Watershed Restoration and Protection Strategy.

Phosphorus

Planning Region	AUID	Reach Name	TMDL Percent Reduction
Buffalo Creek	65-0002	Preston Lake	35%
	43-0084	Marion Lake	15%
Upper South Fork	34-0086	Big Kandiyohi Lake	70%
	34-0012	Johnson Lake	74%
	34-0105	Kasota Lake	89%
	34-0072	Lillian Lake	41%
	34-0096	Little Kandiyohi Lake	81%
	34-0076	Minnetaga Lake	81%
	47-0159	Thompson Lake	62%
	34-0169	Wakanda Lake	56%
	43-0115	Cedar Lake	63%
	47-0062	Greenleaf Lake	37%
	47-0127	Goose Lake	93%
	47-0106	Hoff Lake	33%

	47-0129	Star Lake	49%
	47-0049	Belle Lake	49%
	47-0061	Willie Lake	12%
	65-0013	Boon Lake	73%
Lower South Fork	43-0076	Bear Lake	86%
	43-0034	Silver Lake	86%
	43-0012	Winstead Lake	87%
	10-0094	Mud Lake	75%
	86-0032	Rice Lake	87%

Sediment

Planning Region	AUID	Reach Name	Reach Description	TMDL Percent Reduction
Buffalo Creek	07010205-501/638	Buffalo Creek	JD15 to S Fk Crow Rd	30% (High Flow Zone)
Upper South Fork	07010205-540/658	Crow River South Fork	Headwaters to 145th St	37% (Very High Flow Zone)
Lower South Fork	07010205-510	Crow River South Fork	Hutchinson Dam to Bear Cr	42% (Very High Flow Zone)
	07010205-511	Crow River South Fork	Bear Cr to Otter Cr	43% (Very High Flow Zone)
	07010205-508	Crow River South Fork	Buffalo Cr to N Fk Crow R	9% (High Flow Zone)

E.coli/Fecal Coliform

Planning Region	AUID	Reach Name	Reach Description	TMDL Percent Reduction
Buffalo Creek	07010205-513	Judicial Ditch 15	T115R32WS32, west line to Buffalo Cr	66% (Mid)
Lower South Fork	07010205-508	Crow River South Fork	Buffalo Cr to N Fk Crow R	47% (Mid)

Dissolved Oxygen

Planning Region	AUID	Reach Name	Reach Description	TMDL Percent Reduction
Buffalo Creek	07010205-501/638	Buffalo Creek	JD15 to S Fk Crow Rd	57%

Appendix C.
Priority Resources

Priority Resources

Below is a summary of the streams, public drainage systems, and lakes that were identified as priority resources within **Section 4-Measurable Goals**.

Priority Streams and Drainage Systems

Name	Stream AUID	County	Nearly / Barely Impaired			Priority Drainage System
			TP and TN	TSS	Bacteria	
JD 28A (Buffalo Creek)	07010205-502	Renville	X			X
JD 2 (Buffalo Creek)	07010205-502	Renville	X			X
JD 27 (Buffalo Creek)	07010205-502	Renville	X			X
JD 15	07010205-513	Renville			X	X
Buffalo Creek	07010205-638	McLeod	X	X		
JD1 (Crow River, South Fork)	07010205-658	Kandiyohi				X
JD1	07010205-620	Renville				X
JD1	07010205-620	McLeod				X
County Ditch 20 (also Judson Lake)	N/A	McLeod				X
JC 11	N/A	McLeod				X
Dog Lake	N/A	Kandiyohi				X
Emma Lake	N/A	Kandiyohi				X
Crow River, South Fork	07010205-510	Meeker, McLeod, Carver		X		
Otter Creek	07010205-643	McLeod		X		

Priority Lakes

Name	Lake ID	County
Independence Lake	27-0176-00	Hennepin
Rebecca	27-0192-00	Hennepin
Whaletail Lake	27-0184-01	Hennepin
Campbell Lake	N/A	McLeod, Carver
Winsted Lake	43-0012-00	McLeod
Marion Lake	43-0084-00	McLeod
Eagle Lake	43-0098-00	McLeod
Otter Lake	N/A	McLeod
Belle Lake	47-0049-01	McLeod, Meeker
Star Lake	47-0129-00	Meeker
Carrie Lake	34-0032-00	Kandiyohi
Lake Elizabeth	34-0022-02	Kandiyohi
Lillian Lake	34-0072-00	Kandiyohi
Big Kandiyohi	34-0086-00	Kandiyohi

Appendix D. Geospatial Data for Priority Subwatersheds

Geospatial Data for Priority Subwatersheds

This table presents the list of measurable goals and geospatial data that was used to prioritize issues by subwatershed as part of the South Fork Crow River CWMP. The resulting maps are provided in **Section 4-Measurable Goals**.

Resource Group	Resource	Goal	Geospatial Data	Tier
Surface Water 	Streams, Agricultural Land	**Drainage Partnerships and Drainage Management**	• Local knowledge	1 and 2
Surface Water 	Streams	**Loss of Water Storage and Altered Hydrology**	• Altered streams (https://gisdata.mn.gov/dataset/water-altered-watercourse) • MPCA Impaired stream AQL-altered hydrology stressor • DNR WHAF - Hyd Metric - Hydro Storage - Straightened-Meandering Streams (https://gisdata.mn.gov/dataset/env-watershed-health-assessment) • Local knowledge	1
Surface Water 	Lakes & Streams	**Nutrient Loading to Surface Waters**	• HSPF nutrient yields (TP and TN) and pesticide yield • MPCA Impaired streams (nutrients) • MPCA Impaired lakes • Nearly/ barely impaired streams / lakes for TP and TN	1
Surface Water 	Lakes & Streams	**Erosion and Sedimentation**	• HSPF sediment loads • DNR WHAF - Sediment erosion susceptibility (https://gisdata.mn.gov/dataset/env-watershed-health-assessment)	1
Lands 	Agricultural Land	**Soil Health**	• NLCD 82 • HSPF sediment yield • DNR WHAF - Sediment erosion susceptibility (https://gisdata.mn.gov/dataset/env-watershed-health-assessment) • Local knowledge	1

Resource Group	Resource	Goal	Geospatial Data	Tier
Surface Water 	Lakes & Streams	**Bacteria Loading**	• MPCA Bacteria (*E. coli* or FC) Impaired streams • Local knowledge	2
Lands 	Urban Land	**Urban Stormwater Runoff and Development Pressure**	• NLCD land cover type 22, 23, 24	2
Lands 	Forests, Riparian areas, Prairie, Grasslands	**Wildlife Habitat and Perennial Ground Cover**	• Prominence of existing protected land (WPA, WMA, RIM, CREP, FWS, and State Parks/Recreation Areas)	2

Appendix E. HSPF-SAM Scenario with Storage Calculations

HSPF-SAM Scenario with Storage Calculations

HSPF-SAM Scenario

This planning process used Hydrological Simulation Program Fortran-Scenario Application Manager (HSPF-SAM) to calculate the cost and load reduction (sediment and nutrients) benefits of conservation practices at a large HSPF catchment scale.

Three BMP scenarios were simulated using HSPF-SAM, treating different percentages of cropland based on HUC10 priority.

Scenario for each HUC 10:

- Highest: 5%, ,10%, 100%
- Moderate High 4%, 8%, 100%
- Moderate: 3%, 7%, 100%
- Low: 1%, 6%, 100%

BMP distribution of:

- Grassed waterways – 15%
- WASCOBS (side inlets / grade stabilization)- 25%
- Wetland restorations -10%
- Soil health practices (nutrient mgmt. / tillage)- 50%

Soil health practices were a compilation of multiple BMPs, including:

- Nutrient Management
- Nutrient management + manure incorporation
- Reduced Tillage-30% residue
- No till
- Corn and Soybeans with cover crop
- Conservative crop rotation
- Conservative cover perennials
- Short season crop with cover

The following pages present the results from each implementation scenario.

Scenario 1- Used for the Plan Implementation Scenario

Table 1. Treated cropland area, in acres, by HUC10 subwatershed for Scenario 1

HUC10	Planning Region	Acres of cropland treated				
		Grass waterways/ Filter Strips	WASCOBs	Restored Wetlands	Soil Health Practices	Total
Headwaters South Fork Crow River	Upper	468	781	312	1,561	3,123
Judicial Ditch No 28A	Buffalo	371	618	247	1,236	2,472
Judicial Ditch No 15	Buffalo	237	396	158	791	1,582
City of Hutchinson-South Fork Crow River	Upper	399	665	266	1,329	2,658
Buffalo Creek	Buffalo	441	735	294	1,469	2,938
City of Lester Prairie-South Fork Crow River	Lower	267	445	178	889	1,779
South Fork Crow River	Lower	33	54	22	109	218
Total		2,216	3,693	1,477	7,385	14,770

Table 2. Treated cropland area, in acres, by Planning Region for Scenario 1

Planning Region	Acres of cropland treated				
	Grass waterways/ Filter Strips	WASCOBs	Restored Wetlands	Soil Health Practices	Total
Upper	867	1,445	578	2,890	5,781
Lower	299	499	200	998	1,996
Buffalo	1,049	1,748	699	3,497	6,993
Total	2,216	3,693	1,477	7,385	14,770

Table 3. Estimated annualized costs of practices by HUC10 subwatershed for Scenario 1

HUC10	Annualized costs of BMPs ($/yr)					10-year Total Cost
	Restored Wetlands	WASCOBs	Grass waterways/ Filter Strips	Soil Health Practices	Total Annual Costs	
Headwaters South Fork Crow River	$5,823	$39,783	$9,719	$55,940	$111,264	$1,112,640
Judicial Ditch No 28A	$4,610	$31,500	$7,694	$44,291	$88,096	$880,958
Judicial Ditch No 15	$2,951	$20,156	$4,924	$28,342	$56,372	$563,715
City of Hutchinson-South Fork Crow River	$4,958	$33,867	$8,274	$47,622	$94,721	$947,205
Buffalo Creek	$5,479	$37,439	$9,145	$52,639	$104,701	$1,047,008
City of Lester Prairie-South Fork Crow River	$3,317	$22,661	$5,535	$31,865	$63,377	$633,773

South Fork Crow River	$408	$2,773	$678	$3,896	$7,755	$77,550
Total	$27,545	$188,178	$45,968	$264,594	$526,285	$5,262,848

Table 4. Estimated annualized costs of practices by Planning region for Scenario 1

HUC10	Annualized costs of BMPs ($/yr)					10-year Total Cost
	Restored Wetlands	WASCOBs	Grass waterways/ Filter Strips	Soil Health Practices	Total Annual Costs	
Upper	$10,781	$73,650	$17,993	$103,562	$205,985	$2,059,845
Lower	$3,725	$25,434	$6,213	$35,761	$71,132	$711,323
Buffalo	$13,040	$89,094	$21,763	$125,272	$249,168	$2,491,680
Total	$27,545	$188,178	$45,968	$264,594	$526,285	$5,262,848

Table 5. Overland loads and load reductions by HUC10 Subwatershed Scenario 1.

HUC10	Treated Area [acres]	TSS [tons/yr]			TN [lbs/yr]			TP [lbs/yr]		
		Base	Reduction	% Removal	Base	Reduction	% Removal	Base	Reduction	% Removal
Headwaters South Fork Crow River	3,123	3,547	92	2.59%	792,125	10,251	1.29%	56,952	724	1.27%
Judicial Ditch No 28A	2,472	2,010	52	2.59%	1,213,852	14,800	1.22%	21,188	258	1.22%
Judicial Ditch No 15	1,582	1,678	35	2.07%	1,219,156	11,821	0.97%	19,009	184	0.97%
City of Hutchinson-South Fork Crow River	2,658	4,990	103	2.07%	1,130,286	11,599	1.03%	64,778	661	1.02%
Buffalo Creek	2,938	3,719	96	2.59%	891,688	11,556	1.30%	76,435	955	1.25%
City of Lester Prairie-South Fork Crow River	1,779	4,000	62	1.55%	763,757	5,930	0.78%	57,933	439	0.76%
South Fork Crow River	218	1,921	10	0.52%	333,580	878	0.26%	25,806	66	0.26%

Table 6 Overland loads and load reductions by Planning Region for Scenario 1

Planning Region	Treated Area [acres]	TSS [tons/yr]			TN [lbs/yr]			TP [lbs/yr]		
		Base	Reduction	% Removal	Base	Reduction	% Removal	Base	Reduction	% Removal
Upper	5,781	8,537	195	2.29%	1,922,411	21,850	1.14%	121,730	1,385	1.14%
Lower	1,996	5,920	72	1.22%	1,097,337	6,808	0.62%	83,739	505	0.60%
Buffalo	6,993	7,406	183	2.47%	3,324,696	38,178	1.15%	116,632	1,398	1.20%

Table 7. Overland loads and load reductions by HUC10 Subwatershed for Soil Heath Practices for Scenario 1.

HUC10	Treated Area [acres]	TSS [tons/yr]			TN [lbs/yr]			TP [lbs/yr]		
		Base	Reduction	% Removal	Base	Reduction	% Removal	Base	Reduction	% Removal
Headwaters South Fork Crow River	1,561	3,547	35	0.99%	792,125	3,384	0.43%	56,952	239	0.42%
Judicial Ditch No 28A	1,236	2,010	20	0.99%	1,213,852	4,817	0.40%	21,188	85	0.40%
Judicial Ditch No 15	791	1,678	13	0.80%	1,219,156	3,843	0.32%	19,009	61	0.32%
City of Hutchinson-South Fork Crow River	1,329	4,990	40	0.80%	1,130,286	3,823	0.34%	64,778	218	0.34%
Buffalo Creek	1,469	3,719	37	0.99%	891,688	3,824	0.43%	76,435	315	0.41%
City of Lester Prairie-South Fork Crow River	889	4,000	24	0.60%	763,757	1,969	0.26%	57,933	145	0.25%
South Fork Crow River	109	1,921	4	0.20%	333,580	291	0.09%	25,806	22	0.08%

Table 8. Overland loads and load reductions by Planning Region for Soil Heath Practices for Scenario 1.

Planning Region	Treated Area [acres]	TSS [tons/yr]			TN [lbs/yr]			TP [lbs/yr]		
		Base	Reduction	% Removal	Base	Reduction	% Removal	Base	Reduction	% Removal
Upper	2,890	8,537	75	0.88%	1,922,411	7,208	0.37%	121,730	457	0.38%
Lower	998	5,920	28	0.47%	1,097,337	2,260	0.21%	83,739	167	0.20%
Buffalo	3,497	7,406	70	0.95%	3,324,696	12,484	0.38%	116,632	461	0.40%

Table 9. Overland loads and load reductions by HUC10 Subwatershed for Restored Wetlands for Scenario 1.

HUC10	Treated Area [acres]	TSS [tons/yr]			TN [lbs/yr]			TP [lbs/yr]		
		Base	Reduction	% Removal	Base	Reduction	% Removal	Base	Reduction	% Removal
Headwaters South Fork Crow River	312	3,547	10	0.28%	792,125	1,366	0.17%	56,952	84	0.15%
Judicial Ditch No 28A	247	2,010	6	0.28%	1,213,852	2,045	0.17%	21,188	30	0.14%
Judicial Ditch No 15	158	1,678	4	0.23%	1,219,156	1,638	0.13%	19,009	21	0.11%
City of Hutchinson-South Fork Crow River	266	4,990	11	0.23%	1,130,286	1,552	0.14%	64,778	77	0.12%
Buffalo Creek	294	3,719	10	0.28%	891,688	1,532	0.17%	76,435	112	0.15%
City of Lester Prairie-South Fork Crow River	178	4,000	7	0.17%	763,757	781	0.10%	57,933	51	0.09%
South Fork Crow River	22	1,921	1	0.06%	333,580	116	0.03%	25,806	8	0.03%

Table 10. Overland loads and load reductions by Planning Region for Restored Wetlands for Scenario 1.

Planning Region	Treated Area [acres]	TSS [tons/yr]			TN [lbs/yr]			TP [lbs/yr]		
		Base	Reduction	% Removal	Base	Reduction	% Removal	Base	Reduction	% Removal
Upper	578	8,537	21	0.25%	1,922,411	2,918	0.15%	121,730	161	0.13%
Lower	200	5,920	8	0.13%	1,097,337	897	0.08%	83,739	58	0.07%
Buffalo	699	7,406	20	0.27%	3,324,696	5,214	0.16%	116,632	163	0.14%

Table 11. Overland loads and load reductions by HUC10 Subwatershed for Grass waterways/Filters for Scenario 1.

HUC10	Treated Area [acres]	TSS [tons/yr]			TN [lbs/yr]			TP [lbs/yr]		
		Base	Reduction	% Removal	Base	Reduction	% Removal	Base	Reduction	% Removal
Headwaters South Fork Crow River	468	3,547	17	0.47%	792,125	1,797	0.23%	56,952	128	0.22%
Judicial Ditch No 28A	371	2,010	9	0.47%	1,213,852	2,595	0.21%	21,188	46	0.22%
Judicial Ditch No 15	237	1,678	6	0.38%	1,219,156	2,073	0.17%	19,009	33	0.17%
City of Hutchinson-South Fork Crow River	399	4,990	19	0.38%	1,130,286	2,033	0.18%	64,778	117	0.18%
Buffalo Creek	441	3,719	18	0.47%	891,688	2,026	0.23%	76,435	168	0.22%
City of Lester Prairie-South Fork Crow River	267	4,000	11	0.28%	763,757	1,039	0.14%	57,933	78	0.13%
South Fork Crow River	33	1,921	2	0.09%	333,580	154	0.05%	25,806	12	0.05%

Table 12. Overland loads and load reductions by Planning Region for Grass waterways/Filters for Scenario 1.

Planning Region	Treated Area [acres]	TSS [tons/yr]			TN [lbs/yr]			TP [lbs/yr]		
		Base	Reduction	% Removal	Base	Reduction	% Removal	Base	Reduction	% Removal
Upper	867	8,537	36	0.42%	1,922,411	3,831	0.20%	121,730	245	0.20%
Lower	299	5,920	13	0.22%	1,097,337	1,193	0.11%	83,739	89	0.11%
Buffalo	1,049	7,406	33	0.45%	3,324,696	6,694	0.20%	116,632	247	0.21%

Table 13. Overland loads and load reductions by HUC10 Subwatershed for WASCOBs for Scenario 1.

HUC10	Treated Area [acres]	TSS [tons/yr]			TN [lbs/yr]			TP [lbs/yr]		
		Base	Reduction	% Removal	Base	Reduction	% Removal	Base	Reduction	% Removal
Headwaters South Fork Crow River	781	3,547	30	0.84%	792,125	3,704	0.47%	56,952	273	0.48%
Judicial Ditch No 28A	618	2,010	17	0.84%	1,213,852	5,344	0.44%	21,188	97	0.46%
Judicial Ditch No 15	396	1,678	11	0.68%	1,219,156	4,267	0.35%	19,009	70	0.37%
City of Hutchinson-South Fork Crow River	665	4,990	34	0.68%	1,130,286	4,190	0.37%	64,778	250	0.39%
Buffalo Creek	735	3,719	31	0.84%	891,688	4,174	0.47%	76,435	360	0.47%
City of Lester Prairie-South Fork Crow River	445	4,000	20	0.51%	763,757	2,141	0.28%	57,933	166	0.29%
South Fork Crow River	54	1,921	3	0.17%	333,580	317	0.10%	25,806	25	0.10%

Table 14. Overland loads and load reductions by Planning Region for WASCOBs for Scenario 1.

Planning Region	Treated Area [acres]	TSS [tons/yr]			TN [lbs/yr]			TP [lbs/yr]		
		Base	Reduction	% Removal	Base	Reduction	% Removal	Base	Reduction	% Removal
Upper	1,445	8,537	64	0.75%	1,922,411	7,894	0.41%	121,730	523	0.43%
Lower	499	5,920	23	0.40%	1,097,337	2,459	0.22%	83,739	191	0.23%
Buffalo	1,748	7,406	60	0.81%	3,324,696	13,785	0.41%	116,632	527	0.45%

Scenario 2: 10%/8%/7%/6% Cropland Treated Scenario

Table 4. Treated cropland area, in acres, by HUC10 subwatershed for Scenario 2

HUC10	Planning Region	Acres of cropland treated				
		Grass waterways/ Filter Strips	WASCOBs	Restored Wetlands	Soil Health Practices	Total
Headwaters South Fork Crow River	Upper	1,249	2,082	833	4,163	8,327
Judicial Ditch No 28A	Buffalo	989	1,648	659	3,297	6,593
Judicial Ditch No 15	Buffalo	633	1,055	422	2,109	4,219
City of Hutchinson-South Fork Crow River	Upper	1,063	1,772	709	3,544	7,089
Buffalo Creek	Buffalo	1,175	1,959	784	3,918	7,836
City of Lester Prairie-South Fork Crow River	Lower	830	1,383	553	2,767	5,534
South Fork Crow River	Lower	261	435	174	870	1,740
Total		6,201	10,335	4,134	20,669	41,338

Table 5. Treated cropland area, in acres, by Planning Region for Scenario 2

Planning Region	Acres of cropland treated				
	Grass waterways/ Filter Strips	WASCOBs	Restored Wetlands	Soil Health Practices	Total
Upper	2,312	3,854	1,542	7,708	15,416
Lower	1,091	1,819	727	3,637	7,274
Buffalo	2,797	4,662	1,865	9,324	18,648
Total	6,201	10,335	4,134	20,669	41,338

Table 6. Estimated annualized costs of practices by HUC10 subwatershed for Scenario 2

HUC10	Annualized costs of BMPs ($/yr)					10-year Total Cost
	Restored Wetlands	WASCOBs	Grass waterways/ Filter Strips	Soil Health Practices	Total Annual Costs	
Headwaters South Fork Crow River	$15,528	$106,087	$25,914	$149,169	$296,698	$2,966,980
Judicial Ditch No 28A	$12,293	$83,998	$20,519	$118,112	$234,922	$2,349,220
Judicial Ditch No 15	$7,867	$53,751	$13,129	$75,576	$150,323	$1,503,230
City of Hutchinson-South Fork Crow River	$13,218	$90,313	$22,060	$126,988	$252,579	$2,525,790
Buffalo Creek	$14,611	$99,832	$24,387	$140,372	$279,202	$2,792,020
City of Lester Prairie-South Fork Crow River	$10,321	$70,505	$17,221	$99,135	$197,182	$1,971,820
South Fork Crow River	$3,244	$22,175	$5,415	$31,178	$62,012	$620,120
Total	$77,082	$526,661	$128,645	$740,530	$1,472,918	$14,729,180

Table 4. Estimated annualized costs of practices by Planning region for Scenario 2

HUC10	Annualized costs of BMPs ($/yr)					10-year Total Cost
	Restored Wetlands	WASCOBs	Grass waterways/ Filter Strips	Soil Health Practices	Total Annual Costs	
Upper	$28,746	$196,400	$47,974	$276,157	$549,277	$5,492,770
Lower	$13,565	$92,680	$22,636	$130,313	$259,194	$2,591,940
Buffalo	$34,771	$237,581	$58,035	$334,060	$664,447	$6,644,470
Total	$77,082	$526,661	$128,645	$740,530	$1,472,918	$14,729,180

Table 5. Loads and load reductions at the outlet of HUC10 Subwatershed Scenario 2.

HUC10	TSS [tons/yr]			TN [lbs/yr]			TP [lbs/yr]		
	Base	Reduction	% Removal	Base	Reduction	% Removal	Base	Reduction	% Removal
Headwaters South Fork Crow River	3,233	139	4.31%	750,602	22,960	3.06%	32,712	1,056	3.23%
Judicial Ditch No 28A	1,906	104	5.46%	1,318,928	41,498	3.15%	19,189	592	3.09%
Judicial Ditch No 15	1,851	79	4.27%	1,378,609	34,211	2.48%	22,609	478	2.12%
City of Hutchinson-South Fork Crow River	5,303	190	3.58%	1,140,937	28,732	2.52%	45,633	1,144	2.51%
Buffalo Creek	6,033	209	3.47%	931,955	30,453	3.27%	57,957	1,726	2.98%
City of Lester Prairie-South Fork Crow River	6,702	157	2.34%	1,011,355	18,880	1.87%	73,645	888	1.21%
South Fork Crow River	4,127	61	1.49%	316,616	4,404	1.39%	13,426	179	1.33%

Table 6. Overland loads and load reductions by HUC10 Subwatershed Scenario 2.

HUC10	Treated Area [acres]	TSS [tons/yr]			TN [lbs/yr]			TP [lbs/yr]		
		Base	Reduction	% Removal	Base	Reduction	% Removal	Base	Reduction	% Removal
Headwaters South Fork Crow River	8,327	3,547	245	6.91%	792,125	27,336	3.45%	56,952	1,930	3.39%
Judicial Ditch No 28A	6,593	2,010	139	6.91%	1,213,852	39,467	3.25%	21,188	688	3.25%
Judicial Ditch No 15	4,219	1,678	93	5.53%	1,219,156	31,523	2.59%	19,009	492	2.59%
City of Hutchinson-South Fork Crow River	7,089	4,990	276	5.53%	1,130,286	30,930	2.74%	64,778	1,763	2.72%
Buffalo Creek	7,836	3,719	257	6.91%	891,688	30,817	3.46%	76,435	2,547	3.33%
City of Lester Prairie-South Fork Crow River	5,534	4,000	193	4.84%	763,757	18,450	2.42%	57,933	1,366	2.36%
South Fork Crow River	1,740	1,921	80	4.15%	333,580	7,024	2.11%	25,806	530	2.05%

Table 7. Overland loads and load reductions by Planning Region for Scenario 2

Planning Region	Treated Area [acres]	TSS [tons/yr]			TN [lbs/yr]			TP [lbs/yr]		
		Base	Reduction	% Removal	Base	Reduction	% Removal	Base	Reduction	% Removal
Upper	15,416	8,537	521	6.10%	1,922,411	58,266	3.03%	121,730	3,693	3.03%
Lower	7,274	5,920	273	4.61%	1,097,337	25,474	2.32%	83,739	1,896	2.26%
Buffalo	18,648	7,406	489	6.60%	3,324,696	101,807	3.06%	116,632	3,727	3.20%

Scenario 3: 100% Treated Acres Scenario

Table 7. Treated cropland area, in acres, by HUC10 subwatershed for Scenario 3

HUC10	Planning Region	Acres of cropland treated				
		Grass waterways/ Filter Strips	WASCOBs	Restored Wetlands	Soil Health Practices	Total
Headwaters South Fork Crow River	Upper	12,490	20,817	8,327	41,635	83,270
Judicial Ditch No 28A	Buffalo	9,890	16,483	6,593	32,966	65,932
Judicial Ditch No 15	Buffalo	7,910	13,184	5,274	26,368	52,736
City of Hutchinson-South Fork Crow River	Upper	13,292	22,153	8,861	44,305	88,610
Buffalo Creek	Buffalo	11,754	19,590	7,836	39,180	78,360
City of Lester Prairie-South Fork Crow River	Lower	11,858	19,764	7,906	39,528	79,057
South Fork Crow River	Lower	4,351	7,252	2,901	14,504	29,007
Total		71,546	119,243	47,697	238,486	476,971

Table 8. Treated cropland area, in acres, by Planning Region for Scenario 3

Planning Region	Acres of cropland treated				
	Grass waterways/ Filter Strips	WASCOBs	Restored Wetlands	Soil Health Practices	Total
Upper	25,782	42,970	17,188	85,940	171,880
Lower	16,210	27,016	10,806	54,032	108,064
Buffalo	29,554	49,257	19,703	98,514	197,028
Total	71,546	119,243	47,697	238,486	476,971

Table 9. Estimated annualized costs of practices by HUC10 subwatershed for Scenario 3

HUC10	Annualized costs of BMPs ($/yr)					10-year Total Cost
	Restored Wetlands	WASCOBs	Grass waterways/ Filter Strips	Soil Health Practices	Total Annual Costs	
Headwaters South Fork Crow River	$155,270	$1,060,879	$259,142	$1,491,689	$2,966,980	$29,669,800
Judicial Ditch No 28A	$86,228	$589,150	$143,913	$828,401	$1,647,692	$16,476,920
Judicial Ditch No 15	$71,236	$486,720	$118,893	$684,371	$1,361,220	$13,612,200
City of Hutchinson-South Fork Crow River	$218,980	$1,496,167	$365,474	$2,103,746	$4,184,367	$41,843,670
Buffalo Creek	$119,318	$815,234	$199,138	$1,146,292	$2,279,982	$22,799,820
City of Lester Prairie-South Fork Crow River	$184,270	$1,259,019	$307,542	$1,770,297	$3,521,128	$35,211,280
South Fork Crow River	$54,086	$369,554	$90,272	$519,629	$1,033,541	$10,335,410
Total	$889,388	$6,076,723	$1,484,374	$8,544,425	$16,994,910	$169,949,100

Table 4. Estimated annualized costs of practices by Planning region for Scenario 3

HUC10	Annualized costs of BMPs ($/yr)					10-year Total Cost
	Restored Wetlands	WASCOBs	Grass waterways/ Filter Strips	Soil Health Practices	Total Annual Costs	
Upper	$374,250	$2,557,046	$624,616	$3,595,435	$7,151,347	$71,513,470
Lower	$238,356	$1,628,573	$397,814	$2,289,926	$4,554,669	$45,546,690
Buffalo	$276,782	$1,891,104	$461,944	$2,659,064	$5,288,894	$52,888,940
Total	$889,388	$6,076,723	$1,484,374	$8,544,425	$16,994,910	$169,949,100

Table 5. Loads and load reductions at the outlet of HUC10 Subwatershed Scenario 3.

HUC10	TSS [tons/yr]			TN [lbs/yr]			TP [lbs/yr]		
	Base	Reduction	% Removal	Base	Reduction	% Removal	Base	Reduction	% Removal
Headwaters South Fork Crow River	3,233	1,394	43.12%	750,602	228,891	30.49%	32,712	10,416	31.84%
Judicial Ditch No 28A	1,906	1,040	54.58%	1,318,928	415,049	31.47%	19,189	5,814	30.30%
Judicial Ditch No 15	1,851	987	53.32%	1,378,609	427,843	31.03%	22,609	5,996	26.52%
City of Hutchinson-South Fork Crow River	5,303	2,376	44.81%	1,140,937	358,110	31.39%	45,633	14,359	31.47%
Buffalo Creek	6,033	2,093	34.69%	931,955	297,871	31.96%	57,957	16,771	28.94%
City of Lester Prairie-South Fork Crow River	6,702	2,245	33.50%	1,011,355	277,790	27.47%	73,645	13,166	17.88%
South Fork Crow River	4,127	1,036	25.11%	316,616	96,115	30.36%	13,426	3,970	29.57%

Table 6. Overland loads and load reductions by HUC10 Subwatershed Scenario 3.

HUC10	Treated Area [acres]	TSS [tons/yr]			TN [lbs/yr]			TP [lbs/yr]		
		Base	Reduction	% Removal	Base	Reduction	% Removal	Base	Reduction	% Removal
Headwaters South Fork Crow River	83,270	3,547	2,451	69.10%	792,125	273,364	34.51%	56,952	19,299	33.89%
Judicial Ditch No 28A	65,932	2,010	1,389	69.10%	1,213,852	394,675	32.51%	21,188	6,883	32.49%
Judicial Ditch No 15	52,736	1,678	1,159	69.10%	1,219,156	394,038	32.32%	19,009	6,149	32.35%
City of Hutchinson-South Fork Crow River	88,610	4,990	3,448	69.10%	1,130,286	386,622	34.21%	64,778	22,042	34.03%
Buffalo Creek	78,360	3,719	2,570	69.10%	891,688	308,170	34.56%	76,435	25,469	33.32%
City of Lester Prairie-South Fork Crow River	79,057	4,000	2,764	69.10%	763,757	263,573	34.51%	57,933	19,521	33.70%
South Fork Crow River	29,007	1,921	1,327	69.10%	333,580	117,070	35.09%	25,806	8,834	34.23%

Table 7. Overland loads and load reductions by Planning Region for Scenario 3

Planning Region	Treated Area [acres]	TSS [tons/yr]			TN [lbs/yr]			TP [lbs/yr]		
		Base	Reduction	% Removal	Base	Reduction	% Removal	Base	Reduction	% Removal
Upper	171,880	8,537	5,899	69.10%	1,922,411	659,986	34.33%	121,730	41,341	33.96%
Lower	108,064	5,920	4,091	69.10%	1,097,337	380,642	34.69%	83,739	28,355	33.86%
Buffalo	197,028	7,406	5,118	69.10%	3,324,696	1,096,882	32.99%	116,632	38,501	33.01%

Storage Calculations for Conservation Practices

This planning process used Hydrological Simulation Program Fortran-Scenario Application Manager (HSPF-SAM) to calculate the cost and load reduction (sediment and nutrients) benefits of conservation practices at a large HSPF catchment scale. HSPF-SAM does not calculate the acre-feet storage benefit of conservation practices. In order to inform the short-term goal for Loss of Water Storage and Altered Hydrology, the planning partnership needed a method to estimate the acre-feet storage benefit of conservation practices and potential capital improvement projects.

Conservation Practices

The Prioritize, Target, and Measure Application (PTMApp) is another tool that is commonly used to inform watershed management planning efforts. This tool models the cost and load reduction benefits of conservation practices at a field scale. This tool also estimates the acre-feet storage benefits of some types of implemented conservation practices. While this data does not exist in the South Fork Crow River Watershed, it does in neighboring watersheds. As such, this data was used to inform a realistic estimate for the acre-feet storage benefits of planned conservation practices in the South Fork Crow River Watershed.

In the absence of an in-depth topographical analysis of the watershed, PTMApp data for surface storage potential from neighboring watersheds was selected to represent each planning region in the South Fork Crow River Watershed based on proximity and similarities of land use and water resource features. Hawk Creek Watershed PTMApp data was used to estimate storage benefits of restored wetland and water and sediment control basins (WASCOBs) in the Buffalo Creek and Upper South Fork Planning Regions. Similar data from the North Fork Crow River Watershed was used for the Lower South Fork Planning Region.

For these two types of conservation practices, relationships were created between drainage area to PTMApp wetlands or WASCOBs and the total volume stored in those wetlands or WASCOBs to allow for the estimation of an assumed storage volume for those two types of storage-based conservation practices in the South Fork Crow River Watershed. Assumed treated drainage areas are presented in the tables below for restored wetlands and WASCOBs in each of the planning regions.

PTMApp does not estimate subsurface or soil storage for grassed waterway practices, so a different method was used to estimate storage potential of those practices. The existing curve number (from the statewide curve number GIS layer - available on the

PTMApp download website) was used to estimate current runoff from a grid of hypothetical grassed waterways within the South Fork Crow River Watershed during a 10-year, 24-hour precipitation event. Then, the curve number of those hypothetical grassed waterways was adjusted to match the assumed curve number after a grassed waterway has been implemented. Post-implementation curve number was obtained from Hydrologic Engineering Center - River Analysis System (HEC-RAS) model information. Runoff pre and post practice implementation were compared, and the difference was assumed to be the change in soil storage.

Planning region water storage benefits are shown below by the type of practices that were included in the HSPF SAM implementation scenario.

Restored Wetland

Planning Region	Treated Area [acres]	Volume (ac-ft)
Upper	578	28
Lower	200	72
Buffalo	699	33

Water and Sediment Control Basins

Planning Region	Treated Area [acres]	Volume (ac-ft)
Upper	1,445	109
Lower	499	121
Buffalo	1,748	132

Grassed Waterways

Planning Region	Treated Area [acres]	Volume (ac-ft)
Upper	867	30
Lower	299	11
Buffalo	1,049	36

Total for Structural Conservation Practices

Planning Region	Volume (ac-ft)
Upper	167
Lower	204

Buffalo	201
Watershed Wide	**572**

While soil health practices have been shown to retain water on the landscape, the water storage benefits of these practices was not able to be quantified with the methods employed.

Potential Capital Improvement Projects

In order to inform the short-term goal for Loss of Water Storage and Altered Hydrology, the planning partnership estimated the ace-feet storage benefit of potential capital improvement projects. These are rough, planning estimates solely created for the purpose of informing a short-term measurable goal. They are anticipated to adjust during implementation efforts based on additional information gathered about each capital improvement projects.

Project	Project ID	Planning Estimate Acre-Feet Storage
Montana St NW Drainage Improvements Drainage improvements including storm sewer infrastructure and ponding	CIP 1	10 ac-ft
Regenerative Air Sweeper Purchase of one regenerative air street sweeper to replace mechanical and vacuum sweepers	CIP 2	N/A
Leaf Vacuum Replacements Purchase two new leaf vacuums to replace existing. The vacuums are used for leaf collection each fall and reduce the release of nutrients into storm water	CIP 3	N/A
Big Kandiyohi Lake Hydrologic Analysis Understand and restore altered hydrology within the Big Kandi subwatershed.	CIP 4	N/A
South Fork- Emma Lakebed Reestablish the drained lakebed of Emma Lake.	CIP 5	N/A
South Fork- Dog Lakebed Reestablish the drained lakebed of Dog Lake.	CIP 6	N/A
Uptown Willmar Stormwater Stormwater feasibility study to identify and prioritize water quality improvement BMPs.	CIP 7	5 ac-ft

Project	Project ID	Planning Estimate Acre-Feet Storage
South Fork - JD2 Feasibility study and implementation of subsequent priority projects along JD2	CIP 8	20 ac-ft
Big Kandiyohi Water Control Structure Water control structure with carp barrier to alleviate carp problems	CIP 9	N/A
Michigan St Regional Pond Michigan St NE and Hilltop neighborhood regional pond and piping	CIP 10	20 ac-ft
Clifton Heights Drainage Improvements Storm sewer improvements in Clifton Heights neighborhood necessary to alleviate localized flooding and convey water to Michigan St Regional Pond	CIP 11	N/A
Market St SW Drainage Improvements Drainage improvements to Market St SW ditch system. Install new pipe conveyance and ponding to alleviate flooding in the area adjacent and North of the existing ditch	CIP 12	10 ac-ft
Water storage (McLeod Parcel) with BCWD Reduce peak flows and improve water quality (reductions in sediment and nutrients)	CIP 13	100 ac-ft
Water storage (Renville Parcels) with BCWD Reduce peak flows and improve water quality (reductions in sediment and nutrients)	CIP 14	100 ac-ft
City of Brownton Stream bank Stabilization	CIP 15	N/A
JD15 Enhanced Drainage Management Plan Enhanced drainage management plan	CIP 16	N/A
JD15 Enhanced Drainage Management Plan Implementation of projects that arise from the completed JD15 Enhanced Drainage Management Plan	CIP 17	200 ac-ft
Glencoe East and Central Basic Water Management Project	CIP 18	50 ac-ft
Central Ditch Water Retention Project Increase water storage and improve water quality in area located north of Glencoe.	CIP 19	50 ac-ft
Total Estimated Potential Storage		**565 ac-ft**

N/A: Not applicable, or estimate was not available at the time of the plan

Appendix F. Altered Hydrology Analysis

Technical Memorandum

To: South Fork Crow River 1W1P Partnership

From: Timothy Erickson PE

Houston Engineering, Inc.

Subject: South Fork Crow River Altered Hydrology Analysis

Date: January 24, 2023

Project: 8891-0001

1.0 INTRODUCTION

One of the stressors commonly referenced as a reason for aquatic life impairments is “altered hydrology.” Altered hydrology is commonly thought to be characterized by increases in peak discharge and runoff volume for a range of precipitation events, as compared to some historic or benchmark condition. Numerous studies have suggested that this hydrologic alteration is a result of some combination of climatic variation, land use/land cover changes, or other landscape scale changes. Aquatic habitat loss, increased streambank erosion and bank failure, and increased sediment levels are some of the suggested consequences of altered hydrology. Individually and collectively these are believed to lead to the impairment of aquatic life, exhibited by lower ecological diversity.

This technical memorandum (TM) describes a framework used define and quantify altered hydrology using records for the USGS’s long-term, continuous flow gaging network. In addition, this TMS describes methods to estimate storage goals based on changes of altered hydrology metrics that can be used to develop management plans to help mitigate the impacts of alteration.

1.1 A NEED TO ASSESS ALTERED HYDROLOGY

Although a general sense of the characteristics of altered hydrology exists, a substantive challenge remains. A challenge associated with addressing altered hydrology is the lack of a common definition, including agreement on a set of science-based metrics to establish the desired (i.e., benchmark) condition, and assess whether altered hydrology has indeed occurred. **Figure 1** provides an example of hydrologic data which could be used to illustrate altered hydrology. **Figure 1** shows a flow duration curve for a streamflow gage in the Sand Hill River Watershed, within northwestern Minnesota. Two 30-year time periods are shown on the graph; i.e., 1980 – 2010 (solid line) and 1945 - 1975 (dashed line). The graph represents the likelihood of exceeding a specific daily mean discharge. The graph indicates an increase in the daily mean discharge through most of the flow range, because for the same likelihood of exceedance the daily mean discharge is greater for the more recent time periods. This suggests "altered hydrology" meaning that flow conditions in the watershed differ between the two time periods. The example illustrates one possible visual metric which could be used to describe altered hydrology.

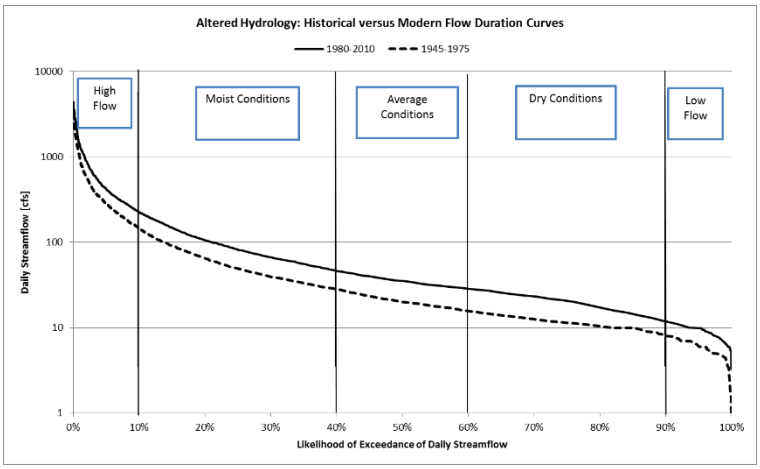


Figure 1. Flow duration curve for the Sand Hill River at Climax, Minnesota. The solid black line shows an increase in daily mean discharge for the 1980 – 2010 period, compared to the early 1945 – 1975 period.

Agreement on a set of science-based metrics to assess the extent of hydrologic alteration and the desired (i.e., benchmark) condition is needed in order to quantitatively assess changes in the hydrology of a watershed. A definition is needed to rigorously assess whether hydrology has indeed changed through time, establish goals for altered hydrology, and assess and evaluate various means, methods and projects to mitigate the adverse effects of altered hydrology.

Considerable research and technical information relative to describing altered hydrology has been completed. The recently release report titled "Technical Report: Protection Aquatic Life from Hydrologic Alternatives" (Novak et al., 2015) is one example. The report presents metrics which can be used to describe altered hydrology. However, causal information about how the change in hydrology results in the alteration or loss of ecological function is lacking within the report.

For the hydrology of a watershed to be altered there must be some deviation from a preferred or desired hydrologic condition; i.e., a "benchmark" condition. The benchmark for altered hydrology could be the "natural hydrologic regime" or some other condition. The natural hydrologic regime (Poff et al 1997; Arthington et al 2006; Bunn and Arthington 2002 ; Sparks 1995) is the characteristic pattern of water quantity, timing and variability in a natural water body. A river's hydrologic or flow regime consists of environmental flow components (Mathews and Richter, 2007; The Nature Conservancy, 2009), each of which can be described in terms of the magnitude, frequency, duration, timing and rate of change in discharge. The integrity of an aquatic system presumably depends on the natural dynamic character of these flow components to thereby driving ecological processes.

Defining altered hydrology and the benchmark condition, identifying the metrics to describe altered hydrology and translating the information into goals to mitigate the adverse consequences is technically challenging. The approach used to evaluate whether a watershed exhibits altered hydrology is presented within this document. A definition of altered hydrology is presented. Specific quantitative metrics to assess the extent of hydrologic change and the desired (i.e., benchmark) condition are also presented. No effort is made to describe the causal relationship between hydrology and the ecological, geomorphological or water quality effects. Rather, the assumption is made that the desired condition is achieved by obtaining the benchmark condition. These results are intended to be a beginning point in addressing the topic of altered hydrology in a more rigorous manner, which no doubt will evolve through time.

2.0 A METHODOLOGY TO DEFINE ALTERED HYDROLOGY

2.1 A BRIEF HISTORY OF CHANGING HYDROLOGY

Streamflow in Minnesota (Novotny & Stefan, 2007) and across the contentious United States (Lins and Slack 1999, McCabe and Wolock, 2002) have been changing during the past century, with flows in the period starting from the 1970s to the beginning of the 21st Century tending to be higher than during the early to mid-1900s (Ryberg et al. 2014). Numerous studies have been conducted to quantify magnitude of impact and pinpoint relative importance of potential causes of these changes, but scientific consensus has currently not been achieved. The science is not at a point where specific causes can be attributed to altered hydrology with any significant certainty and public discussion about specific causes usually leads to barriers to implementation. In general, the leading candidate causes of altered hydrology can be categorized into to two primary groups: climatic changes and landscape changes. Examples of climatic changes include changes in annual precipitation volumes, in surface air temperature, timing of the spring snowmelt, annual distribution of precipitation, and rainfall characteristics (timing, duration, and intensity). Examples of landscape changes include changes in land use/land cover, increased imperviousness (urbanization), tile drainage and drainage ditching, wetland removal/restoration, groundwater pumpage, flow retention and regulation, and increased storage (both in-channel and upland storage). Although it is important to water resource management to understand the mechanics behind the changes in hydrology, the focus of this analysis is developing a definition for altered hydrology, a method for assessing whether it has occurred within a watershed, and establishing a goal for addressing altered hydrology. No assumption of causation is made or needed to use this framework.

2.2 ALTERED HYDROLOGY DEFINED

Altered hydrology is defined as a *discernable* change in specific metrics derived from stream discharge, occurring through an entire annual hydrologic cycle, which exceed the measurement error, compared to a benchmark condition. For this framework, *discernable* has been used as a proxy for statistical comparisons. The metrics are typically some type of hydrologic statistic derived from the annual discharge record across a long period of time, usually a minimum of 20-years (Gan et al. 1991). The amount of baseflow, the hydrograph shape, peak discharge, and runoff volume for a range of precipitation event magnitudes, intensities, and durations are specific components of or derived from the annual hydrograph.

2.3 ESTABLISHING BENCHMARK CONDITION

A reference or "benchmark" condition is needed to complete an assessment of whether hydrology is altered. A minimum of a 20-year time-periods reasonably ensures stable estimates of streamflow predictably (Gan et al. 1991; Olden & Poff 2003), sufficient duration to capture climate variability and the interdecadal oscillation typically found in climate (McCabe et al. 2004, Novotny and Stefan 2007), and is the standard timespan used for establishing "normal" climate statistics in the United States. Where the extent data allows it, the analysis is performed for two 35-year time periods; i.e., a benchmark period called "historic" and an "altered" state or called "modern"). The benchmark period used to establish benchmark conditions represents the period before shifts in hydrology are commonly thought to have begun within Minnesota as a result of land use/land cover changes, or increases in the depth, intensity, and duration of precipitation.

To illustrate an example of a change in streamflow and the validity in the breakpoint period, cumulative streamflow (using annual depth values) is plotted across time (**Figure 2)** for the USGS gage at Crow River at Rockford, MN (USGS ID: 05280000). Cumulative streamflow was used instead of straight annual streamflow because (1) it linearizes streamflow relationship where the slope of a trendline would be the average annual streamflow, (2) no assumptions about multi-year dependencies (e.g. changes in storage) or autocorrelation is necessary, and (3) changes in slope can be visualized, showing an altered state of hydrology.

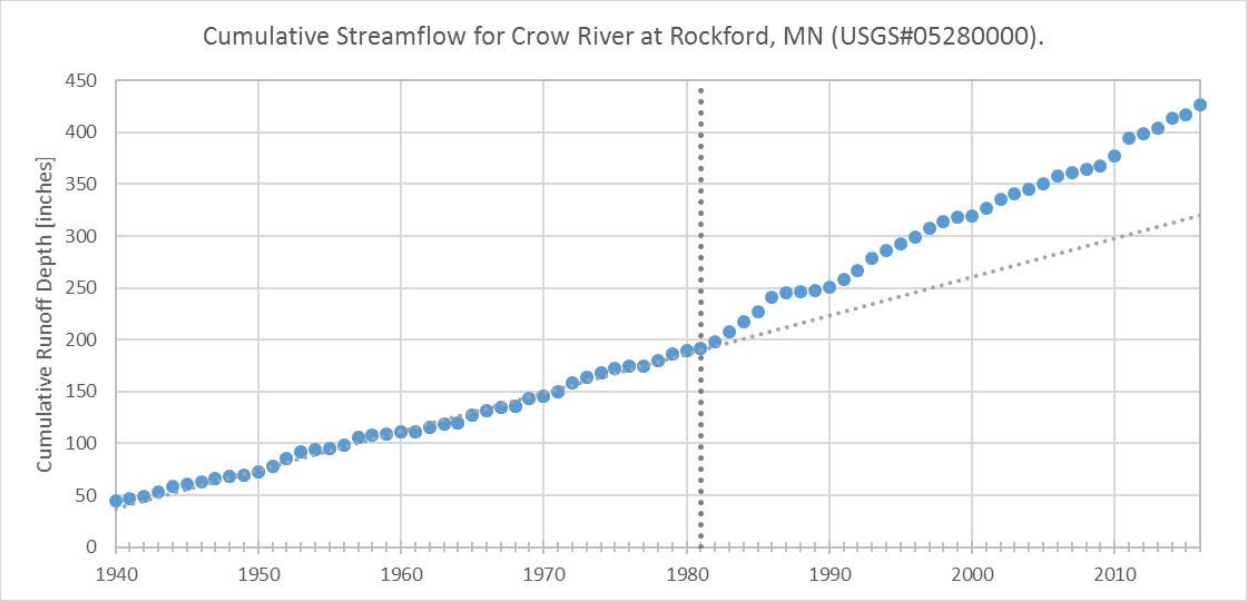


Figure 2. Cumulative streamflow for the Crow River at Rockford, MN (USGS Station 05280000).

Results from analysis shown in the example (**Figure 2**) determine the break point and define the benchmark and modern conditions.

2.4 METRICS USED TO ASSESS ALTERED HYDROLOGY

Many potential metrics can be used to describe a measurable change in the annual hydrograph. For example, the indicators of hydrologic alteration software developed by the Nature Conservancy

(https://www.conservationgateway.org/ConservationPractices/Freshwater/EnvironmentalFlows/MethodsandTools/IndicatorsofHydrologicAlteration/Pages/indicators-hydrologic-alt.aspx) uses 67 different statistics derived from mean daily discharge to describe altered hydrology. Ideally, each indicator or metric could be causally linked to an ecological or geomorphological consequence, although this is technically challenging. Use of such a large number of indictors can be problematic as many of the metrics can be correlated and are therefore interdependent or lack ecological or geomorphological meaning.

The structure and therefore function of ecological systems are often "driven" by "non-normal" events; e.g., low flows associated with drought, higher flows which inundate the floodplain. Metrics used to complete this analysis were preferentially selected to reflect the variability in specific characteristics of the annual hydrograph, and include peak discharges, runoff volumes and hydrograph shape. Each metric was specifically selected to represent a flow condition believed to be of ecological or geomorphological importance, in the absence of causal information. **Table 1** shows the specific metrics used to complete the analysis. The use of these metrics is intended to identify: 1) whether the hydrology within a watershed is indeed altered: and 2) which resources may be at risk because of the alteration.

Table 1. Metrics used to define and assess whether hydrology is "altered" for a specific watershed.

Relevance	Hydrograph Feature	Frequency of Occurrence	Duration	Metric	Ecological or Geomorphic Endpoint
Condition of Aquatic Habitat	Baseflow	10-year	30 day	The minimum change between time periods is the accuracy of measuring streamflow discharge and estimating daily mean discharge. A discharge measurement accurate within 10% of the true value is considered excellent by the United States Geological Survey (USGS). Some additional error is induced through the conversion of these data to discharge. Therefore, a minimum change of 15% is needed between "historic" and "modern" period for this metric to classified as "altered."	Discharge needed to maintain winter flow for fish and aquatic life.
		Annual	30-day median (November)		
Aquatic Organism Life Cycle	Shape	Mean	Monthly average of daily means	Use the "historic" period of record to define "normal variability." Develop a histograms of daily mean discharges for each month within the period of record for the "historic" and "modern" time periods. Compare the histograms of the monthly average of daily means using an appropriate statistical test. Assume the histograms are from the same statistical population and text for significance at an appropriate significance level.	Shape of the annual hydrograph and timing of discharges associated with ecological cues.
	Timing	Julian day of minimum	1-day		
		Julian day of maximum			
Riparian Floodplain (Lateral) Connectivity	Peak discharge	10-year	24-hour and 10-day	The minimum change between time periods is the accuracy of measuring streamflow discharge and estimating daily mean discharge. A discharge measurement accurate within 10% of the true value is considered excellent by the United States Geological Survey (USGS). Some additional error is induced through the conversion of these data to discharge. Therefore, a minimum change of 15% is needed between "historic" period and "modern" period for this metric to classified as "altered."	Represents the frequency and duration of flooding of the riparian area and the lateral connectivity between the stream and the riparian area. Functions include energy flow, deposition of sediment, channel formation and surface water – groundwater interactions
		50-year			
		100-year			
	Volume	10-year	Total runoff volume for those days with a daily mean discharge exceeding the 24-hour discharge		
		50-year			
		100-year			
Geomorphic Stability and Capacity to Transport Sediment	Peak Discharge	1.5 year	24 - hour	The minimum change between time periods is the accuracy of measuring streamflow discharge and estimating daily mean discharge. A discharge measurement accurate within 10% of the true value is considered excellent by the United States Geological Survey (USGS). Some additional error is induced through the conversion of these data to discharge. Therefore, a minimum change of 15% is needed between "historic" period and "modern" period for this metric to classified as "altered."	Channel forming discharge. An increase is interpreted as an increased risk of stream channel susceptibility to erosion.
	Volume	1.5 year	Cumulative daily volume exceeding channel forming discharge		
		Average daily	30-year flow duration curve		

2.5 DETERMINATION OF ALTERED HYDROLOGY

A simple weight of evidence approach is used to decide whether the hydrology of a watershed is “altered” between two time periods. A “+” is assigned to each metric if it has a discernable increase from the benchmark as defined by the metric, between the historic and modern time periods. A “-“ is assigned to each metric if it has a discernable decrease from the benchmark as defined by the metric, between the historic and modern time periods. An “o” is assigned to each metric if it lacks a discernable increase or decrease from the benchmark as defined by the metric, between the historic and modern time periods. If the number of “+” values exceeds the number of “-“ values, an increase in the watershed response to precipitation is implied and the hydrology is considered altered between the two time periods. If the number of “-” values exceeds the number of “+“ values, the a decrease in the watershed response to precipitation is implied and the hydrology is considered altered between the two time periods. The hydrologic response of the watershed is considered “altered” if the percentage of + and – signs exceeds 50% in any group of metrics.

2.6 ESTABLISHING ALTERED HYDROLOGY GOALS

There are two types of goals; i.e., a qualitative and a quantitative goal. The qualitative goal is to return the hydrology to the benchmark condition. The qualitative goal is evaluated using a weight of evidence approach. The goal is simply to achieve the conditions for the historic period as defined by the metrics with **Table 1**. It is presumed the historic period is “better” from an ecological and geomorphological perspective.

The second type of goal is a quantitative storage goal. Several of the metrics within **Table 1** can be used to establish storage goals, which may be accomplished by a variety of types of projects. These project types include not only traditional storage but increasing the organic matter content of soils. These goals are the change in volume between the historic and modern time periods. The volume needs to be described by the effective volume, which is the amount of storage required on the landscape.

2.7 METHODS FOR EVALUATING ALTERED HYDROLOGY MITIGATION STRATEGIES

Several methods can be used to develop strategies to mitigate the effects of altered hydrology. These methods include the use of continuous simulation hydrology models (like the Hydrologic Simulation Program Fortran) and the event-based hydrology approaches (like those within the Prioritize, Target and Measure Application).

3.0 ALTERED HYDOLOGY IN THE SOUTH FORK CROW RIVER

The following are summaries of results from the altered hydrology analysis conducted on long-term gaging stations.

3.1 CROW RIVER

3.1.1 CROW RIVER AT ROCKFORD, MN (USGS# 05280000)

The USGS long-term, continuous flow gaging station in the Crow River at Rockford, MN (USGS# 05280000) and drains approximately 2640 square miles and includes drainages from both the North Fork Crow River and South Fork Crow River. The data record starts in 1906 and runs to the 1917, then restarts in 1929 and runs through 2023 (present day). The flow record was downloaded on January 24, 2023. The site includes both daily average streamflow records and peak flow measurements. **Figure 3** shows the cumulative streamflow (in inches per year) for the gaging site. Cumulative streamflow is used to determine a breakpoint between the benchmark condition and the altered condition (see **Section 2.3**).

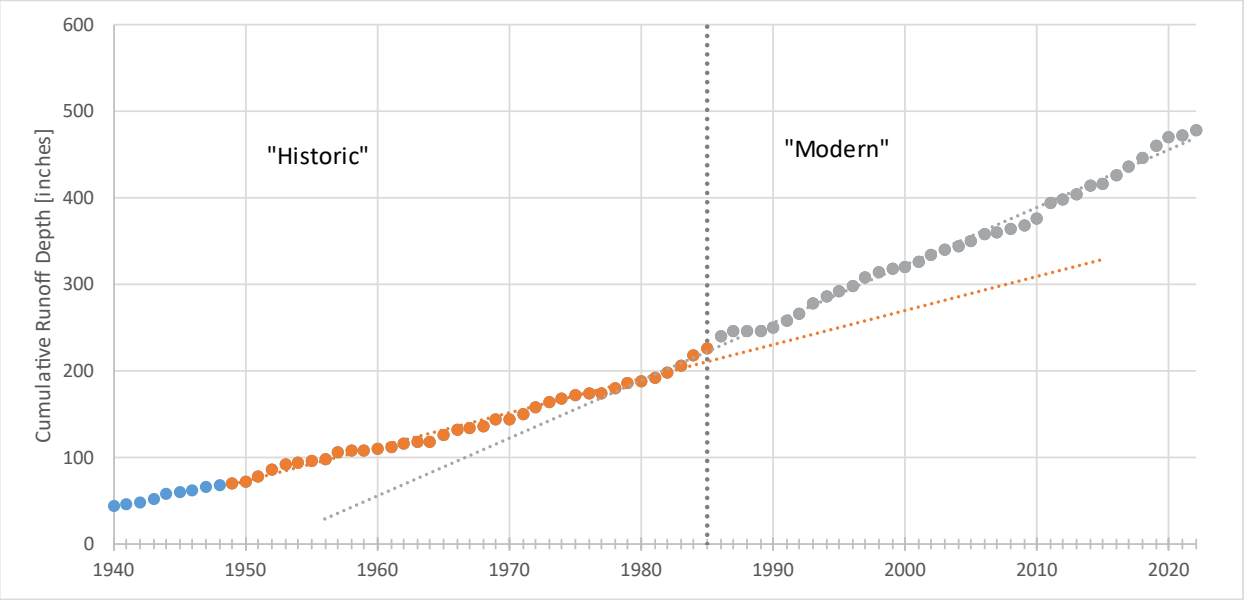


Figure 3. Cumulative streamflow for Crow River at Rockford, MN. (USGS# 05280000).

According to the cumulative streamflow analysis, a breakpoint exists around 1985. Therefore, the benchmark ("historic") conditions will include data from 1949-1985 and the altered ("modern") will include data form 1986-2022.

A summary of the results from the altered hydrology analysis is provided in **Table 2.** A more detailed description of the results is provided in **Appendix A**. A summary of the storage goals based on the altered hydrology analysis are provided in **Section 4**.

Table 2: Altered Hydrology Summary for Crow River at Rockford, MN. (USGS# 05280000).

Group	Metric	% Difference	Altered Hydrology Metric	Evidence of Altered Hydrology for Group
Aquatic Habitat	10-year, Annual Minimum 30-day Mean Daily Discharge	104.4%	+	Yes, Increasing
	10-year, Annual Minimum 7-day Mean Daily Discharge	104.4%	+	
	Median November (Winter Base) Flow	185.4%	+	
Aquatic Organism Life Cycle	Magnitude of Monthly Runoff Volumes	6.5%-to-212%	o	Possibly, Increasing
	Distribution of Monthly Runoff Volumes	-32.9%-to-96.4%	o	
	Timing of Annual Peak Discharge	14.73%	+	
	Timing of Annual Minimum Discharge	36.75%	+	
Riparian Floodplain (Lateral) Connectivity	10-year Peak Discharge Rate	5.72%	o	Possibly, Decreasing
	50-year Peak Discharge Rate	-22.21%	-	
	100-year Peak Discharge Rate	-31.01%	-	
	Average Cumulative Volume above the Historic 10-year Peak Discharge	-86.23%	-	
	Average Cumulative Volume above the Historic 50-year Peak Discharge	NA	NA	
	Average Cumulative Volume above the Historic 100-year Peak Discharge	NA	NA	
Geomorphic Stability and Capacity to Transport Sediment	1.5-year Peak Discharge Rate	61.10%	+	Yes, Increasing
	2-year Peak Discharge Rate	50.91%	+	
	Average Cumulative Volume above the Historic 1.5-year Peak Discharge	70.54%	+	
	Average Cumulative Volume above the Historic 2-year Peak Discharge	45.55%	+	
	Duration above the Historic 1.5-year Peak Discharge	69.28%	+	
	Duration above the Historic 2-year Peak Discharge	73.74%	+	
	Flow Duration Curve	-13.4%-to-130.8%	o	

4.0 STORAGE GOALS

Goals for addressing the change in hydrology were estimated using four methods. Each method is based on different assumptions and altered the metrics for a specific "altered hydrology" group. The first method is focused on the aquatic habitat and geomorphic and ability to transport sediment metric group and uses the change in the cumulative volume for mean daily discharges, exceeding the 1.5-year return period event. The cumulative total volume when the daily average discharge exceeds the 1.5-year peak discharge includes all flows above the 1.5-year peak, i.e. can include storms with much larger return periods. This method is based on the changes in the observed data and since it includes all flows above the 1.5-year flow relies on the two periods to have a similar distribution of flows. The second method is based on the changes in hydrology across the entire annual hydrograph and integrates the differences in return period discharges between the modern and historic period and finding a probability-weighted representative change in flow rate. A volume is found by assuming a flow period equal to the change in flow period for the 1.5-year flow (i.e. the change in the number of days above the 1.5-year flow). This method assumes a constant flow over a representative duration to estimate the storage goal. Since a hydrograph typically changes over time, this method may over-estimate the storage goal. The third method is also based on addressing the effects through the entire flow range and is a revision to Method 2. Method 3 considers incorporates the observed change in the timing of the peak discharge for each return period event. This method uses the probability-weighted representative change in flow rate and multiples the flow rates by the change in the number of days exceeding the return period flow for each return period. Method 4 estimates a storage goal based on changes in the flow duration curve (FDC) (see **Figure A.6**). Method 4 integrates the changes in the FDC between two periods and applies the probability of each flow to occur.

This analysis presents a preliminary framework for defining altered hydrology, applying a method to determine whether altered hydrology has occurred, and establishing a goal for relating to proposed projects. The storage goals are provided in **Table** 3 for each of the four methods. For planning purposes, we recommend ignoring method 2 and averaging the remaining three methods since method 2 is much different than the remaining three. The average, representative storage goal is **0.64 inches** across the watershed, or **43,600 acre-feet,** based on the area of the South Fork Crow River watershed and assuming similar changes in hydrology in the North Fork Crow River. The actual amount of mitigation needed may exceeds the estimated range, as the methods used to achieve the goal are not expected to be 100% effective in removing volume from peak of the hydrograph. The means to achieve the estimated mitigation goal may include the use of structural practices and management practices and should be specifically evaluated through completion of a hydrologic study or the use of appropriate tools and models.

Table 3: Storage goals for rivers in the Crow River.

Stream	USGS ID	Storage Targets			
		Method 1	Method 2	Method 3	Method 4
Crow River at Rockford, MN	05280000	0.66 in.	0.89 in.	0.61 in.	0.64 in.

Details on calculations of the storage goals can be found in the Appendices.

APPENDIX A: METRICS OF ALTERED HYDROLOGY FOR THE CROW RIVER AT ROCKFORD, MN (USGS# 05280000).

The following is the summary statistics used to determine the altered hydrology metrics in detail and develop the storage goals. A summary of these statistic is shown in **Table 2** in **Section 3.1**.

A.1 CONDITION OF AQUATIC HABITAT

The condition of aquatic habitat includes a group of metrics that primarily reflect the flow characteristics of the annual hydrograph, needed to maintain adequate habitat for fish and aquatic life. The 7-day low flow, the 30-day low flow, and the median November mean daily discharge are metrics used to represent changes in the availability of flow for aquatic habitat.

A.1.1 Annual minimum 30-day mean daily discharge

The annual minimum 30-day mean daily discharge is the minimum of the 30-day moving mean daily discharge within a year (an annual minimum series). **Figure A.1** shows the annual minimum 30-day mean daily discharge for select return periods (1.01-year, 1.5-year, 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year). **Table A.1** summarizes the data shown in **Figure A.1**.

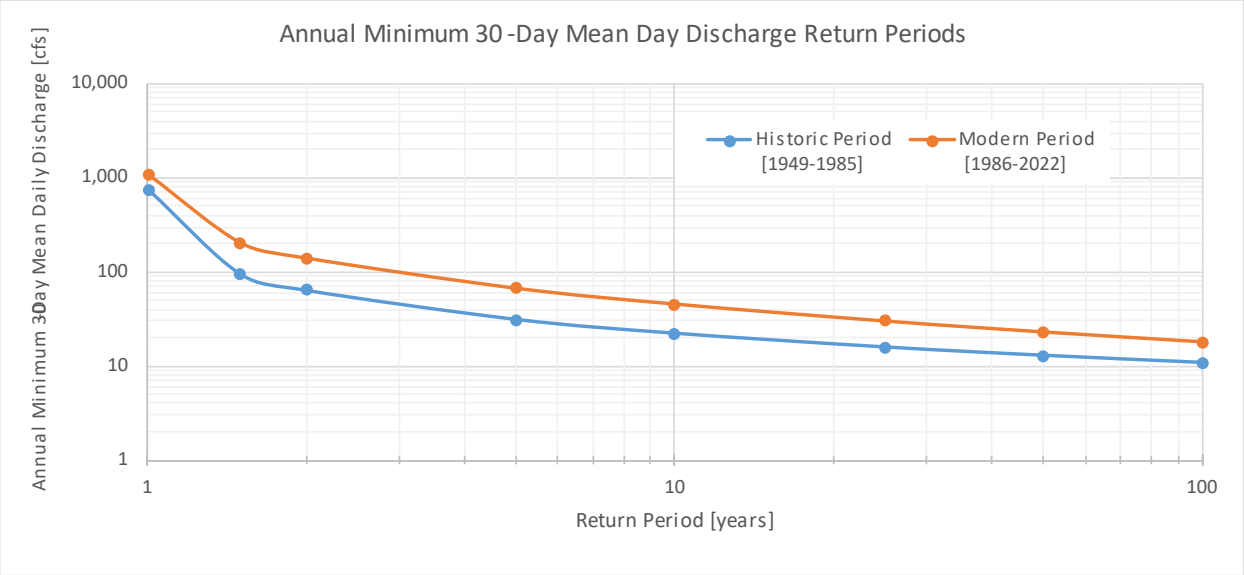


Figure A.1. Historical versus modern annual minimum 30-day mean daily discharge versus return period for the Crow River at Rockford, MN (USGS# 05280000).

Table A.1: Summary of annual minimum 30-day mean daily discharge by return periods for the Crow River at Rockford, MN (USGS# 05280000).

Return Period	Historic Period [1949-1985]	Modern Period [1986-2022]	% Diff.	Altered Hydrology Criterion
1.01	737.8	1058.5	43.5%	+
1.5	95.1	204.0	114.5%	+
2	63.7	139.9	119.6%	+
5	31.1	66.8	114.4%	+
10	22.2	45.3	104.4%	+
25	15.8	29.9	89.2%	+
50	12.9	22.9	77.6%	+
100	10.8	17.9	66.2%	+

+ symbol indicates metric exhibits altered hydrology and an increase for the modern period compared to the historic period
o symbol indicates fails to exhibit altered hydrology for the modern period compared to the historic period
- symbol indicates metric exhibits altered hydrology and a decrease for the modern period compared to the historic period

A.1.2 Annual Minimum 7-Day Mean Daily Discharge

Like the annual minimum 30-day mean daily discharge, the annual minimum 7-day mean daily discharge is the minimum of the 7-day moving average flow in the year. **Figure A.2** shows the annual minimum 7-day mean daily discharges for select return periods (1.01-year, 1.5-year, 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year). **Table A.2** summarizes the data shown in **Figure A.2**.

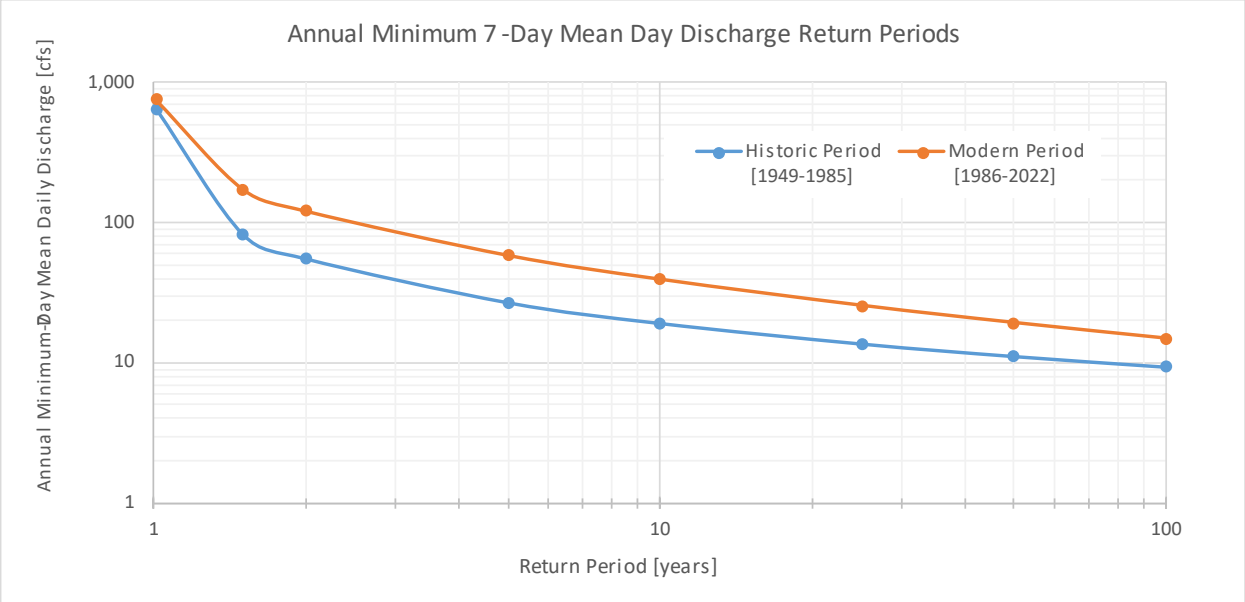


Figure A.2. Historical versus modern annual minimum 7-day mean daily discharge return periods for the Crow River at Rockford, MN (USGS# 05280000).

Table A.2: Summary of annual minimum 7-day mean daily discharge return periods for the Crow River at Rockford, MN (USGS# 05280000).

Return Period	Historic Period [1949-1985]	Modern Period [1986-2022]	% Diff.	Altered Hydrology Criterion
1.0101	647.1	759.3	17.3%	+
1.5	82.5	172.9	109.6%	+
2	55.2	120.7	118.5%	+
5	27.0	58.3	115.8%	+
10	19.2	39.3	104.4%	+
25	13.7	25.6	86.1%	+
50	11.2	19.2	71.8%	+
100	9.4	14.8	57.8%	+

+ symbol indicates metric exhibits altered hydrology and an increase for the modern period compared to the historic period
o symbol indicates fails to exhibit altered hydrology for the modern period compared to the historic period
- symbol indicates metric exhibits altered hydrology and a decrease for the modern period compared to the historic period

A.1.3 November Median Daily Discharge

The median daily mean discharge for November is another indicator of baseflow. This metric is intended to represent baseflow condition during the winter months. **Table A.3** provides the median November flow for each period.

Table A.3: Historical and modern median November flow for the Crow River at Rockford, MN (USGS# 05280000).

Return Period	Historic Period [1949-1985]	Modern Period [1986-2022]	% Diff.	Altered Hydrology Criterion
Period median November flow [cfs]	164.5	469.5	185.4%	+

+ symbol indicates metric exhibits altered hydrology and an increase for the modern period compared to the historic period
o symbol indicates fails to exhibit altered hydrology for the modern period compared to the historic period
- symbol indicates metric exhibits altered hydrology and a decrease for the modern period compared to the historic period

A.2 AQUATIC ORGANISM LIFE CYCLE

The shape of the annual hydrograph and timing of discharges are associated with ecological cues. Metrics related to the aquatic organism life cycle include the shape of the annual hydrographs, timing of the annual minimum flow, and timing of the annual peak flow.

A.2.1 Annual Distribution of Discharges

The annual distribution of runoff is shown two ways: as average monthly runoff volume in acre-feet per month (**Figure A.3**) and as a percentage of average annual runoff volume (**Figure A.4**). **Table A.4** summarized the data used to generate **Figures A.3** and **A.4**.

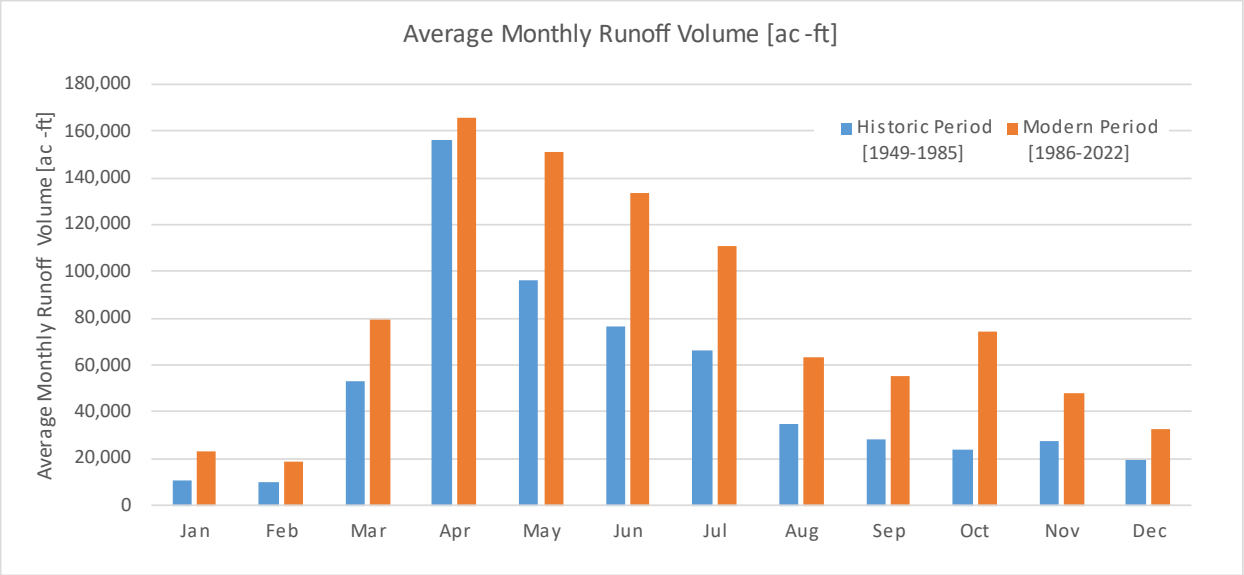


Figure A.3. Average monthly runoff volume [ac-ft] in the Crow River at Rockford, MN (USGS# 05280000).

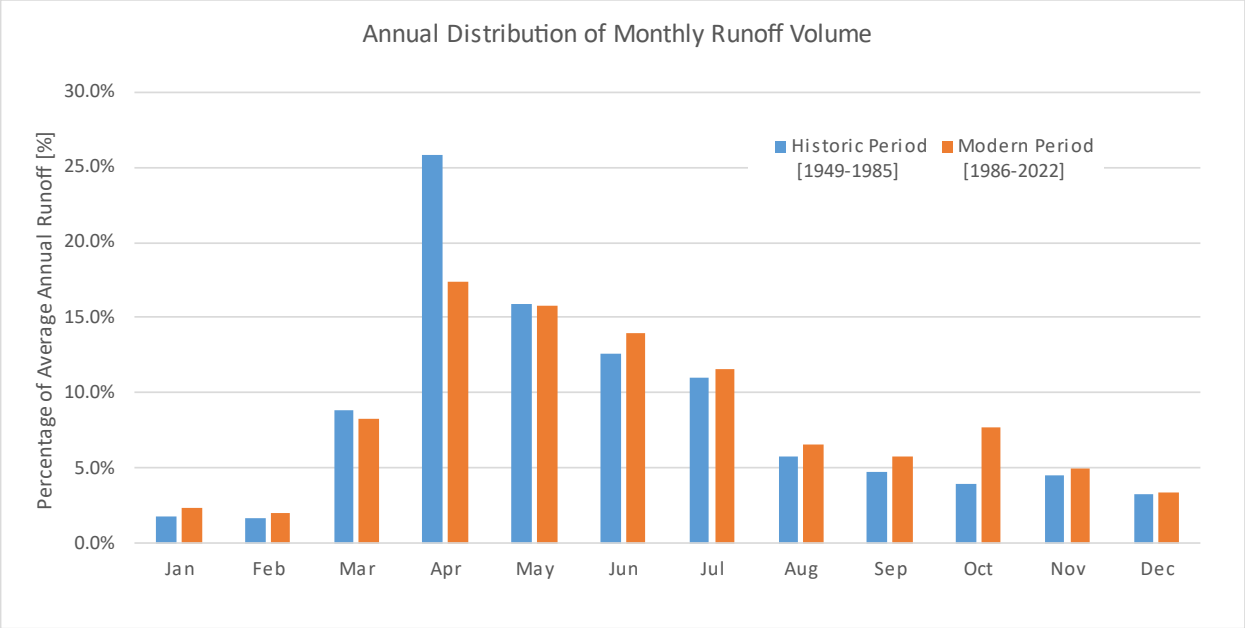


Figure A.4. Annual distribution of average monthly runoff volume as a percentage of annual total volume in the Crow River at Rockford, MN (USGS# 05280000).

Table A.4. Average monthly runoff volume and annual distribution of monthly runoff volumes in the Crow River at Rockford, MN (USGS# 05280000).

Month	Average Monthly Volumes [ac-ft]	Distribution of Annual Volume

	Historic Period [1949-1985]	Modern Period [1986-2022]	% diff.	AH	Historic Period [1949-1985]	Modern Period [1986-2022]	% diff.	AH
Jan	10,819	23,044	113.0%	+	1.8%	2.4%	34.2%	+
Feb	10,090	18,954	87.9%	+	1.7%	2.0%	18.4%	+
Mar	53,345	79,066	48.2%	+	8.8%	8.3%	-6.6%	o
Apr	155,846	166,007	6.5%	o	25.8%	17.3%	-32.9%	-
May	95,920	151,211	57.6%	+	15.9%	15.8%	-0.7%	o
Jun	76,171	133,559	75.3%	+	12.6%	14.0%	10.5%	+
Jul	66,425	111,022	67.1%	+	11.0%	11.6%	5.3%	o
Aug	34,831	63,469	82.2%	+	5.8%	6.6%	14.8%	+
Sep	28,500	55,332	94.1%	+	4.7%	5.8%	22.3%	+
Oct	23,841	74,303	211.7%	+	4.0%	7.8%	96.4%	+
Nov	27,491	48,124	75.1%	+	4.6%	5.0%	10.3%	+
Dec	19,748	32,942	66.8%	+	3.3%	3.4%	5.1%	o

+ symbol indicates metric exhibits altered hydrology and an increase for the modern period compared to the historic period
o symbol indicates fails to exhibit altered hydrology for the modern period compared to the historic period
- symbol indicates metric exhibits altered hydrology and a decrease for the modern period compared to the historic period
AH means altered hydrology criterion

A.2.2 Timing of Annual Maximum and Minimum Flows

The timing of the annual maximum daily discharge and annual minimum daily discharge are important metrics of the annual distribution of flows. The timing of the annual maximum typical occurs during the spring flood and the timing of the annual minimum usually occurs during the winter months. **Table A.5** provides statistics on the Julian day of the annual maximum flow and **Table A.6** provides the Julian day for the annual minimum flow. The statistics include the average, the median, and the standard deviation of the Julian days when the maximum or minimum flow occur.

Table A.5. Julian Day of annual maximum in the Crow River at Rockford, MN (USGS# 05280000).

Statistic	Historic Period [1949-1985]	Modern Period [1986-2022]	% diff.	AH
Average	6-May	25-May	14.73%	+
Median	16-Apr	8-May	20.75%	+
Standard Deviation	45 days	62 days	36.10%	+

[1]Based on 365-day year.
+ symbol indicates metric exhibits altered hydrology and an increase for the modern period compared to the historic period
o symbol indicates fails to exhibit altered hydrology for the modern period compared to the historic period
- symbol indicates metric exhibits altered hydrology and a decrease for the modern period compared to the historic period
AH means altered hydrology criterion

Table A.6. Julian Day of annual minimum flow in the Crow River at Rockford, MN (USGS# 05280000).

Statistic	Historic Period [1949-1985]	Modern Period [1986-2022]	% diff.	AH
Average	3-Jun	29-Jul	36.75%	+
Median	6-Mar	15-Sep	297.69%	+
Standard Deviation	132 days	104 days	-21.21%	-

[1]Based on 365-day year.
+ symbol indicates metric exhibits altered hydrology and an increase for the modern period compared to the historic period
o symbol indicates fails to exhibit altered hydrology for the modern period compared to the historic period
- symbol indicates metric exhibits altered hydrology and a decrease for the modern period compared to the historic period
AH means altered hydrology criterion

A.3 RIPARIAN FLOODPLAIN (LATERAL) CONNECTIVITY (PEAK FLOWS)

The riparian floodplain connectivity metrics represent the frequency and duration of flooding of the riparian area and the lateral connectivity between the stream and the riparian area. Functions include energy flow, deposition of sediment, channel formation and surface water – groundwater interactions. The riparian floodplain connectivity metrics include the discharge rates for the 10-year, the 25-year, the 50-year, and the 100-year peak discharges. The annual peak discharge rates for select return periods (1.01-year, 1.5-year, 2-year, 5-year, 10-year, 25-year, 50-year, 100-year, and 200-year) are shown in **Figure A.5**.

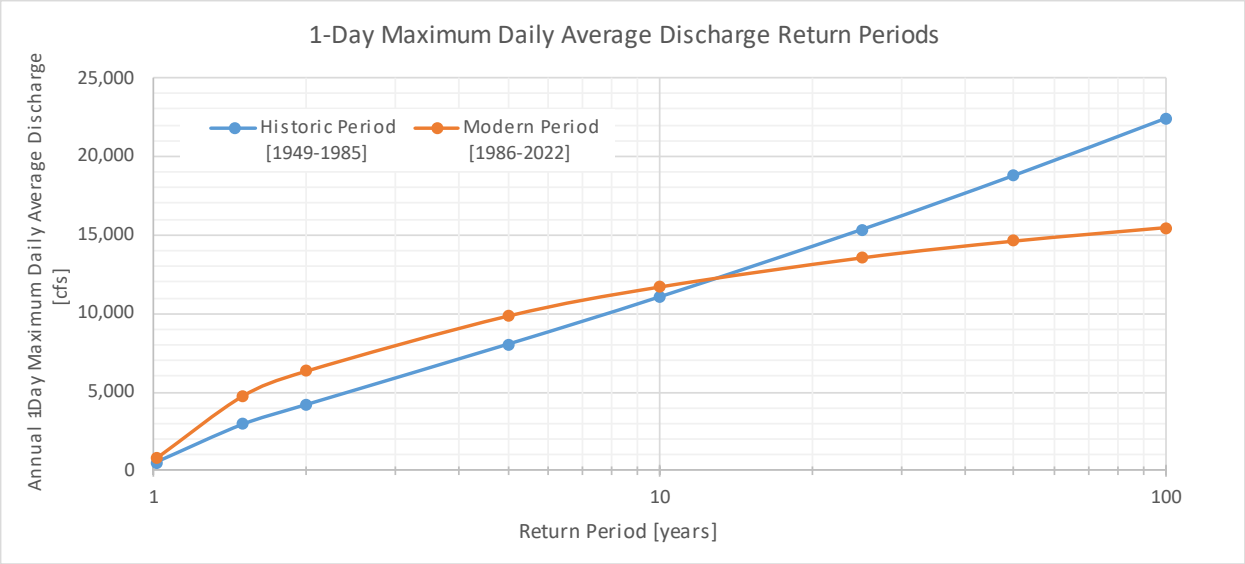


Figure A.5. Historical (1940-1975) versus modern (1980-2015) peak discharge return periods for the Crow River at Rockford, MN (USGS# 05280000).

In addition, the number of years with discharges exceeding the historic peak discharge within a period, the average number of days above the historic peak discharge rates, and the average cumulative volume of discharge above the historic peak discharges are provide (**Table A.7**).

Table A.7. Riparian floodplain connectivity metrics for the Crow River at Rockford, MN (USGS# 05280000).

Flow Metric	Historic Period [1949-1985]	Modern Period [1986-2022]	% Diff.[1]	Altered Hydrology
5-Year Peak Discharge, Q(5) [cfs]	8,033	9,835	22.4%	+
Number of years with Discharge (Q) > Q_H (5)	5	11	120.0%	+
Average number of days per year Q > Q_H (5)	12	12	-0.1%	o
Average annual cumulative volume > Q_H (5) [ac-ft]	96,538	45,832	-52.5%	-
10-Year Peak Discharge, Q(10) [cfs]	11,059	11,692	5.7%	o
Number of years with Discharge (Q) > Q_H (10)	4	7	75.0%	+
Average number of days per year Q > Q_H (10)	9	5	-39.6%	-
Average annual cumulative volume > Q_H (10) [ac-ft]	54,363	7,485	-86.2%	-
25-Year Peak Discharge, Q(25) [cfs]	15,327	13,537	-11.7%	-
Number of years with Discharge (Q) > Q_H (25)	1	0	NA	o
Average number of days per year Q > Q_H (25)	7	0	NA	o
Average annual cumulative volume > Q_H (25) [ac-ft]	56,953	0	NA	o
50-Year Peak Discharge, Q(50) [cfs]	18,775	14,606	-22.2%	-
Number of years with Discharge (Q) > Q_H (50)	1	0	NA	o
Average number of days per year Q > Q_H (50)	5	0	NA	o
Average annual cumulative volume > Q_H (50) [ac-ft]	18,293	0	NA	o
100-Year Peak Discharge, Q(100) [cfs]	22,419	15,467	-31.0%	-
Number of years with Discharge (Q) > Q_H (100)	0	0	NA	o
Average number of days per year Q > Q_H (100)	0	0	NA	o
Average annual cumulative volume > Q_H (100) [ac-ft]	0	0	NA	o

[1]No events occurred above return period discharge.
+ symbol indicates metric exhibits altered hydrology and an increase for the modern period compared to the historic period
o symbol indicates fails to exhibit altered hydrology for the modern period compared to the historic period
- symbol indicates metric exhibits altered hydrology and a decrease for the modern period compared to the historic period

A.4 GEOMORPHIC STABILITY AND CAPACITY TO TRANSPORT SEDIMENT

The geomorphic stability and capacity to transport sediment metrics are related to the channel forming discharge. An increase in these metrics would be interpreted as an increase in the risk of the stream channel susceptibility to erosion. These metrics include changes to the flow duration curves, the 1.5-year peak flow, the 2-year peak flow. The 1.5-year to 2-year peak flows are generally consider the range of channel forming flow. In addition, the number of years within a period exceeding the historic peak flows, the average number of days above the historic peak flow rates, and the average volume of flow above the historic peak flows are provide (**Table A.8**). **Figure A.6** is the flow duration curves for the historic and modern periods and **Table A.8** provides a summary of flows for select percent exceedances. Both show that discharges across the flow spectrum have increased substantially, with the exception of the very high flows.

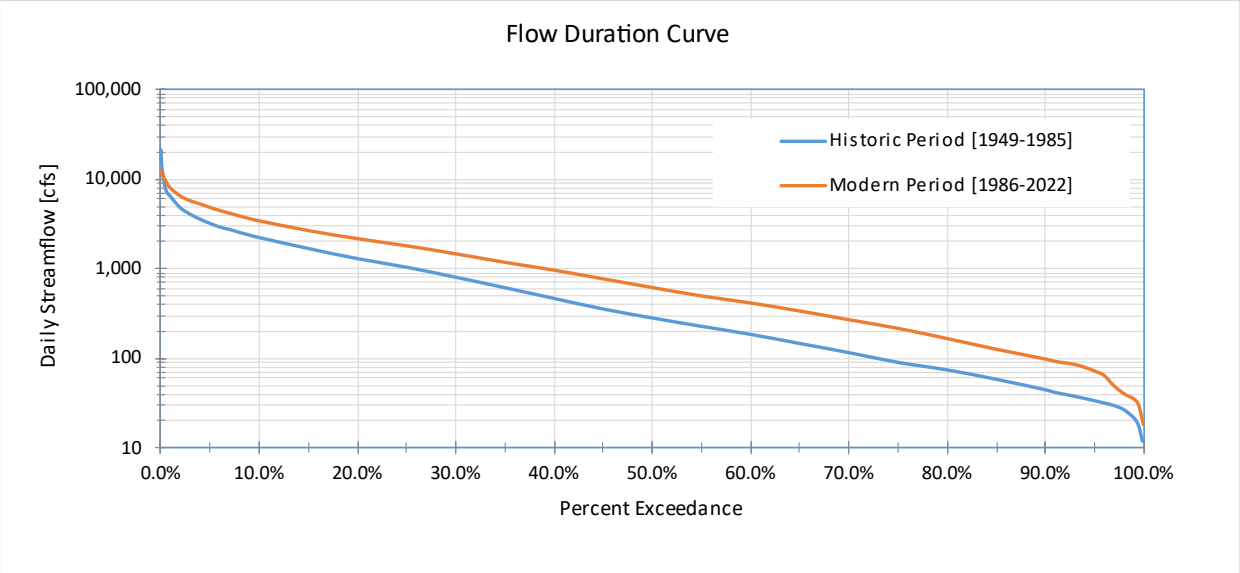


Figure A.6. Historical (1940-1975) versus modern (1980-2015) flow duration for the Crow River at Rockford, MN (USGS# 05280000).

Table A.8. Select summary of the flow duration curves for the Crow River at Rockford, MN (USGS# 05280000).

Percent Exceedance	Historic Period [1949-1985]	Modern Period [1986-2022]	% Diff.	Altered Hydrology
0.10%	13,700	11,860	-13.4%	-
1.0%	6,429	8,020	24.8%	+
10.0%	2,250	3,470	54.2%	+
25.0%	1,050	1,820	73.3%	+
50.0%	285	620	117.5%	+
75.0%	117	270	130.8%	+
90.0%	45	98	117.3%	+
99.0%	22	35	59.1%	+
99.9%	12	20	66.7%	+

+ symbol indicates metric exhibits altered hydrology and an increase for the modern period compared to the historic period
o symbol indicates fails to exhibit altered hydrology for the modern period compared to the historic period
- symbol indicates metric exhibits altered hydrology and a decrease for the modern period compared to the historic period

Table A.9 provides the 1.5-year and 2-year annual peak flows and flow statistics, including peak discharge, number of years with flow rates above the historic return period flow, average number of days per year above the historic return period flow, and average volume above the historic return period flow.

Table A.9. Geomorphic stability and capacity to transport sediment metrics for the Crow River at Rockford, MN (USGS# 05280000).

Flow Metric	Historic Period [1949-1985]	Modern Period [1986-2022]	% Diff.	Altered Hydrology
1.5-Year Peak Discharge, Q(1.5) [cfs]	2,953	4,757	61.1%	+
Number of years with Discharge (Q) > Q_H (1.5)	24	30	25.0%	+
Average number of days per year Q > Q_H (1.5)	34	57	69.3%	+
Average annual cumulative volume > Q_H (1.5) [ac-ft]	132,073	225,232	70.5%	+
2-Year Peak Discharge, Q(2) [cfs]	4,197	6,334	50.9%	+
Number of years with Discharge (Q) > Q_H (2)	20	28	40.0%	+
Average number of days per year Q > Q_H (2)	19	33	73.7%	+
Average annual cumulative volume > Q_H (2) [ac-ft]	88,468	128,763	45.5%	+

+ symbol indicates metric exhibits altered hydrology and an increase for the modern period compared to the historic period
o symbol indicates fails to exhibit altered hydrology for the modern period compared to the historic period
- symbol indicates metric exhibits altered hydrology and a decrease for the modern period compared to the historic period

A.5 SETTING GOALS

A summary of the storage goals is provided in **Table 4** in **Section 4.** The following are the methods used to develop those goals. Goals for addressing the change in hydrology were estimated using three methods. Each method is based on different assumptions and altered the metrics for a specific "altered hydrology" group (see Table 11). The first method is focused on the aquatic habitat and geomorphic and ability to transport sediment metric group and uses the change in the cumulative volume for mean daily discharges, exceeding the 1.5-year return period event. The cumulative total volume when the daily average discharge exceeds the 1.5-year peak discharge includes all flows above the 1.5-year peak, i.e. can include storms with much larger return periods. The change in average annual cumulative volume above the 1.5-year peak flow (see **Table A.9**) This method is based on the changes in the observed data and since it includes all flows above the 1.5-year flow relies on the two periods to have a similar distribution of flows. The storage goal based on observed flows is **93,159 AF or 0.66 inches** across the watershed.

The second method is based on the changes in hydrology across the entire annual hydrograph and integrates the differences in return period discharges between the modern and historic period (see **Table A.10**) and finding a probability-weighted representative change in flow rate. A volume is then found by assuming a flow period equal to the change in flow period for the 1.5-year flow (i.e. the change in the number of days above the 1.5-year flow; see **Table A.9**).

Table A.10. Estimated goal for the drainage area of the Crow River at Rockford, MN (USGS# 05280000) using method 2.

Return Period	Historic Period Discharges (cfs)	Modern Period Discharges (cfs)	Difference (cfs)	Probability of Occurrence	Difference*Probability (cfs)
1.5	1,127	2,953	4,757	1804	0.67

2	1,617	4,197	6,334	2137	0.50
5	3,428	8,033	9,835	1802	0.20
10	5,204	11,059	11,692	633	0.10
25	8,276	15,327	13,537	-1790	0.04
50	11,286	18,775	14,606	-4169	0.02
100	15,026	22,419	15,467	-6952	0.01
				Sum (cfs):	2,695
				Sum (ac-ft/day):	5,346
		Number of days:	23	Total Volume Goal:	125,016 AF (0.89 in.)

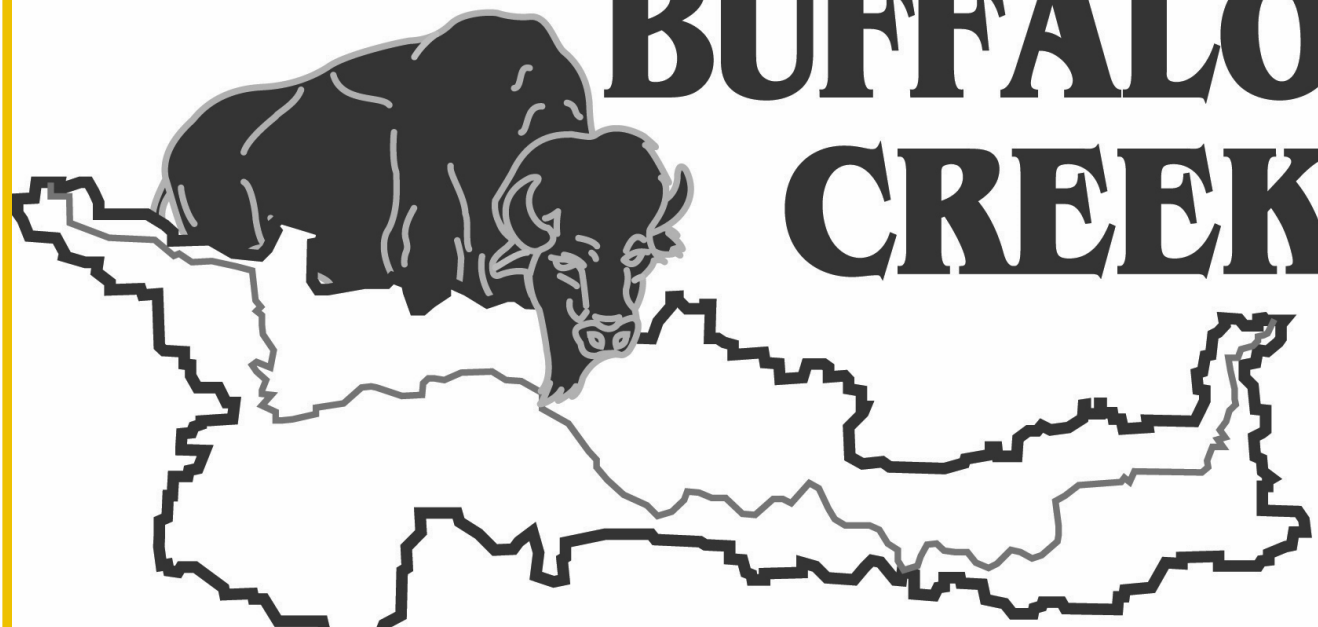
The third method is also based on addressing the effects through the entire flow range and is a revision to Method 2. Method 3 considers incorporates the observed change in the timing of the peak discharge for each return period event. This method uses the probability-weighted representative change in flow rate and multiples the flow rates by the change in the number of days exceeding the return period flow for each return period (see **Table A.11**).

Table A.11. Estimated goal for the drainage area of the Crow River at Rockford, MN (USGS# 05280000) using method 3.

Return Period	Change in Flow (Q_m-Q_h) [cfs]	Probability of Occurrence	Probability Weighted Flow [AF/day]	Change in number of days above flow (days)	Storage Volume
1.5	1,804	0.67	2,386.2	23	55,797
2	2,137	0.50	2,119.8	14	30,010
5	1,802	0.20	714.9	0	0
10	633	0.10	125.5	0	0
25	-1,790	0.04	0.0	0	0
50	-4,169	0.02	0.0	0	0
100	-6,952	0.01	0.0	0	0
				Total Volume Goal:	85,807 AF (0.61 in.)

The fourth method integrates the changes in the FDC (see Figure A.6) and the probability of occurrence of each flow. The fourth method estimated a storage goal of **90,771 AF, or 0.64 inches,** across the watershed.

BUFFALO CREEK



WATERSHED DISTRICT

www.bcwatershed.org

Appendix G. BCWD Water Management Districts

Buffalo Creek Watershed District Overall Plan (2014-2023)

Appendix D: Water Management Districts

A. Use of Water Management Districts

B. Establishment of Marsh Water Management District

C. Establishment of Glencoe Central Water Management District

Attachment 1 – City of Glencoe's Petition for Marsh Water Project (4/8/14)

Attachment 2 – Marsh Water Project Addendum to the Engineering Report (10/8/2014)

Attachment 3 – Marsh Water Project Implementation Preliminary Charge Analysis and Timeline

Attachment 4 – City of Glencoe's Petition for Glencoe Central-East Stormwater Basic Water Management Project (7/19/16)

Attachment 5 – Glencoe East and Central Basic Water Management Project – Phase 1: Existing Conditions and Conceptualization of Potential Projects (6/21/17)

Attachment 6 – Glencoe East and Central Basic Water Management Project - Phase 2: Regional Comprehensive Stormwater and Flood Management Plan (7/17/18)

Attachment 7 – Glencoe Central-East Stormwater Basic Water Management Plan – Priorities, Cost Allocation, and Schedule (1/15/19)

Water Management Districts

A. Use of Water Management Districts

The Buffalo Creek Watershed District (BCWD) plans on using Water Management Districts (WMD) as one of several funding mechanisms for the implementation of activities to solve local and regional problems and issues. The provision for collection of charges found under Minnesota Statutes (MS) 103D.729 and 444.075) allows a watershed district, through the amendment of its plan or during an update to the Water Management Plan (WMP), the authority to establish one or more water management districts for the purpose of collecting revenues and paying the costs of projects initiated under MS 103B.231, 103D.601, 103D.605, 103D.611, or 103D.730.

To establish a water management district, the WMP update, or an amendment to the WMP, must describe the area to be included, the amount of the necessary charges, the methods used to determine the charges, and the length of time the water management district will remain in effect. After adoption, the amendment or WMP must be filed with the county auditor and county recorder of each county affected by the water management district. The water management district may be dissolved by the same procedures as prescribed for the establishment of the water management district.

A distinguishing element of the water management district over an assessment, or ad valorem tax is that the watershed district assumes the authority similar to that of a municipality; the ability to establish a system of charges based a prescribed method, such as a property's contribution of storm water and/or pollutants to a receiving body of water. Thus, funds generated by utilizing a water management district can be based upon a mechanism related to a property's contribution to a problem rather than the value of the property. Ultimately the water management district provides a supplemental financing tool for the BCWD and is especially useful in situations where project components are required to address a locally generated need or problem.

Through this amendment to the WMP (the addition of Appendix D in the Buffalo Creek Watershed District Overall Plan 2014-2023), the BCWD intends to establish the Marsh Water Management District (Marsh WMD) and the framework for creating and implementing additional water management districts by amendment to this Plan.

Local Appeal Procedures for Water Management Districts

Subpart 1. Applicability. This part applies when an owner of land in a water management district disputes the charges to be collected for their land in the water management district. This part does not apply to the validity of a water management district being in place.

Subpart. 2. Petition. A petition may be made by an owner of land in a water management district to appeal the charges to be collected for their land in the water management district. A petition must be made in writing to the Buffalo Creek Watershed District. The petition must state the reasons the water management district charges are calculated improperly for their land.

Subpart 3. Petition review process.

A. Within ten working days of receiving a petition, the watershed district, its staff, legal counsel or consultants (District), are required to acknowledge in writing to the petitioner receipt of the petition.

B. The District must complete an assessment of the reasons stated in the petition to revise the charges. The District may request further information from the petitioner, have discussions with the petitioner or their legal counsel, view the property that is the subject of the petition, conduct onsite investigations, and such other fact finding as the District deems necessary to evaluate the petition.

C. The results of the assessment shall be reviewed by the Board of Managers and a decision made on the findings and recommendations in the assessment.

D. Upon the Board of Managers approval of an assessment, the assessment must be provided to the petitioner or their legal counsel accompanied with notification of the deadline for the petitioner to submit evidence to the District refuting the assessment.

Subpart 4. Decisions.

A. The District must notify the petitioner or their legal counsel in writing at least ten working days before the meeting in item B takes place.

B. On receipt of any information from, or lapse of the time period in, subpart 3, item D, the Board of Managers must:

1. Advise staff to conduct additional fact finding it considers necessary and report back to the managers accordingly;

2. Direct staff to attempt to resolve the matter and to advise the managers further; or

3. Issue findings of fact and conclusions of its investigation on the petition.

C. The District shall provide written notice of the decision in item B to the petitioner or their legal counsel within five working days of the decision.

Subpart 6. Limitations. A petition may not be filed more than once in five years for a specific parcel of land unless significant land alterations or land use changes have occurred since the charges were calculated or since a previous petition was filed with the watershed district.

Subpart 7. Withdrawal of petition. If agreement is reached at any time before the above procedures are completed, the petitioner may withdraw their petition and the District may revise the charges if needed.

B. Establishment of the Marsh Water Management District

Establishment Purpose: Marsh Ditch is a privately constructed and owned ditch which conveys runoff from the west side of the City of Glencoe and portions of Glencoe Township, into Buffalo Creek. The drainage system is necessary for stormwater management. Because the drainage system is privately owned and not managed by a public entity, little or no coordinated efforts have been taken to repair the drainage system, and thus its condition and function has deteriorated throughout the system. To address this deterioration and provide an opportunity to address nutrient loading to Buffalo Creek, the BCWD initiated a watershed project called the “Marsh Water Project” which would provide a comprehensive stormwater management project over the entire contributing drainage area to Marsh Ditch.

On April 8, 2014 the City of Glencoe petitioned the BCWD to re-establish the Marsh Water Project under MS 103D.605 as a phased Basic Water Management Project. The petition, included as ***Appendix D Attachment 1***, described the following four project phases:

1) Identifying existing conditions and opportunities for stormwater management;

2) Regional comprehensive stormwater management planning;

3) Development of implementation timelines and cost allocation; and

4) Project implementation.

The goals of Phase 1 were addressed through an August 13, 2012 report entitled, *Marsh Water Project – Engineering Report* (refer to Appendix C of the BCWD Overall Plan). Phase 2 was completed via a subsequent report, *Marsh Water Project - Addendum to the Engineering Report* dated October 8, 2014 (included as ***Appendix D Attachment 2***). This addendum recommended five project components as a first phase to the Marsh Water Project, including:

1) Construction of a stormwater wetland;

2) Completion of repairs to the Main Trunk stormsewer system ;

3) Acquisition of easements for access and maintenance;

4) Replacement of culverts; and

5) Creation of buffer strips.

Funds collected through the Marsh WMD will be used to construct specific project features. The specific project features to be planned for, designed, constructed and maintained using the WMD are described with a May 15, 2015, memorandum entitled *Marsh Water Project Implementation Preliminary Charge Analysis and Timeline* (included as ***Appendix D Attachment 3***) which concludes Phase 3 of the City of Glencoe's petition.

Estimated Costs: Charges will be based on properties that contribute runoff to Marsh Ditch. The charge collected will be used for the implementation of those features providing benefit to properties located within the boundary of the Marsh WMD. These features yield direct benefit by providing predictable drainage to largely agricultural lands now and urban stormwater conveyance as development proceeds. The Engineer's Opinion of Probable Cost for the project is an estimated $941,800 of which an estimated $402,200 will be paid by the charge collected through the Marsh WMD. The remaining portion of the Opinion of Probable Cost, primarily for all or portions of those features which provide water quality benefit, will be paid for through the district-wide Ad valorem levy. The initial charge will be used to repay the capital construction cost. Continued maintenance and repairs to the system, as necessary, shall not exceed an average of $25,000 annually with a public hearing and providing notice to the Board of Water and Soil Resources. In addition, Marsh WMD issues and charges will be readdressed in future revisions to the Buffalo Creek Watershed District Overall Plan.

Area for Inclusion: The hydrological boundary of the Marsh Ditch drainage system will comprise the area for the Marsh WMD as shown in **Map 1**. ***Methods for Determining Charges***: The method to determine the per-acre charge will generally consist of evaluating the runoff amount by land use type. Specifics of the method of determining the stormwater charge are expected to include:

• Use soils and land use data to determine the existing curve numbers or runoff coefficients for each current land use within the Marsh WMD;

• Use the curve number or runoff coefficients for each current land use and the annual average precipitation depth to compute the annual runoff volume for each land use;

• Sum the annual runoff volumes for all land uses within the Marsh WMD to determine the total annual runoff volumes for current conditions. Divide the sum of the annual runoff volumes by the total annual runoff volume for each land use, respectively, within the Marsh WMD. This represents a "charge ratio" for each land use.

• Apply the charge ratio to the total amount of revenue needed for the Marsh WMD to carry out the projects, programs and activities of the BCWD within the Marsh WMD.

• The charge for a specific parcel will be determined by area-weighting the per acre charges based on the

land use within a parcel.

This approach may be further defined or revised once the BCWD develops the necessary data required to determine the charge.

Duration: This Marsh WMD is intended to be a permanent WMD. Initial charges will be effective for a duration consistent with the time necessary to repay the capital cost for the project, which currently is estimated at 10 years. Thereafter, the Marsh WMD charges may be reinitiated to generate revenue to pay for project maintenance.

C. Establishment of the Glencoe Central Water Management District

Establishment Purpose: The Glencoe Central Ditch and East Ditch are private drainage systems which convey runoff from the north and east sides of the City of Glencoe and portions of Glencoe Township, into Buffalo Creek. In 2013 and 2014 the area experienced two large rainfall events which caused significant flooding and damages. Subsequent coordination between the City of Glencoe, the District, and local stakeholders and local stakeholders made apparent the need for comprehensive water management planning in the Central and East Ditch subwatersheds.

On July 19, 2016 the City of Glencoe petitioned the Watershed District to establish the Glencoe Central-East Stormwater Basic Water Management Project (Project Number 16-01) under MS 103D.605 as a phased Basic Water Management Project (see ***Appendix D, Attachment 4***). The petition described four project phases:

1) Identifying existing conditions and opportunities for stormwater management; 2) Regional comprehensive stormwater management planning; 3) Development of implementation timelines and cost allocation; and 4) Project implementation.

The goals of Phase 1 were addressed through a June 21, 2017 report entitled, *Glencoe East and Central Basic Water Management Project – Phase 1: Existing Conditions and Conceptualization of Potential Projects* (see ***Appendix D, Attachment 5***). Phase 2 was completed via a subsequent report, *Glencoe East and Central Basic Water Management Project - Phase 2: Regional Comprehensive Stormwater and Flood Management Plan* dated July 17, 2018 (see ***Appendix D, Attachment 6***). The stakeholders used this second report to identify four project components as a first phase to the Glencoe Central-East Stormwater Basic Water Management Project, including:

- Construction of an outlet at Morningside Drive from the School Wetland to the 14th St. Pond;
- Expansion of the 14th St. Pond to accommodate the increase in discharge;
- Improvement of the Glencoe Regional Health Service (GRHS) and County Office Outlet; and
- Ditch Maintenance along the entire length of Central Ditch from just upstream of the North-Central Ponds to Garden Avenue (including establishment of easements and buffers).

Funds collected through a WMD will be used to construct specific project features. The specific project features to be planned for, designed, constructed and maintained using the WMD are described with a memorandum entitled *Glencoe Central-East Stormwater Basic Water Management Plan – Priorities, Cost Allocation, and Schedule*, as amended January 15, 2019, which concludes Phase 3 of the City of Glencoe's petition.

Estimated Costs: The charge collected will be used for the implementation of those features providing benefit to properties located within the boundary of the Glencoe Central WMD. These features yield direct benefit by providing predictable drainage to largely agricultural lands now and urban stormwater conveyance as development proceeds. The Engineer's Opinion of Probable Cost for the project is an estimated $575,067, of which an estimated $450,965 will be paid by the charge collected through the Glencoe Central WMD. The remaining portion of the Opinion of Probable Cost, primarily for all or portions of those features which provide water quality benefit, will be paid for through the district-wide Ad valorem levy and by the City of Glencoe. WMD charges will include an additional 20% ($115,000) to be placed in a dedicated maintenance fund for project facilities. The total of WMD charges is capped at $565,965 for the 10-year recovery period indicated below. The WMD charges will be used to repay the capital construction costs of project facilities and for the establishment of a maintenance fund as indicated above.

Area for Inclusion: The area of the Glencoe Central WMD, approximately 1,132 acres in size, is generally described as the portion of the watershed to Glencoe North Central Ponds and School wetlands that is outside of the City of Glencoe, as shown in **Map 2**.

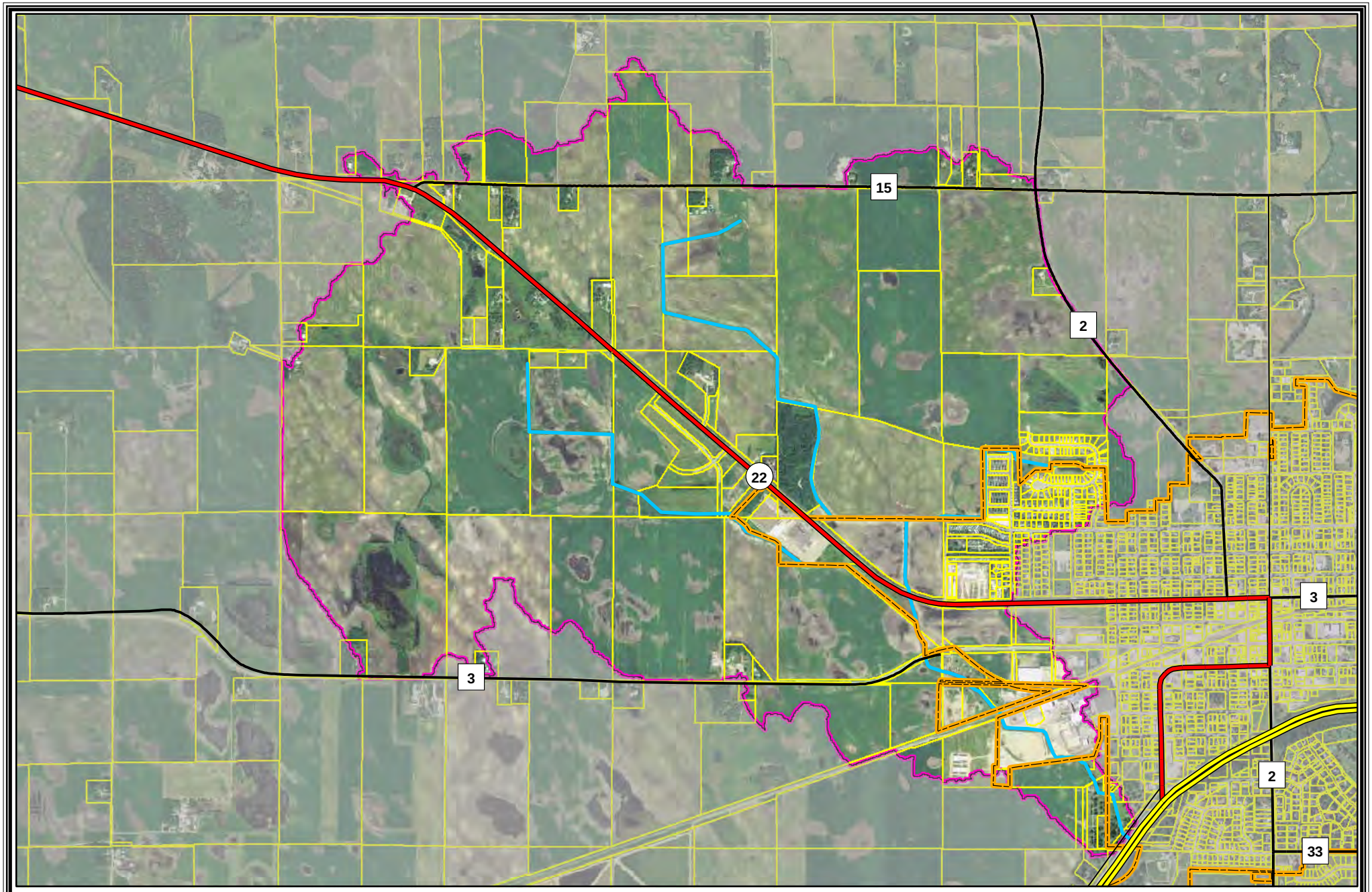
Methods for Determining Charges: The method to determine the per-acre charge will generally consist of evaluating the runoff amount by land use type. Specifics of the method of determining the stormwater charge are expected to include:

- Use soils and land use data to determine the existing curve numbers or runoff coefficients for each current land use within the Glencoe Central WMD;
- Use the curve number or runoff coefficients for each current land use and the annual average precipitation depth to compute the annual runoff volume for each land use;
- Sum the annual runoff volumes for all land uses within the Glencoe Central WMD to determine the total annual runoff volumes for current conditions. Divide the sum of the annual runoff volumes by the total annual runoff volume for each land use, respectively, within the Glencoe Central WMD. This represents a "charge ratio" for each land use.
- Apply the charge ratio to the total amount of revenue needed for the Glencoe Central WMD to carry out the projects, programs and activities of the BCWD within the Glencoe Central WMD.
- The charge for a specific parcel will be determined by area-weighting the per acre charges based on the land use within a parcel.

This approach may be further defined or revised once the BCWD develops the necessary data required to determine the charge and will be subject to review in the hearings process for both project establishment and charge establishment/implementation under statutes chapter 103D.

Duration: This Glencoe Central WMD will be effective for the duration consistent with the time necessary to repay the capital cost for the project, which currently is estimated at 10-years. The WMD may be renewed in subsequent revisions, update or amendments to the watershed management plan to support charges for other programs or projects within the WMD.

Map 2. Glencoe Central WMD



N
W E
S

0 1,050 2,100 4,200 Feet

Date Saved: 3/26/2015 9:19:14 AM

US Hwy
State Hwy
County Hwy
County Roads
Marsh Ditch
Marsh Water Managment District
Glencoe Municipal Boundaries

Map 1: Marsh Water Management District

Houston Engineering Inc.
Maple Grove
P: 763.493.4522
F: 763.493.5572

N
W
E
S
130th St
Garden Ave
120th St
Ford Ave
Hennepin Ave
Falcon Ave
16th St W
Hennepin Ave N
16th St E
110th St
Pryor Ave N
14th St E
Union Ave N
State Hwy 22
13th St W
13th St E
11th St E
10th St E
Hennepin Ave S
6th St S
0
0.25
0.5
Miles
Central Ditch
Glencoe Central WMD
Parcels within WMD
Map 2 - Glencoe Central Water Management District
Scale:	Drawn by:	Checked by:	Project No.:	Date:	Sheet:
AS SHOWN	TWW		6234-0016	5/9/2019	

Houston Engineering Inc.
Maple Grove
P: 763.493.4522
F: 763.493.5572

BUFFALO CREEK

WATERSHED DISTRICT

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Appendix H.
BCWD Rules

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BUFFALO CREEK WATERSHED DISTRICT RULES & REGULATIONS

REVISED MARCH 27, 2018

BUFFALO CREEK WATERSHED DISTRICT

www.bcwatershed.org

These Rules and Regulations are adopted pursuant to Minnesota Statute 2009, Chapter 103D.341, on this 27th day of March, 2018.

BWCD President

BWCD Secretary

Buffalo Creek Watershed District
Board of Managers
~ as of March 27, 2018 ~

Donald Belter, Sibley County

Corey Henke, McLeod County

Larry Kramer, Renville County

Matt Melberg, Renville County

Larry Phillips, McLeod County

Buffalo Creek Watershed District
Rules & Regulations

~ Table of Contents ~

APPENDICES

SECTION ONE:
ADMINISTRATION

1.01 Official Website: The Buffalo Creek Watershed District (BCWD or District) maintains an official website that contains the District's rules and regulations, permit information, and the required application forms. The BCWD's official website is located at:

www.bcwatershed.org

1.02 Origins of the District: BCWD was established under the order of the Minnesota Water Resources Board (now known as the Minnesota Board of Water and Soil Resources or BWSR) on January 30, 1969. The District developed its first Overall Plan, in accordance with Minnesota Statutes Section 112.46, which was adopted on February 8, 1974. The Plan provided the District with a basis for making decisions on the management of its water resources until the Plan was revised in 1991. The third-generation plan was adopted in January 2004 and covered a 10-year period. The fourth-generation plan was adopted in May 2014, but was revised a year later to include the formation of the Marsh Water Management District (formally adopted on May 26, 2015). The current plan is set to expire in May 2024.

1.03 Jurisdiction: The jurisdiction of these Rules and Regulations includes all the area, incorporated and unincorporated, including both land and water, within the territory of the Buffalo Creek Watershed District. The map found in Appendix A shows the District's legal boundary (or visit www.bcwatershed.org to view a larger map). There was a minor boundary change located in the City of Stewart, Minnesota, which took place between BCWD and High Island Watershed District, with official BWSR Board approval in January 1999. The District spans approximately 422 square miles within parts of five counties: Renville (55%), McLeod (38%), Sibley (4%), Kandiyohi (2%), and Carver (1%) Counties.

1.04 Organizational Structure: Renville and McLeod County Boards of Commissioners each appoint two BCWD Board of Managers while Sibley County Board of Commissioners appoints one manager. Each manager is required to be a resident of the District. In addition, they are also prohibited from being a public official of the county, State or Federal government (exception: Soil and Water Conservation District Supervisors may also be BWCD managers). Board of Managers serve three-year terms, which are renewable upon reappointment by their respective County Board of Commissioners.

1.05 Mission Statement: The BCWD was formed with the Mission to: 1) help alleviate water problems, 2) enhance the living conditions of the area and 3) maintain or improve the economic well-being of the residents of the District. The District has in the past and will continue to strive towards the realization of this Mission by:

A. Coordinating activities and issues between the public, interest groups, and governmental agencies;

B. Providing technical and financial assistance, when feasible, towards important water-related issues and projects within the District;

C. Collecting, analyzing, and reporting data on the quality and quantity of water resources throughout the District.

1.06 Intergovernmental Cooperation: The District will coordinate the administration of its Rules and Regulations with all involved local, state, and federal governmental units and agencies having jurisdiction in the District.

A. The District shall review and provide comment to counties, cities, and townships for proposed land use activities, which have the potential to impact water quality and/or quantity in the District.

B. The District shall have the opportunity to review and provide comment on any proposed change to ordinances regulating surface water, drainage, land use and development, stormwater management and/or similar issues.

C. The District shall have the authority to administer all local, state, and federal provisions granted to watershed districts and/or specially granted to the Buffalo Creek Watershed District.

1.07 Due Process: It is the intention of the Board of Managers that no person shall be deprived or divested of any preciously established beneficial use or right, by any rule or regulation of the District, without due process of the law, and that all Rules and Regulations for the District shall be construed according to said intention.

A. It shall be the function of the Board of Managers to exercise control over proposed improvements only to the extent necessary to protect the waters of the Watershed District from unreasonable impacts that are inconsistent with the policies contained in the Overall Plan and the Rules and Regulations.

B. The Board of Managers shall review permit applications filed with the Minnesota DNR, pursuant to Minnesota Statutes 1990, Chapter 103G.001, that may impact water management decisions in the District as well as other development plans and proposed improvements. The Board of Managers desire to become informed of improvements and land development proposals during the early planning stages. The application shall be the primary vehicle for submission of proposed improvements to the Board of Managers.

C. The Board of Managers will submit to the applicant their comments, recommendations, requirements and all other District actions regarding the proposed improvements.

D. The Board of Managers will coordinate their review with the applicant and, when appropriate, the applicant will coordinate with all other regulating authorities.

1.08 Definitions: Appendix B contains a list of definitions, acronyms, and terminology used throughout these Rules and Regulations. If a definition, acronym, and/or terminology is not defined, the common usage of the definition, acronym, and/or terminology shall prevail.

1.09 Effective Date: The Buffalo Creek Watershed District Rules and Regulations shall be in full force and effect after adoption on April 27, 2018, and shall replace the Rules and Regulations adopted on January 25, 2011 (which replaced the Rules and Regulations adopted on May 25, 1993).

SECTION TWO:
PURPOSE, GOALS, AND OBJECTIVES OF THE BUFFALO CREEK WATERSHED DISTRICT

2.01 Purpose: The District is required by Minnesota Chapter Statutes 103D to maintain administrative rules. In addition, the District's Overall Plan identifies several areas where rules are necessary to successfully achieve the District's statutory Mission Statement (*refer to Section 1.05*). These areas include, but are not limited to: agricultural drainage; erosion and sediment control; stormwater management; and reducing other sources of pollution and problems that affect both water quality and quantity. The District's rules are intended to fill gaps in existing local, state, and federal regulations and are not intended to duplicate existing regulations.

2.02 Goals: The District's Rules and Regulations were developed with the following goals:

A. To provide guidelines for the implementation of the District's Overall Plan; and

B. To inform permit applicants of the criteria which their proposed project will be reviewed; and

C. To inform the District's staff and/or hired consultants of the criteria on which they should base their review and recommendation; and

D. To aid the Board Managers in their review process.

2.03 Objectives: Buffalo Creek Watershed District has enacted these rules to carry out the Mission Statement for which the District was created under Minnesota Statutes Chapter 103D and to implement the policies of the District's Overall Plan. Specifically, the District's Rules and Regulations have the following objectives: *

A. To accomplish the Mission Statement for which the Watershed District was created (*refer to Section 1.05*).

B. To implement the policies contained in the District's Overall Plan.

C. To coordinate the District's activities with other governmental agencies.

D. To ensure that water resources are considered, protected and enhanced, when needed, during land use and development in the District.

E. To ensure that future regional water management needs are considered in the development of individual subdivisions, farms and all local water management plans.

F. To protect public health, safety, and general welfare.

* The BCWD will work with applicants, landowners and stakeholders to secure funding to help minimize project costs.

SECTION THREE:
VALIDITY AND AMENDMENT PROCEDURE

3.01 Validity and Separability: All rules adopted by the District shall have the force and effect of law. If, for any reason, a section or subdivision of these rules should be held invalid, such decision shall not affect the validity of the remaining rules.

3.02 Amendment Procedure: The following amendment procedures shall apply to all rule adoption and/or rule amendments:

A. Any property owner in the District, Board Manager, or District staff/consultant may propose rules or amendments to the Board. A copy of the proposed rules or amendments shall be submitted to each Board Manager, along with a statement justifying the proposed rule or amendment.

B. At the Board's discretion, depending on the potential impact of the proposed rule, District staff may be directed to conduct stakeholder meetings to solicit input from persons and political subdivisions likely to be affected by the proposed rule.

C. In accordance with Minnesota Chapter Statutes 103D, the District shall submit the proposed rules to the Board of Soil and Water Resources and transportation authorities within the District for comments 45 days before the Board Managers vote to adopt the proposed rules.

D. The Board shall hold a public hearing prior to the adoption of all rules or amendments. The time, date, and location of the public hearing shall be determined by the District's Board Managers and notice shall be provided by publication in a legal newspaper of general circulation in each county with territory in the District.

E. The Board Managers shall adopt or reject the proposed rules or amendments after a legally publicized public hearing and a majority vote of the Board Managers. Upon being signed by the District's Chair and Secretary, the proposed rules or amendments are deemed adopted.

F. The adopted rules or amendments shall become effective and have the full affect and force of law after publication in a legal newspaper of general circulation in each county having territory in the District.

G. A copy of the proposed and adopted rules or amendments shall be forwarded to each of the following persons: the County Auditor and the County Commissioners of each county having territory in the District; every Township Board Clerk, City Clerk, and Regional Development Commission Chairman within the District; the Board of Soil and Water Resources; the Commissioner of the Minnesota Department of Natural Resources Board; the Executive Director of the Minnesota Pollution Control Agency; the Commissioner of the Minnesota Department of Health, SWCD, all Zoning and Planning Boards in the District, the Administrator of the Minnesota Environmental Quality Board, and other entities that the Board deems appropriate.

SECTION FOUR:
THE DISTRICT'S PERMITTING PROCESS

4.01 Justification and Prior Approval: The requirement for a permit for certain activities within the District is not intended to delay or inhabit development. The District finds that a permit program is needed to successfully achieve the District's statutory Mission Statement (*refer to Section 1.05*). No work or activity requiring a permit shall be commenced prior to issuance of the permit. If work does commence prior to permit approval, an after-the-fact fee can be assessed in addition to any fees associated with acquiring the required permit.[1] Both landowners and contactors will be held liable for all expenses related to bringing a project into compliance if it has proceeded without a District permit.

4.02 Application Process: Any permit required by these rules will be issued in accordance with the procedural process of this Section and all applications are subject to the following requirements:

A. Prior to the submission of any application, the applicant must be familiar with the District's rules, application requirements, and the standards for the approval of an application. The applicant is encouraged to contact and/or meet with the District Staff if necessary. A copy of the District's current Rules, permit requirements, and application forms are maintained on the District's official website at:

www.bcwatershed.org

B. **All applications for a District permit must be submitted on an application form approved by the District.**

C. All applications must be accompanied by a fee according to the District's current fee schedule.[2]

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[1] The after-the-fact fee is required due to the District having to spend additional time/money trying to determine preexisting conditions. The fee is not intended to be punitive in nature.

[2] ***The District's current Fee Schedule is available online at www.bcwatershed.org***

D. Any application that requires Board review must be submitted, and deemed complete, 15 business days prior to the next regularly scheduled Board Meeting in order to be placed on the agenda. If an application is deemed to be incomplete, a written letter will be sent to the applicant outlining what additional information is required. Any change in the application may trigger a new review process.

E. Drawings or plans are required to be submitted with every permit application. The drawings or plans are not required to be prepared by an engineer, but they must adequately depict the information required by the District's application form.

F. Emails are initially accepted if the originals are placed in the mail the same day.

G. An initial site inspection, in-progress site inspections, final site inspection, and post-project monitoring inspections may be required as part of the approval of a permit application. A site inspection fee is charged to the applicant for each required site inspection. The fee shall be equal to the District's actual costs as outlined in the District's Fee Schedule.

4.03 Staff and/or Administrative Review: It is administratively difficult for the Board to review every permit application. As a result, District Staff shall review all applications and make recommendations for approval or denial, including suggesting conditions that should be required. In addition, Staff may work with consultants on the administrative review of a permit. Any fees charged to the District may be passed to the applicant.

4.04 Board Approval: The Board will review and discuss all permit applications and may rely upon comments and/or advice from staff, legal counsel, consultants, governmental agencies, local units of government, and the general public.

A. The Board shall review permit applications at regularly scheduled meetings.

B. The applicant or a representative of the applicant must be present at the meeting to answer questions about the permit application. If no one is present and additional information on the permit is requested by the Board, the applicant will be contacted to

explain what additional information is required. This may ultimately delay the Board's final decision on the permit until all of the information required for the application is available.

C. The Board may add reasonable conditions to the approval of a permit to address site-specific or activity-specific concerns.

D. All Board approved permits shall be deemed issued when signed by the Board and all conditions of the permit have been satisfied.

E. If the District denies an application, written reasons for the denial will be provided.

4.05 Conditions: A permit may be approved subject to reasonable conditions necessary to ensure compliance with the requirements and intent of these rules. All conditions of the permit must be satisfied before the permit is deemed to be issued and the applicant can begin work.

A. A site inspection may be required any time before, during, or after a project is complete in order to ensure that the applicant will and/or has complied with the conditions of the permit. Applicants are responsible for associated site inspection fees as outlined in the District's Fee Schedule.

B. The requirements of any other permit (i.e., NPDES permit, wetland permit, public water permit, etc) required for the proposed activity are incorporated into the District permit. A violation of other required permits is a violation of the District permit.

C. By requesting and receiving a District permit, an applicant affirmatively grants the District a right of entry onto the applicant's property for the purpose of performing site inspections.

D. A performance surety may be required as outlined in Section 4.07.

E. The Board of Managers may charge a fee for field inspections, if one is required. This fee will vary from permit to permit based upon actual costs, a per diem, or the District's current fee schedule.

F. The Board of Managers will also charge for after-the-fact permits. The fee for after-the-fact permits shall be up to $1,000 plus all other expenses incurred by the Watershed District. All cost incurred shall be paid before the permit is issued.

G. If conditions of the permit have not been met, the District has the authority to fix the situation at the applicant's expense.

4.06 Deadlines for Action: The District will seek to approve or deny a permit application within 60 days after receipt of a complete application and full payment of fees.

A. An application that requires a site inspection is not deemed complete until a site inspection is completed by a person and/or business authorized by the District. When weather or other uncontrollable natural conditions makes a site inspection difficult or impossible, the timeline under this Section and Minnesota Statute 15.99 is tolled until conditions allow for the site inspection. Within 15 business days of receiving an application, the District will notify the applicant in writing if the application is incomplete or if the application requires a site inspection (and is therefore deemed incomplete until the site inspection is performed).

B. The District will comply with Minnesota Statutes Section 15.99 when it is applicable. Failure to meet an approval deadline shall not authorize any activity for which a permit cannot be granted due to the activity being prohibited under applicable law.

C. If a state or federal law or court order requires a process to occur before the District acts upon an application, or if an application requires prior approval of a state or federal agency, any applicable deadline for the District to approve or deny is extended to 60 days after the completion of the required process or approval is granted.

D. Any change in the application my trigger a new review process.

E. If necessary, the District may extend any applicable initial 60-day period according to the provisions found in Minnesota Statutes Section 15.99.

4.07 Performance Surety: In accordance with Minnesota Statute 103D.345 Subdivision 4, the District may require a performance surety, such as a bond or an irrevocable letter of credit, to secure performance of permit conditions and compliance with District rules and regulations. All political subdivisions are exempt from the requirements of this subdivision.

A. When a performance surety is required, the surety must be provided to the District before the permit is deemed to be issued and the applicant can begin work.

B. When the Board requires a performance surety, it shall be for an amount sufficient to cover the potential costs to resolve any problems that may result from a violation of the permit.

C. The performance surety must be in a form acceptable to the District and from a surety company licensed to do business in Minnesota.

D. The performance surety must allow the District to claim the performance surety if the conditions of the permit are not met.

E. The District will release the performance surety in writing after all work is completed in compliance with the permit and District's rules and regulations. The District, in writing, may release a portion of the surety if the entire surety, in the District's sole discretion, is no longer necessary to secure compliance with the permit and District rules.

4.08 Applicant Agreement: When a permit is conditionally approved, the applicant is entering into an agreement with the District. The conditions of the permit must thereafter be executed before the permit is deemed to be issued and the applicant can begin work. The Board may require as a condition of the permit that an applicant and/or landowner, including any mortgagee, enter into an additional agreement with the District to specify the following items:

A. Specify the responsibility for the construction and future maintenance of the project; and

B. Document other continuing obligations of the applicant or owner; and

C. Grant reasonable access to the proper authorities for inspection, monitoring and enforcement purposes; and

D. Affirm that the District or other political subdivisions can require or perform the necessary repairs or reconstruction of the project, if necessary; and

E. Reimburse the reasonable costs incurred to enforce the agreement; and

F. Require indemnification of the District for claims arising from issuance of the permit or construction and use of the approved structures.

4.09 Assignment and Transfer of Permits: An assignment or transfer of a permit without a change in the approved plans may be approved by the District. No assignment or transfer of a permit is allowed where the approved plans are changed. A change in the approved plans requires a new permit application. If transferred, the responsibility of the permit transfers unless authorized by the District or the permit is currently in violation. No assignment or transfer shall relieve the original applicant from liability under the permit.

4.10 Expiration of Permits: Permits are valid for 12 months unless otherwise specified in the permit. Permit extensions may be granted by the District. Extension requests must be made in writing at least 30 days before the expiration of the permit. Additional conditions may be added to the permit when an extension is requested.

4.11 Appeals: Any person adversely affected by the approval or denial of a permit by the District may appeal the District's decision in accordance with the appellate procedure provided by Minnesota Statutes Sections 103D.537 and 103D.539.

4.12 Exemptions: The Board of Managers may hear requests for an exemption from the literal provisions of these Rules and Regulations in the rare circumstance where the strict enforcement would cause undue hardship because of conditions unique to the property under

consideration. In order to grant an exemption, the Board must find the request meets **ALL** of the following standards:

A. Special conditions apply to the applicant's property that do not apply generally to other property within the District; and

B. Because of the unique conditions of the property involved, undue hardship to the applicant will result, as distinguished from mere inconvenience, if the strict letter of the rules are carried out. Economic considerations alone shall not constitute undue hardship; and

C. The proposed activity for which the exemption is sought will not adversely affect the public health, safety, and general welfare; will not create an extraordinary public expense; and will not adversely affect water quality or quantity; and

D. The intent of the District's Rules and Regulations are met.

An exemption expires when the permit it is associated with expires. A violation of any condition for a permit where an exemption has been granted shall automatically terminate the exemption and the permit.

SECTION FIVE:
THE DISTRICT'S REQUIRED PERMITS

A permit from the Buffalo Creek Watershed District is required for the following water related projects or land use activities in the Watershed District:

5.01 Surface Water: Surface water, as defined in Appendix B, includes any natural or manmade water body that is found above ground (i.e., lakes, streams, rivers, wetlands, drainage ditches, etc.). The District has a vested interest in ensuring that all of the following projects with the potential of negatively impacting surface water resources in the District are properly mitigated through the District's permitting process:

A. ***Stream, Creek, and River Projects****:* Any project potentially affecting, crossing, or involving a stream, creek, and/or river.

B. ***Dams and/or Dikes:*** Any project involving a dam and/or dike.

C. ***Bridge and/or Crossings:*** Any bridge construction, repair, and/or crossing.

D. ***Culvert Repairs or Replacement:*** Any culvert repair or replacement project.

E. ***Clean Outs:*** Any surface water clean out, including drainage systems.

F. ***Water Discharge:*** Any project involving discharging water into a surface water resource.

G. ***Wetlands:*** Any wetland development, modification, and/or restoration.

H. ***Ponding and/or Berming:*** Any project potentially resulting in holding or retaining water.

I. ***Multiple Subwatersheds:*** Any project proposed to impact more than one subwatershed must demonstrate how the proposed project may impact both subwatersheds.

J. ***Miscellaneous:*** Any other project or activity that has the potential to negatively impact surface water resources.

K. The BCWD has adopted a separate rule on ***Buffer Enforcement***, which can be found in Appendix D.

5.02 Drainage Systems: Every person shall use their land reasonably in disposing of surface water. Surface water shall not be artificially removed from upper land to and across lower land without adequate provision being made on the lower land for its passage, nor shall the natural flow of surface water be obstructed so as to cause an overflow onto the property of others. The District will enforce and comply with Minnesota's Drainage Laws. The District intends to preserve drainage capacity, prevent flooding, and improve water quality by regulating certain agricultural drainage facilities within the watershed. In addition to the provision listed in Section 5.01, drainage systems have the following additional permit requirements:

A. ***Tiling:*** Installation of any tile greater than 8" in diameter **or** any size tile where an easement is required (i.e., for projects potentially affecting adjacent landowner's property).

B. ***New or improved systems:*** Any proposed new or improved public or private ditch system.*

C. ***Outlets/Inlets:*** Any new or improved outlets or inlets into an existing drainage system which increase the volume or rate of water directly entering into the drainage system.

* The repair or replacement of an existing public or private drainage system is exempt from this Section as long as the repair or replacement is not an expansion or an improvement and the other provisions set forth in these Rules and Regulations are met.

D. ***Standards.*** A site drawing with the location of all drainage facilities must be submitted with the permit application. Where the exact location of drain tiles is unknown, an

approximate location is sufficient. An application for a drainage permit under this Section must meet the following standards:

1. Demonstrate that downstream capacity exists for the additional water discharged by the drainage facility; and
2. Demonstrate that the proposed project complies with all local, State, and Federal wetland regulations; and
3. Design and maintain drain tile system intakes in a way that minimizes the introduction of sediments to the drainage facility; and
4. All new and improved outlets into existing public drainage systems or public waters shall be constructed in such design which will:
    a) Provide and maintain a stable outfall that minimizes erosion; and
    b) Will not impede the flow of water; and
    c) Will not cause a deterioration of the receiving water.
5. It shall be the overall policy of the District to maintain up to a 3/8" drainage coefficient. Exceptions to this include when the drainage system was designed to accommodate smaller or larger coefficients or if mitigation measures are implemented (i.e., stormwater ponds, restored wetlands, etc.) when using larger drainage coefficients.
6. Projects shall not drain lands into the District that do not already drain into the District, nor shall projects drain lands out of the District that do not already drain out of the District.

5.03 Land Use and Development: The District has a vested interest in ensuring that all land use and development projects which could negatively impact surface or groundwater resources properly implemented through the District's permitting process. The following projects require a permit from the District:

A. Any land use alterations that has the potential to negatively affect the quality or quantity of water resources.

B. Any underground construction, including but not limited to storm sewers, gas lines, pipelines, manure holding basins, underground storage, etc. Exemptions include basements, foundations, septic systems, and wells.

C. New or reconstructed roadway construction, development, or improvements which has the potential to negatively impact water resources.

D. Any construction crossing (over, through, or underground) which has the potential to negatively impact water resources.

E. The platting of property to ensure proper stormwater retention and drainage.

F. Standards:

1. For projects that permanently alter drainage patterns and/or flows, the applicant must submit hydrologic and hydraulic modeling calculations for the 2-year, 10-year, and 100-year critical duration storm events. Peak runoff rates from these events shall not be increased in aggregate.

    a) Rainfall depths shall be based on NOAA Atlas 14 values, or as amended.

    b) A hydrologic model based on NRCS Technical Release #20 or USGS Regression Equations must be used to analyze discharge and water levels.

    c) The runoff from pervious and impervious areas within the model should be modeled separately.

2. Any increase in peak flows from at a specific point of discharge must be limited and cause no adverse downstream impact

3. Projects shall not drain lands into the Buffalo Creek Watershed that do not already drain to Buffalo Creek Watershed, nor shall projects drain lands out of the Buffalo Creek Watershed that do not already drain away from Buffalo Creek Watershed.

5.04 Erosion Control: The District intends to manage erosion and sedimentation into surface waters within the watershed by regulating land use activities. The District requires that erosion control measures be in place for all land use activities above specific thresholds. The erosion control measures must minimize erosion and sedimentation to meet local, state, and federal regulations. The following projects require a permit from the District:

A. Any person or political subdivision undertaking a land disturbing activity that is:

1. Greater than 400 square feet in area if located within 300 feet of any surface water resource; **OR**

2. Greater than one acre or more in area if located 300 feet or more from of any surface water resource.

B. **Agricultural Exemption.** The ordinary agricultural practices of cultivating and planting, performed as part of an ongoing farming operation, are exempt from this Section.

C. **Standards.** An erosion and sediment control plan must be submitted and approved before a permit may be issued. The plan must minimize erosion and sedimentation. A site plan drawing with the location of all erosion control features must be submitted with the permit application. The plan must demonstrate how the project will achieve the following standards:

1. Each landowner and operator is expected to apply land use practices to minimize runoff and soil erosion from sloping land; and

2. Sloping land abutting drainageways, lakes, ponds, or reservoirs shall be used in such manner so as to provide reasonable control of sediment. A permit is required from the Managers to till any area covered with permanent grass within 200 feet of the low water mark of drainageways and within 200 feet of the normal high-water mark of lakes, ponds, or reservoirs; and

3. The project must be phased to the greatest extent possible to minimize the area of disturbed land at any given time; and

4. Site specific topography and soil conditions must be specifically addressed; and

5. Best Management Practices (BMPs) must be used in a manner consistent with MPCA guidance documents.

5.05 Stormwater Management. The District intends to manage storm water runoff within the watershed to promote infiltration, encourage pretreatment, minimize peak flows after storm events and snow melt, and avoid adverse impacts to stream stability, flood elevations, or drainage due to increased runoff flow and volume. A District permit is required for any development or redevelopment of the following properties:

A. The development or redevelopment of property resulting in the creation of more than one acre of new or reconstructed impervious surface.

B. The development of any new resort or PUD.

C. The expansion or replacement of a structure at an existing resort.

D. The redevelopment of a parcel that currently exceeds impervious surface limits imposed by Minnesota Rules Chapter 6120 or by any political subdivision within the watershed.

E. Construction of new or reconstruction of existing stormwater management facilities (e.g. stormsewer, culverts, ponding) for which conveyance capacity is increased, storage capacity is decreased, or flows are redirected from their current routing.

F. Standards. A site plan must be submitted with the permit application. A storm water permit application under this Section must meet the following standards:

1. The applicant must submit hydraulic/hydrologic calculation demonstrating that runoff rates for the proposed development or redevelopment of a property will not exceed existing runoff rates for the 2-year, 10-year, and 100-year critical storm events. Calculations must meet the requirements of Section 5.03F.

2. The applicant must submit calculations demonstrating that all development or redevelopment of property will treat 1.0 inch of runoff from all newly created impervious surface and 0.5 inch of runoff from all reconstructed impervious surface on the property such that implemented storm water BMPs, consistent with MPCA guidance documents, achieve removal of 90 percent of total suspended solids and

50 percent of total phosphorus prior to any runoff leaving the property. Reconstruction of public roadways and sidewalks shall be exempt from this requirement.

3. The applicant must submit calculations demonstrating that the 100-year floodplain volume in any basin greater than one acre-foot in size will not be diminished, or that the applicant provides equivalent floodplain storage elsewhere that provides an identical flow reduction function.

5.06 Notification Only: A permit is normally not required on the following projects if the District is properly notified 30 days prior to the projects being issued a permit by the proper regulating authority:**

A. Public facility wastewater projects

B. Feedlot expansion and/or development projects

C. Aggregate mining projects

D. Any permit normally required in by the District as identified in this Section which is deemed exempt for being regulated by existing local regulations. These exemptions are described in Section 5.07.

** The District reserves the right to determine that a permit from the District is required if the proposed project triggers one of the topics regulated by the District's Rules and Regulations.

5.07 Exemption for Existing Regulation: The District does not intend to duplicate the regulations of other political subdivisions where other political subdivisions have regulations that are equally as stringent or more stringent than the District's regulations. An exemption from the District's Rules and Regulations will be assumed if all of the following conditions are met:

A. The political subdivision must enforce its regulations at a standard which meets or exceeds the District's standards; and

B. The political subdivision must provide the District with notice of all pending permit applications within the watershed 15 days prior to approval by the political subdivision; and

C. The political subdivision must consider any comments provided by the District in regards to the pending permit.

SECTION 6:
ENFORCEMENT

6.01 Violation is a Misdemeanor: A violation of a District rule, or a permit issued under District rules, is a misdemeanor subject to the maximum penalty provided by Minnesota law.

6.02 Court Action: The District may exercise all powers conferred upon it by Minnesota Statutes Chapter 103D in enforcing these rules, including criminal prosecution, injunction, or an action to compel performance, restoration, or abatement.

6.03 Administrative Order: The District may enforce its rules by issuing a cease and desist order when it finds that an activity violates any rule of the District or permit issued by the District.

6.04 Order to Show Cause: The Board may require a person or political subdivision in violation of a District rule or permit to appear at a District meeting to show cause why the violation should be allowed to continue.

6.05 Future Permits: No future permit shall be issued to any person or political subdivision in violation of a District rule or a previously issued District permit until the violation has been remedied to the sole satisfaction of the District.

6.06 After-the-Fact Permits: The Board of Managers may also charge for after-the-fact permits. The fee for after-the-fact permits shall be up to $1,000 plus all other expenses incurred by the Watershed District. All costs incurred shall be paid before the permit is issued.

SECTION 7:
PUBLIC MEETINGS AND RECORDS

7.01 Public Meetings: All meetings of the District, whether regular or special, shall be open to the public and shall be held at a time, date, and place determined by the Board of Managers. All regular scheduled meetings shall be posted on the District's website at:

www.bcwatershed.org

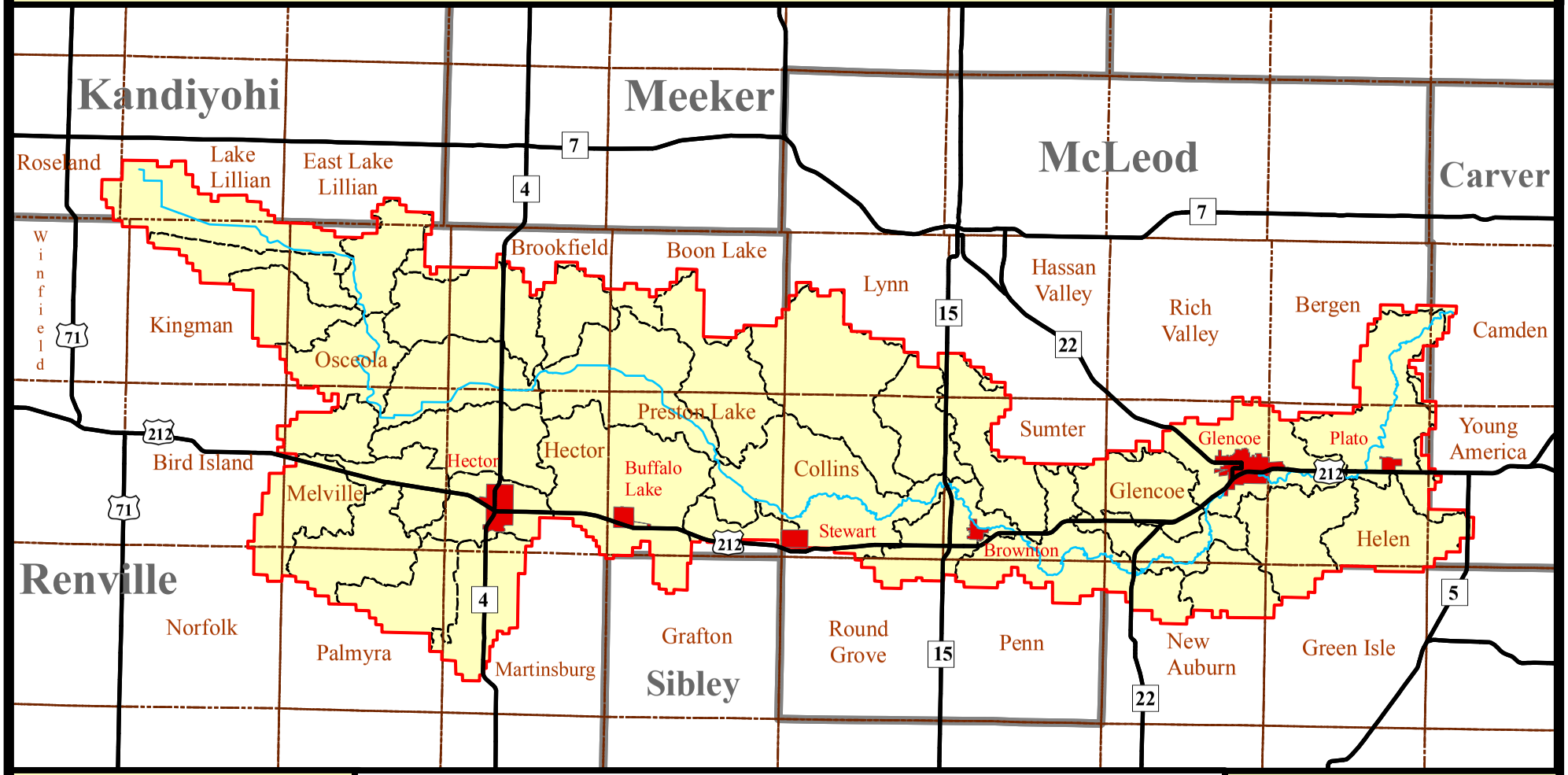
7.02 District Records: The records of the District shall be public records, as required by State statute and shall be available to the public for inspection to the extent required. The intention of the District is to cooperate with all persons, governmental units, organizations, and agencies in the promotion of the District's regulatory activities.

APPENDIX A:

BUFFALO CREEK

WATERSHED DISTRICT OFFICIAL MAP

Buffalo Creek Watershed District



MMDC

Prepared by the

Mid-Minnesota Development Commission

(320) 235-8504

District Map Features

- District Boundary
- County Boundary
- Subwatershed
- Township
- Major Road
- Buffalo Creek
- City
- Watershed

Miles: 0 1 2 4 6

BUFFALO CREEK WATERSHED DISTRICT

www.bcwatershed.org

APPENDIX B:
DEFINITIONS, ACRONYMS,
AND TERMINOLOGY

For the purpose of these rules, unless a different meaning clearly appears from the context, certain terms are defined as follows (if a phrase, acronym, and/or terminology is not defined, the common usage of the phrase, acronym, and/or terminology shall prevail. Definitions found in Minnesota's State Statutes, State Rules and Regulations, and the Webster-Merriam Dictionary may be consulted if necessary):

Alterations to Land: including, but not limited to, grading, excavation, fill or movement of soil or vegetative material.

BMPs (Best Management Practices): practices to prevent or reduce the pollution of waterbodies and wetlands, including schedules of activities, prohibitions of practices, and other management practices.

Board: the District's Board of Managers.

Board of Managers: the District's Board of Managers.

Board Meeting: the District Board of Managers meeting held on the fourth Tuesday of each month at the District Office.

BWSR: stands for the Minnesota Board of Water and Soil Resources and is the State's soil conservation agency. The 20-member board consists of representatives of local and state government agencies and citizens.

CROW: The Crow River Organization of Water (CROW) was formed in 1999 as a result of heightened interest in the Crow River. A Joint Powers Agreement has been signed between all ten of the Counties with land in the Crow River Watershed. The CROW Joint Powers Board is made up of one representative from each of the County Boards who signed the

agreement. The Counties involved in the CROW Joint Powers include Carver, Hennepin, Kandiyohi, McLeod, Meeker, Pope, Renville, Sibley, Stearns and Wright.

Detention System: a structure or facility which collects and stores runoff on a temporary basis with a subsequent gradual release of stormwater at a controlled rate. A detention basin may retain some water.

Discharge: the disposal, conveyance, channeling of runoff or drainage of water or material, including, but not limited to, surface water, drainage facilities, stormwater, and snow melt.

District: the Buffalo Creek Watershed District.

Drainage Facilities: open ditches and drain tile systems collectively.

Drain Tile System: any privately owned underground conduit used to conduct the flow of water in order to drain agricultural lands.

Erosion: the wearing away of soil by rainfall, surface water runoff, wind, or ice-movement.

Fill: soils, sand, gravel, clay, or any other natural material which is moved from one place to another and placed on land or in water.

FSA: stands for the Farm Service Agency, responsible for the implementation of U.S farm policy. The organizational structure of FSA is laid out by Congress and overseen by the secretary of agriculture. The FSA administrator reports to an undersecretary of agriculture for Farm and Foreign Agricultural Services (FFAS).

Groundwater Recharge Area: an area in which surface water accumulates and is conveyed to groundwater aquifers.

Intake: an opening through which fluid enters a duct, channel, or drainage tile.

Impervious Surface: a surface that is compacted or covered with a layer of material that is resistant to the infiltration of water, including, but not limited to, compacted sand, gravel, or clay and streets, sidewalks, parking lots, and structures.

Land Disturbing Activity: any disturbance to the ground surface that may result in soil erosion from water or wind and the movement of sediments into or upon waterbodies or wetlands within the watershed. Land-disturbing activity includes but is not limited to the demolition of

a structure or surface, soil stripping, clearing, grubbing, grading, excavating, filling and the storage of soil or earth materials. This includes a disturbance to the land that results in a change in the topography, existing soil cover, or vegetation that may result in accelerated storm water runoff which may lead to soil erosion and movement of sediment. The term does not include normal farming practices as part of an ongoing farming operation.

Lateral: any constructed waterway or drain which conveys water to a public ditch.

Managers: the Board of Managers of the Buffalo Creek Watershed District. Please refer to Section 1.03 of the District's Rules for more information.

MAWD: The Minnesota Association of Watershed Districts (MAWD) represents 45 watershed districts in the state. The watershed districts are partners in water protection and management.

MDNR: The Minnesota Department of Natural Resources.

MPCA: the Minnesota Pollution Control Agency.

NRCS: Since 1935, the Natural Resources Conservation Service (originally called the Soil Conservation Service) has provided leadership in a partnership effort to help America's private land owners and managers conserve their soil, water, and other natural resources.

On-Site: within the contiguous confines of a commonly owned land and/or parcel.

Open Ditch: any privately owned open channel used to conduct the flow of water in order to drain agricultural lands.

Ordinary High Water (OHW) – the boundary of public waters and wetlands which is an elevation delineating the highest water level which has been maintained for a sufficient period of time. Commonly it is the point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For watercourses, the OHW is the elevation of the top of the bank of the channel.

Person: any individual, partnership, company, corporation, but does not include any political subdivision.

Point Discharge: discharge from a specific outlet, such as a storm sewer, pipe, culvert, or ditch.

Political subdivision: any city, township, county, school district, or political subdivision of the State of Minnesota.

Public Waters: are all types of surface water that meet the criteria set forth in Minnesota Statutes, Section 103G.005, subd. 15, that are identified on Public Water Inventory maps authorized by Minnesota Statutes, Section 103G.201.

PUD (Planned Unit Development): a type of development characterized by a unified site design for a number of dwelling units or dwelling sites on a parcel, usually involving clustering of these units or sites to provide areas of common open space, density increases, and a mix of structure types, land uses, and form of ownership.

Redevelopment: any change in use of a property or permanent physical change to a property that alters the drainage pattern of the property or causes an increase in pollutants in storm water runoff from the property.

Resort: a building or group of buildings located adjacent to any waterbody for purposes of providing convenient access to the waterbody, and held out to the public to be a place where sleeping accommodations are furnished to the public, primarily to those seeking recreation.

Retaining Wall: a structure or facility which accumulates a specified amount of stormwater or runoff.

Runoff: water, including nutrients, pollutants and sediments carried by water, discharged from a land surface.

Sediment: mineral or organic particulate matter what has been carried from its point of origin by water or wind.

Shoreland (Shoreland District or Shoreland Zone): land located within 1,000 feet of the ordinary high water mark of a protected water (lake) or 300 feet from a river or stream. These areas are often identified in the various county zoning ordinances.

Storm Sewer: a system installed for the specific purpose of transporting water from one location to another. Normally made of pipe material, but may also include reaches of flumes, spillways, or open channels.

Stormwater: normally refers to precipitation runoff and/or snow melt runoff, but may also include any other surface runoff and/or drainage that varies according to precipitation levels.

Surface Water: any natural or manmade water body that is found above ground (as opposed to underground). Surface water includes but is not limited to lakes, rivers, streams, ditches, wetlands, ponds, drainage ditches, etc.

TMDL: A Total Maximum Daily Load (TMDL) is a regulatory term in the U.S. Clean Water Act (CWA), describing a value of the maximum amount of a pollutant that a body of water can receive while still meeting water quality standards. Alternatively, TMDL is an allocation of that water pollutant deemed acceptable to the subject receiving waters.

Vegetation: normally refers to naturally occurring brush, shrubs, grass, or trees, but may also refer to preferred vegetation based upon a prescribed Best Management Practice (BMP).

Waterbody: any body of water including lakes, rivers, streams, watercourses, or water basins.

Watercourse: channel having definable bends and banks capable of conducting confined runoff from adjacent lands (except during periods of flooding). A watercourse may be perennial or intermittent, natural (i.e. stream), or man-made (i.e. ditch).

Watershed: means the boundaries of Buffalo Creek Watershed District (see the District Map found in Appendix A or visit www.bcwatershed.org).

Wetland: lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water and where hydric soils and hydrophytic vegetation are present under normal circumstances. This definition includes public waters wetlands as designated by the Minnesota Department of Natural Resources and wetlands under the jurisdiction of the Wetland Conservation Act.

APPENDIX C:

BCWD PERMIT FORMS

APPLICATION FOR PERMIT

TO: BUFFALO CREEK WATERSHED DISTRICT PERMIT NO._____

Applicant_____
(Print or Type)

Address_____

Telephone Number ( ) _____-_____ Email Address_____

Cell Phone Number ( ) _____-_____

Applicant proposes to do the following work:

- ☐ Clean Existing Ditch
- ☐ Construct New Ditch
- ☐ Build Water Retention Area
- ☐ Abandon and Fill an Existing Ditch or Waterway
- ☐ Abandon Existing Tile and Replace With a New Tile
- ☐ Install Erosion Control Structure
- ☐ Install Tile
- ☐ Repair Shoreline
- ☐ Install Culvert
- ☐ Other _____
  _____

The proposed construction is necessary because:

- ☐ Flooding Occurs
- ☐ Control Runoff
- ☐ Excessive Erosion
- ☐ Poor Drainage
- ☐ Ditch Filled with Silt
- ☐ Present Design Inadequate
- ☐ Other_____

If a ditch is to be constructed or cleaned; a culvert is to be installed; a tile is to be installed, provide how many acres will it drain and percent of grade? _____ _____%

I intend to begin construction on/or about _____

The work is to be done in _____TWP, TWP_____North, Range _____ West, Section _____

The applicant shall provide all necessary drawings, studies, maps, aerial photographs, calculations, easements, etc., with the permit application.

I UNDERSTAND THAT THE CONSTRUCTION I PROPOSE MAY BE VIEWED AND/OR EVALUATED PRIOR TO BOARD ACTION AND MUST BE DATED 15 DAYS PRIOR TO REGULAR BOARD MEETING DATE TO BE CONSIDERED.

Date_____ Signed_____

I am aware of the requirements of the Rules of the District. This Permit does not relieve the applicant of any requirements for other Permits which may be necessary from Township, County, State, or Federal Government Agencies.

_____

ACTION BY THE BOARD OF MANAGERS OF THE BUFFALO CREEK WATERSHED DISTRICT

The above Application for Permit is approved _____ disapproved _____ this _____ day of

_____, 20_____. This permit is valid for a period of one year from the date of

issuance. The Board makes the following (suggestion/requirement) as a part of this Permit:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Buffalo Creek Watershed District

_____ _____

President Secretary

APPENDIX D:

BCWD BUFFER ENFORCEMENT RULE

PURSUANT TO STATUES SECTION 103F.48

(***Note: page numbering is sperate from the rest of this document***)

BUFFALO CREEK WATERSHED DISTRICT BUFFER ENFORCEMENT RULE PURSUANT TO STATUTES SECTION 103F.48

Statutory authorization. This buffer enforcement rule is adopted pursuant to the authorization and policies contained in Minn. Stat. §103F.48, the Buffer Law, Minn. Stat. §103B.101, subdivision 12a, authority to issue penalty orders, and the Watershed District enabling legislation in Minn. Stat. chapter 103D.

1.0 Policy

It is the policy of the Board of Managers to:

(a) Provide for riparian vegetated buffers and water quality practices to achieve the following purposes:

(1) Protect state water resources from erosion and runoff pollution;

(2) Stabilize soils, shores and banks; and

(3) Protect or provide riparian corridors.

(b) Coordinate closely with the District's landowners, soil and water conservation districts and counties, and utilize local knowledge and data, to achieve the stated purposes in a collaborative, effective and cost- efficient manner.

(c) Integrate District authorities under Minn. Stat. §§103D.341 and 103F.48 to provide for clear procedures to achieve the purposes of the rule.

2.0 Definitions

BWSR or board: Minnesota Board of Water and Soil Resources.

Buffer: An area consisting of perennial vegetation, excluding invasive plants and noxious weeds.

Buffer law: Minnesota Statutes §103F.48, as amended.

Commissioner: Commissioner of the Minnesota Department of Natural Resources.

Cultivation farming: Practices that disturb vegetation roots and soil structure, or involve vegetation cutting or harvesting that impairs the viability of perennial vegetation.

Drainage authority: The public body having jurisdiction over a drainage system under Minnesota Statutes chapter 103E.

BCWD or district: The Buffalo Creek Watershed District.

Notice: Any notice or other communication to be provided herein shall be directed to the Landowner whose name and address appears on the County Property Taxes Records and listed as the taxpayer. Notice on said Landowner shall be considered sufficient notice to all those who may be considered a Landowner as defined in Section 2.1.7.

NRCS: U.S. Department of Agriculture, Natural Resource Conservation Service.

Operator: A party other than a landowner that directly or indirectly controls the condition of riparian land subject to a buffer under the rule.

Person: Individual or entity.

Public drainage system: has the meaning given to "drainage system" in Minn. Stat. §103E.005, subd. 12.

Public water: As defined at Minnesota Statutes §103G.005, subdivision 15, and included within the public waters inventory as provided in Minnesota Statutes §103G.201.

Riparian protection: A water quality outcome for the adjacent waterbody equivalent to that which would be provided by the otherwise mandated buffer, from a facility or practice owned or operated by a municipal separate storm sewer system (MS4) permittee or subject to a maintenance commitment in favor of that permittee at least as stringent as that required by the MS4 general permit in effect.

Shoreland standards: Local shoreland standards as approved by the Commissioner or, absent such standards, the shoreland model standards and criteria adopted pursuant to Minnesota Statutes §103F.211.

Structure: An above-ground building or other improvement that has substantial features other than a surface.

SWCD: Soil and Water Conservation District.

Validation of Compliance: means a notice issued by SWCD that validates that a site is compliant and that the validation is good as long as all practices identified/documented continue to be in place and substantially in the condition identified at the time of issuance.

3.0 Data sharing/management

3.1 The District may enter into arrangements with an SWCD, a county, the BWSR and other parties with respect to the creation and maintenance of, and access to, data concerning buffers and alternative practices under this rule.

3.2 The District will manage all such data in accordance with the Minnesota Data Practices Act and any other applicable laws.

4.0 Vegetated Buffer Requirement

4.1 Except as subsection 4.3 or 4.4 may apply, a landowner must maintain a buffer on land that is adjacent to a watercourse identified and mapped on the buffer protection map established and maintained by the Commissioner pursuant to the buffer law.

4.1.1 For a public water, the buffer must extend landward to the further of:

(a) a 50-foot average width and 30-foot minimum width; or

(b) the setback standard for the shore impact zone as identified in County shoreland ordinance and the state shoreland standards and criteria adopted by the Commissioner under Minnesota Statutes §103F.211.

4.1.2 For public drainage systems established under chapter 103E, a 16.5-foot minimum width continuous buffer as provided in section 103E.021, subdivision 1. The buffer vegetation shall not impede future maintenance of the ditch..

4.1.3 The buffer is measured from the top or crown of bank. Where there is no defined bank, measurement must be from the edge of the normal water level. Normal water level will be determined in accordance with BWSR guidance. For a public drainage system, the top or crown of bank will be determined in the same manner as for measuring the perennially vegetated strip under Minnesota Statutes §103E.021.

4.1.4 A buffer may not be used for cultivation farming, but may be grazed, mowed, hayed or otherwise harvested, provided permanent growth of perennial vegetation is maintained.

4.2 The requirement of subsection 4.1 Applies to all public drainage ditches within the District's boundary for which it is the drainage authority; all public drainage ditches and public waters within the District's boundary that are not under the jurisdiction of County enforcement; and all public drainage ditches and public waters for which enforcement has been delegated to the District by a County.

4.3 The requirement of section 4.1 does not apply to land that is exempted from the water resources riparian protection requirements under Minn. Stat. §103F.48, subd. 5.

4.4 An owner of land that is used for cultivation farming may demonstrate compliance with subsection 4.1 by establishing and maintaining an alternative riparian water quality practice(s), or combination of structural, vegetative, and management practice(s) which provide water quality protection comparable to the water quality protection provided by a required buffer as defined in sections 4.1. The adequacy of any alternative practice allowed under this section shall be evaluated and approved by the SWCD based on: the Natural Resources Conservation Service (NRCS) Field Office Technical Guide (FOTG); common alternative practices adopted and published by BWSR; practices based on local conditions approved by the SWCD that are consistent with the Natural Resources Conservation Service (NRCS) Field Office Technical Guide (FOTG); or other practices adopted by BWSR.

4.4.1 An alternative practice may be approved by means of a validation of compliance issued by the SWCD. The approval must find that the proposed practice provides water quality protection comparable to the buffer protection of subsection 4.1.

4.4.2 A landowner may not rely on an alternative practice for compliance with subsection 4.1 unless the landowner holds an SWCD-issued validation of compliance for the alternative practice and the landowner has implemented the practice and is maintaining it as the validation stipulates.

4.5 A landowner or authorized agent or operator of a landowner may, or for the purpose of paragraph 4.4.2 must, submit an application for a validation of compliance to the SWCD pursuant to administrative procedures prescribed by the SWCD. The application may request: (a) a finding that a buffer satisfies subsection 4.1; (b) a determination as to the applicability of an exemption listed in subsection 4.3; or (c) approval of an alternative practice pursuant to subsection 4.4. An SWCD validation of compliance will be conclusive for the purpose of subsection 7.2. In making a finding of compliance with this rule for the purpose of subsection 7.1, the District will give substantial weight to an SWCD validation of compliance. Any District compliance determination contrary to the SWCD validation will rest on specific findings justifying the contrary determination.

5.0 Drainage System Acquisition and Compensation for Buffer

Nothing in this rule shall prevent the acquisition and compensation of grass buffers on public drainage systems pursuant to Minnesota Statutes chapter 103E.

6.0 Action for Noncompliance

6.1 When the SWCD observes potential noncompliance or receives a third party complaint from a private individual or entity, or from another public agency, it will consult with the District to determine the appropriate course of action to confirm compliance status. This may include communication with the landowner or his/her agents or operators, communication with the shoreland management authority, inspection or other appropriate steps necessary to verify the compliance status of the parcel. On the basis of this coordination, the SWCD may issue a notification of noncompliance to the District. If the SWCD does not transmit such a notification, the District will not pursue a compliance or enforcement action under Minnesota Statutes §103F.48 and paragraph 7.2, but may pursue such an action under the authority of Minnesota Statutes §103D.341 and paragraph 7.1. If the SWCD does issue such a notification, the SWCD must include, for consideration by the District, a list of corrective actions needed to come into compliance with the requirements of Minn. Stat. §103F.48; a recommended timeline for completing the corrective actions; and a standard by which the SWCD will judge compliance with the requirements of Minn. Stat. §103F.48 after the corrective actions are taken. The notification must also include identification of the landowner of record and any operator that, in its judgment, is a responsible party, along with identification of the tract of record to which it pertains and the portion of that tract that is alleged to be noncompliant.

6.2 On receipt of an SWCD notification of noncompliance, or if acting solely under authority of Minnesota Statutes §103D.341, the District will issue a corrective action list and practical schedule for compliance to the landowner. The District may inspect the property and will consult with the SWCD, review available information and exercise its technical judgment to determine appropriate and sufficient corrective action and a practical schedule for such action. The District will maintain a record establishing the basis for the corrective action that it requires.

6.2.1 The District will issue the corrective action list and schedule to the landowner of record and to any operator that, in its judgment, is a responsible party. The landowner and any other named responsible party each may be the independent subject of enforcement liabilities under subsections 7.1 and 7.2. The District may deliver or transmit the list and schedule by any means reasonably determined to reach the responsible party or parties, and will document receipt. However, a failure to document receipt will not preclude the District from demonstrating receipt or knowledge in an enforcement proceeding under section 7.0.

6.2.2 The corrective action list and schedule will identify the tract of record to which it pertains and the portion of that tract that is alleged to be noncompliant. It will describe corrective actions to be taken, a schedule of intermediate or final dates for correction, a compliance standard against which it will judge the corrective action, and a statement that failure to respond to this list and schedule will result in an enforcement action. The District will provide a copy of the list and schedule to the BWSR.

6.2.3 At any time, a landowner may supply information to identify an additional responsible party, and any named responsible party may supply information as evidence that it is not responsible. In addition, at any time a responsible party may supply information in support of a request to modify a corrective action or the schedule for its performance. On the basis of any such submittal or at its own discretion, the District may modify the corrective action list or schedule, and deliver or transmit the modified list and schedule in accordance with paragraph 6.3.1, or may advise the responsible party or parties in writing that it is not pursuing further compliance action.

6.2.4 The corrective action list and schedule for compliance may be modified in accordance with subsection 6.2, to extend the compliance timeline for a modification that imposes a substantial new action or significantly accelerates the completion date for an action.

6.2.5 At any time after the District has issued the list and schedule, a landowner, or authorized or operator of a landowner, may request that the SWCD issue a validation of compliance with respect to property for which the list and schedule has been issued. On District receipt of the validation: (a) the list and schedule will be deemed withdrawn for the purpose of subsection 7.2, and the subject property will not be subject to enforcement under that subsection; and (b) the subject property will not be subject to enforcement under subsection 7.1 unless the District makes a contrary compliance determination under subsection 4.5.

6.2.6 A corrective action list and schedule is not considered a final decision subject to appeal. A responsible party objecting to a finding of noncompliance may apply for a validation of compliance under subsection 4.5. An objection to a finding of noncompliance, or to any specified corrective action or its schedule, is reserved to the responsible party and may be addressed in an enforcement proceeding under section 7.0.

7.0 Enforcement

7.1 Under authority of Minnesota Statutes §§103D.545 and 103D.551, the District may seek remedies for noncompliance with section 4.0 against any responsible party including but not limited to: (a) administrative compliance order; (b) administrative order requiring reimbursement of District compliance costs under Minnesota Statutes §103D.345 and/or an escrow for same; (c) district court remedy including injunction, restoration or abatement order, authorization for District entry and/or order for cost recovery; and (d) referral to county attorney for criminal misdemeanor prosecution.

7.2 The District may issue an administrative order imposing a monetary penalty against a landowner for noncompliance with the corrective action list and schedule, as provided

under paragraphs 7.2.1 and 7.2.2. The penalty will continue to accrue until the noncompliance is corrected as provided in the corrective action list and schedule.

7.2.1 The penalty for a landowner on a single parcel that previously has not received a corrective action list and schedule for compliance shall be:

(a) $0 for 11 months after issuance of the corrective action list and schedule or during the schedule issued for taking correction actions, whichever is greater;
(b) Up to $200 per parcel per month for the first six (6) months (180 days) following the time period in (a); and
(c) Up to $500 per parcel per month after six (6) months (180 days) following the time period in (b).

7.2.2 The penalty for a landowner on a single parcel that previously has received a corrective action list and schedule for compliance shall be:

(a) Up to $200 per parcel per day for 180 days after issuance of the subsequent corrective action list and schedule; and
(b) Up to $500 per parcel per day for after 180 days following the time period in (a).

7.2.3 Penalty Determination. For administrative penalties imposed by the District, the District shall determine the severity of the noncompliance, intentional nature of noncompliance and frequency of noncompliance in determining the amount of violation. The amount of an administrative penalty will be based on considerations including the extent, gravity and willfulness of the noncompliance; its economic benefit to the responsible party; the extent of the responsible party's diligence in addressing it; any noncompliance history; the public costs incurred to address the noncompliance; and other factors as justice may require. Upon appropriate findings, the District shall use the following table to determining a penalty amount:

Nature of Violation	Severity of Violation		
	Minor	**Moderate**	**Substantial**
Initial noncompliance (initial term)	$50	$100	$150
Initial noncompliance (subsequent term)	$200	$300	$400
Subsequent initial noncompliance (new parcel, initial term)	$100	$150	$200
Subsequent initial noncompliance (new parcel, subsequent term)	$300	$400	$500
Repeat noncompliance (same parcel, initial term)	$100	$150	$200
Repeat noncompliance (same parcel, subsequent term)	$300	$400	$500

7.3 The administrative order will state:

i. The facts constituting a violation of the buffer requirements;
ii. The statute and/or rule that has been violated;
iii. Prior efforts to work with the landowner to resolve the violation;
iv. For an administrative penalty order, the amount of the penalty to be imposed, the facts supporting the amount of the penalty, the date the penalty will begin to accrue, and the date when payment of the penalty is due; and
v. The right of the responsible party to appeal the order.

A copy of the APO must be sent to the SWCD and BWSR.

7.4 An administrative order under subsection 7.1 or 7.2 will be issued after a compliance hearing before the District Board of Managers. The landowner and any other responsible parties will receive written notice at least two weeks in advance of the hearing with a statement of the facts alleged to constitute noncompliance and a copy or link to the written record on which District staff intends to rely, which may be supplemented at the hearing. A responsible party may be represented by counsel, may present and question witnesses, and may present evidence and testimony to the Board of Managers. The District will make a verbatim record of the hearing.

7.5 After a hearing noticed and held for consideration of an administrative penalty or other administrative order, the Board of Managers may issue findings and an order imposing any authorized remedy or remedies.

7.5.1 The Board of Managers findings and order will be delivered or transmitted to the landowner and other responsible parties. An administrative penalty order may be appealed to the BWSR in accordance with Minnesota Statutes §103F.48,

subdivision 9, and will become final as provided therein. Other appellate relief may be sought pursuant to Minnesota Statutes §§103D.537 and .539. The District may enforce the order in accordance with Minnesota Statutes §116.072, subdivision 9, or otherwise as provided in Minnesota Statutes chapter 103D.

7.5.2 The Board of Managers may forgive an administrative penalty, or any part thereof, on the basis of diligent correction of noncompliance following issuance of the findings and order and such other factors as the Board finds relevant.

7.6 Absent a timely appeal pursuant to paragraph 7.5.2, an administrative penalty is due and payable to the District as specified in the administrative penalty order.

7.7 A landowner agent or operator may not remove or willfully degrade, wholly or partially, a riparian buffer or alternative practice, unless the agent or operator has obtained a signed statement from the landowner stating that written permission for the work has been granted by the District or that the buffer or alternative practice is not required as indicated in a validation of compliance issued by the SWCD. A prohibited action under this paragraph is a separate violation of this rule that is subject to remedies under both subsections 7.1 and 7.2.

7.8 Nothing within this rule diminishes or otherwise alters the District's authority under Minnesota Statutes, chapter 103E with respect to any public drainage system for which it is the drainage authority, or any buffer strip that is an element of that system, or under Minnesota Statutes chapter 103D regarding remedies for violations of District rules.

8.0 Effect of Rule

8.1 If any section, provision or portion of this rule is adjudged unconstitutional or invalid by a court of competent jurisdiction, the remainder of the rule is not affected thereby.

Appendix I. Regulatory Comparison Table

Regulatory Comparison Table

Statute, Ordinance, or Rule Name	Kandiyohi	Meeker	Wright	Renville	McLeod	Carver SWCD	City of Winsted	Buffalo Creek WD
Shoreland Management	Ordinance (County)	Ordinance (County)	Ordinance	Ordinance (County)	Ordinance (County)	-	-	Ordinance (County)
Floodplain Management	Ordinance (County)	Ordinance (County)	Ordinance	Ordinance (County)	Ordinance (County)	-	-	Regulated
Subsurface Sewage Treatment System (SSTS)	Ordinance (County) Point of Sale	Ordinance (County) Point of Sale	Ordinance (County)	Ordinance (County) Point of Sale	Ordinance (County) Point of Sale	Ordinance (County) Point of Sale	-	-
Solid Waste Management	Ordinance (County)	Ordinance (County)	Ordinance (County)	Ordinance (County)	Ordinance (County)	-	-	-
Hazard Management	Hazard Mitigation Plan (County)	Hazard Mitigation Plan (County)	Multi-Hazard Mitigation Plan (County)	Multi-Hazard Mitigation Plan (County)	Hazard Mitigation Plan (County)	-	-	-
Feedlots	Delegated responsibility from MPCA	Delegated responsibility from MPCA	Feedlot Ordinance 152	Delegated responsibility from MPCA	Delegated responsibility from MPCA	-	-	-
Buffers	Ordinance (SWCD and County)	Ordinance (SWCD and County)	Ordinance	Ordinance (SWCD and County)	Ordinance (SWCD and County)	Administers	-	Enforced
Wetland Conservation Act	County	SWCD	SWCD	SWCD	SWCD	Administers	-	SWCD
Aquatic Invasive Species (AIS)	County	County	SWCD	County	County	-	-	-
Public Drainage Systems	Drainage Authority (County)	Drainage Authority (County)	Right of Way Ordinance	Drainage Authority (County and BCWD)	Drainage Authority (County and BCWD)	-	Comprehensive Plan	Regulated

Appendix J. Local Funding Authorities

Local Funding Authorities

Purpose: *This table provides an overview of Minnesota statutes and laws that provide authorities to local governments to fund water management projects, to be used by local governments while exploring funding options for locally funded water projects. Does not include fees, fines, or wetland banking, grants, etc. This is not a legal document and should not be considered comprehensive, complete, or authoritative.*

note: "metro" refers to Anoka, Carver, Dakota, Hennepin, Ramsey, and Washington counties or watershed organizations in the 7-county metro area.

Citation	Applies to	Summary *(please see details in the full text of each provision)*
§40A.152	Counties (metro)	Money from the county conservation account (see chapter 287) must be spent by the county to reimburse the county and taxing jurisdictions within the county for revenue lost under the conservation tax credit under §273.119 or the valuation of agricultural preserves under §473H.10. Money remaining in the account after reimbursement may be spent on: 1) agricultural land preservation and conservation planning and implementation of official controls under this chapter or chapter 473H; 2) soil conservation activities and enforcement of soil loss ordinances; 3) incentives for landowners who create exclusive agricultural use zones; 4) payments to municipalities within the county for the purposes of clauses 1-3.
§103B.241	Watershed districts & watershed management organizations (metro)	May levy a tax to pay for plan preparation costs & projects in the adopted plan necessary to implement the Metropolitan Water Management Program.
§103B.245	Watershed districts & watershed management organizations (metro)	May establish a watershed management tax district within the watershed to pay the costs of: planning required under §§103B.231 and 103B.235, the capital costs of water management facilities described in the capital improvement program of the plans, and normal & routine maintenance of the facilities.
§103B.251	Watershed districts & watershed management organizations (metro), counties	May certify for payment by the county all or any part of the cost of a capital improvement contained in the capital improvement program of plans developed in accordance with §103B.231. Counties may issue general obligation bonds to pay all or part of the cost of project. The county may pay the principal and interest on the bonds by levying a tax on all property located in the watershed or subwatershed in which the bonds are issued. Loans from counties to watershed districts for the purposes of implementing this section are not subject to the loan limit set forth in §103D.335.

Citation	Applies to	Summary *(please see details in the full text of each provision)*
§103B.331 Subdivisions 3 & 4	Counties	(3) May charge users for services provided by the county necessary to implement the local water management plan.
		(4) May establish one or more special taxing districts within the county and issue bonds to finance capital improvements under the Comprehensive Local Water Management Act. After adoption of the resolution, a county may annually levy a tax on all taxable property in the district.
§103B.335	Counties, municipalities, or townships	May levy a tax to implement the Comprehensive Local Water Management Act or a comprehensive watershed management plan (§103B.3363). A county may levy amounts needed to pay the reasonable costs to SWCDs and WDs of administering and implementing priority programs identified in an approved & adopted plan or comprehensive watershed management plan.
§103B.555 Subdivisions 1 & 3	Counties	(1) May establish a Lake Improvement District and impose service charges on the users of lake improvement district services within the district. May levy an ad valorem tax solely on property within the lake improvement district for projects of special benefit to the district; may impose or issue any combination of service charges, special assessments, obligations, and taxes.
		(3) A tax under Subd. 1 may be in addition to amounts levied on all taxable property in the county for the same/similar purposes.
§103C.331 Subdivision 16	County boards on behalf of soil and water conservation districts	May levy an annual tax on all taxable real property in the district for the amount that the board determines is necessary to meet the requirements of the district.
§103D.335	Watershed districts	A watershed district has the power to incur debts, liabilities, and obligations and to provide for assessments and to issue certificates, warrants, and bonds.
§103D.601	Watershed districts	May set up special taxing districts via petition to conduct larger, Capital Improvement Projects (CIP). The costs to the affected parties cannot exceed $750,000.
§103D.615	Watershed districts	May declare an emergency and order that work be done without a contract. The cost of work undertaken without a contract may be assessed against benefitted properties or raised by an ad valorem tax levy if the cost is not more than 25% of the most recent administrative ad valorem levy and the work is found to be of common benefit to the watershed district.

Citation	Applies to	Summary *(please see details in the full text of each provision)*
§103D.729	Watershed districts	May establish a water management district or districts in the territory within the watershed to collect revenues and pay the costs of projects initiated under §§103B.231, 103D.601, 103D.605, 103D.611, or 103D.730. (Guidelines for creating water management districts)
§103D.901	Watershed districts	County auditors assess the amount specified in an assessment statement filed by managers. The county may issue bonds (§103E.635). An assessment may not be levied against a benefited property in excess of the amount of benefits received.
§103D.905 Subdivisions 2,3, 7-9	Watershed districts	Established funds for watershed districts (not a complete list – see full statute language): **Organizational expense fund** - consisting of an ad valorem tax levy, shall be used for organizational expenses and preparation of the watershed management plan for projects. **General fund** - consisting of an ad valorem tax levy, shall be used for general administrative expenses and for the construction or implementation and maintenance of projects of common benefit to the watershed district. May levy a tax not to exceed 0.00798 percent of estimated market value to pay the cost attributable to projects initiated by petition. **Repair and maintenance funds** - established under §103D.631, Subd. 2. **Survey and data acquisition fund** - consists of the proceeds of a property tax that can be levied only once every 5 years and may not exceed 0.02418 percent of estimated market value. **Project tax levy** - a WD may levy a tax: 1. To pay the costs of projects undertaken by the WD which are to be funded, in whole or in part, with the proceeds of grants or construction or implementation loans under the Clean Water Partnership Law; 2. To pay the principal of, or premium or administrative surcharge (if any), and interest on, the bonds and notes issued by the WD pursuant to §103F.725; 3. To repay the construction or implementation loans under the Clean Water Partnership Law.
§103E.011 Subdivision 5	Drainage authorities	A drainage authority can accept and use external sources of funds together with assessments from benefited landowners in the watershed of the drainage system for the purposes of flood control, wetland restoration, or water quality improvements.
§103E.015 Subdivision 1a	Drainage authorities	When planning a "drainage project" or petitioned repair, the drainage authority must investigate the potential use of external sources of funding, including early coordination for funding and technical assistance with other applicable local government units.
§103E.601 §103E.635 §103E.641	Drainage authorities	Funding of all costs for constructed "**drainage projects"** are apportioned to benefited properties within the drainage system pro rata on the basis of the benefits determined (§103E.601). After the contract for the construction of a drainage project is awarded, the board of an affected county may issue bonds of the county

Citation	Applies to	Summary *(please see details in the full text of each provision)*
		in an amount necessary to pay the cost of establishing and constructing the drainage project. (§103E.635). Drainage authorities may issue drainage funding bonds (§103E.641).
§103E.728 §103E.731 §103E.735	Drainage authorities	Costs for drainage system **repairs** are apportioned pro rata on all benefited properties of record. The drainage authority may charge an additional assessment on property that is in violation of §103E.021 (ditch buffers) or a county soil loss ordinance (§103E.728). If there is not enough money in the drainage system account to make a repair, the board shall assess the costs of the repairs on all property and entities that have been assessed benefits for the drainage system (§103E.731). To create a repair fund for a drainage system to be used only for repairs, the drainage authority may apportion and assess an amount against all property and entities benefited by the drainage system, including property not originally assessed and subsequently found to be benefited according to law. (§103E.735).
Chapter 287	Counties	Counties participating in the agricultural land preservation program impose a fee of $5 per transaction on the recording or registration of a mortgage or deed that is subject to tax under §§287.05 and 287.21.
Chapter 365A	Towns	Townships may create subordinate service districts with special taxing authority. Requires a petition signed by at least 50 percent of the property owners in the part of the town proposed for the subordinate service district.
§373.475	Counties	A county board must deposit the money received from the sale of land under Laws 1998, chapter 389, article 16, section 31, subd. 3, into an environmental trust fund. The county board may spend interest earned on the principal only for purposes related to the improvement of natural resources.
Chapter 429	Municipalities	May levy special assessments against properties benefitting from special services (including curbs, gutters and storm sewer, sanitary sewers, holding ponds, and treatment plants).
§444.075	Municipalities	May collect stormwater utility fees to build, repair, operate & maintain stormwater management systems.
§462.358 Subdivision 2b(c)	Municipalities	May accept a cash fee for lots created in a subdivision or redevelopment that will be served by municipal sanitary sewer and water service or community septic and private wells. May charge dedication fees for the acquisition and development or improvement of wetlands and open space based on an approved parks and open space plan.
M. L. 1998, Chapter 389 Article 3, Section 29	Red River Watershed Management Board	Watershed Districts that are members of the Red River Watershed Management Board may levy an ad valorem tax not to exceed 0.04836 percent of the taxable market value of all property within their district. This levy is in excess of levies authorized by §103D.905.

Appendix K.
Index of NRCS Practices

Index of Conservation Practice Standards

Minnesota

Practice Name and Units	Practice Code	Date of Current CPS	Lead Discipline	Practice Lifespan
Access Control (ac)	472	10/21	ECS	10
Access Road (ft)	560	10/21	ENG	10
Agrichemical Handling Facility (no)	309	10/22	ENG	15
Alley Cropping (ac)	311	10/21	ECS	15
Amending Soil Properties with Lime (ac)	805	08/23	ECS	1
Anaerobic Digester (no)	366	10/22	ENG	25
Animal Mortality Facility (no)	316	10/22	ENG	15
Annual Forages for Grazing Systems (ac)	810	11/22	ECS	1
Aquaculture Pond (ac)	397	10/20	ENG	10
Aquatic Organism Passage (mi)	396	07/23	ECS	5
Brush Management (ac)	314	04/19	ECS	10
Channel Bed Stabilization (ft)	584	10/22	ENG	10
Clearing and Snagging (ft)	326	10/23	ENG	5
Combustion System Improvement (no)	372	10/21	ENG	10
Composting Facility (no)	317	10/21	ENG	15
Conservation Cover (ac)	327	10/16	ECS	5
Conservation Crop Rotation (ac)	328	10/16	ECS	1
Conservation Harvest Management (ac)	809		ECS	1
Constructed Wetland (ac)	656	10/23	ENG	15
Contour Buffer Strips (ac)	332	10/16	ECS	5
Contour Farming (ac)	330	10/21	ECS	5
Cover Crop (ac)	340	09/17	ECS	1
Critical Area Planting (ac)	342	10/16	ECS	10
Cross Wind Ridges (ac)	588	10/21	ECS	1
Cross Wind Trap Strips (ac)	589C	10/16	ECS	5
Dam (no)	402	11/20	ENG	50
Deep Tillage (ac)	324	09/16	ECS	1
Denitrifying Bioreactor (no)	605	10/21	ENG	10
Dike and Levee (ft)	356	10/23	ENG	20
Diversion (ft)	362	10/23	ENG	10
Drainage Water Management (ac)	554	10/22	ENG	1
Dry Hydrant (no)	432	10/22	ENG	15
Early Successional Habitat Development-Mgt (ac)	647	04/23	ECS	1
Emergency Animal Mortality Management (no)	368	10/23	ENG	1
Energy Efficient Agricultural Operation (no)	374	10/22	ENG	10
Energy Efficient Building Envelope (no)	672	10/22	ENG	10
Energy Efficient Lighting System (no)	670	10/22	ENG	10
Feed Management (au)	592	10/21	ECS	1
Fence (ft)	382	10/21	ECS	20
Field Border (ac)	386	10/16	ECS	10
Field Operations Emissions Reduction (ac)	376	09/23	ECS	1

Practice Name and Units	Practice Code	Date of Current CPS	Lead Discipline	Practice Lifespan
Filter Strip (ac)	393	02/17	ECS	10
Firebreak (ft)	394	09/16	ECS	5
Forage Harvest Management (ac)	511	10/21	ECS	1
Forest Farming (ac)	379	12/22	ECS	10
Forest Stand Improvement (ac)	666	09/16	ECS	10
Forest Trails and Landings (ac)	655	10/21	ECS	5
Fuel Break (ac)	383	06/19	ECS	10
Grade Stabilization Structure (no)	410	10/22	ENG	15
Grassed Waterway (ac)	412	10/21	ENG	10
Grazing Land Mechanical Treatment (ac)	548	08/23	ECS	1
Groundwater Recharge Basin or Trench (no)		10/23	ECS	1
Heavy Use Area Protection (sf)	561	10/21	ENG	10
Hedgerow Planting (ft)	422	04/17	ECS	15
Herbaceous Weed Treatment (ac)	315	10/21	ECS	5
Herbaceous Wind Barriers (ft)	603	06/22	ECS	5
High Tunnel System (sf)	325	09/16	ECS	5
Irrigation Pipeline (ft)	430	10/21	ENG	20
Irrigation Reservoir (no)	436	10/22	ENG	15
Irrigation System, Microirrigation (ac)	441	10/21	ENG	15
Irrigation Water Management (ac)	449	10/21	ENG	1
Land Clearing (ac)	460	10/21	ENG	10
Land Reclamation, Abandoned Mined Land (ac)	543	10/23	ENG	15
Land Reclamation, Landslide Treatment (ac)	453	10/23	ENG	15
Lined Waterway or Outlet (ft)	468	10/21	ENG	15
Livestock Pipeline (ft)	516	10/21	ENG	20
Livestock Shelter Structure (no)	576	10/21	ENG	10
Low Tunnel Systems (sf)	812		ECS	1
Mulching (ac)	484	10/21	ECS	1
Nutrient Management (ac)	590	01/22	ECS	1
Obstruction Removal (no)	500	10/20	ENG	10
On-Farm Secondary Containment Facility (no)	319	10/22	ENG	15
Open Channel (ft)	582	10/22	ENG	15
Organic Management (ac)	823	04/23	ECS	1
Pasture and Hay Planting (ac)	512	10/21	ECS	5
Pest Management Conservation System (ac)	595	01/22	ECS	1
Phosphorus Removal System (no)	782	10/23	ENG	1
Pond (no)	378	10/23	ENG	20
Pond Sealing or Lining, Compacted Soil Treatment (sf)	520	10/22	ENG	15
Pond Sealing or Lining, Concrete (sf)	522	10/23	ENG	20
Pond Sealing or Lining, Geomembrane or Geosynthetic Clay Liner (sf)	521	09/18	ENG	20
Precision Land Forming and Smoothing (ac)	462	10/22	ENG	10
Prescribed Burning (ac)	338	10/21	ECS	1
Prescribed Grazing (ac)	528	12/18	ECS	1
Pumping Plant (no)	533	10/21	ENG	15
Raised Beds (sf)	812		ECS	5

Practice Name and Units	Practice Code	Date of Current CPS	Lead Discipline	Practice Lifespan
Range Planting (ac)	550	12/22	ECS	5
Residue and Tillage Management, No Till (ac)	329	10/21	ECS	1
Residue and Tillage Management, Reduced Till (ac)	345	09/16	ECS	1
Restoration of Rare or Declining Natural Communities (ac)	643	04/17	ECS	1
Riparian Forest Buffer (ac)	391	10/21	ECS	15
Riparian Herbaceous Cover (ac)	390	07/23	ECS	5
Road-Trail-Landing Closure and Treatment (ft)	654	02/20	ECS	10
Roof Runoff Structure (no)	558	10/22	ENG	15
Roofs and Covers (no)	367	04/22	ENG	10
Saline and Sodic Soil Management (ac)	610	11/21	ENG	1
Saturated Buffer (ft)	604	10/21	ENG	15
Sediment Basin (no)	350	10/22	ENG	20
Shallow Water Development and Management (ac)	646	10/22	ECS	5
Silvopasture (ac)	381	02/20	ECS	15
Sinkhole Treatment (no)	527	10/22	ENG	10
Soil Carbon Amendment (ac)	336	09/23	ECS	1
Soil Carbon Amendment (ac)	808		ECS	1
Spoil Disposal (cf)	572	10/20	ENG	1
Spring Development (no)	574	10/21	ENG	20
Sprinkler System (ac)	442	10/22	ENG	15
Stormwater Runoff Control (ac)	570	10/21	ENG	1
Stream Crossing (no)	578	10/23	ENG	10
Stream Habitat Improvement and Management (ac)	395	10/21	ECS	5
Streambank and Shoreline Protection (ft)	580	10/22	ENG	20
Stripcropping (ac)	585	10/21	ECS	5
Structure for Water Control (no)	587	10/22	ENG	20
Structures for Wildlife (no)	649	11/14	ECS	5
Subsurface Drain (ft)	606	10/23	ENG	20
Surface Roughening (ac)	609	10/21	ECS	1
Terrace (ft)	600	10/21	ENG	10
Trails and Walkways (ft)	575	10/21	ENG	10
Tree-Shrub Pruning (ac)	660	12/22	ECS	10
Tree-Shrub Site Preparation (ac)	490	10/21	ECS	1
Tree/Shrub Establishment (ac)	612	04/18	ECS	15
Underground Outlet (ft)	620	10/21	ENG	20
Upland Wildlife Habitat Management (ac)	645	07/23	ECS	1
Vegetated Treatment Area (ac)	635	10/23	ENG	10
Vegetative Barrier (ft)	601	10/21	ECS	5
Waste Facility Closure (no)	360	10/22	ENG	15
Waste Separation Facility (no)	632	10/22	ENG	15
Waste Storage Facility (no)	313	09/18	ENG	15
Waste Transfer (no)	634	10/22	ENG	15
Waste Treatment (no)	629	10/21	ENG	10

Practice Name and Units	Practice Code	Date of Current CPS	Lead Discipline	Practice Lifespan
Wastewater Treatment, Milk House (no)	627	10/23	ENG	10
Water and Sediment Control Basin (no)	638	10/22	ENG	10
Water Well (no)	642	10/21	ENG	20
Watering Facility (no)	614	10/21	ENG	10
Well Decommissioning (no)	351	10/21	ENG	20
Wetland Creation (ac)	658	12/22	ECS	15
Wetland Enhancement (ac)	659	07/23	ECS	15
Wetland Restoration (ac)	657	04/17	ECS	15
Wetland Wildlife Habitat Management (ac)	644	08/23	ECS	1
Wildlife Habitat Planting (ac)	420	10/21	ECS	5
Windbreak-Shelterbelt Establishment and Renovation (ft)	380	10/21	ECS	15
Woody Residue Treatment (ac)	384	10/21	ECS	10

Appendix L.
Formal Review Comments

South Fork Crow River Watershed CWMP

Formal Review Comments

Comment #	Commenter	Section	Page	Comment	Change Needed (Y/N)	Material	Editorial	Note	Resolution
1	BWSR	Measurable Goals	39	In the last paragraph on page 39, it says, "The short-term goal focuses on implementation of conservation practices (e.g., WASCOBs, grade stabilization structures, filter strips) to reduce peak flows and volume in receiving waters and reduce erosion and sedimentation issues associated with public drainage systems." The issues your goals need to address are Peak Flows and Erosion/Sedimentation. The number of projects completed will not indicate progress toward addressing the issues (Peak flow and Erosion/Sedimentation). While we've had much discussion about simplicity for the sake of this goal, this issue, Drainage Water Management, was the number one issue identified at the public kickoff event (Figure 3.2, page 25). As this was the number one issue identified, we feel that measurable goals that can clearly show a planned pace of progress towards addressing the issues are necessary beyond what is specified in this draft. We recommend the goals include a reduction in TSS in tons/year and water storage goal. The Stacking Multiple Benefits Column adds some confusion to reviewers. For example, under the Drainage goal, Erosion and Sedimentation list s 165 tons/year TSS reduced. Is this the Erosion and Sedimentation Goal for the watershed as a whole or what you plan to accomplish via the Drainage projects? While useful information, the way it's presented adds confusion.	Y	X			Anticipated benefits from those 250 drainage practices is included in the "Stacking Benefits" section. Stacking Benefits section revised to indicate it is 36% of the overall goal for Erosion and Sedimentation / Nutrients. This solution will also apply to each goal.
2	BWSR	Targeted Implementation Schedule	69	Several of the measurable goals are not adequately reflected in the tables. For example, in the Upper South Fork Planning Region Action Table, the currently identified metric for the Drainage Goal (from the measurable Goals section) is the number of projects. While we have issue with this measurable goal as stated in item 3 above, there is not a corresponding line in the Implementation Table. So, assuming its part of the agricultural practices and non-structural practices, there is a ten-year output reflected in both items as acres treated. From what is provided, we have no way to determine the intended pace of progress towards achieving measurable goals.	Y		X		Added load reduction benefits of practices implemented to output for structural / nonstructural practices
3	BWSR	Targeted Implementation Schedule	69, 71, 73, 75, 76, 77	We have the same concern for the water storage goals, and erosion and sedimentation goals and for the other sub-watershed action tables. Short term measurable goal metrics should correspond to these 10-year outputs.	Y	X			Outputs added for water storage benefits of conservation practices and Capital Improvements. Water Storage goal language revised accordingly.
4	BWSR	Targeted Implementation Schedule	77	The last row in the table on page 77 has no 10-year output. This should not be blank.	Y	X			Output revised: one partner meeting per year, and 1 enrollment per year
5	BWSR	Targeted Implementation Schedule	78	Is Technical assistance reflected in the cost of implementing the plan on page 78? We assume its part of the "Support" identified on page 78 in Table 5.7, but it should be more clearly specified.	N		X		Technical assistance is already the last action of each planning region action table.
6	BWSR	Plan Implementation		Per Plan Content Requirements There should be a paragraph on Drainage. There is a small paragraph under Capital Improvements Projects but should be given its own heading and expanded on, especially considering it is a Tier 1 Priority for this plan.	Y	X			Section on drainage added with language "County boards and the Buffalo Creek Watershed District serve as the drainage authorities for public drainage systems in the South Fork Crow River Watershed. "
7	BWSR	Land and Water Resource Inventory		Should include paragraphs on Stormwater, Drainage systems and control structures.	Y	X			Sections added to LWRN
8	BWSR	Plan Administration and Coordination	93	Page 93 there is still placeholder language for the formal agreement decision that needs to be finalized.	Y	X			Placeholder language struck as it is not necessary to include information about what the implementation group will be referred to
9	BWSR	Plan Administration and Coordination		The revisions to this portion of the plan since the internal review draft clearly identifies amendment procedures. Thank you for working with us on this and we recommend that all Policy Committee members are aware of how the Water Management Districts differ from the rest of the plan.	N			X	Comment noted with thanks
10	BWSR	Plan Administration and Coordination	104	On page 104, the statement that reads, "Policy Committee and will proceed according to the procedure described in State statute." Should be changed to, "Policy Committee and will proceed according to the procedure described in State statute BWSR Policy."	Y		X		Edited as requested to BWSR policy
11	BWSR	Appendices	Appedix F	Appendix F still looks like it's in draft form with strikeout and underlined portions. This should be fixed.	Y	X			Document for Appendix updated as available

Comment #	Commenter	Section	Page	Comment	Change Needed (Y/N)	Material	Editorial	Note	Resolution
12	MDH	Land and Water Resource Narrative	16	First paragraph of Groundwater and Drinking Water Resources. MDH's comment in the first draft was to have the plan reflect the fact there are 5,859 private wells with known locations throughout the watershed, or something to that effect. The current draft states that the watershed is estimated to have over 5,800 private wells that are used for drinking water consumption. MDH appreciates this edit.	N			X	Comment noted with thanks
13	MDH	Land and Water Resource Narrative	17	final sentence of the first paragraph. MDH had suggested that the Partnership include "downstream surface water communities" as a focus Resource where applicable in the Action Tables, as many of the activities proposed in the Action Tables include activities that will have a positive influence on downstream surface drinking water quality. The statement included on page 17 satisfactorily addresses MDH's comment.	N			X	Comment noted with thanks
14	MDH	Priority Issues	30	Table 3.6 lists arsenic as a potential groundwater contaminant, and Page 16, final sentence of the penultimate paragraph notes that MDH has identified elevated levels of arsenic as an additional issue with private wells. MDH had previously commented that the plan does not address/emphasize the relatively high incidence rates of arsenic (33.2% of samples exceed the Safe Drinking Water Act standard of 10 µg/L and nearly 50% exceed 5 µg/L). Additionally, the lack of activities in the plan that focus on arsenic outreach, education, and possible testing clinics in the Action Tables may be a missed opportunity, and MDH encouraged the inclusion of possible ideas such as website postings and/or pamphlet mailings; arsenic clinics; outreach to realtors to ensure testing for real estate transactions; partnerships with Local Public Health, others. MDH noticed the current draft does not include this suggestion.	N	X			As groundwater is a Tier 3 issue, action will not be added to the implementation schedule, but the local partnership supports MDH's efforts in this matter.
15	MDH	Targeted Implementation Schedule	69	Table 5.3 Upper South Fork Planning Region Action Table. MDH had commented that the Action Description titled "Provide cost-share for well sealing" had listed in the Focus Resources column: Drinking Water Source Management Areas, or DWSMAs. MDH had requested that the Focus Resource be changed from DWSMAs to Watershed-wide. The change was made and MDH appreciates this edit.	N			X	Comment noted with thanks
16	MPCA	Land and Water Resource Narrative	13	Figure 2.2: There are two stream layers being labeled – difficult to read. Example: Buffalo Creek labels are overlapping.	Y		X		Stream labels revised
17	MPCA	Land and Water Resource Narrative	14	Incorrect calculation; should be 72.5% instead of 71%	Y		X		Text amended to 73%
18	MPCA	Land and Water Resource Narrative	15	Table 2.1: If definitions are of classes, may want to adjust descriptions unless you were integrating from elsewhere: a. The 2B, 2Bg, and 2Bm, do not include 'also protected for drinking water' b. 2B: Cool and warm water aquatic life and habitat c. 2Bg: Aquatic life and recreation – General Cool and Warm Water Aquatic Life Habitat d. 2Bm: Aquatic life and recreation – Modified Cool and Warm Water Aquatic Life Habitat e. Clip to support definitions: (Spec is over in HEI Notes)	Y	X			Revised based on feedback from MPCA
19	MPCA	Measurable Goals	40 & 55	Could these be more concrete goals? a. With only recording the number of projects, will you get the desired reductions and thereby meet target goals to be successful? A project could be small and not get significant changes.	N	X			Projects will be selected based on scoring and ranking. Projects will rank higher if in a priority area and if load reduction benefits are substantial.
20	MPCA	Appendix		I don't believe the reference section was added to the report.	Y			X	References added to Appendix
21	DNR			We are pleased that implementation projects offering multiple stacked benefits are emphasized and prioritized throughout the plan. These projects provide a higher benefit/cost ratio	N			X	Comment noted with thanks
22	DNR			It is excellent to see specific Capital Improvement Projects directly addressing the loss of water storage and altered hydrology detailed within the plan	N			X	Comment noted with thanks

Comment #	Commenter	Section	Page	Comment	Change Needed (Y/N)	Material	Editorial	Note	Resolution
23	DNR	Goals	39	Agricultural drainage system repair, maintenance, and management were identified as one of the highest priorities in the plan due to increased erosion and sediment delivery to receiving waters. The plan's storage and altered hydrology sections consider options to offset the impact of increased water delivery to downstream areas and identify goals to address altered hydrology by storing water on the landscape. While the DNR is hopeful the plan will influence future public and private drainage projects, the options considered in the plan for offsetting drainage impacts may not be enough to produce measurable results. Consider seeking more firm and specific commitments from the drainage authorities to develop projects with numeric goals, moderate drainage coefficients, and landscape-suitable water storage alternatives. The DNR suggests identifying where Watershed Based Implementation Funding (WBIF) can be utilized to implement projects that are not required to offset impacts from drainage projects, and that will result in positive gains in water storage on the landscape	N	X			103E requires storage to be considered. WBIF will be used to fund practices with water quality and storage benefits. Action has already been included for early coordination on drainage projects (see action #W5)
24	DNR	Goals		In our priority concerns letter, we commented that the watershed plan must influence public and private drainage. We noted that the cumulative effect of increased drainage is straining public infrastructure, contributing to stream channel erosion, and increasing the risk of flooding for homes and farmland. Per statute requirements, the DNR's role is to review and comment on drainage improvement projects' adherence to MN Statutes, including MN Statutes §103E.015, which involves environmental considerations and identifying alternative measures in locally adopted water management plans. It states, "This investigation shall include early coordination with applicable soil and water conservation district [SWCD] and county and watershed district water planning authorities about potential external funding sources and technical assistance for these purposes and alternative measures. The drainage authority may request additional information about potential funding or technical assistance for these purposes and alternative measures from the executive director of the Board of Water and Soil Resources [BWSR]". The DNR recognizes the importance of **early coordination** with the drainage authorities, drainage engineers, and local conservation agencies. DNR also understands the complexity of achieving adequate drainage and mitigating the negative environmental consequences of increased drainage system capacity.	N			X	Importance of early coordination recognized by local Partnership, with thanks.
25	DNR	Issues	33	Page 33 "Storage, Resiliency and Drainage": Restoring and enhancing drainage function and installing conservation practices for drainage systems can lower sediment transport and peak flow within localized systems; however, implementation practices should consider prioritizing mitigation of potential increased peak flows to downstream receiving waters	N			X	Comment noted with thanks. Additional goal for "Loss of Water Storage and Altered Hydrology" also aimed at mitigating potential increased peak flows.
26	DNR	Goals	39,42	Descriptions within "Drainage Partnerships and Drainage Management" on page 39 and "Loss of Water Storage and Altered Hydrology" on page 42 emphasize increasing water storage and reconnecting to the floodplain, restoring wetlands, and building infiltration basins, but the associated action tables and goals include strategies that only indirectly address these goals. While several capital improvement projects have strategies to address the loss of water storage/altered hydrology, we suggest including action items in the regional action tables to promote water storage and watershed flow reductions. Consideration of smaller-scale water storage practices in addition to the large capital improvement projects to show actionable goals addressing the loss of water storage and altered hydrology may also be a beneficial strategy.	N	X			Action #1-3 in each Planning Region Action Table is inclusive of the practices that will be the focus of the local Partnership in achieving these goals, including multipurpose drainage management practices, wetland restorations, soil health practices, stormwater ponds, etc.

Comment #	Commenter	Section	Page	Comment	Change Needed (Y/N)	Material	Editorial	Note	Resolution
27	DNR	Goals	43	The DNR highly encourages prioritizing water storage projects that leverage natural features and processes and demonstrate multiple benefits not only to water quantity and quality but also to aquatic and terrestrial ecosystems, fish and wildlife species, and public and private infrastructure/property. Temporary storage via channels with well-connected floodplains and restored natural wetlands for long-term retention are preferred methods to achieve those objectives, especially in the upper reaches of the watershed. These practices aid in flood damage reduction to help curb the effects of flooding and should be considered a higher priority. The plan mentions water storage, flood damage reduction, and reduced flooding as auxiliary benefits of another practice and not explicitly emphasized as an individual actionable item goals. The plan addresses flooding locally within the context of public drainage ditch functionality but not regionally or watershed-wide. Flooding and reconnection to the floodplain are classified as a Tier 3 issue (Table 3.6 Tier 3 Issues, page 30) to be addressed by others or other funding sources. Consider including strategies in the plan to emphasize the importance of flood damage reduction and restoring floodplain connectivity	Y	X			Added sentence to 'what can be done' water storage section emphasizing the importance of restoring connections to the floodplain
28	DNR			Significant alterations of stream channels have occurred, especially in headwater areas. These altered watercourses generally exhibit limited floodplain connectivity, excessive bank erosion, and poor fish and wildlife habitat. Combating this degradation requires adopting resilient and progressive land management practices. This plan builds on a framework to address the principles detailed in the South Fork Crow Watershed Characterization Report published by the DNR in 2016. Natural channel restoration, dam removal, and enhanced buffers are considered Tier 3 priorities in the plan. The DNR encourages prioritizing these and other practices related to natural channel processes and restoration	N			X	Local planning staff will support our partners in channel restoration, dam removal, and enhanced buffer efforts as time and funding allows, but WBIF and the focus of this plan will be on addressing Tier 1 and 2 priority issues.
29	DNR	Goals	43	Stream connectivity benefits the health of a watershed, aquatic organisms, and floodplain access. Stream connectivity concerns are a Tier 3 issue in the plan with other agencies managing and funding these practices. The DNR suggests more emphasis in the plan on increasing stream connectivity. As implementation work proceeds and conservation practices are installed throughout the watershed, stream connectivity can be considered and incorporated into many of these practices	Y	X			Added text saying stream connectivity should be a consideration of practices in the 'what can be done' section for altered hydrology
30	DNR	Issues	30	The DNR recommends the plan consider the importance of perched culvert replacement or restoration and culvert sizing to enhance stream connectivity. Healthy streams with longitudinal connectivity can transport the water and sediments of their watershed over time in a sustainable balance. Perched or improperly sized culverts require long-term maintenance and are at risk of failure during flood periods. Improving lateral connectivity (floodplain access) should also be prioritized in this watershed, and the DNR may be able to assist with project selection and design implementation	N	X			Culverts are a Tier 3 issue, because only a number of issues could be priorities for realistic plan implementation. Local planning staff will support our partners with improving connectivity projects as time and funding allows, but implementation of plan actions addressing Tier 1 and 2 priority issues are the priority.
31	DNR	Implementation	60	The plan addresses habitat restoration and preservation and protection of natural features, native species, and landscapes by preserving what remains and adding 825 acres of permanently protected land within ten years (Short-Term Goal, page 60). The DNR applauds this approach and suggests a strong emphasis on preserving and protecting riparian areas in particular.	Y	X			Added text emphasizing the importance of protecting riparian land
32	DNR	Implementation		In this heavily altered and impaired watershed, the DNR applauds the 1W1P Steering Committee for prioritizing funding to address “nearly” and “barely” impaired waters. However, this challenge is daunting, with over 70% of lakes in the watershed impaired	N			X	Comment noted with thanks
33	DNR	Goals?	60?	The DNR recommends consideration of in-basin strategies like water level management/temporary drawdown in shallow lakes and some wetlands. DNR staff have partnered with LGU staff, NGOs, and local landowners in many areas to complete such projects, which temporarily lower water levels to promote emergent vegetation growth, improve water quality, and enhance wetland wildlife habitat. We are available to help prioritize and implement these types of projects	N	X			Comment noted for implementation purposes. Lake Internal Loading and In-Lake Management is a Tier 3 issue. Local planning staff will support our partners with these efforts as time and funding allows, but implementation of plan actions addressing Tier 1 and 2 priority issues are the priority.
34	DNR			It is excellent to see the vast extent of agricultural and urban BMP implementation and proposed goals incorporated in the plan	N			X	Comment noted with thanks

Comment #	Commenter	Section	Page	Comment	Change Needed (Y/N)	Material	Editorial	Note	Resolution
35	DNR	Goals	61	Invasive species are classified as a Tier 3 issue in the plan. We suggest treating invasive species as issues and impacts within watershed strategies and goals – especially strategies to prevent, contain, and/or control the spread of both aquatic and terrestrial invasive species. In addition, please consider leveraging local efforts with state programs with the goal of simultaneously improving water quality and reducing the spread of invasive species	Y	X			The wildlife habitat goal will be focused on protecting native species and controlling invasives. Text adding this consideration added to the wildlife goal.
36	DNR	Issues		Groundwater/drinking water protections are included in the plan as a Tier 3 issue; please consider making them a higher priority, given the importance of groundwater sustainability and future impacts in this watershed. Surface water infiltration is essential in increasing aquifer recharge, especially in areas dominated by shallow glacial sediment aquifers like the SFC watershed. The installation of drainage tile and impervious surfaces, particularly within low-lying or depressional areas, should be limited to help promote infiltration and aquifer recharge. Additional benefits of more infiltration can include less surface water runoff and less flooding. The DNR can assist with strategy development to encourage groundwater sustainability, including helping to identify groundwater recharge areas.	N				All watershed issues are important, but only a few could be Tier 1 or Tier 2 issues for realistic plan implementation. Increasing priority of drinking water protection will be considered in future plan amendments.
37	Renville SWCD	Appendix		The Renville SWCD would like an appendix added to denote the potential conservation practices that will be implemented to address the goals and priorities outlined in the South Fork Crow River Comprehensive Watershed Management Plan.	Y	X			Appendix of conservation practices added
38	Kandiyohi SW	Issues, Programs	22, 85	We understand that Table 3.6 Tier 3 Issues of the plan includes Aquatic Invasive Species: "The priority tier definitions are important for communicating why some issues were not deemed a focus of this plan. For example, aquatic invasive species was one of the highest-ranking issues in the public kick-off meeting but is a Tier 3 issue for this plan. This is because aquatic invasive species are handled by partners instead of the South Fork Crow River Partnership." Page 27. However, in 2018, Big Kandiyohi Lake association contracted Wenck to complete a sediment analysis to understand total phosphorus concentrations in Big Kandiyohi Lake as well as a Carp assessment. Big Kandiyohi needs water control structure with a carp barrier to alleviate some of the carp issues within the basin. Can this be added to the Table 6.3? And in the section of identifying issues on page 20, under 'existing local information," could you also include the assessment was completed in 2018 describing the recommendations: Technical Memo Big Kandiyohi Lake Sediment Analysis.	Y	X			Water control structure added to CIP table. Added Tech Memo to existing local information on pg. 22
39	Carver WMO	Acronyms	91	Pg. 91 – under Wetland Conservation Act it identifies that the "WMO is the LGU for Carver County". Either add WMO to the list of acronyms or change to CCWMO and add CCWMO to list of acronyms.	Y		X		Text changed to CCWMO, and CCWMO added to acronym list
40	Carver WMO	Executive Summary	1	Pg.1 - BWSR has approved a Water Management Plan for the CCWMO which is the governing plan in most of the Carver County portion of the SFCR. BWSR and this plan should clarify what "plan area" means in this document as it creates duplicate plan areas and funding confusion. A brief discussion of metro planning area requirements from state statute and existing CCWMO plan would be useful as well.	Y	X			Explanation of planning area along HUC 8 boundary, and overlap with metro area planning area requirements added
41	Carver WMO	Programs	90	Pg. 90 - Carver County is a delegated feedlot county	Y		X		Added Carver to the list
42	Carver WMO	Programs	91	Pg. 91 – Carver County has a Comprehensive Plan which was adopted in 2020, which controls land use in the incorporated portions of Carver County within the SFCR. Each of the cities within Carver County also have their own comprehensive plans, which can be found on their websites.	Y		X		Added Carver Co Comprehensive Plan to the table

Comment #	Commenter	Section	Page	Comment	Change Needed (Y/N)	Material	Editorial	Note	Resolution
43	Carver WMO	Implementation		If possible, it would be helpful for some of the education and outreach items to be more specific. For example, the action step "Conduct an annual meeting with SWCDs, BCWD, and drainage inspectors to gain a deeper understanding of drainage system operation to conduct proactive maintenance rather than reactive" (pg. 75) specifically outlines what is to be achieved, when, with who, and why it is needed. Here are a couple actions that it would be helpful if they could be more defined: 1) "Continue and expand surface water monitoring efforts to understand water quality, trends, and impacts of conservation action" (pg. 75) - Expand on how this will be done. Are new monitoring sites going to be added? New monitoring parameters? Is this action step perhaps to identify where and how to expand monitoring efforts in order to increase this understanding? 2) "Continue and expand watershed education and outreach programming in each jurisdictional area." (pg. 75) – How will education and outreach programming be expanded? Through offering more programs? Attending public events?	Y	X			Added reference to Implementation Programs section

South Fork Crow River One Watershed, One Plan Public Hearing: November 27th, 2023 6 P.M.
Public Comments and Response

1. Doug Rathke
    a. He is concerned about being notified; wants to know why farmers are not being notified directly via physical letter.

    Response: Comment noted. The notification process appropriately followed state statute and is uniform to all other One Watershed, One Plan public hearings taking place statewide.

2. Kevin Buss
    a. He stated Mcleod County created the problem on their own; is concerned about larger tile than what the ditches can handle. He does not want to be told how to operate his land and is not happy with non-profit organizations (i.e. Pheasants Forever).

    Response: Comment noted. The Comprehensive Watershed Management Plan is a document that offers methods to improve water quality through a voluntary approach, this is a non-regulatory document and will not control how land is operated and/or sold.

3. Dave Jutz – Elsworth TWP, Meeker County
    a. He stated that Elsworth has the greatest number of lakes in Meeker County and expressed interest in doing projects with the lakes. Concerned about private and public water courses that are not regulated by county controls. Issues include pipes that are set too high or too low, sediment filled, etc. He is looking for funds or ways to find funds to take care of said water courses without suing the landowners.

    Response: Comment noted. Dealing with drainage and public water courses can be a tasking process that usually involves agencies such as the Department of Natural Resources as well as the Army Corps of Engineers. We hope that the plan can aid in the reduction of erosion issues on properties that are contributing to the sedimentation problems expressed. This will need to happen voluntarily as this plan cannot and will not force actions. The Drainage Partnership goal will hopefully expand education to those interested as to who (or what agency or entity) is responsible for drainage issues throughout the watershed.

4. Tom Dahl – Acoma TWP
    a. He reiterated what Dave Jutz spoke on and spoke about issues with dikes and the Crow River. Commented on heavy costs on rip rap to protect their ditches.

    Response: Comment noted. The planning partnership hopes that the efforts revolving around reducing peak flows stated in the plan can help eliminate the heavy flows coming from upstream and reduce the erosion occurring as a result.

5. Jim Steinbach
    a. He claimed that BWSR was not on the notice. He showed contents of the plan, stating government agencies are unconstitutional. He showed maps from the plan and is concerned that the high priority regions are on the west end. He is concerned about the number of projects being proposed in the plan. He is concerned about the buffer law and drainage ditches. Went over his 3 minutes of allotted time.

    Response: Comment noted. The plan utilized a computer model (HSPF SAM) to determine areas for conservation projects that would provide the greatest benefits from investment of

funds. This is largely how the high priority, medium priority, and low priority areas were determined. The number of projects stated in the plan are an estimated number of projects that can be implemented with the anticipated amount of dollars received via Watershed Based Implementation Funds. These sites are largely unidentified and are hypothetical at this time.

6. Doug Benson
    a. He is confused about the water plan, is it about help or control? He brought up previous conversations regarding drainage system projects. His brother feels that people who vote for this plan are traitors of government.

    Response: Comment noted. Water plans have been in place since the 1980s and are used by local governments to steer efforts to make change toward water quality. This plan is to look at the watershed as a whole and not just the boundaries of each entity within the South Fork Crow River Watershed. It is not about control, but rather to establish an accurate means to direct efforts and funds to improve the water resources within the region.

7. Earl Schealler – Cosmos, MN
    a. He is concerned about the budget and how much money will be spent. He claims it will be spent on meetings and not using the backhoe. He wants to see ditches and waterways cleaned out. He feels he can't farm/make hay along the river due to how it has been managed over the last 30 years.

    Response: Comment noted: The planning partnership intends to use a vast majority of the funds for the implementation of Best Management Practices, both structural and non-structural, that will aid in water quality improvements.

8. Reed Seifelt
    a. He asked about generational farmers in the crowd and asked how many folks in the crowd know how to farm.

    Response: Comment noted. Irrelevant to plan content.

9. Rick Willey
    a. He referenced history, the Constitution of the United States, and stated we the people quotes regarding the 4th branch of government.

    Response: Comment Noted. Irrelevant to plan content.

10. Warren Klammer
    a. He asked about appointments to the BWSR board, concerned that the carrot will be held out to the farmer and they will be expected to chase it. He was a member of the High Island Creek Watershed District, has not seen anything from BWSR that was good.

    Response: Comment noted. The funds will be available to those who wish to utilize them, the plan will not force anyone to use the Watershed Based Implementation Funds.

Appendix M.
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