# Appendices

# Appendix A:

## Planning Memorandum of Agreement

**MEMORANDUM OF AGREEMENT**

This agreement (Agreement) is made and entered into by and between:

The Counties of Cottonwood, Jackson, Lyon, Martin, Murray, and Nobles, by and through their respective County Board of Commissioners, and

The Cottonwood, Jackson, Lyon, Martin, Murray, and Nobles Soil and Water Conservation Districts, by and through their respective Soil and Water Conservation District Board of Supervisors, and

The Heron Lake Watershed District, by and through their respective Board of Managers,

Collectively referred to as the "Parties."

**WHEREAS,** the Counties of this Agreement are political subdivisions of the State of Minnesota, with authority to carry out environmental programs and land use controls, pursuant to Minnesota Statutes Chapter 375 and as otherwise provided by law; and

**WHEREAS,** the Soil and Water Conservation Districts (SWCDs) of this Agreement are political subdivisions of the State of Minnesota, with statutory 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; and

**WHEREAS,** the Watershed District of this Agreement is a political subdivision of the State of Minnesota, with statutory authority to carry out conservation of the natural resources of the state by land use controls, flood control, and other conservation projects for the protection of the public health and welfare and the provident use of the natural resources, pursuant to Minnesota Statutes Chapters 103D and as otherwise provided by law; and

**WHEREAS,** the parties to this Agreement have a common interest and statutory authority to prepare, adopt, and assure implementation of a comprehensive watershed management plan in the Des Moines River 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; and

**WHEREAS,** with matters that relate to coordination of water management authorities pursuant to Minnesota Statutes Chapters 103B, 103C, and 103D, and with public drainage systems pursuant to Minnesota Statutes Chapter 103E, this Agreement does not change the rights or obligations of the public drainage system authorities; and

**WHEREAS,** the Parties have formed 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*.

**NOW, THEREFORE,** the Parties hereto 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 Des Moines River Watershed. The purpose of this Agreement is to collectively develop and adopt, as local government units, a coordinated watershed management plan for implementation per the provisions of the Plan. Parties signing this agreement will be collectively referred to as the Des Moines River Watershed Partnership.

2. **Term:** This Agreement is effective upon signature of all Parties in consideration of the Board of Water and Soil Resources (BWSR) Operating Procedures for One Watershed, One Plan; and will remain in effect until December 31, 2023, unless canceled according to the provisions of this Agreement or earlier terminated by law. If any questions arise in implementing this Memorandum of Agreement that are not addressed in the Memorandum of Agreement terms, they will be decided by the Policy Committee in accordance with any applicable published BWSR guidance.

3. **Intent:** This agreement shall not be construed or interpreted to create a Joint Powers Organization. The committee formed in this agreement does not have any power to enter into contracts binding the entities signing the agreement, purchase services independently of the entities signing the agreement or apply for grants on behalf of the entities signing the agreement. The purpose of this agreement is to clarify the signing entities intent to work together to create and implement a comprehensive management plan for the Des Moines River Watershed.

4. **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 May 1, 2020. The party agrees to abide by the terms and conditions of the Agreement; including but not limited to the bylaws, policies, and procedures adopted by the Policy Committee.

5. **Withdrawal of Parties:** A party desiring to leave the membership of this Agreement shall indicate its intent in writing to the Policy Committee in the form of an official board resolution. Notice must be made at least 30 days in advance of leaving the Agreement.

6. **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:** As among the parties to this Agreement, each party shall be liable for the acts of its board members, officers, employees, and 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 board members, 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 board members, officers, employees, and agents pursuant to this Agreement are intended to be and shall be construed as a "cooperative activity." 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 § 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. At the time this agreement expires, all records will be turned over to Jackson Soil & Water Conservation District for continued retention.

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.

7. **Administration:**

a. **Establishment of Committees for Development of the Plan.** The Parties each agree to designate one representative, who must be an elected or appointed member of the governing board, to a Policy Committee for development of the watershed-based plan and may appoint one or more technical representatives to an Advisory Committee for development of the plan in consideration of the BWSR Operating Procedures for One Watershed, One Plan.

i. The Policy Committee 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. Each representative shall have one vote.

ii. Each governing board may choose one alternate to serve on the Policy Committee as needed in the absence of the designated member.

iii. The Policy Committee will establish bylaws to describe the functions and operations of the committee(s) within 90 days of execution of this document.

iv. The Steering Team will meet to provide logistical and process decision-making (not policy) for the plan development process. This Team is typically comprised of local water planners and lead staff from participating local governments, BWSR Board Conservationist, and possibly consultants.

v. 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, 103C 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 watershed-based plan jointly 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, 103C and 103D.

8. **Fiscal Agent:** Jackson Soil & Water Conservation District 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 a watershed-based 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 agreement. At that time, records will be turned over to, and retained by, Jackson Soil & Water Conservation District.

9. **Grant Administration**: Murray County 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 a watershed-based plan, including being the primary BWSR contact for the *One Watershed, One Plan* 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.

10. Jackson Soil & Water Conservation District agrees to provide the following services to the Parties:

    Staff will take notes of the Steering Team, Policy Committee, and Advisory Committee meeting proceedings and distribute minutes to the committee members.

11. **Authorized Representatives:** The following persons will be the primary contacts for all matters concerning this Agreement:

Jackson Soil & Water Conservation District
Assistant Director
603 South Highway 86
Lakefield, MN 56150
Telephone: 507-662-6682 ext. 3

Murray County
Zoning/Environmental Administrator
2500 28th Street, P.O. Box 57
Slayton, MN 56172
Telephone: 507-836-1166

**IN TESTIMONY WHEREOF** the Parties have duly executed this agreement by their duly authorized officers.

PARTNER: Cottonwood County

APPROVED:

BY: _____ 4/7/2020
Board Chair Date

BY: Kelly Thongvivong 4/7/20
County ~~Administrator~~ Coordinator Date

11. **Authorized Representatives:** The following persons will be the primary contacts for all matters concerning this Agreement:

Jackson Soil & Water Conservation District
Assistant Director
603 South Highway 86
Lakefield, MN 56150
Telephone: 507-662-6682 ext. 3

Murray County
Zoning/Environmental Administrator
2500 28th Street, P.O. Box 57
Slayton, MN 56172
Telephone: 507-836-1166

**IN TESTIMONY WHEREOF** the Parties have duly executed this agreement by their duly authorized officers.

PARTNER: Jackson County

APPROVED:

BY: Scott McClure 4/21/2020
Board Chair Date

BY: Steven J Dunn 4/21/2020
County Coordinator Date

11. **Authorized Representatives:** The following persons will be the primary contacts for all matters concerning this Agreement:

Jackson Soil & Water Conservation District
Assistant Director
603 South Highway 86
Lakefield, MN 56150
Telephone: 507-662-6682 ext. 3

Murray County
Zoning/Environmental Administrator
2500 28th Street, P.O. Box 57
Slayton, MN 56172
Telephone: 507-836-1166

**IN TESTIMONY WHEREOF** the Parties have duly executed this agreement by their duly authorized officers.

PARTNER: Lyon County

APPROVED:

BY: Gary Crowley 3-17-2020
Board Chair Date

BY: Lorin Stanley 3-17-2020
County Administrator Date

11. **Authorized Representatives:** The following persons will be the primary contacts for all matters concerning this Agreement:

| | |
|---|---|
| Jackson Soil & Water Conservation District<br>Assistant Director<br>603 South Highway 86<br>Lakefield, MN 56150<br>Telephone: 507-662-6682 ext. 3 | Murray County<br>Zoning/Environmental Administrator<br>2500 28th Street, P.O. Box 57<br>Slayton, MN 56172<br>Telephone: 507-836-1166 |

**IN TESTIMONY WHEREOF** the Parties have duly executed this agreement by their duly authorized officers.

PARTNER: **Martin County**

APPROVED:

BY: _____ 6/2/20
Board Chair Date

BY: _____ 6/2/20
County Coordinator Date

11. **Authorized Representatives:** The following persons will be the primary contacts for all matters concerning this Agreement:

| | |
|---|---|
| Jackson Soil & Water Conservation District | Murray County |
| Assistant Director | Zoning/Environmental Administrator |
| 603 South Highway 86 | 2500 28th Street, P.O. Box 57 |
| Lakefield, MN 56150 | Slayton, MN 56172 |
| Telephone: 507-662-6682 ext. 3 | Telephone: 507-836-1166 |

**IN TESTIMONY WHEREOF** the Parties have duly executed this agreement by their duly authorized officers.

PARTNER: Murray County

APPROVED:

BY: David Thiner 4/7/20
Acting Board Chair Date

BY: Thomas Benke 4/7/20
County Administrator Date

11. **Authorized Representatives:** The following persons will be the primary contacts for all matters concerning this Agreement:

| | |
|---|---|
| Jackson Soil & Water Conservation District | Murray County |
| Assistant Director | Zoning/Environmental Administrator |
| 603 South Highway 86 | 2500 28th Street, P.O. Box 57 |
| Lakefield, MN 56150 | Slayton, MN 56172 |
| Telephone: 507-662-6682 ext. 3 | Telephone: 507-836-1166 |

**IN TESTIMONY WHEREOF** the Parties have duly executed this agreement by their duly authorized officers.

PARTNER: Nobles County.

APPROVED:

BY: _____
Board Chair Date

BY: _____ 22 Jun 20
County Administrator Date

11. **Authorized Representatives:** The following persons will be the primary contacts for all matters concerning this Agreement:

Jackson Soil & Water Conservation District
Assistant Director
603 South Highway 86
Lakefield, MN 56150
Telephone: 507-662-6682 ext. 3

Murray County
Zoning/Environmental Administrator
2500 28th Street, P.O. Box 57
Slayton, MN 56172
Telephone: 507-836-1166

**IN TESTIMONY WHEREOF** the Parties have duly executed this agreement by their duly authorized officers.

PARTNER: Cottonwood SWCD

APPROVED:

BY: Tom Muller 3/26/20
Board Chair Date

BY: Kay Gross 3/24/20
~~County~~ Administrator Date

11. **Authorized Representatives:** The following persons will be the primary contacts for all matters concerning this Agreement:

| | |
|---|---|
| Jackson Soil & Water Conservation District | Murray County |
| Assistant Director | Zoning/Environmental Administrator |
| 603 South Highway 86 | 2500 28th Street, P.O. Box 57 |
| Lakefield, MN 56150 | Slayton, MN 56172 |
| Telephone: 507-662-6682 ext. 3 | Telephone: 507-836-1166 |

**IN TESTIMONY WHEREOF** the Parties have duly executed this agreement by their duly authorized officers.

PARTNER: Jackson SWCD

APPROVED:

BY: _____ 4-20-2020
SWCD Board Chair Date

BY: _____ 4-20-20
SWCD Manager Date

11. **Authorized Representatives:** The following persons will be the primary contacts for all matters concerning this Agreement:

Jackson Soil & Water Conservation District
Assistant Director
603 South Highway 86
Lakefield, MN 56150
Telephone: 507-662-6682 ext. 3

Murray County
Zoning/Environmental Administrator
2500 28th Street, P.O. Box 57
Slayton, MN 56172
Telephone: 507-836-1166

**IN TESTIMONY WHEREOF** the Parties have duly executed this agreement by their duly authorized officers.

PARTNER: Lyon SWCD

APPROVED:

BY: _____ 3-17-2020
Board Chair Date

BY: _____ March 17, 2020
SWCD Manager Date

11. **Authorized Representatives:** The following persons will be the primary contacts for all matters concerning this Agreement:

| | |
|---|---|
| Jackson Soil & Water Conservation District | Murray County |
| Assistant Director | Zoning/Environmental Administrator |
| 603 South Highway 86 | 2500 28th Street, P.O. Box 57 |
| Lakefield, MN 56150 | Slayton, MN 56172 |
| Telephone: 507-662-6682 ext. 3 | Telephone: 507-836-1166 |

**IN TESTIMONY WHEREOF** the Parties have duly executed this agreement by their duly authorized officers.

PARTNER: Martin SWCD

APPROVED:

BY: Linda Meschke 5.14.20
Board Chair Date

BY: 5/14/20
District Manager Date

11. **Authorized Representatives:** The following persons will be the primary contacts for all matters concerning this Agreement:

| | |
|---|---|
| Jackson Soil & Water Conservation District<br>Assistant Director<br>603 South Highway 86<br>Lakefield, MN 56150<br>Telephone: 507-662-6682 ext. 3 | Murray County<br>Zoning/Environmental Administrator<br>2500 28th Street, P.O. Box 57<br>Slayton, MN 56172<br>Telephone: 507-836-1166 |

**IN TESTIMONY WHEREOF** the Parties have duly executed this agreement by their duly authorized officers.

PARTNER: Murray SWCD

APPROVED:

BY: Gary S Brinks 5/14/2020
Board Chair Date

BY: [redacted] 5/14/2020
[redacted] Administrator Date

11. **Authorized Representatives:** The following persons will be the primary contacts for all matters concerning this Agreement:

Jackson Soil & Water Conservation District
Assistant Director
603 South Highway 86
Lakefield, MN 56150
Telephone: 507-662-6682 ext. 3

Murray County
Zoning/Environmental Administrator
2500 28th Street, P.O. Box 57
Slayton, MN 56172
Telephone: 507-836-1166

**IN TESTIMONY WHEREOF** the Parties have duly executed this agreement by their duly authorized officers.

PARTNER: **Nobles Soil and Water Conservation District**

APPROVED:

BY: _____ 6/24/2020
Board Chair Date

BY: _____ 6/24/2020
District Manager Date

11. **Authorized Representatives:** The following persons will be the primary contacts for all matters concerning this Agreement:

Jackson Soil & Water Conservation District
Assistant Director
603 South Highway 86
Lakefield, MN 56150
Telephone: 507-662-6682 ext. 3

Murray County
Zoning/Environmental Administrator
2500 28th Street, P.O. Box 57
Slayton, MN 56172
Telephone: 507-836-1166

**IN TESTIMONY WHEREOF** the Parties have duly executed this agreement by their duly authorized officers.

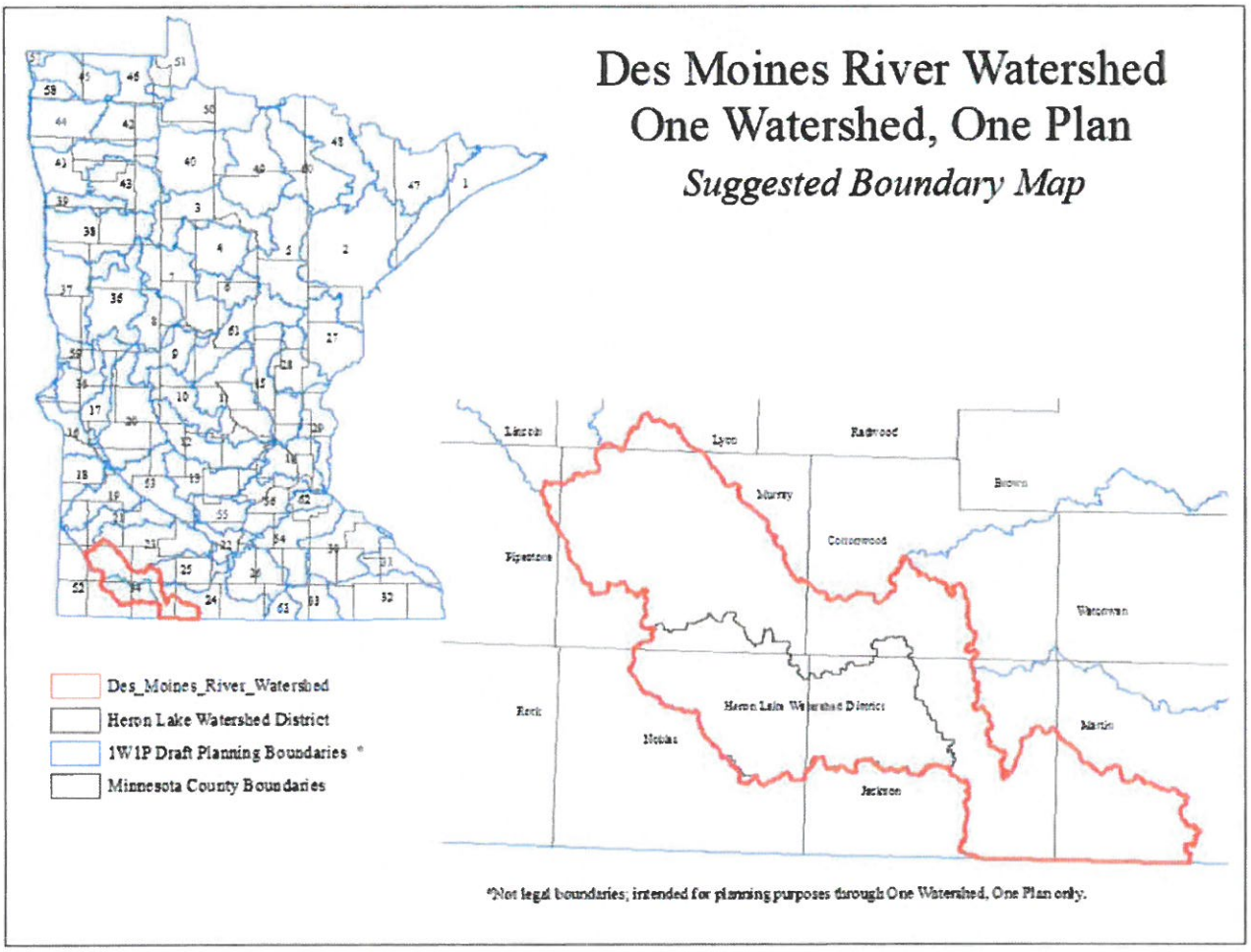
PARTNER: **Heron Lake Watershed District**

APPROVED:

BY: Wayne Rasche 3-23-2020
Board President Date

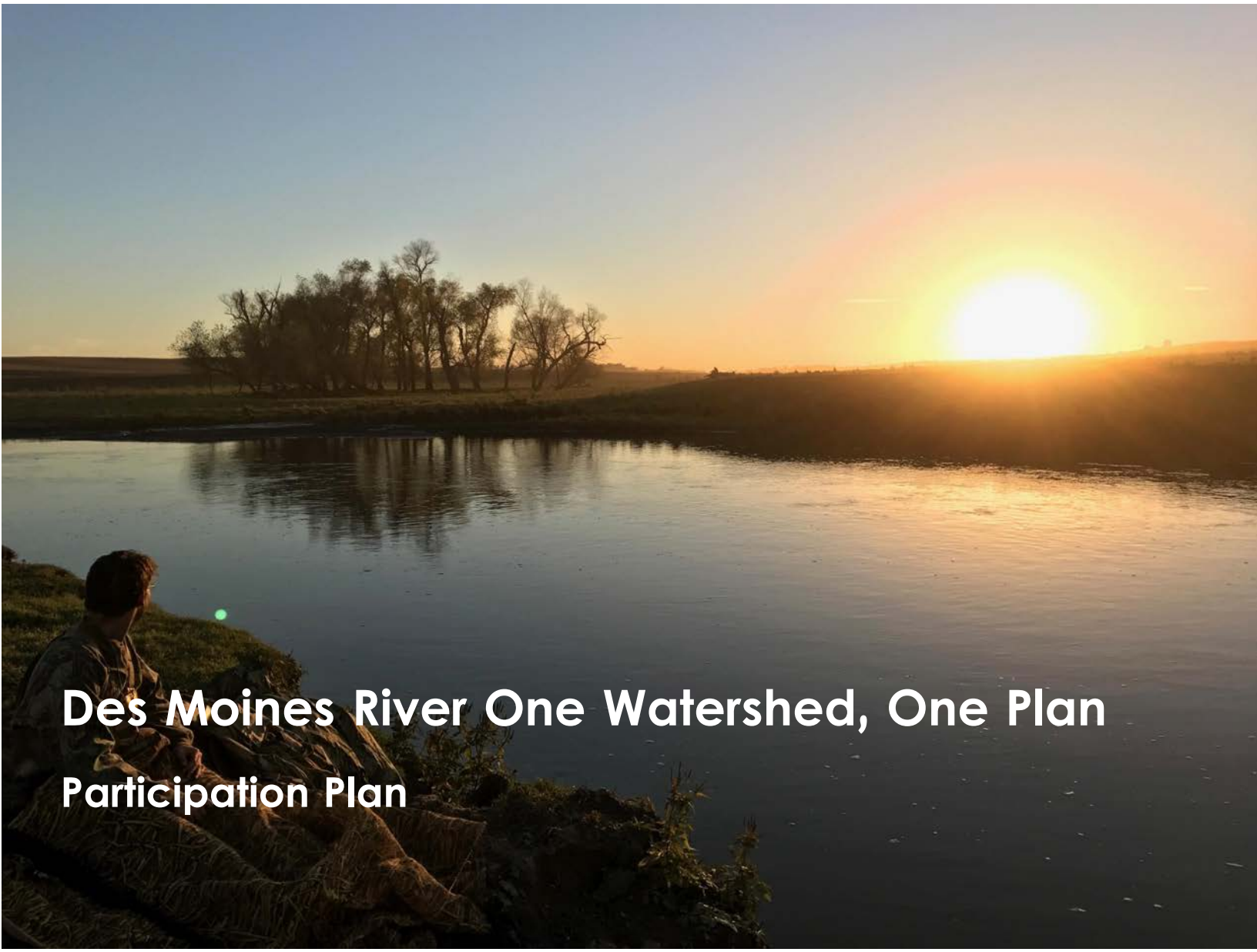
BY: 3-23-2020
District Administrator Date

**Attachment A**



# Appendix B:

## Participation Plan



# Des Moines River One Watershed, One Plan

## Participation Plan

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# 1 BACKGROUND

In 2020, a partnership consisting of Cottonwood, Jackson, Martin, Murray, Nobles, and Lyon Counties and Soil & Water Conservation Districts and the Heron Lake Watershed District were awarded a grant from the Minnesota Board of Water and Soil Resources (BWSR) to complete a comprehensive watershed management plan as part of BWSR's One Watershed One Plan (1W1P) program. Collectively, the parties are called the Des Moines River Watershed Partnership (hereafter referred to as the "Partnership"). The Des Moines 1W1P planning area is shown in Figure 1.

The Partnership shares a common interest in and the statutory authority to prepare, adopt, and implement a plan for the Des Moines River Watershed. Many issues will be addressed in this comprehensive planning effort, requiring engagement from numerous stakeholders. The purpose of this document is to describe the stakeholder participation process for developing this plan.

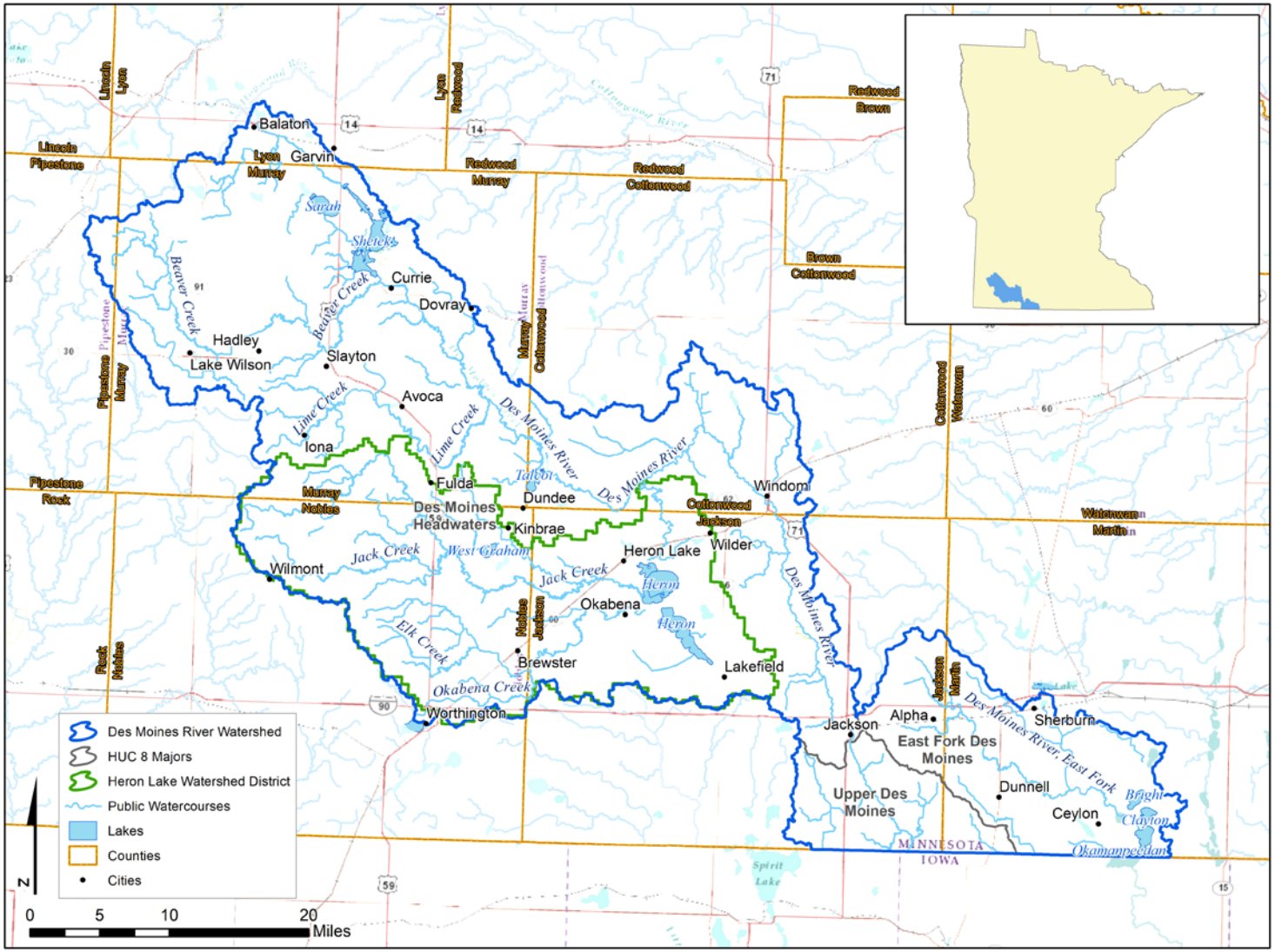



Figure 1. Des Moines 1W1P Planning Area

# 2 COMMITTEES & ROLES

One of the guiding principles of the 1W1P program is that the process "must involve a broad range of stakeholders to ensure an integrated approach to watershed management." For purposes of this document, a stakeholder is defined as a party (person or group) who holds a vested interest in the outcome of the planning process. The primary outcome resulting from the plan will be an implementation schedule describing prioritized and targeted implementation of specific best management practices, capital improvement projects, educational and outreach programs, monitoring activities, and regulatory controls throughout the watershed.

Participants in the planning process are comprised of several audiences or groups and collectively represent the stakeholders. The groups and their respective planning roles are described in the following sections.

## 2.1 Steering Committee

The Steering Committee is comprised of local SWCD, County, and Watershed District (WD) staff for the purposes of logistical and day-to-day decision-making in the planning process. The Steering Committee also includes the plan writing consultant, BWSR Board Conservationist, and state agency staff. Members of the Steering Committee are responsible for providing information needed for the planning process, reviewing and accepting draft plan related information, and assisting in plan development (especially the creation of measurable goals). Steering Committee members are also responsible for providing plan status updates back to their local boards.

The Steering Committee will meet monthly or as needed to maintain pace of progress for plan development. Decisions about plan content will progress with or without designated Lead or Alternate attendance. If Steering Committee absences become evident, at the discretion of the Steering Committee, the Steering Committee member must attend a Policy Committee meeting to explain the absence.

## 2.2 Advisory Committee

Membership on the Advisory Committee may consist of members from the Steering Committee, other local government staff, additional state main water agencies and/or plan review agencies, interested members of the general public, trade organizations, nonprofit organizations, and special interest groups. Leaders within the local community are valued members of the Advisory Committee. Membership to the Advisory Committee has been reviewed and approved by the Policy Committee.

The purpose of an Advisory Committee is to make recommendations on the plan issues, goals, and actions to the Policy Committee. Expectations are that members of the Advisory Committee will communicate plan related activities to their respective organizations. Advisory Committee members are expected to communicate practical concerns during the plan development process and to assist the Policy Committee in ensuring a credible plan development process. Meetings for Advisory Committee members are expected to be every other month or when subject matter expertise is warranted.

Each state or federal agency or organization participating on the Advisory Committee shall designate one lead representative and one designated alternate. An agency's or organization's guidance, input, and decisions shall be communicated through the lead representative or designated alternative. The lead agency or organization representative is expected to coordinate information flow and communication within their agency or organization.

## 2.3 Policy Committee

The primary role of the Policy Committee is to collectively develop and adopt, as local government units, a coordinated watershed management plan for the Des Moines River Watershed. Expectations are that the Policy Committee will review and approve information about the priority issues, goals, and actions affecting the plan area, and review and approve the plan. An additional expectation is that members of the Policy Committee will engage in constructive discussion and debate about issues addressed by the plan and provide consensus direction on plan development matters to the Steering Committee. Meeting commitments for the Policy Committee are expected to be every other month, or as needed. The Policy Committee has additional obligations as described by the Memorandum of Agreement executed by the Partnership.

## 2.4 General Public

Public meetings and hearings will be completed as part of the plan development process. Input from the public meetings will be used to ensure that all issues and resources important to the public are considered by the planning process. An additional role for the public is expected to include review of and discussion about plan actions and goals.

# 3 INTENT FOR STAKEHOLDER INVOLVEMENT

The principal intent of involving stakeholders during the planning process is to discover what is happening in the watershed, what is important to stakeholders, and to build acceptance of plan issues, goals, and actions.

Acceptance is critical because the Partnership is focused on actively utilizing their plan to implement projects and programs within the Des Moines River Watershed. Successful implementation will depend highly on the degree to which the stakeholders believe their concerns, issues, or expectations are addressed within the plan.

The Partnership intends for the stakeholder involvement process to be active, genuine, and credible. To that end, the stakeholder groups will be involved early in the planning process and will remain engaged through plan completion. Input provided by stakeholders is intended to help ensure the comprehensiveness of the plan and validate the implementation priorities of the partnership and stakeholders.

# 4 TOOLS FOR STAKEHOLDER INVOLVEMENT

The Partnership expects to use several tools to involve stakeholders. These tools include:

- Informing stakeholders of status and progress by posting information on a website (https://www.murray-countymn.com/county_departments/environmental_services/desmoinesriver.php);
- Providing meeting summaries to communicate important decisions, discussions, and milestones;
- Convening meetings and workshops with stakeholders at key milestones;
- Use of existing "standing" committees within each county and watershed district, including local water plan advisory committees. These committees tend to include broad representation; and
- Use of meeting "guidelines" to encourage productive meeting engagement, as summarized below:

## Conversation Guidelines for Committee Members

1. Everyone participates; no one dominates.
2. There is not one "right" answer.
3. Keep an open mind.
4. Listen carefully to others.
5. Help keep the discussions on track.
6. Try hard to understand the views of those with whom you disagree.
7. Ask questions if you are uncertain of the meaning of someone else's comments.
8. It is okay to have friendly disagreements – everyone has a right to his/her own views.
9. To help bring closure to a discussion, use the "I can live with it" rule.

## Guidelines for Visitors

1. Visitors (including “alternates” not a member of the committee) will not participate in the discussion unless recognized by the group facilitator or designated by a committee member.
2. Time will be allowed at each meeting (as it fits with the agenda) for visitors to share their comments with committee members.
3. Visitors are asked to write down their comments (a “comment sheet” will be made available) and share this with the facilitator.

In addition, BWSR has developed guidance for agency comments for the 1W1P planning process that is applicable to all stakeholder groups participating in plan development (see table below for BWSR guidance on providing comments). This guidance is available on the link provided below.
https://bwsr.state.mn.us/sites/default/files/2018-12/Best%20Practices%20for%20Agency%20Comments%20on%20Water%20Plans.pdf

Figure 2. BWSR Guidance on Providing Comments during Plan Development.

| Practical and Valuable Comments | Less Valuable Comments |
|---|---|
| The following types of comments can be very valuable to the planning effort:<br>■ Feedback on the legality or statutory authority of a proposed action or strategy in a plan, and/or consistency with an agency rule or policy<br>■ Identification of opportunities for agency collaboration, including when an agency might be willing to lead and/or funds are available through the agency to accomplish a strategy or action<br>■ Identification of alternative methods to identify or accomplish a goal<br>■ Identification of data not reviewed or properly considered, or data that may validate a potential concern or issue<br>■ Work that can or will be done in the future to improve the plan | The following types of comments are less valuable to the planning process:<br>■ Individual comments that have not been vetted or delivered as an agency perspective<br>■ Comments that question a method without suggestions for an alternative method<br>■ Editorial comments, especially in early working drafts of plans, unless the text is unclear |

# 5 CONDUCT

The conduct of members of the various stakeholder groups—how the committees function and affect the process—will be based on the overall intent of building acceptance of the plan through a credible yet timely process. Where appropriate, the Partnership will strive to achieve consensus on plan related matters. However, because of the diversity of issues and range of resources, full agreement between or among all stakeholders is not realistic or expected. Participants are expected to act in a professional, constructive, and contributory manner. Members failing to act in good faith during the planning process can be removed from the Advisory Committee by consensus of the Policy Committee.

# 6 STAKEHOLDER LIST

## 6.1 Steering Committee Members

The Steering Committee Members, their affiliation, and designated alternate are listed in Table 1.

Table 1. Steering Committee Members

| Name | Organization |
|---|---|
| Kay Gross | Cottonwood |
| David Bucklin | Cottonwood SWCD |
| TBD | Heron Lake Watershed District |
| Andy Geiger | Jackson |
| Daniel Bartosh | Jackson SWCD |
| John Biren | Lyon |
| John Biren | Lyon SWCD |
| Pam Flitter | Martin |
| Ashley Brenke | Martin SWCD |
| Jean Christoffels | Murray |
| Sarah Soderholm | Murray |
| Craig Christensen | Murray SWCD |
| Mark Koster | Nobles |
| John Shea | Nobles SWCD |
| Kyle Krier | Pipestone County |
| Kyle Krier | Pipestone SWCD |
| Doug Goodrich | BWSR |
| Mark Hiles | BWSR |
| Tom Kresko | DNR |
| Amanda Strommer | MDH |
| Kevin Hauth | MDA |
| Katherine Peskarek-Scott | MPCA |
| Bryan Spindler | MPCA |

## 6.2 Advisory Committee Members

The Advisory Committee Members, their affiliation, and designated alternate are listed in Table 2.

*Note:* Members of the Policy Committee and Steering Committee can also participate in the Advisory Committee.

**Table 2.** Advisory Committee Members

| Name | Organization |
|---|---|
| Brent Staples | Wildlife, CRP, RIM |
| Denis Quarberg | President, MN Deer Hunters Assoc |
| Jim Amundson | Concerned Citizen – Letter to DNR about Perkins Creek |
| Perry Olson | CRP, Habitat Enthusiast, Fortune Transportation |
| Nicole Schwebach | Pipestone SWCD |
| Trevor Humphrey | Shetek Area Lakes Association member |
| Rick Parker<br>Dave Kremer | Public citizen- Murray County water plan committee member |
| Thomas Hey | People around Lake Sarah (public citizen) |
| Bryan Biegler | Farmer |
| Chris Opdahl | President- Corn/Soybean Producers |
| Nick Bancks | Minnesota Land Trust |
| Eran Sandquist | Pheasants Forever |
| Jon Schneider | Ducks Unlimited |
| Cheryl Heard | NRCS |
| Marcia Wee | Lake Yankton (public citizen) |
| Kelly Rasche | Jackson County Drainage Coordinator |
| Sherry Schoewe | North Heron Lake Watershed Producers |
| Doug Goodrich | BWSR |
| Mark Hiles | BWSR |
| Ed Lenz | BWSR |
| Tom Kresko | DNR |
| Brady Swanson | DNR |
| Amanda Strommer | MDH |
| Kevin Hauth | MDA |
| Katherine Peskarek-Scott | MPCA |
| Bryan Spindler | MPCA |
| Aaron Meyer | Minnesota Rural Water Association |
| Dominic Jones | Red Rock Rural Water, City of Windom |
| Jason Overby | Lincoln-Pipestone Rural Water |
| Roseann Schauer | Lake Shetek State Park |

| Name | Organization |
|---|---|
| Scott Ralston or Todd Luke | US Fish & Wildlife Service |
| Matt Skaret | City of Jackson |
| Harvey Krueger | Public citizen |
| Jeremy Braaksma or Eric Roos | City of Worthington |
| Dean Weiss | Martin County landowner |
| Cole Truesdell | Martin County landowner |
| Justin Jass | MnDOT |
| Name TBD | Cottonwood Cattle Producers |
| Jason Larson | Murray County Cattleman's Association |
| Lloyd Kalfs | |

## 6.3 Policy Committee Members

The Policy Committee Members, their affiliation, and designated alternate are listed in **Table 3**.

**Table 3.** Policy Committee Members

| Name | Organization | Role |
|---|---|---|
| Tom Appel | Cottonwood | Delegate |
| Norman Holmen | Cottonwood | Alternate |
| Tom Muller | Cottonwood SWCD | Delegate |
| Jeremy Nerem | Cottonwood SWCD | Alternate |
| Mark Bartosh | Heron Lake Watershed District | Delegate |
| TBD | Heron Lake Watershed District | Alternate |
| Phil Nasby | Jackson | Delegate |
| Cathy Hohenstein | Jackson | Alternate |
| Paul Nelson | Jackson SWCD | Delegate |
| Larry G. Hansen | Jackson SWCD | Alternate |
| Rick Anderson | Lyon | Delegate |
| Gary Crowley | Lyon | Alternate |
| Steve Prairie | Lyon SWCD | Delegate |
| John Lanoue | Lyon SWCD | Alternate |
| Richard Koons | Martin | Delegate |
| Steve Flohrs | Martin | Alternate |

| Name | Organization | Role |
|---|---|---|
| Linda Meschke | Martin SWCD | Delegate |
| Clair Schmidt Jr | Martin SWCD | Alternate |
| David Thiner | Murray | Delegate |
| Molly Malone | Murray | Alternate |
| Karen Hurd | Murray SWCD | Delegate |
| Mona Henkels | Murray SWCD | Alternate |
| Justin Ahlers | Nobles | Delegate |
| Bob Paplow | Nobles | Alternate |
| Rick Nelsen | Nobles SWCD | Delegate |
| Paul Langseth | Nobles SWCD | Alternate |

# Appendix C:

## 60-Day Priority Concern Letters

BOARD OF WATER AND SOIL RESOURCES

1400 East Lyon Street
Marshall, MN 56258

July 9, 2021

Des Moines River One Watershed, One Plan Partnership
C/O Sarah Soderholm, Murray County
2500 28th Street PO Box 57
Slayton, MN 56172

**Re: Response to request for priority issues and plan expectations (One Watershed, One Plan)**

Dear Sarah,

Thank you for the opportunity to provide priority issues and plan expectations for the development of the Des Moines River Comprehensive Watershed Management Plan (plan) under Minnesota Statutes section 103B.801.

The Board of Water and Soil Resources (BWSR) has the following overarching expectations for the plan:

## Process

The planning process must follow the requirements outlined in the One Watershed, One Plan Operating Procedures (Version 2.0), adopted by the BWSR Board on March 28, 2018. More specifically, the planning process must:

- Involve a broad range of stakeholders to ensure an integrated approach to watershed management.
- Reassess the agreement established for planning purposes when finalizing the implementation schedule and programs in the plan, in consultation with the Minnesota Counties Intergovernmental Trust and/or legal counsel of the participating organizations, to ensure implementation can occur efficiently and with minimized risk. This step is critical if the plan proposes to share services and/or submit joint grant applications.

## Plan Content

The plan must meet the requirements outlined in One Watershed, One Plan – Plan Content Requirements (Version 2.1), adopted by the BWSR Board on August 29, 2019. More specifically, the plan must have:

- A thorough analysis of issues, using available science and data, in the selection of priority resource concerns.

- Sufficient measurable goals to indicate an intended pace of progress for addressing the priority issues.
- A targeted and comprehensive implementation schedule, sufficient for meeting the identified goals.
- A thorough description of the programs and activities required to administer, coordinate, and implement the actions in the schedule; including work planning (i.e. shared services, collaborative grant-making, decision making as a watershed group and not separate entities) and evaluation.

## BWSR has the Following Specific Priority Issues:

- **Surface and Groundwater Quality** – BWSR believes degraded water quality, both surface and groundwater, are significant issues in the watershed. The plan should examine current efforts to address these issues, and examine listed impairments and their locations, as strategies are developed to improve both surface and groundwater quality. BWSR advocates for efforts that will focus on reducing pollutant sources before they reach water resources as a key component of an overall strategy.
- **Altered Hydrology/Flooding/Water Quantity** – The hydrologic conditions of the Des Moines River watershed and lake sheds in this planning area have changed over time. In recent decades more precipitation, more runoff, and more runoff per unit of precipitation has been observed. BWSR believes the watershed plan should examine these causes and identify specific areas within the watershed where implementation of BMPs could help contribute to the reduction of peak flows, frequency of flooding events, and streambank/riparian erosion and sedimentation. Significant artificial drainage that has occurred in the watershed, primarily for more productive agricultural land and infrastructure; this should be examined for impacts to increased peak flows and flooding as well as opportunities for wetland restorations and water storage in targeted areas as one component. These hydrologic changes as well as others have contributed to instability of natural and artificial watercourses, degradation of wetland habitats, loss of agricultural productivity, and increased the risk of flood damages. Recognizing altered hydrology as a priority issue in the plan will help ensure that a driving factor behind many related issues is directly addressed.
- **Drainage** - The drainage authorities within the planning area should be included as stakeholders in the plan development process. This inclusion should ensure that the Chapter 103E processes and proceedings as well as the extent and the limitations of drainage authority responsibility are adequately included in the final plan. Additionally, the planning partners are strongly encouraged to include projects and activities consistent with multipurpose drainage criteria outlined in Minnesota Statutes §103E.011, Subd. 5 and §103E.015. As the 1W1P plan is formulated, BWSR suggests the following:
    - Chapter 103E drainage authorities (who are also water planning authorities) be fully engaged from the early stages of the planning process. Use Section 103E.015 CONSIDERATIONS BEFORE DRAINAGE WORK IS DONE and other provisions of drainage law identified below to capture both the extent and limitations of drainage authority responsibility, authority and opportunity for participating in the planning and implementation of conservation practices involving public drainage systems and their associated drainage areas.
    - Prioritization within the watershed include identification of Chapter 103E drainage systems and their drainage areas; consider using or encouraging the development of a separate planning to systematically prioritize select 103E systems that will accelerate plan goals the greatest.

- Multipurpose drainage management be included in the approach for targeting best management practices (BMPs) within the drainage area of Chapter 103E drainage systems. Lay out a coordinated approach for how implementation of multipurpose drainage management practices identified in the plan can be coordinated with, and/or integrated into Chapter 103E processes and proceedings through early coordination. When projecting funding needs for BMP implementation along, or within the drainage area of, public drainage systems, incorporate applicable Sections of Chapter 103E.

- **Groundwater**

  - **Groundwater Coordination and Prioritization:** Work with BWSR staff and agency partners (MDH, DNR, MDA, and MPCA) to outline any groundwater – related priority issues for the planning area. Take into account identified Groundwater Management Areas, Drinking Water Supply Management Areas, wellhead protection areas, areas with direct connection to the water table, and other areas of groundwater concern. Address specific concerns about groundwater contamination and overuse identified and documented. Groundwater and surface water interactions in Drinking Water Supply Management Areas (DWSMAs) should be considered, as this can be a pathway for pollutants to reach groundwater. Special consideration should be made for the Red Rock Rural Water Source wells and City of Windom DWSMAs that intersect with the Des Moines River channel, Balaton's wellhead source are, and perhaps the groundwater source area for the town of Alpha near the East Fork of the Des Moines River.
  - **Groundwater References:** The Greater Des Moines River Watershed areas of Minnesota has a number of references and data available. Be sure to make use of existing groundwater data and publications. These include maps, data layers, and publications available from the Minnesota Geological Survey, Mn DNR, Mn Dept. of Health, US Geological Survey, and other sources.

- **Wetlands** – Protection and restoration of wetlands provides benefits for water quality, flood damage reduction, and wildlife habitat. The plan should support the continued implementation of the Wetland Conservation Act and look for opportunities to improve coordination across jurisdictional boundaries. The plan should also identify high priority areas for wetland restoration and strategically target restoration projects to those areas. The Restorable Wetland Prioritization Tool is an example resource that can be used to help identify such areas. The state is embarking on a new wetland prioritization plan that will guide wetland mitigation in the future. Wetland restoration and preservation priorities in this plan may be eligible for inclusion in this plan in the future.

- **Conservation Easements** – The State's Re-Invest in Minnesota (RIM) Reserve easement program and the Conservation Reserve Enhancement Program (CREP), in partnership with the United States Department of Agriculture (USDA), considers several site specific and landscape scale factors when funding applications. Though it is dependent on specific program terms, the State considers local prioritization of areas for easement enrollment. The plan should take into account areas with a higher risk of contributing to surface and subsurface water degradation, such as highly erosive lands and wellhead protection areas that would benefit from being placed under permanent vegetative cover. Another factor to consider is the acres of Conservation Reserve Program (CRP) practices that are scheduled to expire within the partnership's counties. The plan should recognize the potential impact of these expiring contracts may have in the planning area and consider prioritizing working with producers regarding the management of those acres.

- **Lakes** – Lakes in the watershed are a major component to the overall land area relative to other southwest Minnesota watersheds. They are very important to the local quality of life and local economies and are sensitive to nutrient enrichment and runoff from both shoreland and watershed sources. Several of the lakes within the watershed are listed as impaired. The watershed plan should consider prioritizing practices that meet the Lake Restoration and Protection Strategies listed in the Watershed Restoration and Protection Strategies (WRAPS) and the 2018 Nonpoint Priority Funding Plan (NPFP). Consideration should be given to the following lakes with Eutrophication impairments: Yankton, Shetek, Sarah, Bloody, Fox, Talcot, North Oaks, East and West Graham, North and South Heron, Okamanpeedan, and many others.

## General Comments:

- **The Nonpoint Priority Funding Plan** (NPFP) – The NPFP outlines a criteria-based process to prioritize Clean Water Fund investments. Planning partners intending to pursue Clean Water Fund dollars are strongly encouraged to consider the high-level state priorities, keys to implementation, and criteria for evaluating proposed activities in the NPFP.
- **GRAPS** - The Groundwater Restoration and Protection Strategies (GRAPS) for the Des Moines watershed will be available in the near future. This report will help identify specific groundwater issues in the planning area; therefore, implementation actions to address these issues should be addressed in the plan. The Department of Natural Resources (DNR) now hosts groundwater and drinking water information in their Watershed Health Assessment Framework (WHAF) tool https://arcgis.dnr.state.mn.us/ewr/whaf2/which provides an organized approach for understanding natural resource conditions and challenges.
- **WRAPS** - The Watershed Restoration and Protection Strategies (WRAPS) for the Des Moines River Watershed is complete and is available from the MPCA. The WRAPS outlines water quality reduction goals for excess sediment, phosphorus, nitrogen, and E. coli Bacteria. It also identifies areas for protection within the watershed and goals to address degraded stream habitat. These recommended strategies to meet restoration goals and protection targets, should be reviewed and incorporated into your planning effort. A reference to how WRAPS Reports can be incorporated within your One Watershed One Plan effort can be found: Using WRAPS Reports in Local Water Planning
- **Landscape Resiliency and Climate Adaption** – BWSR strongly encourages your planning partnership to consider the potential for more extreme weather events and their implications for the water and land resources of the watershed in the analysis and prioritization of issues. The weather record for the planning area shows increased frequency and severity of extreme weather events, which has a direct effect on local water management. Adjustments involving conservation and fieldwork planning and implementation should be explored; for instance, the use of an updated precipitation frequency chart such as the NOAA Atlas 14 when designing conservation projects. An additional source of information for use in the planning process is the BWSR Landscape Resiliency Toolbox. Finally, a new white paper from the Minnesota Interagency Climate Adaptation Team titled "Building Resiliency to Extreme Precipitation in Minnesota" also provides resiliency strategies related to this topic.
- **Local Controls** – BWSR suggests a comparative review of local ordinance and regulations across the watershed with the purpose of identifying commonalities, significant differences as well as

opportunities for coordination. Gaps or inconsistencies within local ordinances, policies, or enforcement could affect the success of your plan's implementation. Examples of this evaluation include (but are not limited to) redetermination of ditches, SSTS compliance inspection requirements (property transfer, variance, etc.), shoreland regulations, level III feedlot inventories. The purpose of this effort is to identify commonalities, differences, and opportunities for coordination when planning implementation goals.

- **Soil Erosion/Soil Health** – BWSR believes that accelerated soil erosion, leading to turbidity and other water quality issues, is a significant issue in the watershed. Most of the land use in the Des Moines River planning area is agriculture. The concept and the associated practices of soil health have the potential to positively change the interaction of agriculture and the natural system at the soil level. Common soil health practices include the use of reduce or no tillage, the use of cover crops, increased areas of continuous living cover, and extended crop rotations. Improving soil health can help decreased soil erosion, increase water infiltration, provide nutrient scavenging, and increase soil organic matter. In addition, there seems to be increased interest from landowners and operators about soil health. It is recommended that these soil health practices be prioritized for implementation in the plan.
- **Protecting Pollinator Populations** - Projects should identify opportunities to benefit pollinator populations through creating areas of refuge and providing floral resources that can benefit a wide range of pollinators. BWSR also has a BWSR Pollinator Toolbox that provides guidance for project planning, implementation and management.
- **Aquatic and Terrestrial Invasive Species**- A cooperative approach across the watershed is recommended for invasive species management to address both aquatic and terrestrial invasive species and weed issues across the planning boundary. Invasive species should be prioritized based on their risk to ecosystems, agriculture, recreation, and human health. There should also be a focus on emerging weed threats such as Palmer amaranth that pose a significant risk to agricultural production. Adaptive management strategies should be used to address invasive species and also maintain ecological functions and services within landscapes.
- **Urban Stormwater/MS4s** – Urban stormwater runoff frequently contains pollutants such as pesticides, fertilizers, sediment, salt, and other debris, which can contribute to excess algae growth and poor water clarity/quality in our water resources. Poorly managed urban stormwater can also drastically alter the natural flow and infiltration of water, scour stream banks and harm or eliminate aquatic organisms and ecosystems. Municipal Separate Storm Sewer System (MS4) General Permits is owned/operated by the City of Worthington within the planning area. The MS4 permit holder should be invited to participate in the planning effort to ensure that their Stormwater Pollution Prevention Programs are incorporated into the plan.
- **Data Collection and Monitoring-** Data collection and monitoring activities necessary to support the targeted implementation schedule and reasonably assess and evaluate plan progress are required and should be coordinated with other data collection and monitoring efforts. As part of the plan, devise methods that the planning group can follow to ensure adherence to the planned activities and reassess the plan as implementation occurs in the future.

We commend the partners for their participation in the planning effort. We look forward to working with you through the rest of the plan development process. If you have any questions, please feel free to contact us via email at Douglas.Goodrich@state.mn.us or Mark.Hiles@state.mn.us, or via telephone at (507-537-6636).

Sincerely,

Douglas Goodrich, *Board Conservationist*

Mark Hiles, *Clean Water Specialist*

Attachments: Des Moines 1W1P Wetland Section Comments

cc: Ed Lenz, BWSR (via email)
Barbara Weisman, Tom Kresko, and Elizabeth Harper, DNR (via email)
Margaret Wagner and Kevin Hauth, MDA (via email)
Carrie Raber and Amanda Strommer, MDH (via email)
Juline Holleran, Katherine Pekarek-Scott, and Bryan Spindler MPCA (via email)

Equal Opportunity Employer

**Minnesota Department of Natural Resources**
**South Region Headquarters**
**21371 State Hwy 15**
**New Ulm, MN 56073**
**507-233-1200**

July 16, 2021

Sarah Soderholm
Environmental Technician
Murray County Environmental Services
2800 28th Street
Slayton, MN 56172

Andy Geiger
Director
Jackson County Environmental Services
603 South Hwy 86
Lakefield, MN 56150

Thank you for inviting the Minnesota Department of Natural Resources (DNR) to provide input as you and other local partners begin developing a Comprehensive Watershed Management Plan for the Des Moines River Basin.

We recognize the challenge of creating a shared vision for a healthy, well-functioning watershed. Local water management and political jurisdictions can have differing perspectives, priorities and goals. The DNR can help provide technical support in the planning process.

Attached to this letter are DNR priority concerns for the Des Moines River watershed. Using sound technical science and governance strategies to sustain water resources is a top DNR priority that aligns well with the One Watershed One Plan (1W1P) effort. DNR field staff from multiple divisions helped identify agency-wide resource priorities for the watershed, emphasizing those that provide multiple benefits. We believe incorporating these priorities will enhance water quality, aquatic and upland habitats, species diversity, groundwater protection and recharge while also providing recreational benefits that will enhance the quality of life in the watershed. We can provide additional information about these priorities as you progress in developing the plan.

Our lead staff person for this 1W1P project is Tom Kresko, Area Hydrologist at the Windom Area DNR office. He can be reached by telephone at 507-832-6045, or by email at tom.kresko@state.mn.us. Please contact Tom if you have questions or would like more information about the attached priorities or the types of technical support we can provide. Feel free to contact me as well if you need additional support.

Sincerely,

Scott W. Roemhildt
DNR South Region Director

EC: Barbara Weisman, DNR EWR Clean Water Operations
Liz Harper, DNR EWR South Manager (interim)
Jim Sehl, DNR EWR North District Manager
Todd Kolander, DNR EWR South District Manager
Tom Kresko, DNR Area Hydrologist
Doug Goodrich, BWSR Board Conservationist
Mark Hiles, BWSR Clean Water Specialist
Kevin Hauth, MDA Pesticide and Fertilizer Management
Amanda Strommer, MDH Regional Planner
Mark Hansen, MPCA Watershed Specialist

# Minnesota DNR Priority Resources and Issues for the Des Moines River Basin

The Department of Natural Resources (DNR) recommends the Des Moines River 1W1P planning committee include the following priority concerns and opportunities, which reflect input from DNR staff representing the divisions of Fish and Wildlife, Ecological and Water Resources (including the Nongame Wildlife Program), Forestry, Parks and Trails, and Lands and Minerals. These include items that can be measured, mapped, and implemented realistically within the Des Moines River watershed. The DNR can provide additional data around each issue as you begin developing the watershed plan, including information to help target areas for protection and restoration.

**Hydrology**: Managing surface and subsurface drainage systems, restoring wetlands, increasing vegetative cover on the landscape, and implementing water storage projects are all ways to reduce flood damage, protect fish and wildlife habitat, maintain, or improve stream stability, support summer and winter stream base flows, filter sediment and nutrients, and improve groundwater recharge.

- **Improving hydrologic functions**: The natural hydrologic functions of streams, rivers and lakes in the Des Moines River basin have been affected by climate change as well as landscape modifications associated with economic development for agriculture, industry, transportation and growing communities. Changes to the landscape—from ditches and straightened streams to drain wetlands and other low-lying areas—play a major role in stream stability issues and water quality impairments that impact the entire watershed. The net increase in water results in more extensive flooding, less aquatic habitat and species diversity, and higher nutrient and sediment loads. These concerns can be addressed by projects designed to build environmental resiliency—for example, projects that promote cover crops, mitigate agricultural drainage improvements with water storage in wetlands and floodplains, vegetate and protect the floodways and floodplains, preserve remaining natural stream channels and support water management practices targeted to reduce impacts.

- **Wetland restoration, cover crops and water storage projects**: Lakes, wetlands, and rivers account for less than 9% of the watershed. This is a result of intensive land use and drainage of 80% of the original wetlands and shallow lakes. These changes are contributing to increases in runoff, suspended sediment, and channel widening, as well as increased discharge of water downstream, less water storage, and reduced groundwater recharge. The cities of Worthington, Currie, Windom, Jackson, and Lake Shetek area have all experienced more frequent and extensive flooding as result of changes in the watershed and increased episodic precipitation events. Wetland restoration, cover crops and water retention practices, specifically in the upper reaches of the watershed, are needed to mitigate excess annual discharge, seasonal shifts in flows, and flood events, as well as to enhance water quality and reduce erosion by holding and metering out the water over a longer duration.

**Ground Water Sustainability**: Long-term planning for groundwater protection and recharge is needed to maintain sustainable water supplies for drinking, natural resources, and business uses, considering interactions between groundwater and surface water. Communities and rural water suppliers are acutely

aware of quality and quantity issues. Several suppliers are currently addressing pollutants in their drinking water supply, are actively seeking, or have recently secured new sources of water or have dealt with significant supply issues. Much of the available groundwater is within shallow aquifers that are connected to surface water features.

- **Water supply planning**: Clean drinking water is a precious resource that we often take for granted. Increasing demand from domestic, agricultural, and industrial water users can strain water resources and municipal water supply systems. Water users can be educated on conservation measures and new technologies designed to reduce overall water use. Planning for sustainable water supply and implementation of water conservation measures are needed across the entire watershed.
- **Groundwater recharge in sensitive areas**: Groundwater resources supply about 75% of Minnesota's drinking water and nearly 90 percent of water used for agricultural irrigation. BMP's and sustainable land use practices are essential in groundwater recharge areas, specifically the surficial sands and gravels and outwash areas where the chance of groundwater contamination is highest. Protecting important groundwater recharge areas for the City of Windom and all three (3) of the water well fields in the Red Rock Rural Water System is critical--including more focused nutrient management strategies and emphasis on land use decisions that improve groundwater quality and quantity.

**Surface Water Quality**: We need to work together to address water quality goals established in Watershed Restoration and Protection Strategies or WRAPS (see the Des Moines WRAPS report at https://www.pca.state.mn.us/water/watersheds/des-moines-river-headwaters). The goals established in the WRAPS and TMDLs work to address current and future water quality impairments, groundwater contamination, improve fish habitat in lakes and streams, and promote watershed's resilience to withstand climate change, invasive species, and other stressors.

**Restoration of lakes in the Watershed:** The Des Moines River WRAPS Report identifies most lakes as impaired for aquatic recreation--including popular lakes such as Shetek, Heron, Sarah, East and West Graham, Talcot, Lime, Currant, Clear, and Lake Yankton. DNR has identified Shetek and Talcot lakes as priority sites for dam removal and/or modification projects since the aging structures were not designed for today's hydrologic conditions or for aquatic organism passage. Fulda Lake and the surrounding watershed have seen great improvements in water clarity, fish diversity and public use. This restoration project serves as a good example of a cooperative lake restoration project in the area.

**Restoration of streams in the watershed**: The MPCA WRAPS report for the Des Moines River basin listed only one stream reach that was meeting water quality standards for supporting aquatic recreation.

- Roughly 53% of streams in the Des Moines Headwaters watershed, 75% of streams in the Upper Des Moines, and 80% of streams in the East Fork Des Moines, have been channelized or impounded. Channelized streams have limited floodplain access, are often unstable and provide poor fish and wildlife habitat. Changes in land and water management is needed to improve these alteration trends. In 2016 DNR published a watershed characterization report summarizing watershed and stream conditions, floodplain connectivity, and hydrology to assist in watershed planning efforts (https://wrl.mnpals.net/islandora/object/WRLrepository%3A2501). DNR also completed a supplemental Evaluation of Hydrologic Change (EHC) for the Des Moines River

Headwaters. The EHC results still need to be interpreted and include additional local input to be more relevant and meaningful in this planning process.

- **Restoring perennial vegetation in riparian areas:** Perennial vegetation is critical in riparian areas. Deep rooted native plants and floodplain connectivity will slow the flow of water, increase water retention, reduce erosion, filter sediment and nutrients, stabilize banks, provide wildlife habitat, and connect habitat corridors.
- **Agriculture and Conservation Best Management Practices (BMP's)**: Prime agricultural land should be preserved for agricultural use, but the watershed would benefit from conservation BMP's in targeted areas. All exposed soils should be protected by cover crops, and support residue to hold water and reduce runoff. Additional cover crop opportunities and initiatives are needed to support the multiple benefits of this practice to protect the land, soil, surface water, and ground water resources.
- **Streambank Erosion:** Streambank erosion is found throughout the watershed, but portions of Lime Creek, Okabena and Jack Creeks, and the Des Moines River exhibit substantial erosion, and Beaver Creek in Murray County exhibits extraordinarily notable bank erosion and detachment from the floodplain. The erosion is a result of stream bed aggradation and changes in precipitation patterns but, most significantly, it is also a symptom of hydrologic changes within the watershed.

**Habitat/Social/Economics**: Protecting, restoring, and enhancing habitat and public recreation opportunities in and around lakes, streams, wetlands, riparian zones, and grasslands in ways that promote clean water and prevent invasive species is essential. This watershed has abundant natural resources unique to Minnesota, however protecting, restoring, enhancing habitat and additional public recreation opportunities need consideration and mindful land use planning and zoning.

- **Protect and connect rare and natural features:** The watershed is home to many documented Species of Greatest Conservation Need (SGCN) like the Blanding's turtle, Dakota skipper, Poweshiek skipperling, and prairie bush clover and other endangered and threatened species. Many of these are grassland dependent species that require the protection and connection of large contiguous grassland areas such as the Heron Lake complex of protected lands, Talcot Lake Wildlife Management Area (WMA), Big Slough WMA, Badger Lakes WMA, and Lake Maria WMA.
- **Recreational opportunities**: Significant recreational opportunities exist in the watershed like the Casey Jones State Trail, Lake Shetek State Park, and Kilen Woods State Park. Additional opportunities for public use could include the development of a state water trail on the Des Moines River which is a publicly driven process that could enhance the use of this resource for outdoor recreation including canoeing, fishing, camping, and bird watching in areas throughout the Des Moines River valley.
- **Calcareous Fens:** There have been nine calcareous fens currently identified in the Des Moines River watershed. They represent one of the most unique and rare habitats in Minnesota. Calcareous fens support rare plant communities that exist only in fens because the constant supply of calcium rich groundwater. Fens require protection from disturbance by livestock or people, herbicide spraying or impacts to the groundwater source supplying the fen.

- **Trout Stream:** Scheldorf Creek is one of the only designated trout streams in the Des Moines watershed. Adding additional access easements for fishing would improve fishing opportunities on this stream. The protection of groundwater resources is critical for maintaining the cool and sustained groundwater that supplies baseflow to this trout stream.
- **Aggregate and mineral resources**: Most of the sand and gravel pits in the watershed are concentrated in the Des Moines River valley. Understanding the risks and rewards of these valuable aggregate resources in proximity to sensitive features is critical. DNR supports planning by local units of government for environmentally sound mining and access to aggregate and other natural construction materials for building and maintaining roads and other infrastructure.

###

**From:** Lloyd Kalfs <kalfs.lloyd@gmail.com>
**Sent:** Friday, July 16, 2021 7:22 PM
**To:** Sarah Soderholm <SSoderholm@co.murray.mn.us>
**Subject:** Des Moines River Watershed Partnership – 60 Day Notice

Sarah,

This email is in response to the Des Moines River Watershed Partnership 60 day notice to submit water management issues in which a management plan for this river should include.

In order to reach the management objectives of this plan, it is critical that we address the constant increase in artificial drainage. Public drainage system improvement projects and extensive use of private pattern tile adds substantially to the volume of water entering our lakes and rivers. The growth of agricultural drainage increases peak flows causing severe streambank erosion. Additionally, larger volumes of water from artificial drainage carry more nutrients and sediment which end up in our lakes and river systems and therefore reduce water quality.

To curb the effects of constant additions to agricultural drainage systems, watershed mandates or statewide legislature is needed. I suggest verbiage similar to the Wetland Conservation Act (WCA) where there may be no net increase in drainage output. This means counties and private individuals could repair drainage systems but not increase the volume of water at the systems outlet (such as by adding more open ditch, larger tile, and more/longer underground tile lines). Without this, a stalemate in water quality improvements will continue.

The Des Moines River Watershed Management Plan also needs to include changes in the overall management of lands within the watershed. Countless opportunities exist to restore wetlands that would help slow runoff and filter water before it enters public lakes and rivers. Acres that are less productive for row crops would be better utilized as pasture or restored upland habitat. Farming practices that focus on improving soil health such as cover crop rotations would create a landscape rich with perennial vegetation that would help to reduce runoff to the Des Moines River and increase groundwater infiltration.

These issues must be addressed in order to make improvements to the water quality of the Des Moines River. I greatly appreciate the opportunity to comment on the development of this watershed management plan and hope that the collaboration of all parties within this partnership yields cleaner water for future generations. Thank you.

Sincerely,

Lloyd Kalfs
(507) 329-0273

DEPARTMENT OF AGRICULTURE

July 12, 2021

Des Moines River One Watershed, One Plan Partnership
c/o Sarah Soderholm
Murray County
PO Box 57
Slayton, MN 56172
ssoderholm@co.murray.mn.us

**Re: Respond to request for priority issues in the Des Moines River Watershed**

Dear Sarah,

Thank you for the opportunity to provide priority issues for consideration in the development of the Des Moines River Watershed One Watershed One Plan (1W1P). The Minnesota Department of Agriculture (MDA) looks forward to working closely with local government units, stakeholders,and other agency partners in the planning process, as well as providing practical information and feedback to appropriate landowners and agricultural organizations in the watershed.

One of MDA's roles that relates to the One Watershed One Plan process is technical assistance. The MDA maintains a variety of water quality programs including; the Minnesota Agricultural Water Quality Certification Program, research, on-farm demonstrations, and groundwater and surface water monitoring. Our goal is to help better understand the resource concerns and further engagethe agricultural community in problem solving.

## MDA Priority Concerns

Nitrates and pesticides in groundwater are a priority resource concern for the MDA in this watershed.

The MDA is interested in working with local and state partners to engage the agricultural community, support on-farm demonstrations, promote the Minnesota Ag Water Quality Certification Program, and use the most recent and relevant research and tools to share information about conservation practices.

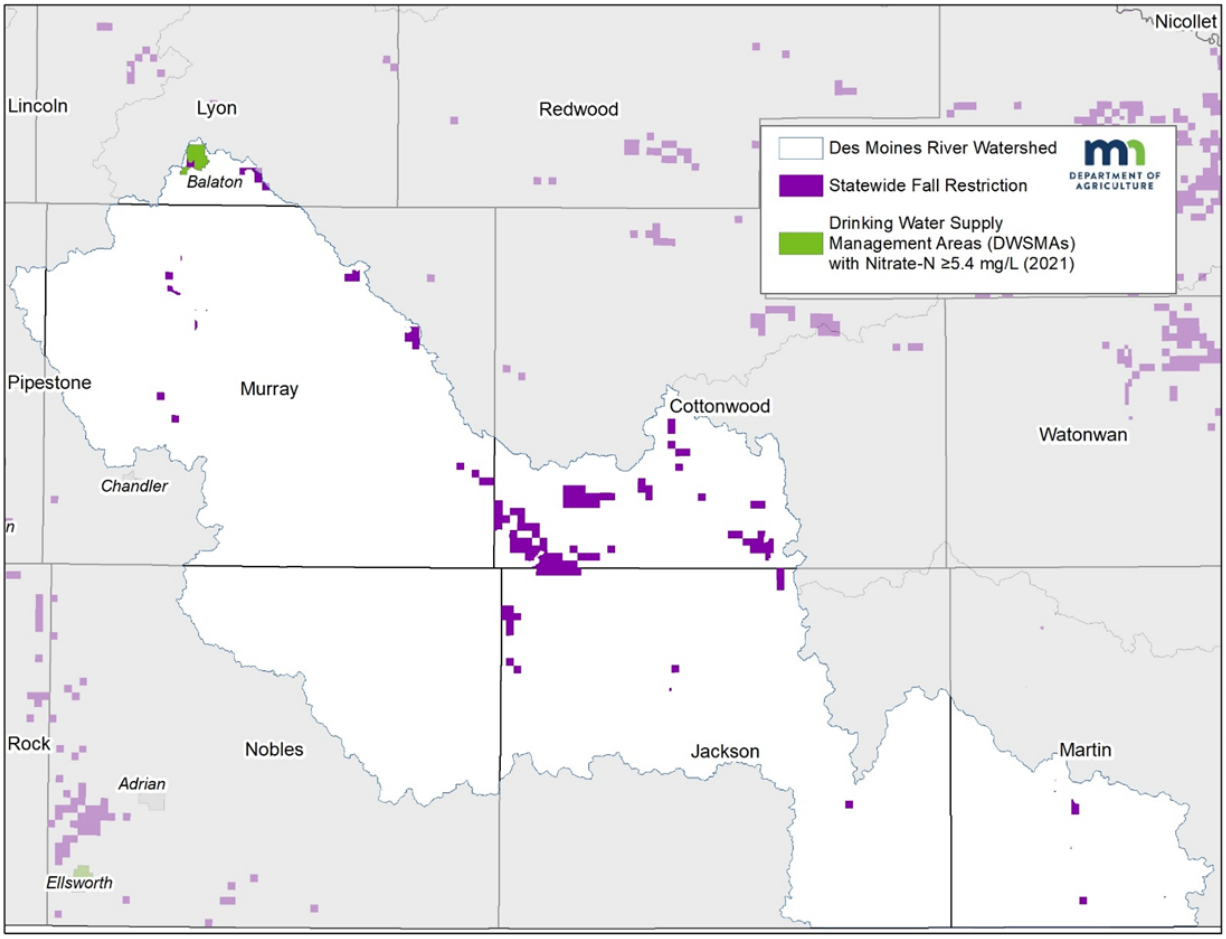
**Nitrogen Fertilizer Management Plan (NFMP)**
http://www.mda.state.mn.us/nfmp

The NFMP is the state's blueprint for preventing or minimizing impacts of nitrogen fertilizer on groundwater. The primary goal of the Nitrogen Fertilizer Management Plan (NFMP) is to involve the agricultural community in problem solving at the local level and work together to respond and address localized concerns about unsafe levels of nitrate in groundwater with a focus on Drinking Water Supply Management Areas (DWSMAs).

**Groundwater Protection Rule (GPR)**
https://www.mda.state.mn.us/nfr

The Groundwater Protection Rule minimizes potential sources of nitrate pollution to the state's groundwater and protects our drinking water. The first part of the rule restricts fall application of nitrogen fertilizer in areas vulnerable to contamination and is identified by the purple and green highlighted areas in **Figure 1** shown below. There are over 18,000 acres in the watershed that fall under part 1 of the rule.

**Figure 1. Land Affected by Groundwater Protection Rule in Des Moines River Watershed**



The second part of the rule outlines steps to reduce the severity of the problem in areas where nitrate in public water supply wells are elevated. In the map shown above, the City of Balaton has been identified as having high levels of nitrate in its public well. More studies are being done to find out the possible source(s) of elevated nitrate levels.

**Township Testing- Private Well Nitrate Testing**

The MDA has identified townships throughout the state that are vulnerable to groundwater contamination and have significant row crop production. Pipestone County and Cottonwood County have participated in the Township Testing Program (TTP.) Each selected township offered testing in two steps, the 'initial' sampling, and the 'follow-up' sampling. In the initial sampling, all township homeowners using private wells received a nitrate test kit. If the initial sample detected nitrate, the homeowner was offered follow-up tests for nitrate and pesticides and a well site visit. Trained MDA staff visited willing homeowners to resample the well and then conducted a site assessment. The site assessment identified possible non-fertilizer sources of nitrate and assessed the condition of the well. A well with construction problems may be more susceptible to contamination.

Two datasets, 'Initial' and 'Final', are used to evaluate nitrate in the private wells in this program. The initial dataset represents private wells drinking water regardless of the potential source of nitrate. The final dataset was informed through an assessment process to evaluate each well. In the assessment, wells that had nitrate results over 5 mg/L were removed from the final dataset if a potential non-fertilizer source or well problem was identified, there was insufficient information on the construction or condition of the well, or for other reasons which are outlined in the full report. The final dataset represents wells with nitrate attributed to the use of fertilizer.

In the initial results, the one township in Pipestone had more than 10% of the wells over 10 mg/L. In Cottonwood, the two townships had <5% of the wells over 10 mg/L. However, in the final results, there were less than 20 wells left in the data sets for each township, which is inadequate to characterize the township in terms of the nitrogen fertilizer management plan. Detailed sampling results are available at this web page: (http://www.mda.state.mn.us/townshiptesting).

**Minnesota Department of Agriculture Pesticide Water Quality Monitoring**

The Minnesota Department of Agriculture (MDA) has been conducting pesticide monitoring in ground water since 1985, and in surface waters since 1991. Annually, the MDA completes approximately 250 sample collection events from ground water and 800 sample collection events from rivers, streams, and lakes across the state. In general, the MDA collects water samples from agriculture and urban areas of Minnesota and analyzes water for up to approximately 150 different pesticide compounds that are widely used and/or pose the greatest risk to water resources. Groundwater monitoring is conducted by MDA and Minnesota Pollution Control Agency staff. Surface water monitoring is conducted by the MDA and a variety of cooperators. All monitoring is completed following annual work plans and standard operating procedures (SOP's) developed by the MDA.

The purpose of the MDA's pesticide monitoring program is to determine the presence and concentration of pesticides in Minnesota waters, and present long-term trend analysis. Trend analysis requires a long-term investment in monitoring within the MDA's established networks. The MDA releases an annual water quality monitoring report that includes all pesticide water quality data and long term trends available at www.mda.state.mn.us/monitoring. The MDA will continue to conduct statewide pesticide monitoring in the future and will provide additional information related to the occurrence of pesticides in Minnesota waters.

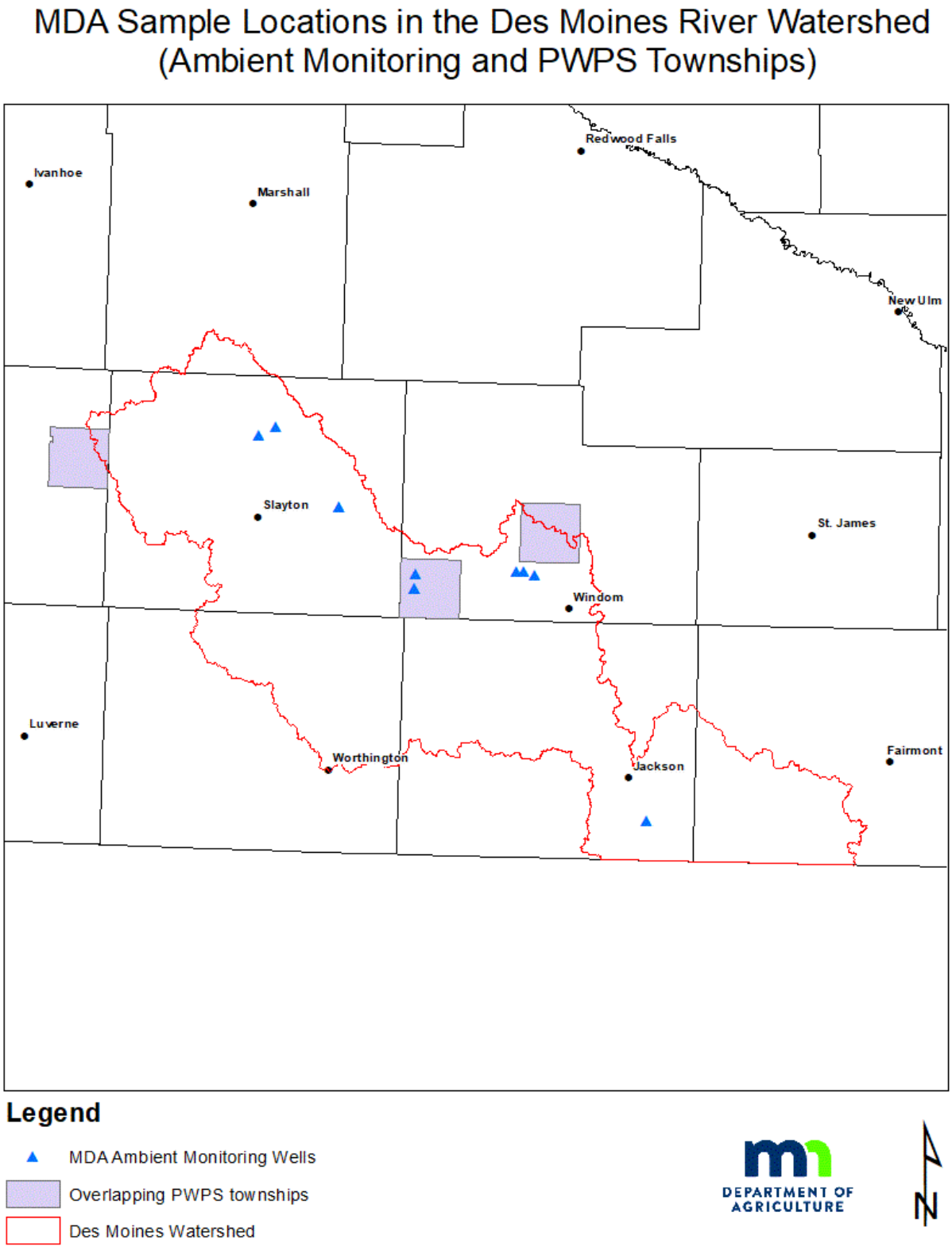
The MDA began evaluating pesticide presence and magnitude in private residential drinking water wells as part of the Private Well Pesticide Sampling (PWPS) Project in 2014 as a companion program to the MDA Township Testing Program (TTP). Townships in different counties have been, and will continue to be, sampled every year with the initial project concluding in June 2021. Townships in the PWPS depend on the participation of well owners and may not reflect all of the townships sampled in the TTP. Water samples are collected by trained MDA hydrologists and analyzed by a private contract lab for compounds similar to the MDA ambient water quality monitoring program. All monitoring is completed following annual work plans and standard operating procedures (SOP's) developed by the MDA. Results of the PWPS sampling can be found at the MDA's website for the PWPS Project.

**Des Moines River Watershed Groundwater**

**Ambient Monitoring Results**

The MDA has sampled 11 sites in the watershed. The MDA currently samples 6 sites within the watershed. **Figure 2** below presents the locations of the MDA's groundwater monitoring locations and the PWPS townships that were sampled.

**Figure 2. MDA surface and groundwater monitoring sites in the Des Moines River Watershed.**



**Current Monitoring**

The MDA currently samples 6 wells within this watershed and these wells have been sampled annually or semiannually since 2004.
Seventeen different pesticides or pesticide breakdown products (or degradants) have been detected in the wells. None have exceeded human health reference values.

Nitrate-nitrite (nitrate) concentrations range from < 0.2 to 22.3 mg/L. The health risk limit (HRL) for nitrate is 10 mg/L.
Monitoring of the MDA's sites in the watershed is expected to continue into the future.

**PWPS Project Results**

As part of the PWPS Project, wells in three townships in Cottonwood and Pipestone Counties were sampled. One township is within the watershed in Cottonwood County. The other two townships border the watershed in Cottonwood and Pipestone Counties. See the Figure 1 below for the locations of these townships. The MDA does not plan to continue this sampling within the watershed.

The sampling occurred in 2019. The chemistry data is available for the wells; however, due to privacy rules, the well locations cannot be shared.
Thirteen pesticides or pesticide degradants were detected in wells in these townships. None of the wells had a concentration that exceeded an established human health reference value for the compounds.

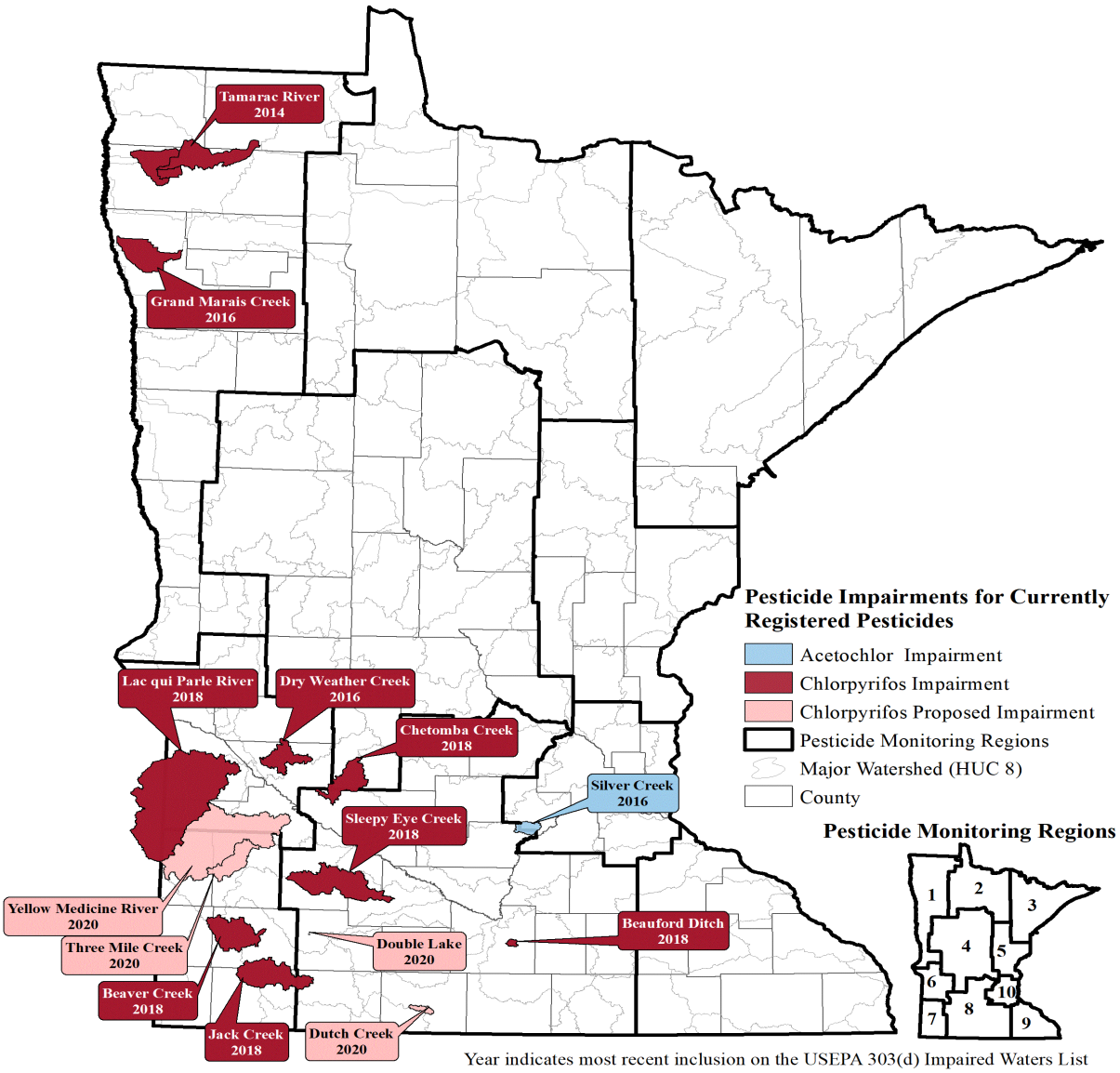
Nitrate concentrations within the townships tested ranged from <0.05 to 84 mg/L (Pipestone County). The HRL for nitrate is 10 mg/L.

**Surface Water**

The MDA has completed 302 pesticide water quality sample collection events from seven river and stream locations from 2003-2020. In addition, the MDA collected pesticide samples from 1 wetland in 2016 and 4 lakes in 2017.

The MDA has monitored Beaver Creek at MN 30 1.75 mile west of Currie, MN (S002-005) and Jack Creek at 370th Ave. 1.0 mile southwest of Heron Lake, MN (S001-590) since 2007. Both waterbodies were determined to be impaired by chlorpyrifos, an insecticide, in 2018. These waterbodies join 11 other waterbodies that are impaired by chlorpyrifos in Minnesota (see **Figure 3** below). The MDA has developed and implemented a Chlorpyrifos Response Plan that details specific actions the MDA is taking related to chlorpyrifos detections in surface water including Best Management Practices (BMPs), outreach and education, as well as targeted regulatory inspections. Specific water quality BMPs for chlorpyrifos are available at: https://www.mda.state.mn.us/sites/default/files/inline-files/chlorpyrifosbmps%281%29.pdf
No other pesticide impairments are in the watershed. The MDA intends to sample Beaver Creek and Jack Creek for the foreseeable future.

**Figure 3. Pesticide Impairments**



**Nitrogen and Pesticide Use**


The MDA surveys farmers through the National Agricultural Statistics Service (NASS). A summary of the data is attached to the submitted email as the pdf. "DMR Watershed MDA Survey."

The most recent nitrogen use survey was for the 2014 crop year for corn, and the most recent pesticide use survey was for the 2015 and 2016 crop years.

For reference, the University of Minnesota fertilizer recommendations are found here: https://extension.umn.edu/crop-production#nutrient-management

## Additional Resources and Opportunities for BMP Funding and Cost-share

Since there is a significant portion of the watershed in agricultural production, we would like to bring to your attention a couple resources, listed below, that we encourage you to reference during the planning process.

1) The **Agricultural BMP Handbook for Minnesota** (*recently updated*) is a comprehensive inventory of agricultural best management practices that address water quality impairments. The handbook is available on-line and hard copies are available upon request. State agencies and local government partners have found this a useful resource in the WRAPS and 1W1P processes. http://www.mda.state.mn.us/protecting/cleanwaterfund/research/handbookupdate.aspx.

    - Download at: https://wrl.mnpals.net/islandora/object/WRLrepository%3A2955/datastream/PDF/view

2) **Minnesota Agricultural Water Quality Certification Program (MAWQCP)**
http://www.mda.state.mn.us/awqcp.

The MAWQCP is a voluntary opportunity for farmers and agricultural landowners to take the lead in implementing conservation practices that protect our water. Those who implement and maintain approved farm management practices will be certified and in turn obtain regulatory certainty for a period of ten years. We encourage you to consider this program in the 1W1P process because it is an opportunity for agricultural producers to evaluate nutrient and field management practices within the Des Moines River Watershed to help reduce losses.

- There are currently 51 farmers, 221 fields, and approximately 26,000 acres (about 3% of acres in watershed) certified in the Des Moines River Watershed.

3) **The AgBMP Loan Program**
http://www.mda.state.mn.us/agbmploans

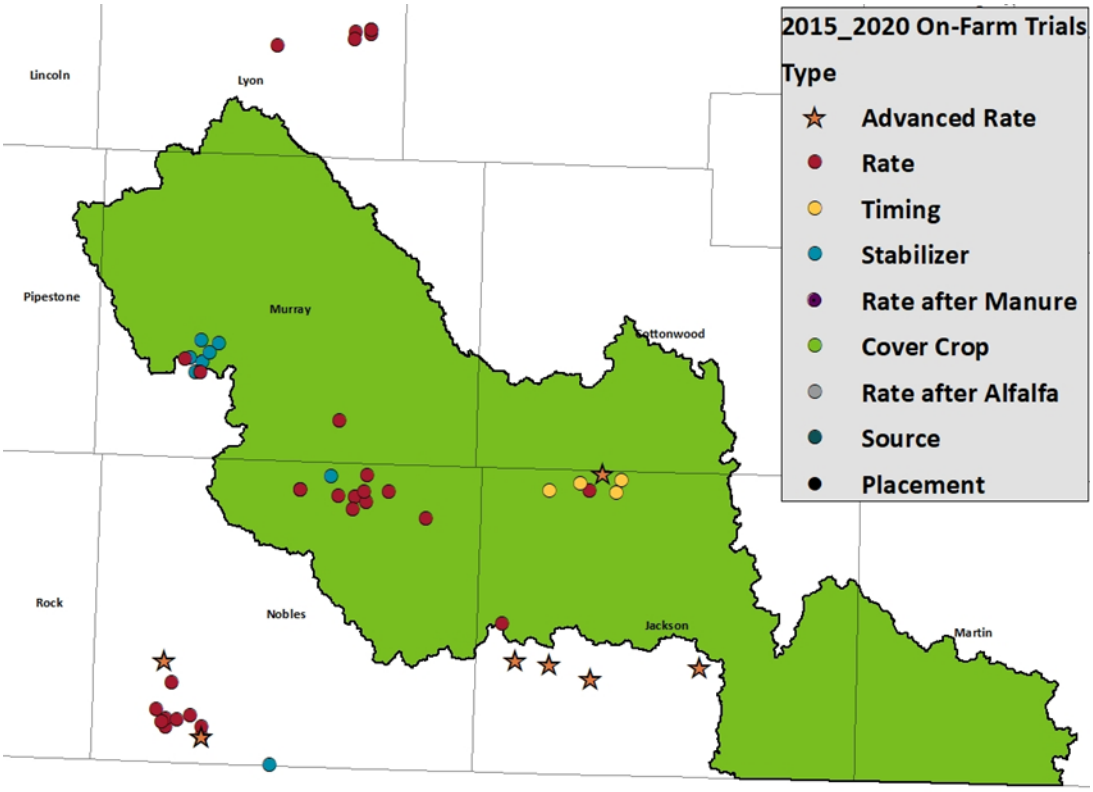
The AgBMP Loan Program is a water quality program that provides low interest loans to farmers, rural landowners, and agriculture supply businesses. The purpose is to encourage agricultural best management practices that prevent or reduce runoff from feedlots, farm fields, and other pollution problems identified by the county in local water plans. Loans can be used asmatch for other federal or state dollars supporting implementation.

4) **Nutrient Management Initiative (NMI)**
http://www.mda.state.mn.us/nmi

The NMI assists crop advisers and farmers in evaluating nutrient management practices on their own fields by utilizing on-farm trials. This is a great opportunity to promote and compare new strategies that are available that could improve fertilizer use efficiency, as well as to help open the door to include local cooperators in the water quality discussion. In addition, advanced nitrogen rate trials working with University of Minnesota researchers help guide current nitrogen rate recommendations.

Since 2015, twenty-four on-farm trials have been completed in the watershed where crop advisers worked directly with farmers and focused on new strategies that evaluated nitrogen rates, timing, and stabilizers. New trial ideas in other watersheds included on-farm cover crop, fertilizer placement, tillage, as well as precision agriculture and technology-based evaluations.

**Figure 4. On-Farm Trials (2015-2020) in Des Moines River Watershed**




We look forward to being involved in the 1W1P process. If you have any questions please do not hesitate to contact me at the information listed below.

Sincerely,

Kevin Hauth

**Kevin Hauth, CCA**
**Soil Scientist**
**Pesticide and Fertilizer Management Division**
23669 130th Street
Lamberton, MN 56152
C: 507-822-4175
kevin.hauth@state.mn.us

DEPARTMENT OF AGRICULTURE

Attachments: DMR Watershed MDA Survey pdf.

CC via email:
Amanda Strommer, MDH
Carrie Raber, MDH
Doug Goodrich, BWSR
Mark Hiles, BWSR
Tom Kresko, DNR
Katherine Pekarek-Scott, MPCA
Bryan Spindler, MPCA

DEPARTMENT OF HEALTH

*Protecting, Maintaining and Improving the Health of All Minnesotans*

July 9, 2021

Sarah Soderholm
Murray County
PO Box 57
Slayton, MN 56172
ssoderholm@co.murray.mn.us

Subject: Initial Comment Letter – *Des Moines River Watershed Planning Project*

Thank you for the opportunity to submit comments regarding water management issues for consideration in the One Watershed One Plan ( 1W1P) planning process for the Des Moines River Watershed Planning Area. Our agency looks forward to working closely with the local government units, stakeholders, and other agency partners on this watershed planning initiative.

The Minnesota Department of Health's (MDH) mission is to protect, maintain, and improve the health of all Minnesotans. An important aspect to protecting citizens health is the protection of drinking water sources. MDH is the agency responsible for implementing programs under the federal Safe Drinking Water Act (SDWA).

Source Water Protection (SWP) is the framework MDH uses to protect drinking water sources. The broad goal of SWP in Minnesota is to protect and prevent contamination of public and private sources of groundwater and surface water sources of drinking water using best management practices and local planning. Core MDH programs relevant to watershed planning are the State Well Code (MR 4725), Wellhead Protection (MR 4720) and surface water / intake protection planning resulting in a strong focus in groundwater management and protecting drinking water sources.

One of the three high level state priorities in Minnesota's Nonpoint Priority Funding Plan is to "Restore and protect water resources for public use and public health, including drinking water" which aligns with our agency's mission and recommendations to your planning process.

**MDH Priority Concerns:**

**Prioritize Drinking Water Supply Management Areas (DWSMA) in the Des Moines River Watershed 1W1P.**

DWSMA boundaries establish a protection area through an extensive evaluation that determines the contribution area of a public water supply well, aquifer vulnerability and provide an opportunity to prioritize specific geographic areas for drinking water protection purposes. DWSMA boundaries that extend beyond city jurisdictional limits or are established in Wellhead Protection (WHP) Action Plans for nonmunicipal public water supplies, like mobile home parks, can be a special focus for local partners prioritizing drinking water protection activities.

Aquifer vulnerability determines the level of management required to protect a drinking water supply and provides an opportunity to target implementation practices in accordance with the level of risk different land uses pose. The attached Public Water Supply Summary Spreadsheet highlights the primary drinking water protection activities for many DWSMAs in the watershed.

**Prioritize Sealing Abandoned Wells**

Unused, unsealed wells can provide a conduit for contaminants from the land surface to reach the sources of drinking water. This activity is particularly important for abandoned wells that penetrate a confining layer above a source aquifer.

Sealing wells is a central practice in protecting groundwater quality, however when resource dollars are limited it is important to evaluate private well density to identify the populations most at risk from a contaminated aquifer.

**Prioritize Protection of Private Wells**

Many residents of Des Moines River Watershed rely on a private well for the water they drink. However, no public entity is responsible for water testing or management of a private well after drilling is completed. Local governments are best equipped to assist private landowners through land use management and ordinance development, which can have the greatest impact on protecting private wells. Other suggested activities to protect private wells include: hosting well testing or screening clinics, providing water testing kits, working with landowners to better manage nutrient loss, promoting household hazardous waste collection, managing storm water runoff, managing septic systems, and providing best practices information to private well owners.

Approximately 19.4% of the 310 arsenic samples taken from wells in the Des Moines River Watershed have levels of arsenic higher than the Safe Drinking Water Act (SDWA) standard of 10 micrograms per liter (µg/L). Arsenic occurs naturally in rocks and soil and can dissolve into groundwater. Consuming water with low levels of arsenic over a long time (chronic exposure) is

associated with diabetes and increased risk of cancers of the bladder, lungs, liver and other organs. The SDWA standard for arsenic in drinking water is 10 µg/L; however, drinking water with arsenic at levels lower than the SDWA standard over many years can still increase the risk of cancer. The EPA has set a goal of 0 µg/L for arsenic in drinking water because there is no safe level of arsenic in drinking water.

**Prioritize Protecting Noncommunity Public Water Supplies**

Noncommunity public water supplies provide drinking water to people at their places of work or play (schools, offices, campgrounds, etc.). Land use and management activities (maintaining/upgrading SSTS, well sealing, etc.) should consider effects on these public water systems. Find information regarding noncommunity public water supplies in the watershed in reports titled Source Water Assessments (SWA) at:
https://www.health.state.mn.us/communities/environment/water/swp/swa.html

Source Water Assessments provide a concise description of the water source - such as a well, lake, or river - used by a public water system and discuss how susceptible that source may be to contamination.

**Prioritize and promote groundwater conservation & recharge.**

The Des Moines River Watershed has areas with limited groundwater resources and aquifer availability. Promote conservation practices that improve groundwater recharge and wise water use.

**Targeting Groundwater & Drinking Water Activities in the 1W1P Planning Process**

**Limitation of Existing Tools –**

Watershed models used for prioritizing and targeting implementation scenarios in the 1W1P, whether PTMapp, HSPF-Scenario Application Manager (SAM) or others, leverage GIS information and/or digital terrain analysis to determine where concentrated flow reaches surface water features. While this is an effective approach for targeting surface water contaminants, it does not transfer to groundwater concerns because it only accounts for the movement of water on the land's surface. Unfortunately, targeting tools are not currently available to model the impact on groundwater resources. The Minnesota Department of Health suggests using methodologies applied by the agency to prioritize and target implementation activities in the Source Water Protection program.

**Using the Groundwater Restoration and Protection Strategies (GRAPS) Report –**

The MDH, along with its state agency partners, are developing a Groundwater Restoration and Protection Strategies (GRAPS) report for the Des Moines River Watershed. GRAPS will provide information and strategies on groundwater and drinking water supplies to help inform the local decision making process of the 1W1P. Information in a GRAPS Report can be used to identify risks to drinking water from different land uses. Knowing the risks to drinking water in a specific area allows targeting of specific activities.

- Prioritize Actions Identified in the Groundwater Restoration and Protection Strategies (GRAPS) report.

**Using Wellhead Protection Plans –**

- Identify Drinking Water Supply Management Areas (DWSMA) located in the watershed.
- Examine the vulnerability of the aquifer to contamination risk to determine the level of management required to protect groundwater quality. For example, a highly vulnerable setting requires many different types of land uses to be managed, whereas a low vulnerability setting focuses on a few land uses due to the long recharge time and protective geologic layer.
- Use the Management Strategies Table in a Wellhead Protection Plan to identify and prioritize action items for each DWSMA

**Using Guidance Documents to Manage Specific Potential Contaminant Sources –**

The MDH has developed several guidance documents to manage impacts to drinking water from specific potential contaminant sources. Topics include mining, stormwater, septic systems, feedlots, nitrates, and chemical and fuel storage tanks. This information is available at

https://www.health.state.mn.us/communities/environment/water/swp/resources.html

Attached you will find a listing of MDH data and information to help you in the planning process. Thank you for the opportunity to be involved in your watershed planning process. If you have any questions, please feel free to contact me at (507) 476-4241 or Amanda.strommer@state.mn.us.

Sincerely,

Amanda Strommer, Principal Planner
Minnesota Department of Health, Source Water Protection Unit
1400 E. Lyon Street, Marshall, MN 56282

Attachments

CC via email:

Mark Wettlaufer, MDH Source Water Protection Unit
Yarta Clemens-Billaigbakpu, MDH Source Water Protection Unit
Carrie Raber, MDH Source Water Protection Unit
Doug Goodrich, BWSR Board Conservationist
Mark Hiles, BWSR Clean Water Specialist
Tom Kresko, DNR
Katherine Pekarek-Scott, MPCA
Bryan Spindler, MPCA
Kevin Hauth, MDA

**MDH Data and information:**

- Drinking Water Statistics – Where do people get their drinking water in the Des Moines River Watershed? One hundred percent obtain their drinking water from groundwater sources. Water is supplied from private wells, community public water supplier, or rural water supplier. Lewis and Clark Regional Water System provides water to public water suppliers in the region to help supplement the need for water. This information can help you understand where people are obtaining their drinking water and develop implementation strategies to protect the sources of drinking water in the watershed.
- A spreadsheet of the public water supply systems in the watershed, status in wellhead protection planning, and any drinking water protection concerns or issues that have been identified in protection areas. This information can help you understand the drinking water protection issues in the watershed, prioritize areas for implementation activities, and identify potential multiple benefits for implementation activities.
    - Shape files of the Drinking Water Supply Management Areas (DWSMA) in the watershed are located at https://www.health.state.mn.us/communities/environment/water/swp/maps/index.htm This information can help you prioritize and target implementation activities that protect drinking water sources for public water supplies.

**MDH Figures:**

- A figure detailing the "Pollution Sensitivity of Near-Surface Materials" in the Des Moines River Watershed. This information can help you understand the ease with which recharge and contaminants from the ground surface may be transmitted into the upper most aquifer on a watershed scale. Individual wellhead protection areas provide this same information on a localized scale. This is turn can be used to prioritize areas and implementation activities.
- A figure detailing "Pollution Sensitivity of Wells" in the Des Moines River Watershed. This information can help you understand which wells in the watershed are most geologically sensitive based on the vulnerability of the aquifer in which the well is completed. This information allows for targeting of implementation activities to the sources of water people are drinking.
- A figure detailing "Nitrate Results" in the Des Moines River Watershed. This information can help you understand which wells in the watershed contain elevated nitrate levels.
- A figure detailing "Arsenic Results" in the Des Moines River Watershed. This information can help you understand which wells in the watershed contain elevated arsenic levels.
- A figure detailing "DWSMA Vulnerability" in the Des Moines River Watershed. This information can help you understand DWSMA vulnerability to contamination from the ground surface. This figure allows for targeting of implementation activities for public water suppliers.

## Des Moines River Watershed Basin Public Water Supplies - Drinking Water Protection Concerns for Quality & Quantity

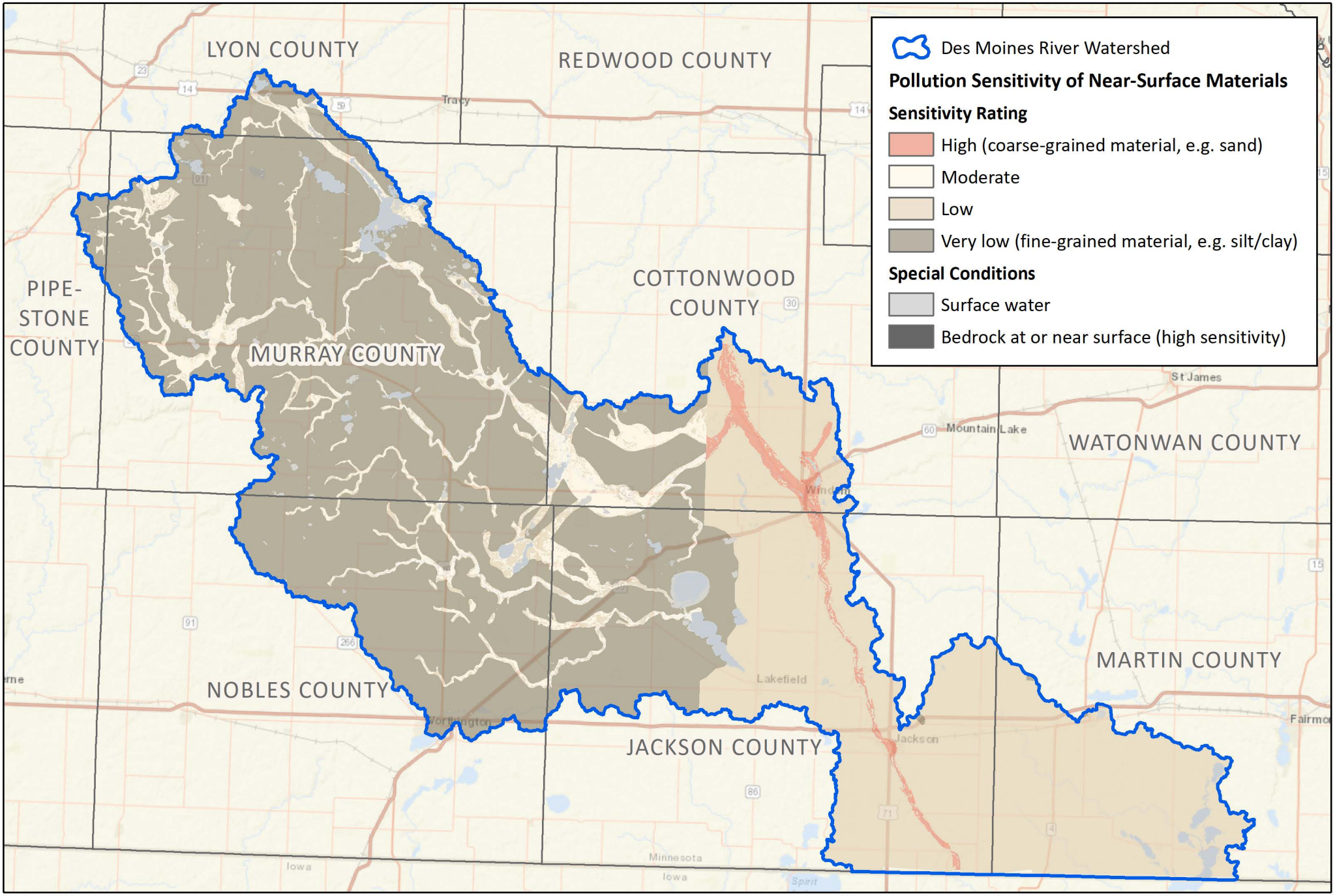
| Aquifer Risk | Name | County | Watershed | Subwatershed | WHP Plan | DWSMA Vulnerability |
|---|---|---|---|---|---|---|
| *Very high potential contaminant risk due to connection with surface water* - Focus on impacts from land use practices and surface water runoff | | | | | | |
| | Red Rock Rural Water - Lake Agusta | Cottonwood | Des Moines Headwaters | Harder Lake | Yes | High SWCA, High and Moderate Groundwater |
| | Red Rock Rural Water - Great Bend | Cottonwood | Des Moines Headwaters | Harder Lake and String Lakes | Yes | High SWCA, High Groundwater |
| | Red Rock Rural Water - Lindstrom | Murray | Des Moines Headwaters | City of Currie-Des Moines River, Big Slough and Lime Creek | Yes | High SWCA, High Groundwater |
| | Windom | Cottonwood | Des Moines Headwaters | Cottonwood Lake and City of Windom-Des Moines River | Yes | High SWCA, High and Low Groundwater |
| *High potential contaminant risk* - Focus on potential land use contaminant sources that may impact water quality | | | | | | |
| | Alpha | Jackson | East Fork Des Moines | Headwaters East Fork Des Moines | Yes | Moderate |
| | Balaton | Lyon | Des Moines Headwaters | Lake Yankton and Currant Lake | Yes | High and Moderate |
| | Lake Wilson | Murray | Des Moines Headwaters | Upper Beaver Creek | Yes | Moderate |
| *Low potential contaminant risk* - Focus on sealing of unused wells and old public water supply wells (funding available from MDH) | | | | | | |
| | Avoca | Murray | Des Moines Headwaters | Lime Creek | No | Anticipate Low |
| | Ceylon | Martin | East Fork Des Moines | Little Tuttle Lake | Yes | Low |
| | Currie | Murray | Des Moines Headwaters | City of Currie-Des Moines River | No | Anticipate Low |

| | | | | | |
|---|---|---|---|---|---|
| Dunnell | Martin | East Fork Des Moines | Fourmile Creek and Soldier Creek | Yes | Low |
| Fulda | Murray | Des Moines Headwaters | East Graham Lake and Lime Creek | Yes | Low |
| Hadley | Murray | Des Moines Headwaters | Lower Beaver Creek | No | Anticipate Low |
| Iona | Murray | Des Moines Headwaters | North Badger Lake | Yes | Low |
| Jackson | Jackson | Des Moines Headwaters | City of Jackson-Des Moines River | Yes | Low |
| Lakefield | Jackson | Des Moines Headwaters | Judicial Ditch 3 | Yes | Low |
| Okabena | Jackson | Des Moines Headwaters | Lower Okabena Creek | No | Anticipate Low |
| Sherburn | Martin | East Fork Des Moines | County Ditch 11 | Yes | Low |
| Slayton | Murray | Des Moines Headwaters | Lower Beaver Creek and Big Slough | In Progress | Low |

36 Non-Community Public Water Suppliers
Brewster, Dundee, Heron Lake, and Wilder purchase water from rural water suppliers. Worthington DWSMAs are outside of planning area.

Acronyms:
SWCA=Surface Water Contribution Area
DWSMA=Drinking Water Supply Management Area
WHP=Wellhead Protection Plan

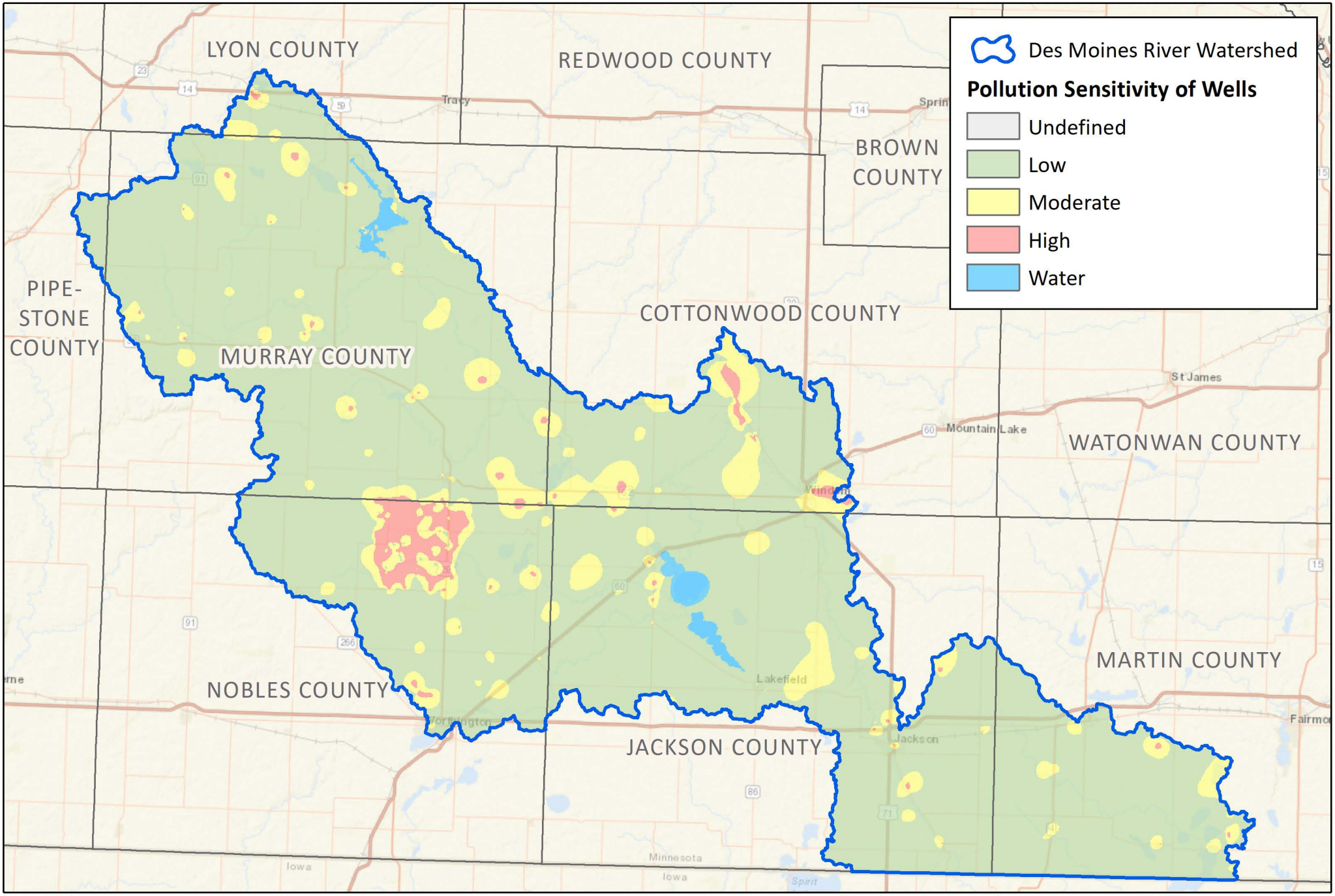
# Des Moines River Watershed - Pollution Sensitivity of Near-Surface Materials




Data: DNR
Basemap: ESRI World Street Map

10 5 0 10 Miles

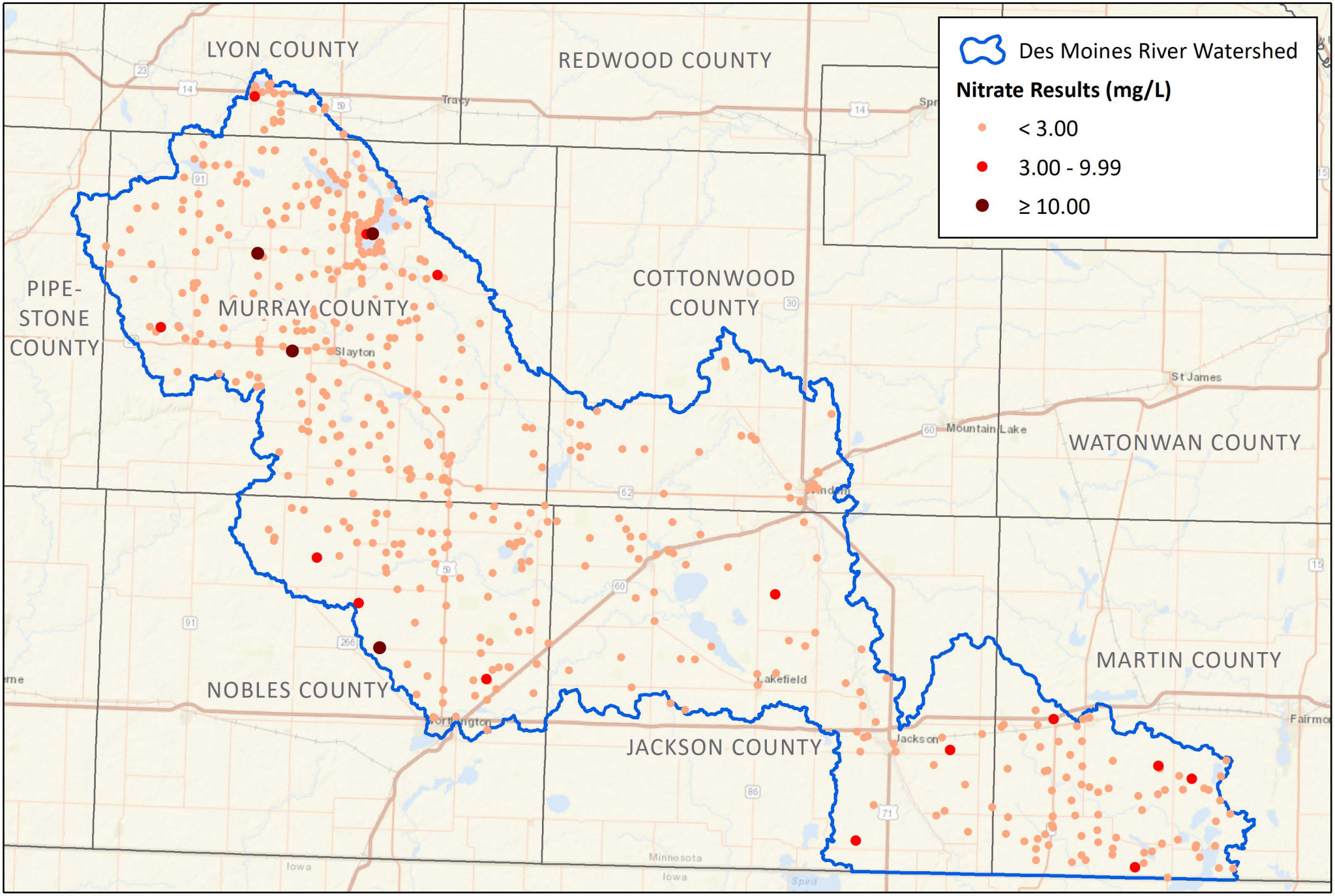
# Des Moines River Watershed - Pollution Sensitivity of Wells




Data: MDH
Basemap: ESRI World Street Map

10 5 0 10 Miles

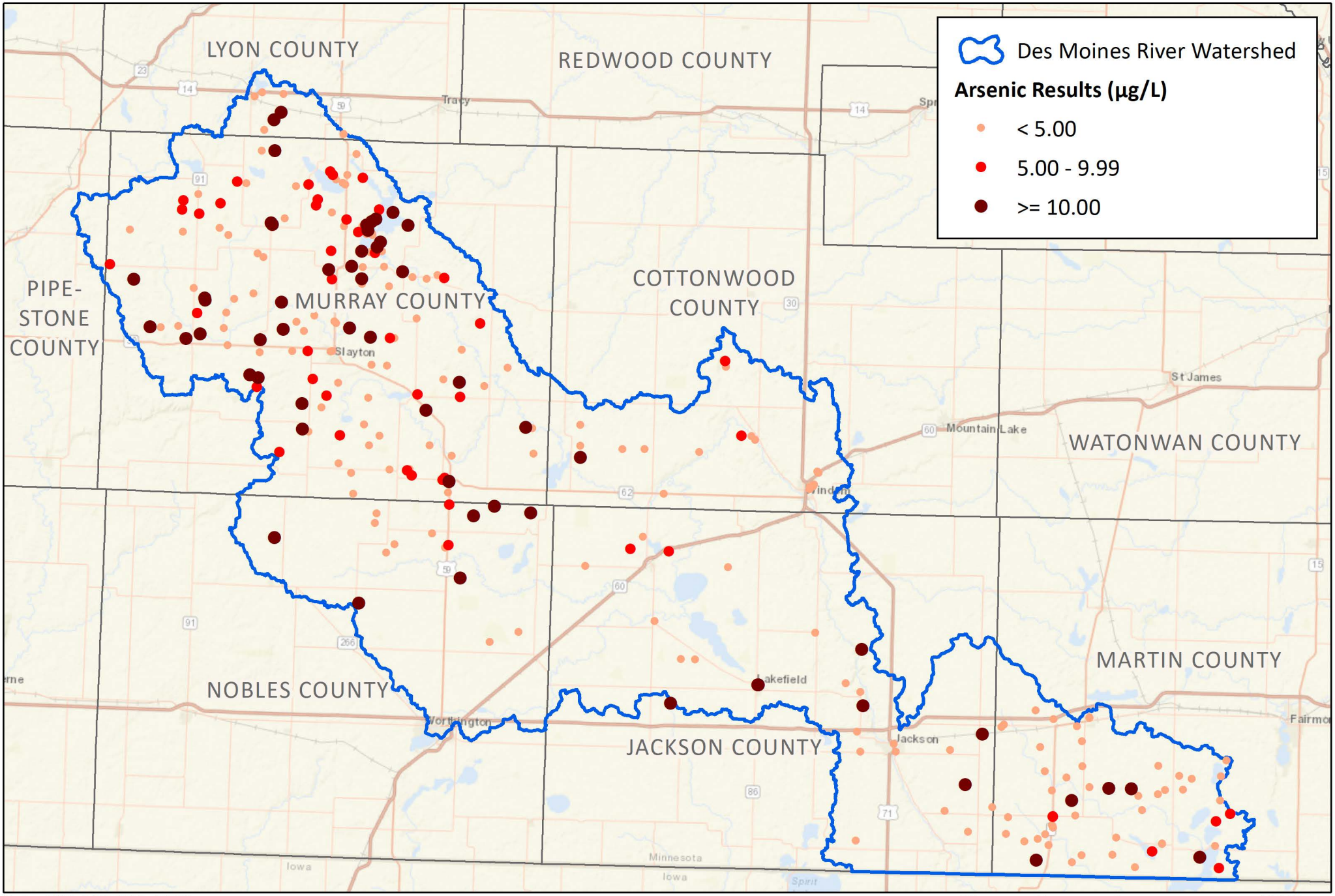
# Des Moines River Watershed - Nitrate Results




Data: CWI, MNDWIS, MDH
Basemap: ESRI World Street Map

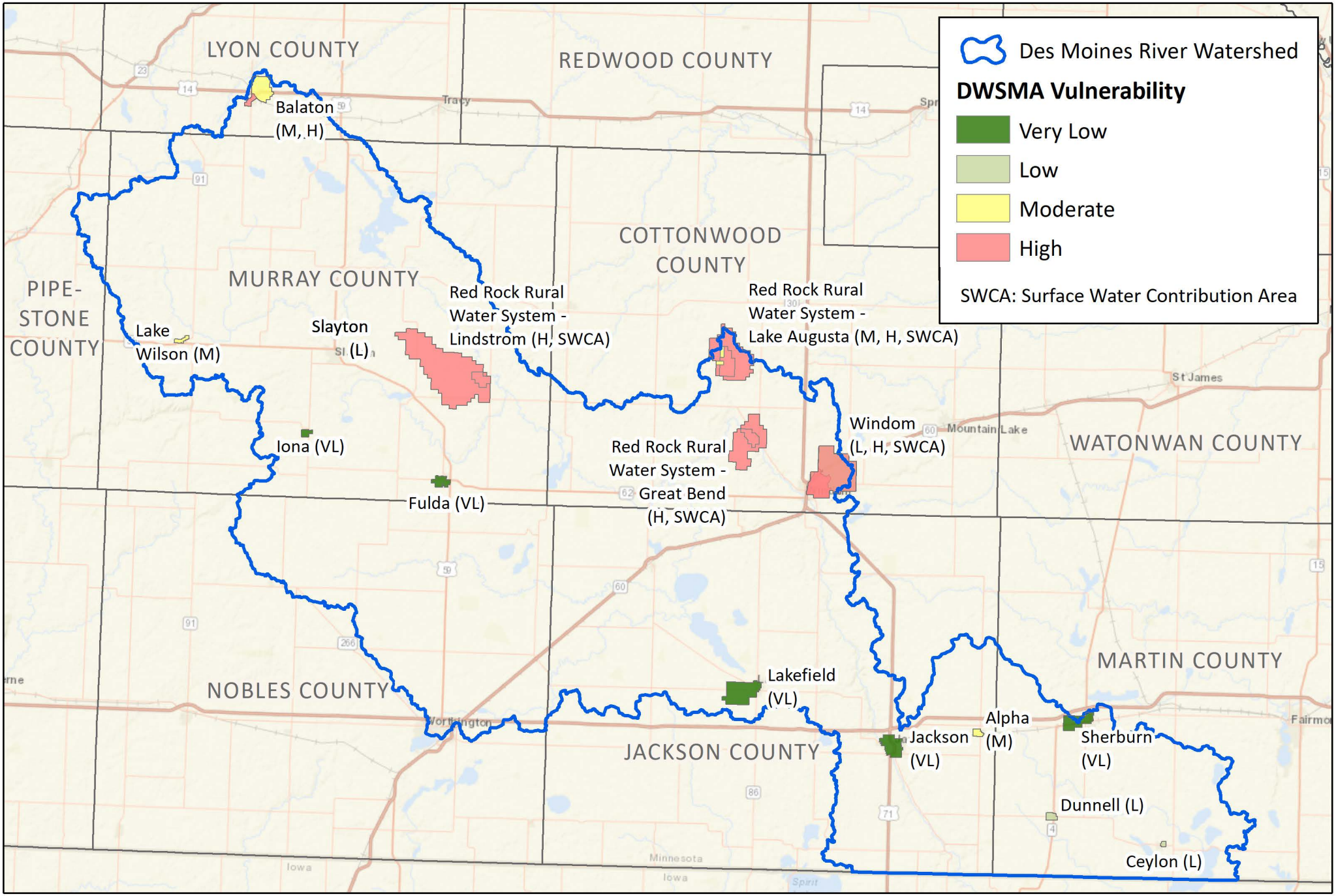
10 5 0 10 Miles

# Des Moines River Watershed - Arsenic Results




Data: CWI, MNDWIS, MDH
Basemap: ESRI World Street Map

# Des Moines River Watershed - DWSMA Vulnerability




Data: MDH

Basemap: ESRI World Street Map

10 5 0 10 Miles

MINNESOTA POLLUTION CONTROL AGENCY

Marshall Office | 504 Fairgrounds Road | Suite 200 | Marshall, MN 56258-1688 | 507-537-7146

800-657-3864 | Use your preferred relay service | info.pca@state.mn.us | Equal Opportunity Employer

July 12, 2021

Sarah Soderholm
Environmental Technician
Murray County
PO Box 57
Slayton, MN 56172

RE: Response to Request for Water Management Issues and Priority Concerns to be addressed in the Des Moines River Watershed One Watershed, One Plan

Dear Sarah Soderholm:

The Minnesota Pollution Control Agency (MPCA) has received your request to submit water management issues pertinent to the Des Moines River Watershed One Watershed, One Plan (Plan) development process. The MPCA appreciates the opportunity to provide input throughout the Plan development process. As part of MPCA's review, we are providing the following comments we would like to see addressed in the Plan.

The MPCA and other state agencies coordinated with local partners to gather, analyze, and summarize information to develop the Watershed Restoration and Protection Strategies (WRAPS) Report for the Des Moines River Watershed. The following pages provide a brief summary of available information from the watershed approach process. The MPCA requests you consider this information during development of the Plan.

## Background Information

The State of Minnesota employs a watershed approach to restore and protect Minnesota's rivers, lakes, and wetlands. The watershed approach includes the following processes that can be used to inform water planning:

1. Watershed monitoring and assessment
2. Stressor identification (SID) of biological impairments
3. Total Maximum Daily Loads (TMDLs)
4. WRAPS

Following is a brief description of these processes and internet links for the reports associated with these efforts.

## Monitoring and Assessment

In 2014, a comprehensive approach was taken to monitor and assess surface water bodies in the Des Moines River Basin (DMRB) for aquatic life, recreation, and fish consumption use support. For details on the data collected, refer to the Des Moines River Watershed Monitoring and Assessment Report (https://www.pca.state.mn.us/sites/default/files/wq-ws3-07100001b.pdf).

Monitoring data are used to determine if water quality is supporting a water body's designated use. During the assessment process, data on the waterbody are compared to relevant standards. When pollutants/parameters in a waterbody do not meet the water quality standard, the waterbody is considered impaired. When pollutants/parameters in a waterbody meet the standard, the waterbody is considered supporting. Data from three water quality monitoring programs inform water quality assessment and create a long-term data set to track progress toward water quality goals. These programs will continue to collect and analyze data in the DMRB as part of Minnesota's Water Quality Monitoring Strategy. Intensive Watershed Monitoring (IWM), the Watershed Pollutant Load Monitoring Network (WPLMN) and Citizen Stream and Lake Monitoring Program (CSMP and CLMP) data provide a periodic but intensive "snapshot" of water quality conditions throughout the watershed.

Within the DMRB, there are 182 impairment listings. Table 1 summarizes the listings by impairment type. Full details on the impairment listings can be found here: https://www.pca.state.mn.us/water/minnesotas-impaired-waters-list.

**Table 1. Summary of Impaired Waters by type for the Des Moines River Basin**

| Impairment Type | Number of Listings | Beneficial Use |
|---|---|---|
| Ammonia, un-ionized | 1 | Aquatic Life |
| Fecal Coliform; E coli | 27 | Aquatic Recreation |
| Aquatic macroinvertebrate bio assessment | 40 | Aquatic Life |
| Fish Bio Assessment | 61 | Aquatic Life |
| River Nutrients | 2 | Aquatic Life |
| Dissolved Oxygen | 2 | Aquatic Life |
| Chlorpyrifos | 2 | Aquatic Life |
| Chloride | 1 | Aquatic Life |
| Lake; Nutrient/Eutrophication | 23 | Aquatic Recreation |
| Stream; Mercury in fish Tissue | 2 | Aquatic Consumption |
| Turbidity; Total Suspended Solids | 20 | Aquatic Life |
| pH | 1 | Aquatic Life |

## Stressor Identification

SID is performed on biological impaired water bodies to determine what pollutant and nonpollutant stressors are causing impairments to the aquatic biological community. The process is described in more detail and documented in the Des Moines River Watershed SID Report (https://www.pca.state.mn.us/sites/default/files/wq-ws5-07100001a.pdf) for the reaches listed for aquatic life impairments (fish, aquatic macroinvertebrate impairments). SID was completed on 56 waterbodies for biota (fish and/or macroinvertebrates) impairments in the entire DMRB. A summary of the primary stressors to the biological community by impaired reach can be found in Table 551 on Page 465 in the report referenced above. A table of stressors for each stream reach is also available in the respective stream reach sections of the report. Biologically impaired reaches in the 2018 report show primary stressors including: dissolved oxygen, nitrate, phosphorous, turbidity/total suspended solids (TSS), habitat, connectivity and altered hydrology. Primary stressors and recommended restoration priorities are summarized in Table 2.

**Table 2. Recommended prioritization of restoration activities relative to the stressors contributing to the biological impairments in the Des Moines River Basin**

| Stressor | Priority | Comment |
|---|---|---|
| Habitat | High | Re-establish quality riparian corridor to increase woody debris, stream stability, and stream shading. Protect streambanks, reduce erosion and overall stream sedimentation. |
| DO and Eutrophication | High | Utilize a variety of nutrient reducing BMPs including but not limited to: cover crops, nutrient management, saturated buffers, etc. |
| Nitrate | High | Utilize a variety of nutrient reducing BMPs including but not limited to: cover crops, nutrient management, saturated buffers, etc. |
| Flow Alteration/Connectivity | High | Increase storage and infiltration of water in locations with flow alteration stressors and solicit DNR recommendations for streams with existing connectivity stressors and/or determine if restoration is appropriate. Further monitoring may be needed to better determine the impact that this stressor may be having on many of the reaches especially in the headwaters of these watersheds. |
| Suspended Sediment | Medium | Focus on reducing sediment input from riparian corridor (cattle pastures) and immediate stream channel (stream banks). |

## Total Maximum Daily Loads

The Clean Water Act requires that TMDLs be developed for waters that do not support their designated uses. A TMDL provides the allowable pollutant loading, as well as needed reductions, to attain and maintain water quality standards in waters that are not currently meeting standards. The TMDL reports containing impaired waterbodies and pollutant reductions located in the watershed can be found here:

Des Moines River - Headwaters Watershed River Eutrophication TMDL Report (2020 completion)
https://www.pca.state.mn.us/sites/default/files/wq-iw7-56e.pdf

Des Moines River Basin Watersheds TMDL Report (2020 Completion)
https://www.pca.state.mn.us/sites/default/files/wq-iw7-54e.pdf

A TMDL was approved in December 2008 that addressed bacteria, turbidity, pH, and excess nutrients. An implementation plan for this TMDL was approved in September 2009.

West Fork Des Moines River - Multiple Impairments TMDL Report
https://www.pca.state.mn.us/sites/default/files/wq-iw7-13e.pdf

Amendment to the West Fork Des Moines River Watershed Multiple Impairments TMDL
https://www.pca.state.mn.us/sites/default/files/wq-iw7-13l.pdf

West Fork Des Moines River and Heron Lake TMDL Implementation Plan
https://www.pca.state.mn.us/sites/default/files/wq-iw7-13c.pdf

## Watershed Restoration and Protection Strategies

In each cycle of the watershed approach, rivers, lakes, and wetlands across the watershed are monitored and assessed, waterbody restoration and protection strategies and local plans are developed, and conservation practices are implemented. Much of the information presented in the WRAPS report was synthesized from the Monitoring and Assessment, SID, and TMDL reports. However, the WRAPS report presents additional data and analyses including watershed-scale models and tools, detailed analyses and output from these work products, and a set of potential strategies for point and nonpoint source pollution that will cumulatively achieve, or otherwise make significant progress toward, water quality targets. The Des Moines River Basin WRAPS Report can be found here: https://www.pca.state.mn.us/sites/default/files/wq-ws4-52a.pdf.

To ensure the WRAPS strategies and other analyses appropriately represent the DMRB, Cottonwood, Jackson, Lyon, Martin, Murray, Nobles and Pipestone county and SWCD staff, and state natural resource and conservation professionals (referred to as the WRAPS Local Work Group) were convened to inform the report and advise technical analyses. Two key products of this WRAPS report are the strategies table and the priorities section, each developed with the WRAPS Local Work Group.

### Goals and 10-year Targets

Among the required elements of WRAPS are timelines for achieving water quality targets and interim milestones within 10 years of strategy adoption. The DMRB goals and targets were developed by the WRAPS Local Work Group and are found in Table 3. Further descriptions of the goals and targets are found in Section 2.1 (Page 31) of the WRAPS report. It is the intent of the implementing organizations in the watershed to make steady progress in terms of pollutant reduction. However, needed pollutant load reductions are generally high and will require significant adoption of conservation practices. Factors that may mean slower progress include limits in funding or landowner acceptance, challenging fixes, (e.g., unstable bluffs and ravines, invasive species) and unfavorable climatic factors. Conversely, there may be faster progress for some impaired waters, especially where high-impact fixes are slated to occur or where the watershed is subject to focused efforts.

**Table 3. Des Moines River Basin goals and 10-Year targets as identified by the WRAPS Local Work Group**

| Parameter (Pollutant/ Stressor) | Basin-Wide Goal (average/surrogate for watershed) | Range of Subwatershed Goals (Estimated only when TMDL or MSHA data available) | 10-year Target (for 2030) | Years to Reach Goal (from 2020) |
|---|---|---|---|---|
| Degraded Habitat | 45% increase in MSHA habitat score | Protection and up to a 214% increase | 20%↑ | 40 |
| Phosphorus/ Eutrophication | 45% reduction in lake and stream concentrations/loads | Protection and up to a 76% reduction | Lakes - 7%↓ Streams - 15%↓ | Lakes - 50 Streams - 40 |
| Sediment | 30% reduction in stream concentrations/loads | Protection and up to a 80% reduction | 5%↓ | 60 |
| Nitrogen | 30% reduction in stream concentrations/loads | Not estimated (TMDLs not completed on this parameter) | 10%↓ | 40 |
| Altered Hydrology | 20% reduction in peak & annual stream flow | Not estimated (TMDLs not completed on this parameter) | 2.5%↓ | 100 |
| | Increase dry season stream base flow where ID'd in SID by enough to support aquatic life | | Small Improvement | 50 |
| Connectivity | Address human-caused issues (dams, culverts) as identified in SID and where practical/feasible | Not estimated (TMDLs not completed on this parameter) | 6 Barriers Removed | 20 |
| Bacteria | 50% reduction in stream concentrations/loads | Protection and up to a 86% reduction | 10%↓ | 50 |
| Chloride | Protect (restore the one impaired reach) | Protection and up to a 33% reduction | Meet permit requirements (impaired reach is point source driven) | |
| **Parameters that are impacted/addressed by the above pollutants and stressors** | | | | |
| Fish (F-IBI) | Each parameter's goal is to meet the water quality standard and support downstream goals. Because these parameters are a response to (caused by) the above pollutants/stressors, the above watershed-wide goals are the (indirect) goals for these parameters. | Not estimated (TMDLs not completed on these parameters) | Meet other 10-year targets | 60 |
| Macroinverts (M-IBI) | | | | 60 |
| DO | | | | 40 |
| pH | | | | 50 |

**WRAPS Strategies**

A set of restoration and protection strategies were developed to achieve water quality targets for waterbodies addressed in the WRAPS report that covers the Plan planning area. The strategies are provided in Table 21 (Page 82) organized by parameter, and Table 22 (Page 83) organized by landuse/source type in the WRAPS report. The strategies tables outline high level strategies necessary to restore and protect water bodies in the Watershed, including social strategies that are key to achieving the physical strategies. Where possible, the strategies were derived through quantitative methods; however, in other cases, only more qualitative characterization of actions was feasible. The chief goal of providing this information is to inform local planning. Specifically, by providing an overall set of actions needed to meet the goals (over some period of years or decades), local planners can focus on a subset of actions to take on for their shorter-term (e.g., 10-year) planning cycle. This provides a means to gauge a plan's ability to make progress over time as well as make adjustments through adaptive management.

**Prioritizing and Targeting**

Several tools are included throughout the WRAPS report that can be used to help identify priority areas. These include the goals maps, Hydrologic Simulation Program – Fortran (HSPF) model maps, and GIS

estimated altered hydrology maps. Table 23 (Page 86) in the WRAPS report identifies priority areas that were determined by the WRAPS Local Work Group along with data sources and specific examples. The MPCA recognizes that some restoration practices, particularly soil health practices, will need to be implemented basin-wide to achieve water quality goals. However, MPCA also highly recommends focusing efforts on some of the priority sub-watersheds that were identified by the WRAPS Local Work Group.

**Civic Engagement for WRAPS Work**

Two different civic engagement projects took place in the DMRB during the watershed approach, one in East Fork Des Moines River Watershed, and one in West Fork Des Moines River Watershed. Even though the two projects took different approaches, the purpose of the projects were to identify community/landowner opportunities, obstacles, and opinions on land management, and provide information about the water quality in the watershed. As a result, constraints and opportunities were discovered, along with additional civic engagement work recommendations. Detailed project information including project reports and attachments can be found in the Des Moines River Watersheds Civic Engagement Project Summary https://www.pca.state.mn.us/sites/default/files/wq-tmdl2-08.pdf. The MPCA recommends the results from the civic engagement efforts are taken into account and used to inform implementation planning efforts.

The opportunities identified from civic engagement projects include:

- Citizens were interested in slowing the flow of water, as well as working toward controlling surface water ponding to meet both water quality and land management needs and keeping water on the landscape upstream
- Participants wanted more information about baseline water quality levels and what is being done to regulate runoff from municipalities
- Interest in ditch channel storage, holding ponds, and two stage ditches
- Need for existing storage areas to be cleaned out more often
- Interest is growing in cover crops and programs are starting that provide cost share money in this watershed for residents to try cover crops
- Restoration efforts should target specific key areas
- There is interest in reduced tillage, nutrient application/timing, crop rotation, feedlot compliance and groundwater protection
- It is believed that water resources are important and that landowners are the most responsible for the water quality in the watershed
- The water resources are important for both agricultural production (drainage and livestock watering) and recreational use such as hunting and fishing to boating and swimming
- There is interest in additional training events that include implementation opportunities in the watersheds and implementation policies

The constraints identified from civic engagement projects include:

- In general, people felt existing programs, such as CRP and cover crops, were too restrictive and had too long of timeframes
- Not enough controlled drainage
- Not enough education of BMP implementation
- Frustration with existing programs, such as CRP and cover crops, finding enough cooperators
- Research findings have not been presented to groups
- Financial incentives have not been adequate

- Not one size fits all to find solutions
- The largest obstacle to implementing conservation BMPs are the associated costs
- Concern about the loss of agricultural production acres
- Some citizens do not believe a water quality problem exists

Some of the identified constraints can be addressed through additional civic engagement work, which will require cooperation among many partners. The following are some examples of what could be done locally.

- Local partners work with community leaders to start building leadership and create a unified vision around water quality issues of importance.
- Local partners, community leaders, state agency staff, and local business partners could work together to develop new funding opportunities to address costs.
- Local partners and agency staff could work together to develop easier and efficient programs to suit landowner interest and need, which would help alleviate program restrictions.
- Local partners could seek new opportunities focused on subwatersheds based on local priorities and landowner interest. Exploring future opportunities to expand face-to-face conversations and education activities regarding water quality to reach a new audience and provide missing information to existing ones. Conversations during the civic engagement projects like these lead to greater interest and involvement in local conservation programs.

## MPCA Water Management Priorities

The MPCA recommends focusing on the following priorities in the Des Moines River Watershed One Watershed, One Plan planning process. Additional information on each of these priorities can be found in the previously referenced Des Moines River Basin WRAPS, TMDLs, SID report, Civic Engagement reports, and Monitoring and Assessment report.

Biota (Aquatic Life)
Address the stressors to aquatic life in the Plan. Aquatic life use impairments within the watershed are complex. Biotic impairments are a result of nonpoint source pollution and localized stress linked to poor habitat condition, excessive nutrients, altered hydrology, low dissolved oxygen and suspended sediments. Stabilizing hydrology, increasing riparian buffer width, and stabilizing stream banks would greatly help the in-stream habitat.

Turbidity and Total Suspended Solids
Reduce and control sediment entering the water bodies of the watershed. TSS and turbidity (measure of water clarity affected by sediment, algae, and organic matter), are common impairments and stressors to aquatic life in the watershed. Reducing TSS will also likely reduce the means by which other pollutants are conveyed (phosphorus and bacteria).

Nutrients
Reduce nutrient delivery to the watershed. High levels of nutrients (phosphorus) are driving nuisance algae blooms in the watershed's impaired lakes, and threatening other lakes that are on the verge of becoming impaired. Algae blooms can deprive lakes of their oxygen as the algae die off and decay, causing fish kills. High levels of algae cause increased levels of turbidity, degrading aquatic recreation and aquatic life. Blue-green algae can also cause serious health issues for humans and pets. In addition to lake eutrophication impairments, the Des Moines River from Windom to Jackson is impaired for river

eutrophication and reducing nutrient inputs to the watershed will improve this reach. Heron Lake Outlet is also impaired for river eutrophication and reducing the nutrients in the Heron Lake complex will improve this stream reach. Management plans that appropriately value the nutrient worth of manure and previous crops and focus on the timing and intensity of the fertilizers and manure applications will help reduce the amount of phosphorus and nitrogen reaching the river. Nutrient reductions would also aid in the low dissolved oxygen problems present in some parts of the watershed.

Bacteria

Control pathways delivering human and livestock feces to the Des Moines River Watershed. High levels of bacteria are widespread across the watershed. The abundance of feedlots, feedlot runoff, improper manure management, and over-grazed pastures in the watershed may correlate with this finding. High bacteria levels are also attributed to noncompliant septic systems.

Altered Hydrology

Seek changes to the landscape that reduce the volume, rates, control surface water runoff and increase the base flows needed to address existing and prevent additional impairments, and still meet land management needs. Other pollutants (sediment, nutrients, bacteria, etc.) are delivered because of altered hydrology. Managing the hydrology to provide a consistent base flow is imperative for the survival of the aquatic biological communities in the watershed. Increasing rainfall infiltration and water retention, and improving vegetative cover are activities that are needed to stabilize hydrology and reduce impairments.

Watershed wide practice implementation

While geographic targeting of specific practices and funding is important, some practices will need to be implemented at the major watershed scale. The MPCA recommends some of the implementation funding for the DMRB is flexible and available watershed wide, to provide options for landowners to try soil health and cover crop practices, work with SWCD staff, and communicate with other landowners who are implementing these practices. The MPCA recommends developing a network of local staff and operators who can provide technical, financial, and practical assistance to landowners implementing soil health principles.

Drainage Watershed Management

The MPCA recommends the Plan identify an approach for addressing petitions for drainage improvement projects in the DMRB. Currently, drainage improvement projects have limited input from local staff to aid in the integration of conservation practices that would help to alleviate hydrology concerns and downstream impacts from increases in water volume. The MPCA recommends early coordination with landowners, SWCD staff, agencies, and engineers to develop improvement projects that account for volume increases.

Previous engineering reports have indicated that drainage improvement projects are a TMDL implementation practice. The current WRAPS and TMDL reports as well as the previous TMDL implementation plan do not include drainage improvement projects as a means for improving water quality. The MPCA encourages the planning group to discuss watershed drainage management and consider water quality with an emphasis on finding ways to store and/or reduce the increased volume of water by working with land owners in areas where drainage improvement will eventually be considered.

Priority Areas

As indicated above in this letter, Table 23 (Page 86) in the WRAPS report identifies suggested priority areas that were determined by the WRAPS Local Work Group. These include protection of supporting waters such as First and Second Fulda Lakes; barely impaired waters such as Fox, Shetek, Bloody, Currant, Yankton, and Bright Lakes; highly hydrologically altered watersheds including Okabena Creek, Jack Creek, Heron Lake Outlet, and most of East Fork Des Moines; the waters needing most improvements including Talcot, Sarah, Pierce, North Oaks and Temperance Lakes, the Lower Des Moines subwatersheds and Beaver Creek for phosphorus, Okabena Creek, Jack Creek and Beaver Creek for sediment, and East Fork Des Moines and Okabena Creek for nitrogen; and areas contributing water or risks to drinking water and ground water resources such as Drinking Water Supply Management Areas in the watershed.

Continued Civic Engagement

During the WRAPS public notice period, comments were received regarding cattle exclusion and improved pasture management, primarily in the Beaver Creek Subwatershed. These practices should be considered for inclusion in the Plan. The MPCA encourages the planning group to actively gather concerns, potential improvement projects, and continued civic engagement efforts and include the results in the Plan.

Through the WRAPS development process, there were civic engagement projects that resulted in gathering great insight into the watershed and its residents. The MPCA encourages local partners to continue civic engagement work through activities such as one-on-one interviews with citizens and development of a networking group.

Modeling considerations

The MPCA requests that any modeling efforts for implementation utilize HSPF model output and WPLMN data to calibrate pollutant load and flow estimates. This would allow for reduction calculations to be comparable to WRAPS goals and targets for load and flow reductions. If additional analyses are completed for protection and restoration efforts of waterbodies, consider explaining differences between load and/or flow reduction estimates in the Plan and the WRAPS.

The MPCA recognizes all of the cooperation and work from the local partners within the Des Moines River Watershed, and offers our continued support in local water planning. Thank you for the opportunity to provide comments during the planning process. If we may be of further assistance, please contact Katherine Pekarek-Scott at katherine.pekarek-scott@state.mn.us or 507-476-4281 or Bryan Spindler at bryan.spindler@state.mn.us or 507-344-5267.

Sincerely,

Katherine Pekarek-Scott

*This document has been electronically signed.*

Katherine Pekarek-Scott
Environmental Specialist
Watershed Division

KPS:jdf

# Appendix D:

## Public Survey Responses

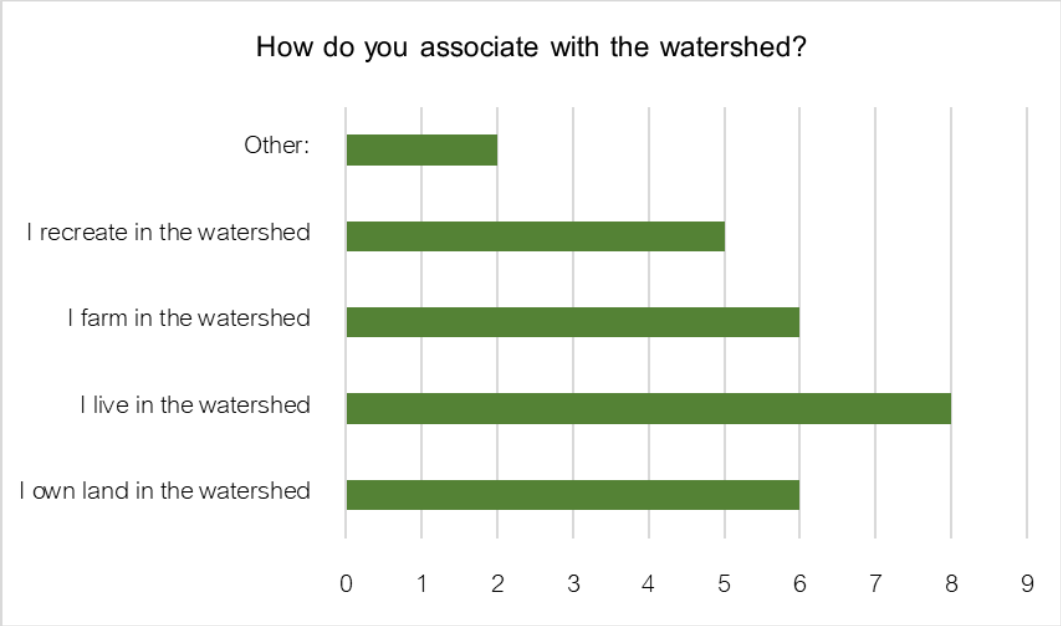
# Public Survey Results

This is a local plan which requires voluntary implementation to be successful. Considering this, planning committees wanted to be sure they were getting feedback from the public on what issues were most important to them. Two public meetings were held:

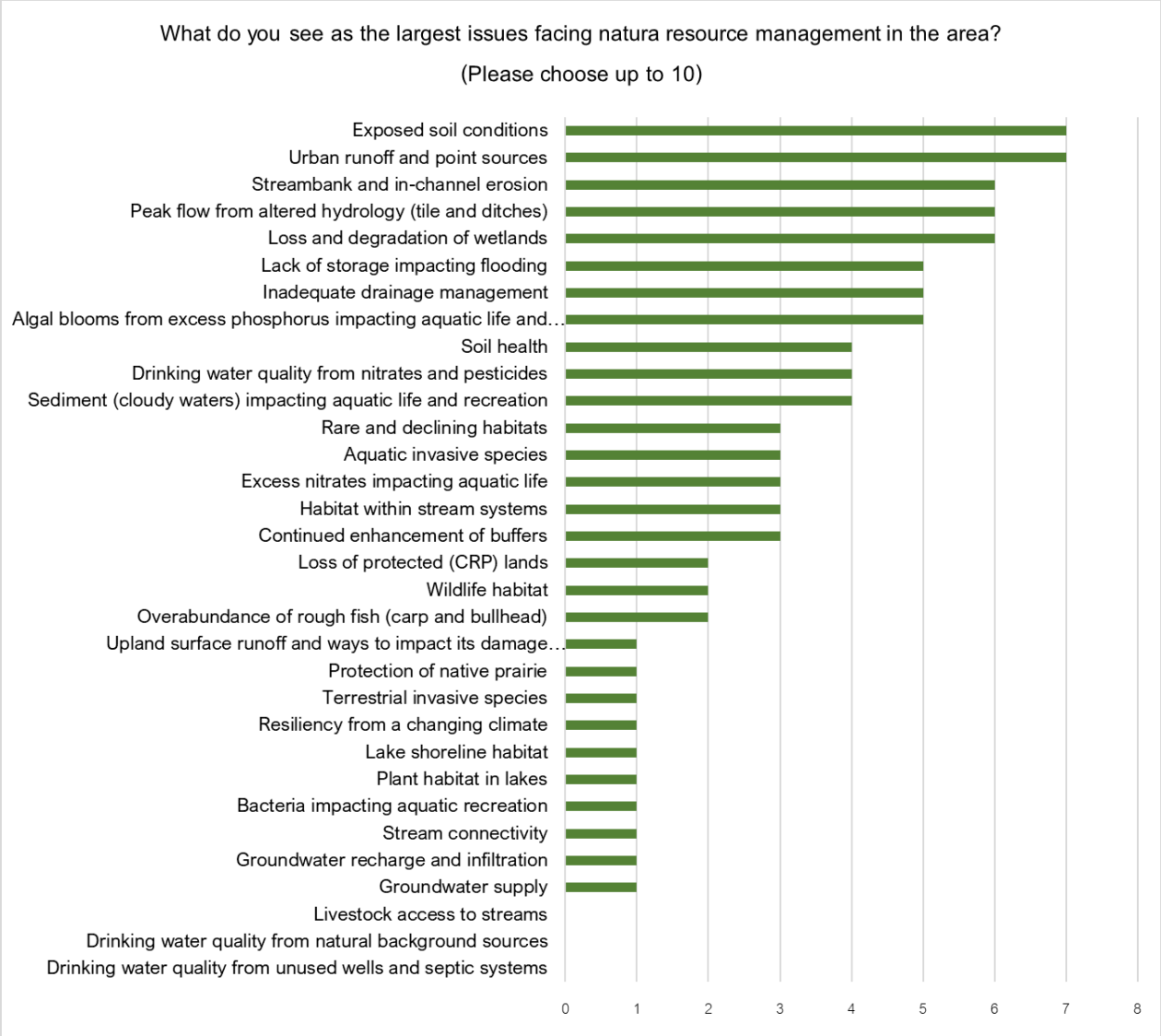
- July 21, 2021 in Windom
- July 22, 2021 in Slayton

Approximately 45 members of the public attended these planning meetings. During the meeting, participants were then asked to complete a survey to record what issues they thought are most important to address in the watershed. This survey was also available online. In total, 27 responses were submitted, and are summarized below:

Question 1:



Question 2:




Question 3: Using 4-5 words, when you think of the Des Moines River Watershed, what comes to mind?

- For me as a landowner of 50 Acres of native prairie and stream I see the need to protect this ground. A drainage (?) ditch comes into my land by the ditch [being tied] OR [brings flood] into the creek native prairie area. This flooding causes erosion and brings in invasive weeds. Also my house is close to this flooding area. And that needs protection. Solution slow the water down.
- Great idea, start small & build
- It's time to fix
- Dirty water
- Prairie and how it varies
- Improper landscape management

Question 4: What would you like the watershed to look like in 50 years?

- Green land & clean water, not green/brown water and brown land

- Natural
- Better than today
- Cleaner water
- A work in progress in fixing the problems noted below
- Clean water with the right landscape mgmt practices; more sustainable farming practices

Question 5: Are there any topics, resources, problems, or opportunities we did not cover in this survey you'd like to comment on?

- Protection of native prairie
- Erosion of state lands
- Problems caused by drainage; improve statute 103
- No

# Appendix E:

## Subwatershed Prioritization

# Subwatershed Prioritization

## Focus Area Maps

Below is a summary of the focus area maps that are presented in **Section 4- Measurable Goals**. Also shown are the geospatial data layers that were used to create the maps, and how the data layers were used to create subwatershed designations of "high," "medium," and "low" for each focus area map (**Table 1**).

**Table 1: Geospatial layers and methods applied to create focus area maps**

| Focus Area Map | Geospatial Data Layers | Prioritization Method |
|---|---|---|
| Groundwater Recharge | • Groundwater recharge map<br>• DWSMAs<br>• RIM Easements | Split groundwater recharge into high-medium-low based on distribution of catchment average recharge in the broader watershed – low is 0-3.5" recharge, medium is 3.5" to 4.0", and high is greater than 4 in. Then, if there is a DWSMA in that subwatershed, upgrade the rating up one category. Priority resources are DWSMAs (sensitivity of pollution not considered). Area of RIM easements calculated, and "Natural Breaks" split these into 5 categories. Those in the top category (>1 sq mi of RIM easement) were bumped up a category. |
| Unused Wells and Septic Systems | • N/A: Issue to be address watershed-wide | N/A: Issue to be address watershed-wide |
| Excess Nitrates | • DWSMA Pollution Sensitivity<br>• Pesticide-impaired surface waters<br>• MDH Elevated Nitrate Layer<br>• Areas of elevated overland total nitrogen loading (PTMApp) | The sensitivity rating for DWSMAs was followed: If a watershed touches a "high sensitivity" DWSMA, it is high priority, etc. Then, if there was a pesticide-impaired stream in the catchment, the catchment was upgraded a priority level. Finally, if there was a drinking water well with nitrate >10 mg/L, the watershed was "high", if there was a well with nitrate between 3 and 10 mg/L (and no other "high"-producing features), the watershed was "medium". All others were "low". Based on the proportion of HUC-12 that is a high priority total nitrogen catchment from PTMApp (top 25% yield), the data was split into natural breaks. |

| Focus Area Map | Geospatial Data Layers | Prioritization Method |
|---|---|---|
| | | Then, if the catchment contains a nearly/barely or an nitrogen impaired reach, it was set to "high." |
| Upland Wind and Water Erosion | • Sediment impaired streams<br>• Nearly and barely impaired reaches for sediment<br>• Areas of elevated overland sediment loading (PTMApp) | The base data used was the PTMApp density of high priority sediment catchments (natural breaks), but auto updated to "high" if there was a TSS/turbidity impaired stream, or a nearly/barely impaired reach for TSS / turbidity. |
| Phosphorus Loading | • Phosphorus-impaired lakes<br>• DNR Lakes of Phosphorus Sensitivity<br>• Recreationally important lakes (WRAPS)<br>• Areas of elevated overland total phosphorus loading (PTMApp) | Priority was set to a "high" where there is already a phosphorus impairment or WRAPS Table 23 identifies a recreationally important lake; "medium" where there is a lake of phosphorus sensitivity, but not listed; and "low" priority where those conditions do not apply. Add in a Natural Breaks for density of high priority (top 25%) catchments for total phosphorus yield to bump any catchment at a lower level up to the level outlined by the PTMApp data. |
| Storage and Altered Hydrology | • MN DNR's Watershed Health Assessment Framework ("WHAF") Hydrological Storage Index<br>• WRAPS Report, Table 23, and Section 2.2 on Altered Hydrology | Use the hydrological storage index from WHAF to calculate natural breaks - under 35 is "high," over 57.5 is "low." Further, some of the WRAPS Table 23 areas were manually changed to "high" based on Section 2.2 of WRAPS. Local knowledge of good opportunities turned the Headwaters Planning Region "high." |
| Soil Health | • PTMApp Critical Soil Loss Area analysis | Natural Breaks used to break out top sediment loss PTMApp areas (by proportion of HUC-12 area). |
| Streambank and Channel Erosion & Enhanced Buffers | • Local knowledge | Used local knowledge of stream systems that need restoration, and density of identified priority streams per watershed. Greater than or equal to 0.10 km/km2 of priority stream was "high", <0.10 and >0 was "medium", and = 0 was "low." |
| Livestock Access to Streams | • Nearly / barely impaired waters for E. coli<br>• E. coli or Fecal Coliform bacteria impairments | Where there is a relatively high level of pasture within a 180-foot buffer of the stream, it was "high". If the catchment included an E Coli or FC impaired stream, it was upgraded one priority level than that based on pasture land use alone. Local knowledge indicated a pasture near the |

| Focus Area Map | Geospatial Data Layers | Prioritization Method |
|---|---|---|
| | • Streams that intersect pasture land use | inlet to Lake Shetek that was high priority, but that catchment was already “high”. |
| Urban and Developed Areas | • Cities<br>• Locally important lakes | Prioritized by average amount of impervious surfaces in each catchment. Greater than 1.5% was “high” priority, greater than 1% was “medium,” and less than 1% was “low.” If a town or population center was identified in the catchment, and the score was "low", it was upgraded to “medium.” If there was an MS4 boundary in the catchment, it was automatically "high". If a town was within 1 mile of a locally important lake, that catchment was set to “high”. If there was a “low” catchment with a general development lake, it was set to “medium”. |
| Lake Shoreline Habitat | • Recreationally important lakes (MPCA, 2021)<br>• Low “Score the Shore” ratings for shoreline health<br>• Local knowledge | “Score the Shore” shoreline scores were expressed as percentiles out of the total available score. Higher scores indicate greater shoreline condition. Lower scores (worse shoreline) were prioritized as “high” while higher scores (better shoreline) were “low” priority. All WRAPS Priority Table important wildlife lakes were included as "high", which overlapped the lake that was below the 70th percentile in Score the Shore; if the lake scored in the 70th percentile, it was “medium”. Lakes greater than 90th percentile were "low". The unscored lakes were also considered "low". All General Development Lakes were considered “high”. Local partners specifically requested the following “high”’ – Heron Lake Complex (Duck Lake to S Heron), Talcot Lake, and Tuttle Lake, Clear Lake |
| Drainage Management | • Local knowledge | Used local knowledge of ditch systems needing maintenance, and density of identified priority ditch systems per watershed. |
| Wetlands | • DNR WHAF Wetland Loss Score | Split the watershed’s wetland loss score (out of 100) into 3 groupings for “high”, “medium”, and “low.” |
| Wildlife Habitat | • DNR Native Plant Communities observations | Add together percentage of catchment in Native Plant Communities, WMAs, SNAs, RIM, USFWS land. These cover types can be considered |

| Focus Area Map | Geospatial Data Layers | Prioritization Method |
|---|---|---|
| | • Protected land for wildlife management, conservation easement, state, or federal ownership<br>• Prairie Plan focus areas<br>• Calcareous fens, a rare habitat | "Natural Land". Quantile break the percent catchment area into 3 quantiles. "Low" was < 3% in "Natural Land", "medium" was 3-7.5% Natural Land, and "high" was >7.5% Natural Land. This aligned with the Prairie Plan outlined priorities, and with Calcareous Fens. |

# Comprehensive Rank by Resource

For each issue in each resource (Surface Water, Groundwater, Land Stewardship, and Habitat), the issue was weighted based on its Priority (A or B) and by its ranking (High, Medium, or Low) (Table 2). Weights for each issue within each resource were summed, and the Natural Breaks method was used to categorize by resource into “high”, “medium” and “low” based on the sum of weighted issues for each resource. The resulting maps are shown for Groundwater, Surface Water, Land Stewardship, and Habitat in Figures 1, 2, 3, and 4 respectively.

**Table 2: Ranking weights for each issue**

| Priority | High | Medium | Low |
|---|---|---|---|
| A | 1 | 0.625 | 0.25 |
| B | 0.75 | 0.375 | 0 |

**Figure 1: Comprehensive Rank for Groundwater in the Des Moines River Watershed**

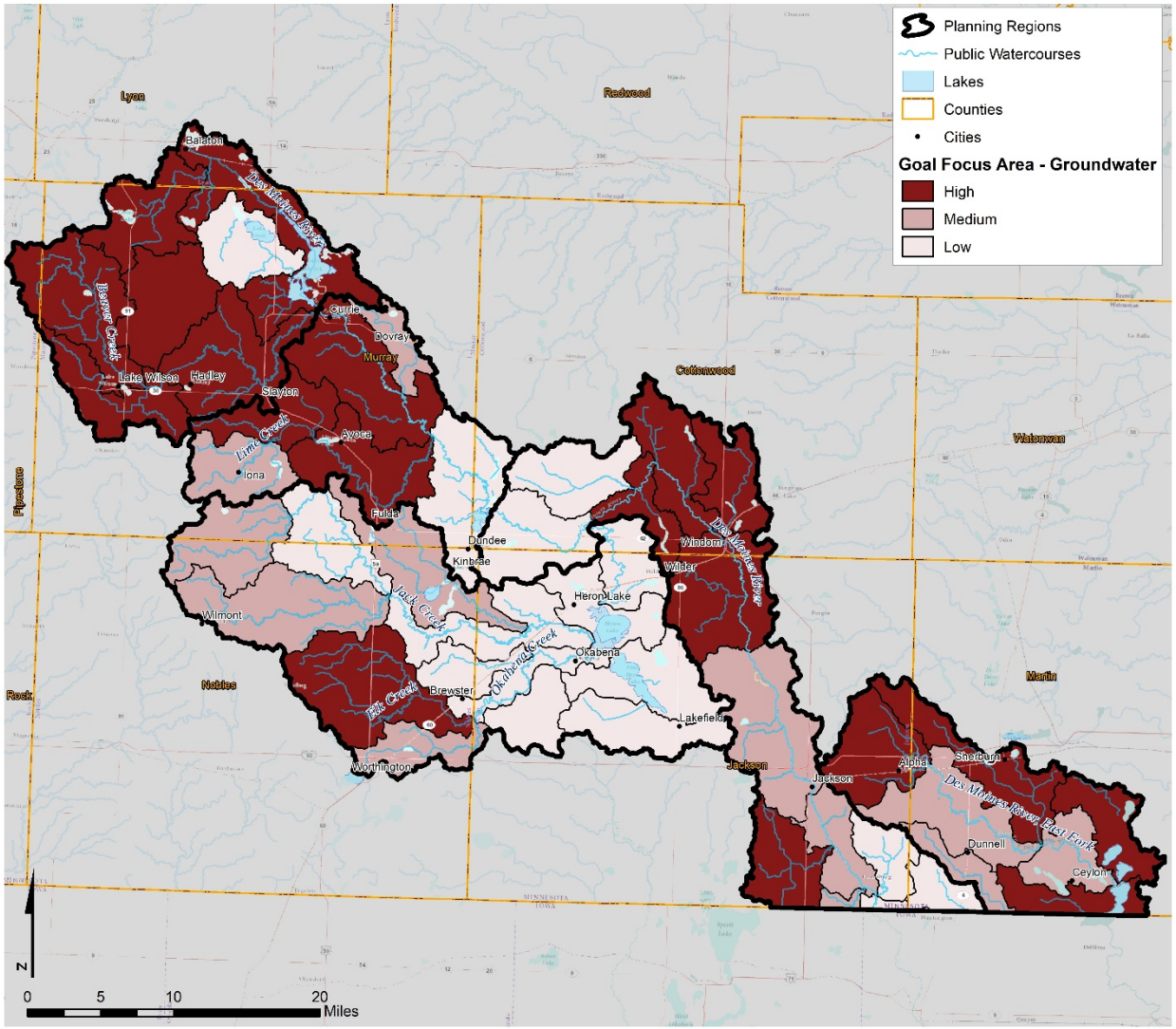


**Figure 2: Comprehensive Rank for Surface Water in the Des Moines River Watershed**

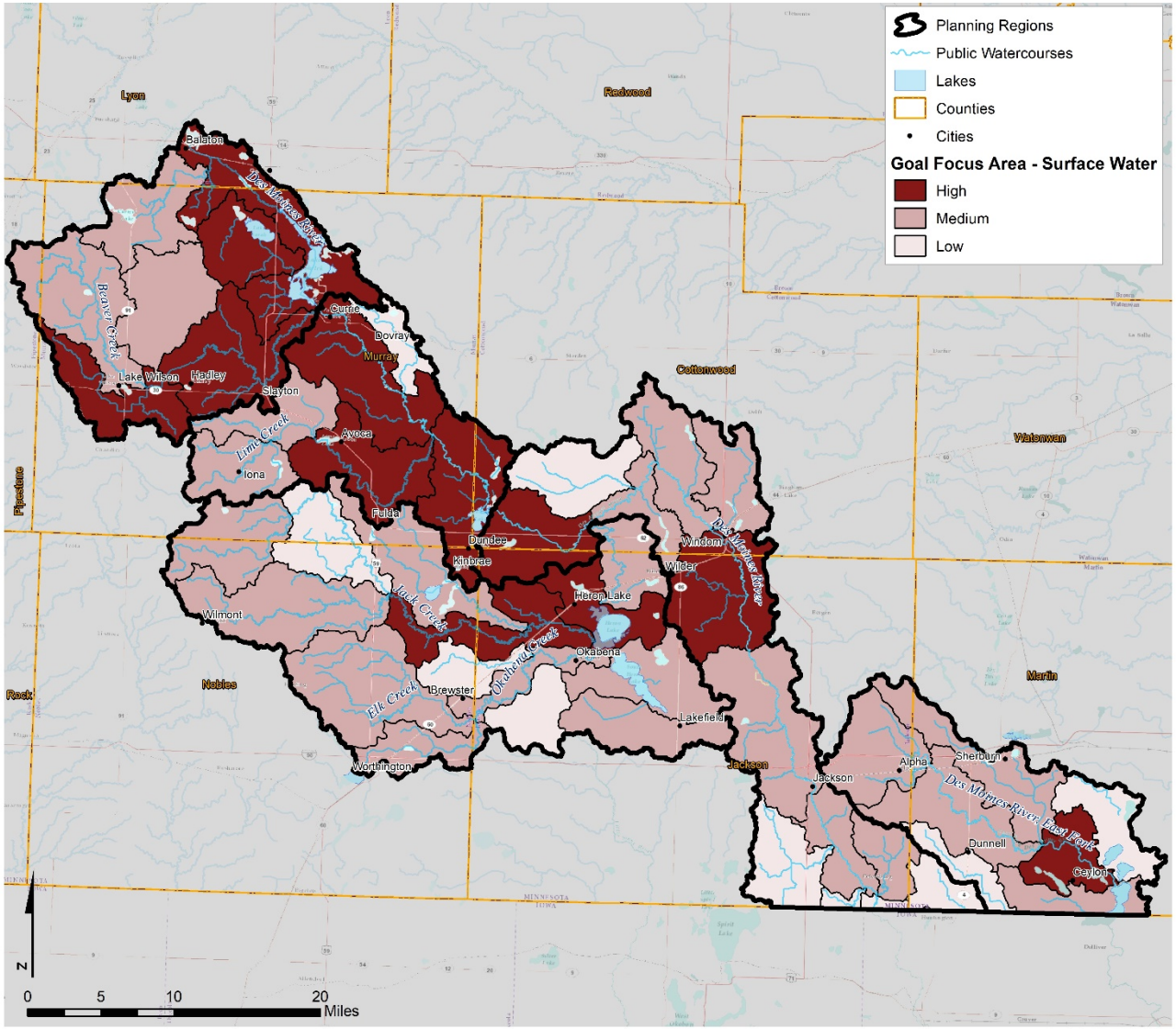


**Figure 3: Comprehensive Rank for Land Stewardship in the Des Moines River Watershed**

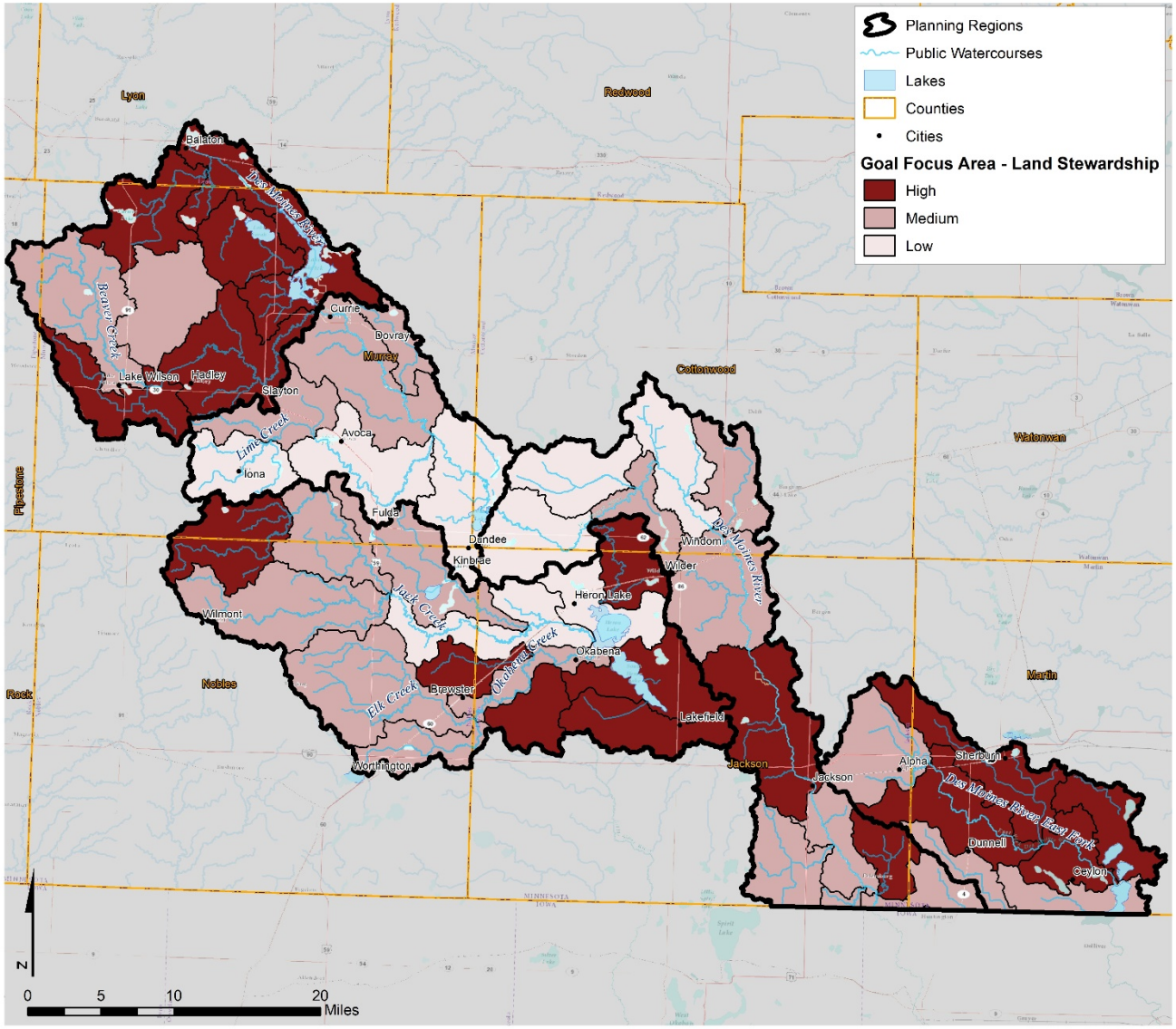
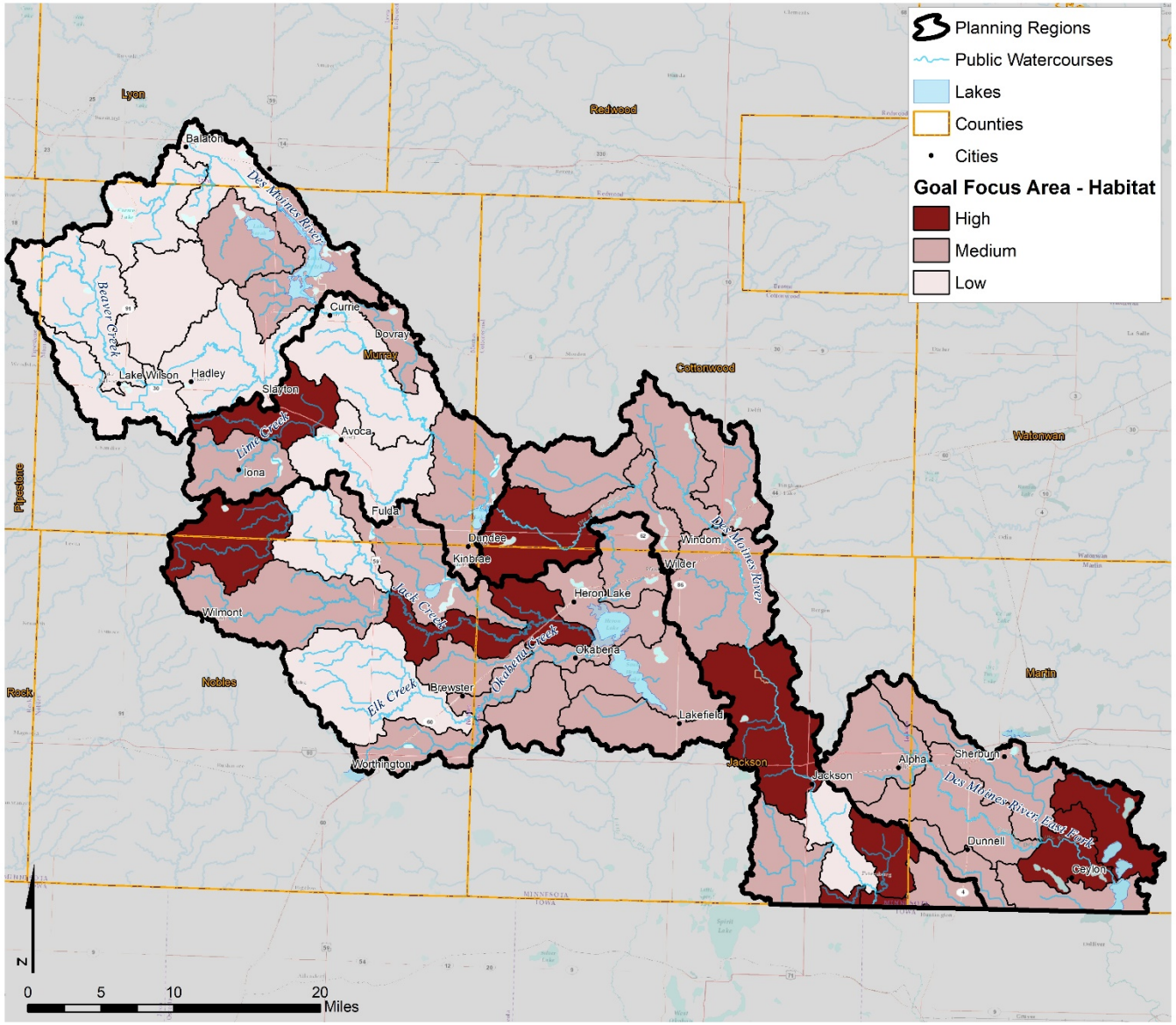


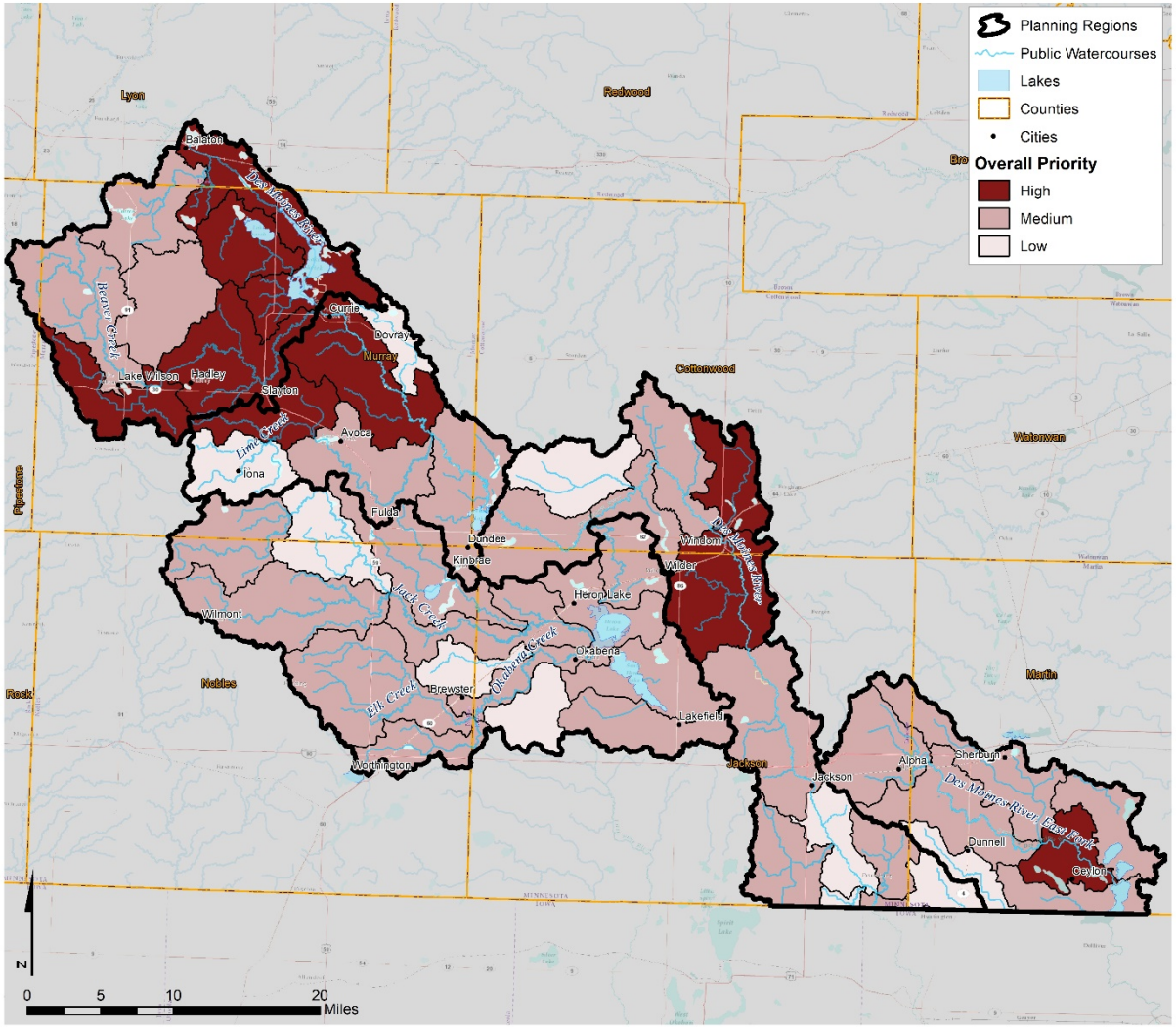
**Figure 4: Comprehensive Rank for Habitat in the Des Moines River Watershed**



# Comprehensive Rank Overall

The summed weights across all issues and all the resources (those weights based on Table 2), and the natural breaks of those sums were used to create an overall ranking of “high”, “medium” and “low” for an overall prioritization. The result is an overall comprehensive priority map, shown in Figure 5.

**Figure 5: Comprehensive priority map for all priority issues in the Des Moines River Watershed**



# Appendix F:

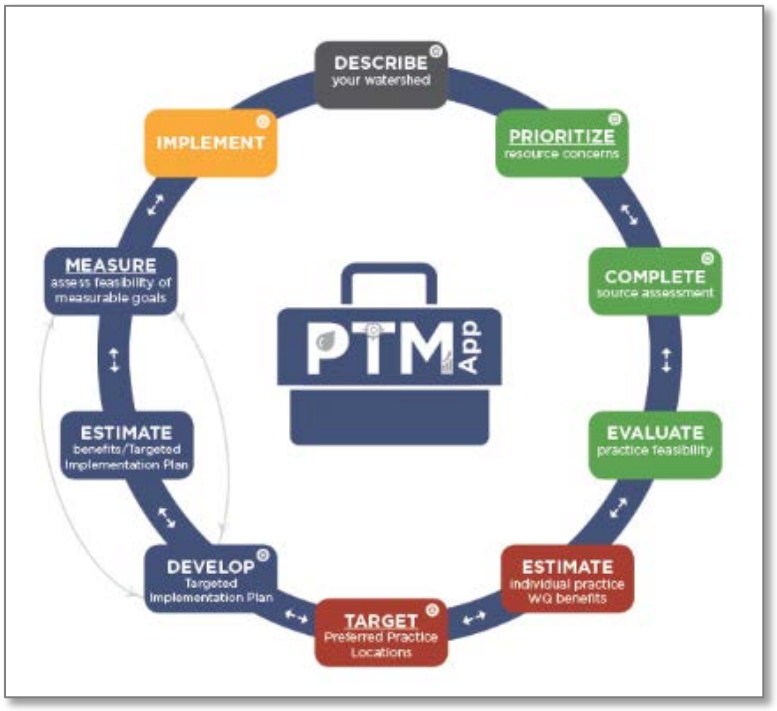
## PTMApp Implementation Scenario

# PTMApp Implementation Scenario

Actions in **Section 5. Targeted Implementation** of this plan are based on a PTMApp Implementation Scenario developed by the Steering Committee during the planning process. For planning, this implementation scenario is summarized more broadly in **Section 5** to enable flexibility during implementation.

## Introduction

The Prioritize, Target, and Measure Application (PTMApp) is a program that can be used by practitioners as a technical bridge from general descriptions of implementation strategies in a local water plan to the identification of implementable on-the-ground Best Management Practices (BMPs) and Conservation Practices (CPs).




PTMApp can be used by Soil and Water Conservation Districts (SWCD), watershed districts, county and local watershed planners, and agency staff and decision-makers to **prioritize** resources and the issues impacting them, **target** specific fields to place CPs and BMPs, and **measure** water quality improvement by estimating the expected nutrient and sediment load reductions delivered to priority resources.

The tool enables practitioners to build prioritized and targeted implementation scenarios, measure the cost-effectiveness of the scenario for improving water quality, and report the results to pursue funds for project implementation. For more information on the theory behind PTMApp, please see https://ptmapp.bwsr.state.mn.us/User/Documentation

## Des Moines River Watershed: PTMApp Approach

The Steering Committee discussed PTMApp Implementation Scenario decisions at meetings on January 12, 2022. The decisions are detailed in **Table 1**.

**Table 1. PTMApp decisions for the Des Moines River Watershed CWMP**

| Decision | Implications | Local Decision |
|---|---|---|
| Criteria used to further screen practices | Criteria are used to further screen practices considered technically feasible for implementation but are not practicable to implement. | See Table 2. |
| Costs | Costs can represent the "cost" share or total cost. For example, EQIP is the government cost share. | Double EQIP Costs to capture the full cost of the practice + 20% for technical assistance, with the exception of grade stabilization which was changed to $4,000 per practice based off local knowledge and expertise.<br><br>Soil Health: $150/acre, based off local feedback on a realistic 3-year cost-share. |
| Planning Regions | Allocate funding and practices per planning region | Allocate based on sediment delivery to the edge of the field with adjustments based on local feedback. |
| Spatial Scale | The decision reflects the spatial scale for application of the load reduction goals. For example, will the ability of the proposed BMPs to achieve the sediment, TP, and TN load reduction goal be assessed at the field edge or some other spatial scale. This decision also affects which BMPs are selected as best. The "best" practice locations tend to be near the location where the load reduction is desired. Using the edge of field will tend to spread practices more evenly across the landscape. Use of a planning region outlet will tend to concentrate the practices upstream of that location. | The "best" practices will be selected based on the highest sediment load reduction at the edge of the field (spreads out practices within the planning region). Practices for the Projects and Practices Implementation Program will be capped (initially) at $250,000 (rationale: anything over $250,000 is a Capital Improvement Project). |
| Parameters and method used to rank the "best" conservation practices. | The "best" conservation practices will differ depending on which parameters are used, and whether they are weighted. | Sediment |
| Process for identifying the number of practices which will be included in the Implementation Scenario. | Decision ultimately affects the "cost(s)" of the Implementation Scenario and ability to achieve the load reduction goals. | Number of practices that can be afforded under the Funding Level 2 (Baseline + Watershed-Based Implementation Funding). |

Feasible PTMApp BMP and CP treatment group outputs were screened based on screening criteria (**Table 2**). Using the screening criteria, BMPs and CPs with low potential for water quality benefits were removed from the analysis.

**Table 2: PTMApp Screening Criteria**

| Conservation Practice Name | PTMApp NRCS Practice Code | Remove BMPs with little runoff volume delivery or constituent removal efficiency | | | | Remove BMPs with low removal magnitudes at the edge of field | | |
|---|---|---|---|---|---|---|---|---|
| | | Delivery and Reduction Efficiency Criteria (Value must be greater than) | | | | Reduction Magnitude Selection Criteria (Value must be greater than) | | |
| | | Percent of 2-yr, 24-hr event treated | Sediment Reduction (%) | TP Reduction (%) | TN Reduction (%) | Sediment Reduction @ Catchment Outlet (tons/year) | TP Reduction @ Catchment Outlet (lbs/year) | TN Reduction @ Catchment Outlet (lbs/year) |
| Farm Pond/Wetland | 378 | 50 | 10 | 10 | 10 | 0.25 | 0.25 | 0.5 |
| Drainage Water Management | 554 | 50 | 10 | 10 | 10 | 0.25 | 0.25 | 0.5 |
| Water and Sediment Control Basin | 638 | 50 | 10 | 10 | 10 | 0.25 | 0.25 | 0.5 |
| Regional Wetland/Pond | 656_1 | 50 | 10 | 10 | 10 | 0.25 | 0.25 | 0.5 |
| Large Wetland Restoration | 656_2 | 50 | 10 | 10 | 10 | 0.25 | 0.25 | 0.5 |
| Riparian Buffer | 390 | 50 | 10 | 10 | 10 | 0.25 | 0.25 | 0.5 |
| Filtration Strip | 393 | 50 | 10 | 10 | 10 | 0.25 | 0.25 | 0.5 |
| Saturated Buffer | 604 | 50 | 10 | 10 | 10 | 0.25 | 0.25 | 0.5 |
| Denitrifying Bioreactor | 605 | 50 | 10 | 10 | 10 | 0.25 | 0.25 | 0.5 |
| Infiltration Trench/Small Infiltration Basin | 350 | 50 | 10 | 10 | 10 | 0.25 | 0.25 | 0.5 |
| Multi-stage Ditch (open channel) | 582 | 50 | 10 | 10 | 10 | 0.25 | 0.25 | 0.5 |
| Critical Area Planting | 342 | | | | | 0.25 | 0.25 | 0.5 |
| Grade Stabilization | 410 | | | | | 0.25 | 0.25 | 0.5 |
| Grassed Waterway | 412 | | | | | 0.25 | 0.25 | 0.5 |
| Lake and Wetland Shoreline Restoration | 580 | | | | | 0.25 | 0.25 | 0.5 |
| Perennial Crops | 327 | | | | | 0.25 | 0.25 | 1 |
| No till | 329 | | | | | 0.25 | 0.25 | 1 |
| Cover Crops | 340 | | | | | 0.25 | 0.25 | 1 |
| Reduced till | 345 | | | | | 0.25 | 0.25 | 1 |
| Forage / Biomass Planting | 512 | | | | | 0.25 | 0.25 | 1 |
| Prescribed Grazing | 528 | | | | | 0.25 | 0.25 | 1 |

| Conservation Practice Name | PTMApp NRCS Practice Code | Remove BMPs with little runoff volume delivery or constituent removal efficiency | | | | Remove BMPs with low removal magnitudes at the edge of field | | |
|---|---|---|---|---|---|---|---|---|
| | | Delivery and Reduction Efficiency Criteria (Value must be greater than) | | | | Reduction Magnitude Selection Criteria (Value must be greater than) | | |
| | | Percent of 2-yr, 24-hr event treated | Sediment Reduction (%) | TP Reduction (%) | TN Reduction (%) | Sediment Reduction @ Catchment Outlet (tons/year) | TP Reduction @ Catchment Outlet (lbs/year) | TN Reduction @ Catchment Outlet (lbs/year) |
| Nutrient Management of Groundwater | 590_1 | | | | | 0.25 | 0.25 | 1 |
| Nutrient Management for Phosphorus | 590_2 | | | | | 0.25 | 0.25 | |
| Nutrient Management for Nitrogen | 590_3 | | | | | 0.25 | | 1 |

After BMPs were screened, the remainder were ranked by their total sediment reduction potential at the catchment outlet from highest to lowest. This ranking highlighted all BMPs with the potential to reduce the most sediment at the edge of the field where the BMP would be located. Each NRCS structural conservation practice was allotted a certain funding limit based on implementation preferences indicated by the Steering Committee (**Table 3**). Targeted BMPs were selected from the highest position on the ranked list (most sediment reduction potential) until each practice funding limit was reached.

**Table 3: Structural NRCS practice implementation preference**

| Conservation Practice Name | NRCS Practice Code | H, M, L |
|---|---|---|
| Farm Pond/Wetland | 378 | L |
| Drainage Water Management | 554 | M |
| Water and Sediment Control Basin | 638 | M |
| Large Wetland Restoration | 656_1† | L |
| Regional Wetland/Pond | 656_2† | L |
| Riparian Buffer | 390 | L |
| Filtration Strip | 393 | L |
| Saturated Buffer | 604 | |
| Denitrifying Bioreactor | 605 | Very L |
| Infiltration Trench/Small Infiltration Basin | 350 | |
| Multi-stage Ditch (open channel) | 582 | |
| Critical Area Planting | 342 | |
| Grade Stabilization | 410 | M |
| Grassed Waterway | 412 | M |
| Lake and Wetland Shoreline Restoration | 580 | |
| Forage / Biomass Planting | 512 | |

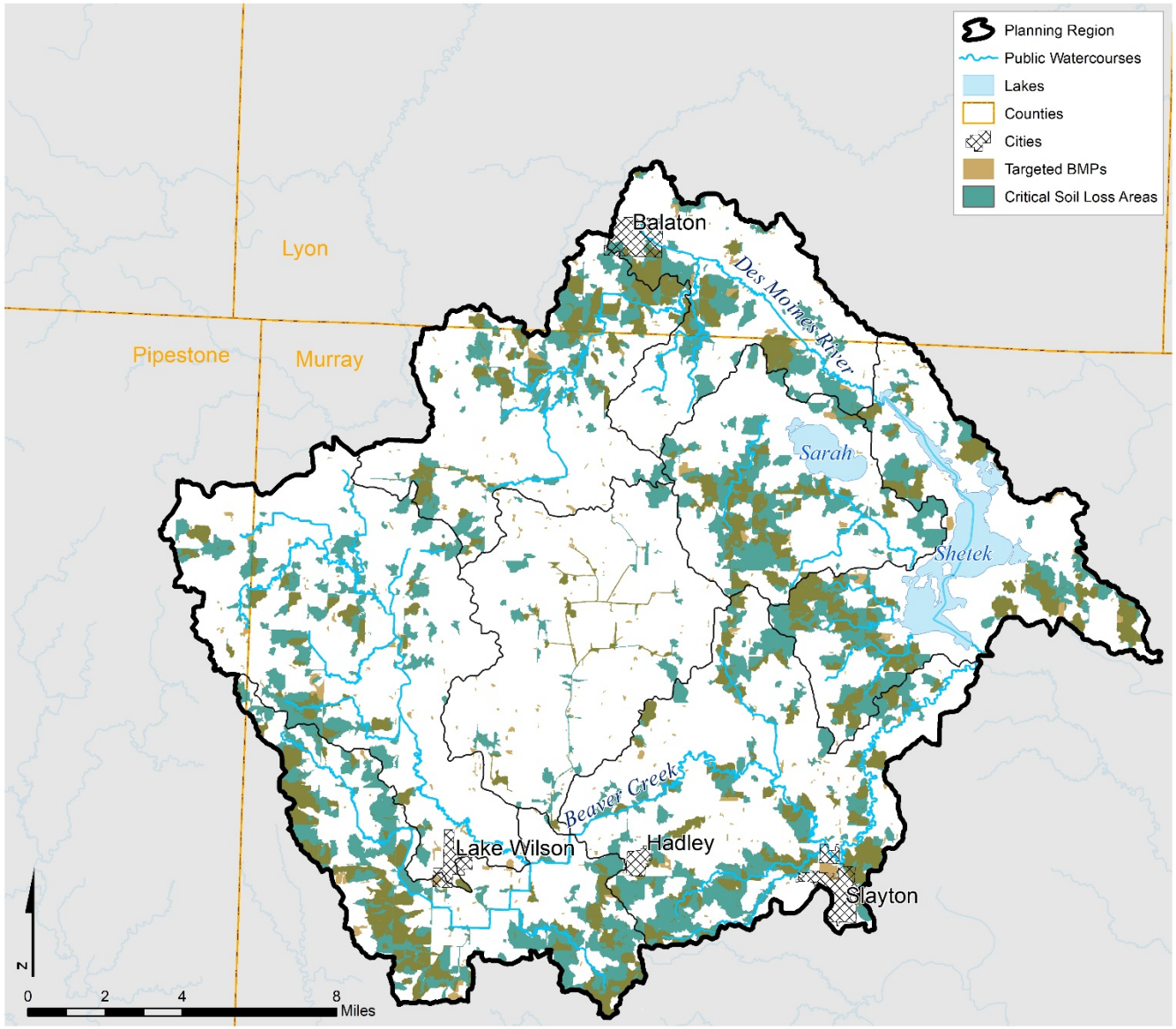
# PTMApp Implementation Scenarios

## *Headwaters Planning Region*

The Table below shows the PTMApp implementation scenario results for the **Headwaters Planning Region**. The next page includes a map showing where practices are located based on Funding Level 2: Current + Watershed-Based Implementation Funding (WBIF).

| NRCS Practice Type | Number of Practices | Total Cost ($) | Values at Catchment Outlet | | | Values at Planning Region Outlet | | | Addit-ional water storage (ac-ft) | Cum-ulative Surface area (acres) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Sediment Reduction (tons/yr.) | TP Reduction (lbs./yr.) | TN Reduction (lbs./yr.) | Sediment Reduction (tons/yr.) | TP Reduction (lbs./yr.) | TN Reduction (lbs./yr.) | | |
| 378 - Farm pond/wetland | 29 | $119,375 | 1,075 | 221 | 4,173 | 70 | 58 | 1,280 | 324 | 73 |
| 554 - Drainage water management | 433 | $239,882 | 6,266 | 1,136 | 19,347 | 267 | 244 | 4,572 | 646 | 452 |
| 638 - WASCOB | 38 | $342,000 | 4,118 | 341 | 4,964 | 464 | 123 | 1,993 | 126 | 12 |
| 656_2 - Large wetland restoration | 2 | $111,550 | 292 | 21 | 643 | 9 | 4 | 99 | 17 | 3 |
| 390 - Riparian Buffer | 58 | $118,189 | 510 | 132 | 2,480 | 25 | 37 | 747 | 0 | 47 |
| 393 - Filtration Strip | 180 | $119,354 | 701 | 109 | 2,208 | 49 | 37 | 820 | 0 | 120 |
| 605 - Denitrifying Bioreactor | 5 | $53,011 | 60 | 6 | 141 | 3 | 2 | 58 | 0 | 1 |
| 410 - Grade Stabilization | 87 | $348,000 | 704 | 42 | 816 | 64 | 13 | 289 | 0 | 120 |
| 412 - Grassed Waterway | 98 | $346,473 | 1,097 | 57 | 1,098 | 140 | 17 | 381 | 0 | 163 |
| 340 - Cover Crops | 320 | $898,295 | 24,865 | 1,394 | 26,883 | 2,672 | 447 | 10,231 | 0 | 5,989 |
| **Scenario 2 Total** | **1,250** | **$2,696,131** | **39,687** | **3,458** | **62,755** | **3,763** | **982** | **20,470** | **1,113** | **6,979** |

## Headwaters Planning Region (map)

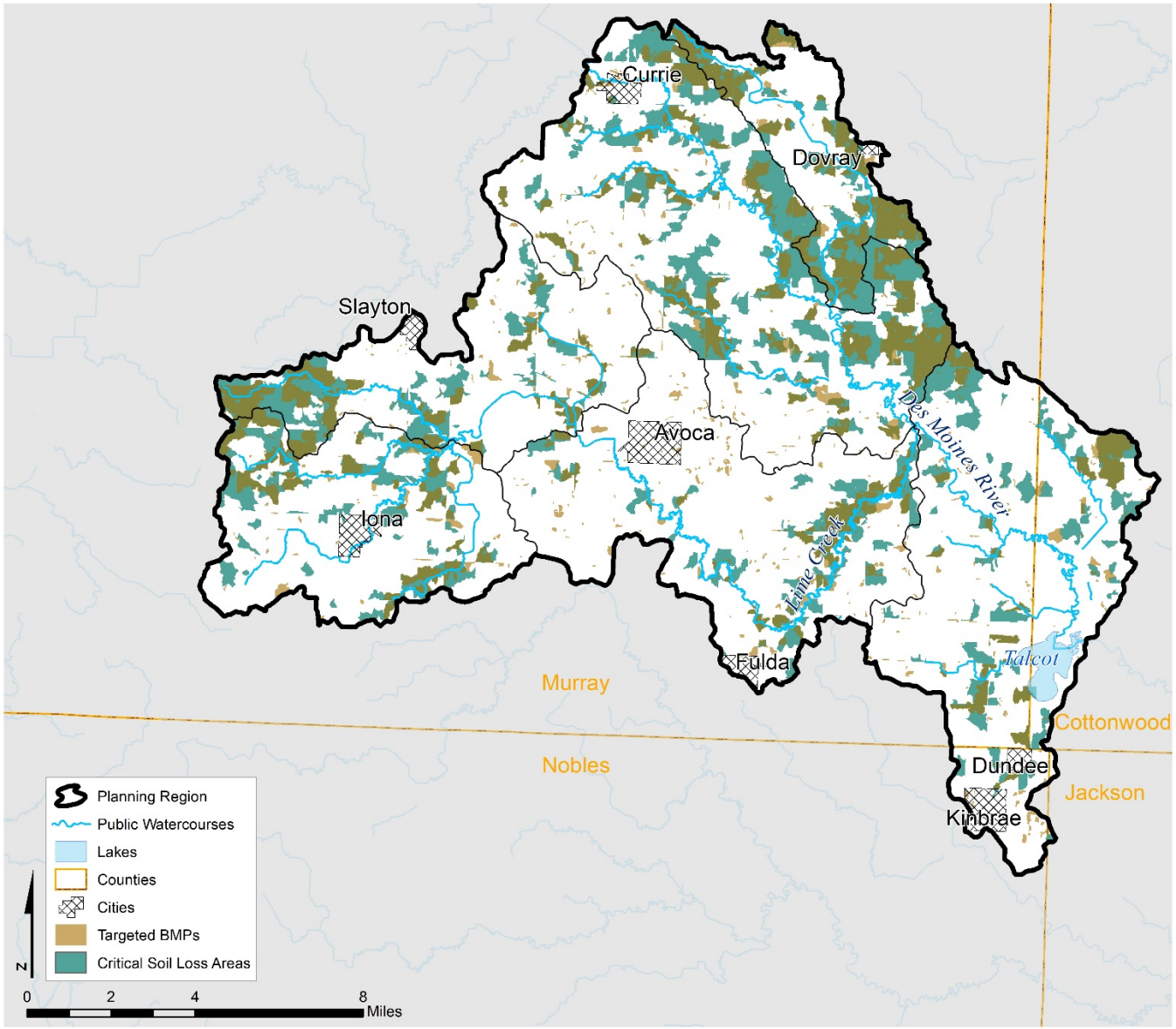


## Lime Creek Planning Region

The Table below shows the PTMApp implementation scenario results for the **Lime Creek Planning Region**. The next page includes a map showing where practices are located based on Funding Level 2: Current Funding + WBIF.

| BMP Treatment Group | Number of Practices | Total Cost ($) | Values at Catchment Outlet | | | Values at Planning Region Outlet | | | Additional water storage (ac-ft) | Cumulative Surface area (acres) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Sediment Reduction (tons/yr.) | TP Reduction (lbs./yr.) | TN Reduction (lbs./yr.) | Sediment Reduction (tons/yr.) | TP Reduction (lbs./yr.) | TN Reduction (lbs./yr.) | | |
| 378 - Farm pond/wetland | 22 | $101,325 | 639 | 94 | 1,986 | 26 | 8 | 202 | 253 | 62 |
| 554 - Drainage water management | 366 | $202,764 | 3,705 | 792 | 13,650 | 259 | 195 | 3,510 | 520 | 549 |
| 638 - WASCOB | 30 | $270,000 | 3,135 | 256 | 3,666 | 292 | 95 | 1,407 | 94 | 8 |
| 656_1 - Regional wetland | 2 | $37,910 | 127 | 8 | 234 | 0 | 0 | 0 | 4 | 1 |
| 656_2 - Large wetland restoration | 2 | $55,456 | 18 | 3 | 96 | 0 | 1 | 31 | 3 | 1 |
| 390 - Riparian Buffer | 47 | $98,620 | 280 | 71 | 1,367 | 57 | 29 | 593 | 0 | 41 |
| 393 - Filtration Strip | 145 | $99,908 | 484 | 74 | 1,513 | 65 | 31 | 663 | 0 | 101 |
| 605 - Denitrifying Bioreactor | 5 | $47,402 | 46 | 5 | 128 | 21 | 3 | 85 | 0 | 1 |
| 410 - Grade Stabilization | 69 | $276,000 | 632 | 35 | 643 | 98 | 14 | 288 | 0 | 96 |
| 412 - Grassed Waterway | 72 | $273,494 | 929 | 47 | 862 | 129 | 20 | 394 | 0 | 129 |
| 340 - Cover Crops | 267 | $760,052 | 20,387 | 1,139 | 21,885 | 2,913 | 480 | 10,023 | 0 | 5,067 |
| Scenario 2 Total | 1,027 | $2,222,936 | 30,383 | 2,523 | 46,029 | 3,861 | 876 | 17,194 | 873 | 6,057 |

## Lime Creek Planning Region (map)

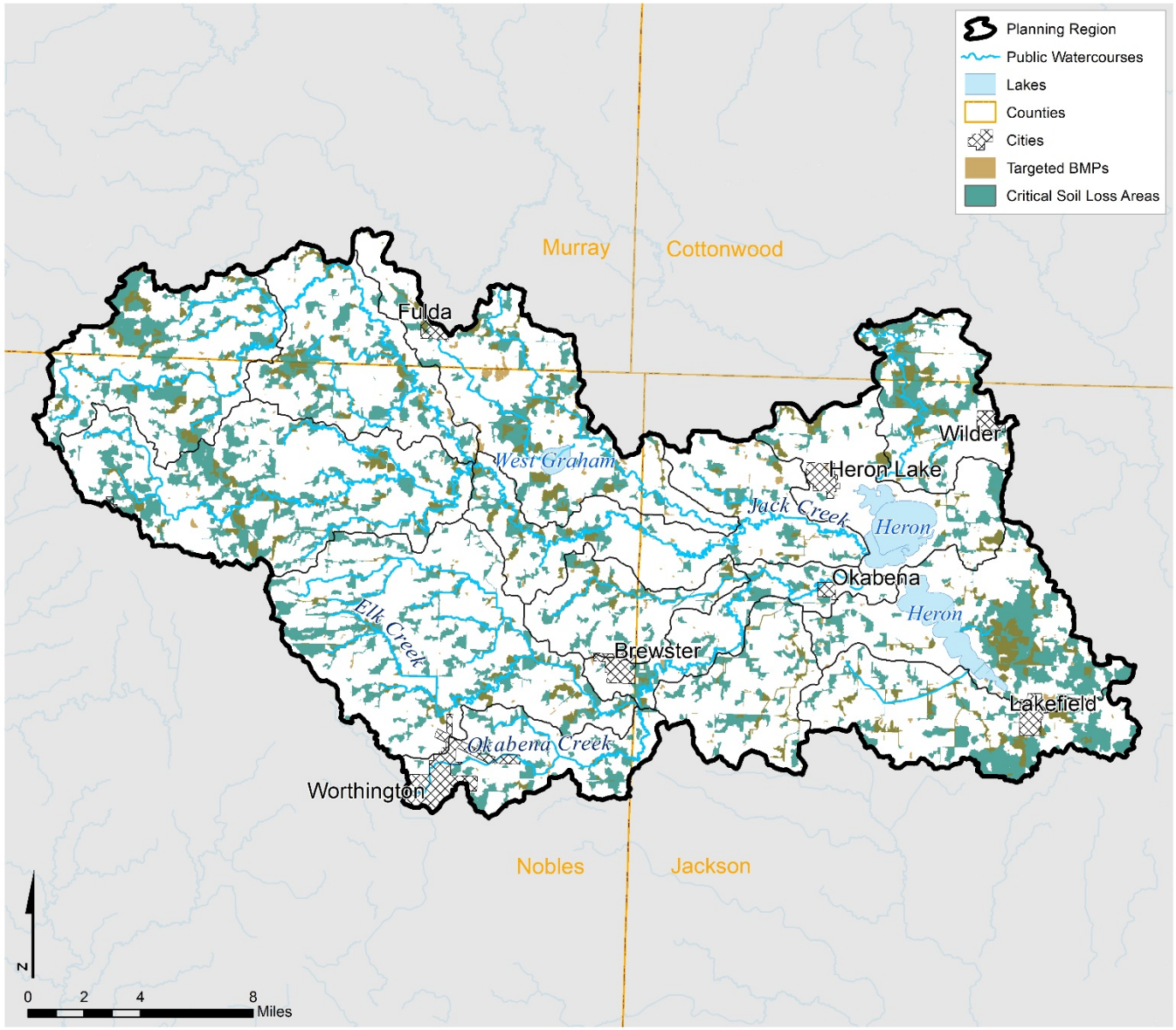


## Heron Lake Watershed District Planning Region

The Table below shows the PTMApp implementation scenario results for the **Heron Lake Watershed District Planning Region**. The next page includes a map showing where practices are located based on Funding Level 2: Current Funding + WBIF.

| BMP Treatment Group | Number of Practices | Total Cost ($) | Values at Catchment Outlet | | | Values at Planning Region Outlet | | | Additional water storage (ac-ft) | Cumulative Surface area (acres) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Sediment Reduction (tons/yr.) | TP Reduction (lbs./yr.) | TN Reduction (lbs./yr.) | Sediment Reduction (tons/yr.) | TP Reduction (lbs./yr.) | TN Reduction (lbs./yr.) | | |
| 378 - Farm pond/wetland | 23 | $82,472 | 447 | 91 | 1,898 | 10 | 8 | 206 | 123 | 50 |
| 554 - Drainage water management | 304 | $168,540 | 5,042 | 1,107 | 19,055 | 231 | 209 | 4,248 | 669 | 841 |
| 638 - WASCOB | 25 | $225,000 | 1,740 | 209 | 2,919 | 115 | 48 | 837 | 75 | 5 |
| 656_2 - Large wetland restoration | 3 | $78,458 | 156 | 8 | 430 | 26 | 4 | 228 | 7 | 2 |
| 390 - Riparian Buffer | 41 | $83,663 | 582 | 112 | 2,174 | 33 | 30 | 714 | 0 | 34 |
| 393 - Filtration Strip | 173 | $83,878 | 745 | 121 | 2,487 | 60 | 36 | 857 | 0 | 85 |
| 605 - Denitrifying Bioreactor | 3 | $34,615 | 41 | 6 | 135 | 7 | 2 | 51 | 0 | 1 |
| 410 - Grade Stabilization | 58 | $232,000 | 901 | 32 | 581 | 43 | 7 | 150 | 0 | 87 |
| 412 - Grassed Waterway | 70 | $231,643 | 941 | 42 | 719 | 100 | 13 | 248 | 0 | 109 |
| 340 - Cover Crops | 236 | $627,519 | 17,264 | 935 | 18,071 | 2,136 | 295 | 6,709 | 0 | 4,183 |
| Scenario 2 Total | 936 | $1,847,788 | 27,859 | 2,663 | 48,468 | 2,762 | 651 | 14,247 | 875 | 5,397 |

## Heron Lake Watershed District Planning Region (map)

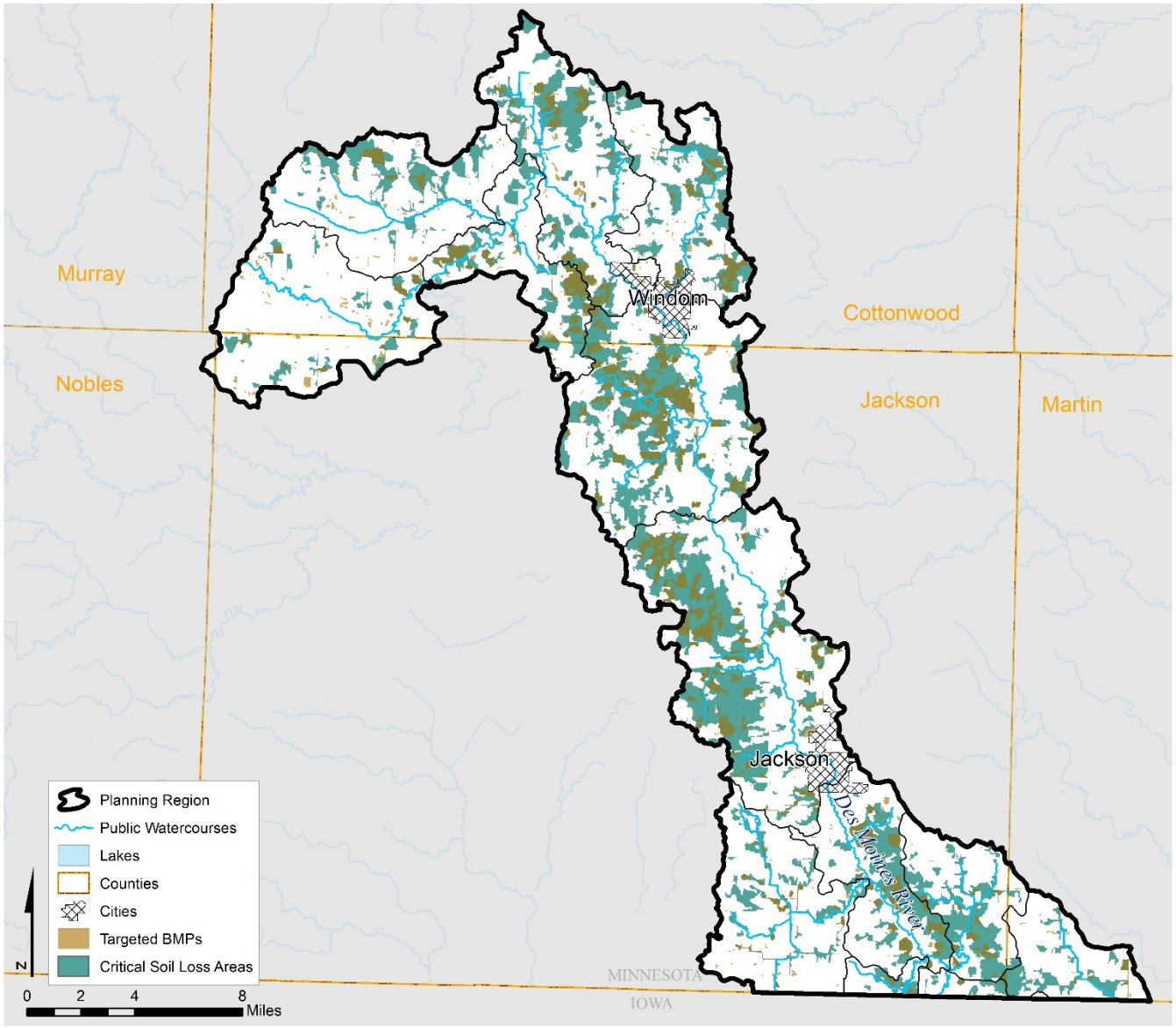


## Mainstem Des Moines River Planning Region

The Table below shows the PTMApp implementation scenario results for the **Mainstem Des Moines River Planning Region**. The next page includes a map showing where practices are located based on Funding Level 2: Current Funding + WBIF.

| NRCS Practice Type | Number of Practices | Total Cost ($) | Values at Catchment Outlet | | | Values at Planning Region Outlet | | | Additional water storage (ac-ft) | Cumulative Surface area (acres) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Sediment Reduction (tons/yr.) | TP Reduction (lbs./yr.) | TN Reduction (lbs./yr.) | Sediment Reduction (tons/yr.) | TP Reduction (lbs./yr.) | TN Reduction (lbs./yr.) | | |
| 378 - Farm pond/wetland | 33 | $87,968 | 1,421 | 184 | 3,809 | 27 | 12 | 209 | 166 | 54 |
| 554 - Drainage water management | 317 | $175,618 | 5,732 | 1,013 | 17,472 | 565 | 360 | 6,207 | 581 | 577 |
| 638 - WASCOB | 25 | $225,000 | 3,349 | 239 | 3,418 | 573 | 122 | 1,779 | 87 | 7 |
| 656_2 - Large wetland restoration | 6 | $88,549 | 125 | 11 | 297 | 21 | 6 | 176 | 7 | 2 |
| 390 - Riparian Buffer | 36 | $86,008 | 560 | 121 | 2,366 | 82 | 48 | 898 | 0 | 37 |
| 393 - Filtration Strip | 163 | $87,832 | 615 | 93 | 1,916 | 156 | 57 | 1,167 | 0 | 89 |
| 605 - Denitrifying Bioreactor | 5 | $41,538 | 51 | 4 | 82 | 12 | 3 | 57 | 0 | 1 |
| 410 - Grade Stabilization | 57 | $228,000 | 854 | 32 | 625 | 262 | 18 | 354 | 0 | 92 |
| 412 - Grassed Waterway | 55 | $228,419 | 932 | 37 | 722 | 281 | 21 | 424 | 0 | 107 |
| 340 - Cover Crops | 253 | $649,286 | 20,767 | 1,014 | 19,357 | 4,615 | 516 | 10,246 | 0 | 4,329 |
| **Scenario 2 Total** | **950** | **$1,898,219** | **34,406** | **2,748** | **50,062** | **6,594** | **1,165** | **21,518** | **840** | **5,294** |

## Mainstem Des Moines River Planning Region (map)

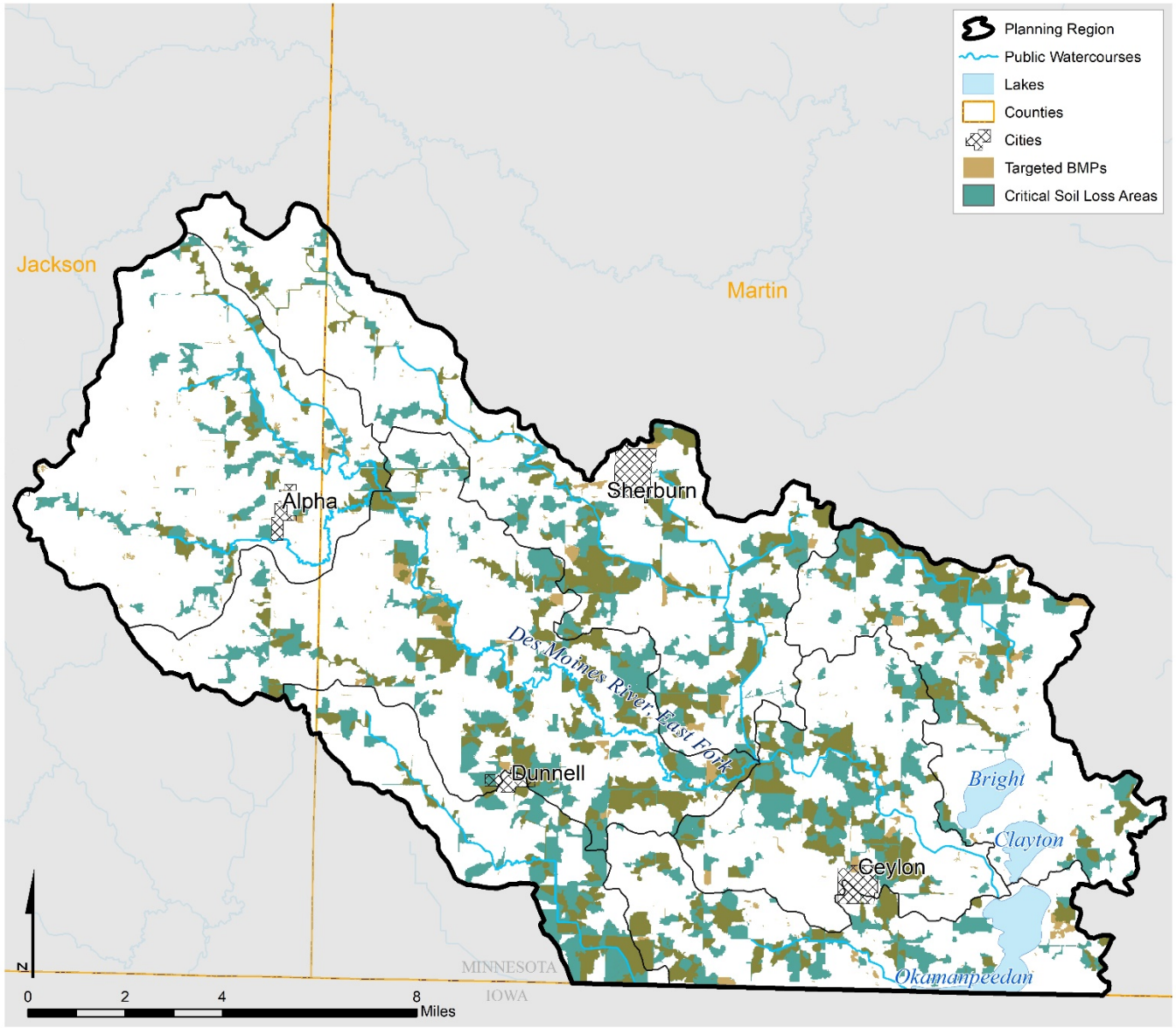


## East Fork Des Moines River Planning Region

The Table below shows the PTMApp implementation scenario results for the **East Fork Des Moines River Planning Region**. The next page includes a map showing where practices are located based on Funding Level 2: Current Funding + WBIF.

| BMP Treatment Group | Number of Practices | Total Cost ($) | Values at Catchment Outlet | | | Values at Planning Region Outlet | | | Additional water storage (ac-ft) | Cumulative Surface area (acres) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Sediment Reduction (tons/yr.) | TP Reduction (lbs./yr.) | TN Reduction (lbs./yr.) | Sediment Reduction (tons/yr.) | TP Reduction (lbs./yr.) | TN Reduction (lbs./yr.) | | |
| 378 - Farm pond/wetland | 17 | $91,378 | 606 | 132 | 2,814 | 123 | 41 | 1,111 | 172 | 56 |
| 554 - Drainage water management | 333 | $184,482 | 2,035 | 439 | 7,546 | 441 | 174 | 3,380 | 237 | 324 |
| 638 - WASCOB | 35 | $315,000 | 2,174 | 274 | 3,694 | 539 | 128 | 1,943 | 99 | 7 |
| 656_2 - Large wetland restoration | 5 | $83,731 | 109 | 12 | 321 | 36 | 7 | 199 | 8 | 2 |
| 390 - Riparian Buffer | 36 | $91,081 | 454 | 92 | 1,755 | 86 | 35 | 787 | 0 | 40 |
| 393 - Filtration Strip | 151 | $92,054 | 579 | 91 | 1,785 | 115 | 39 | 885 | 0 | 93 |
| 605 - Denitrifying Bioreactor | 2 | $42,931 | 31 | 5 | 148 | 5 | 2 | 72 | 0 | 1 |
| 410 - Grade Stabilization | 45 | $180,000 | 262 | 20 | 308 | 45 | 8 | 133 | 0 | 48 |
| 412 - Grassed Waterway | 87 | $317,456 | 791 | 58 | 987 | 136 | 22 | 437 | 0 | 149 |
| 340 - Cover Crops | 219 | $691,069 | 15,516 | 1,048 | 20,144 | 3,946 | 487 | 10,744 | 0 | 4,607 |
| **Scenario 2 Total** | **930** | **$2,089,181** | **22,558** | **2,171** | **39,501** | **5,472** | **944** | **19,692** | **516** | **5,327** |

## East Fork Des Moines River Planning Region (map)



# Appendix G:

## TMDL Loads Related to PTMApp

# Total Maximum Daily Load (TMDL) Load Reduction Table

Below is a summary of TMDL load reductions (TMDL Precent Reduction) for phosphorus and sediment as summarized in the Des Moines River Basin TMDL and WRAPS. The nearest Prioritize, Target, and Measure Application (PTMApp) priority resource point was used to estimate the existing load being delivered to each impaired resource, and a target reduction was calculated based on applying the TMDL percent reduction to the Existing Load.

## Phosphorus

| Planning Region | AUID | Reach Name | Reach Description | TMDL Percent Reduction | Nearest Priority Resource Point | Existing Load (lbs/yr) | Target Reduction (lbs/yr) | Comments |
|---|---|---|---|---|---|---|---|---|
| Lime Creek | 17-0044-00 | North Oaks Lake | NA | 75% | 59 | 1,618 | 1,214 | |
| Lime Creek | 17-0060-00 | Talcot Lake | NA | 69% | 23 | 25,331 | 17,478 | |
| Main Stem | 32-0015-00 | Boot Lake | NA | 57% | 75 | 44 | 25 | |
| Heron Lake | 32-0045-00 | Flahtery Lake | NA | 65% | 7 | 889 | 578 | |
| Heron Lake | 32-0053-00 | Teal Lake | NA | 60% | 10 | 226 | 136 | |
| Heron Lake | 32-0057-02 | Heron (Duck) Lake | NA | 68% | N/A | 1,233 | 838 | No nearby priority resource point. Existing load is based on lake outlet tp_mass_fl_acc value and does not account for in-stream reduction. |
| Heron Lake | 32-0057-05 | Heron (North) Lake | NA | 80% | 11 | 24,879 | 19,903 | |

| Planning Region | AUID | Reach Name | Reach Description | TMDL Percent Reduction | Nearest Priority Resource Point | Existing Load (lbs/yr) | Target Reduction (lbs/yr) | Comments |
|---|---|---|---|---|---|---|---|---|
| Heron Lake | 32-0057-07 | Heron (South) Lake | NA | 79% | 8 | 15,353 | 12,129 | Does not include direct drainage to the lake. |
| Heron Lake | 32-0058-00 | Timber Lake | NA | 55% | 16 | 233 | 128 | |
| Headwaters | 42-0047-00 | Yankton Lake | NA | 45% | 41 | 198 | 89 | |
| Lime Creek | 51-0024-00 | Lime Lake | NA | 56% | 27 | 7,046 | 3,946 | |
| Headwaters | 51-0040-00 | Bloody Lake | NA | 13% | 37 | 120 | 16 | |
| Headwaters | 51-0043-00 | Fox Lake | NA | 9% | 48 | 87 | 8 | |
| Headwaters | 51-0046-00 | Shetek Lake | NA | 33% | 33 | 10,563 | 3,486 | |
| Heron Lake | 51-0054-00 | Corabelle Lake | NA | 37% | 24 | 146 | 54 | |
| Headwaters | 51-0063-00 | Sarah Lake | NA | 45% | 39 | 1,328 | 598 | |
| Headwaters | 51-0082-00 | Currant Lake | NA | 46% | 40 | 433 | 199 | |
| Heron Lake | 53-0020-00 | East Graham Lake | NA | 48% | 14 | 2,973 | 1,427 | |
| Heron Lake | 53-0021-00 | West Graham Lake | NA | 51% | 15 | 2,178 | 1,111 | |

| Planning Region | AUID | Reach Name | Reach Description | TMDL Percent Reduction | Nearest Priority Resource Point | Existing Load (lbs/yr) | Target Reduction (lbs/yr) | Comments |
|---|---|---|---|---|---|---|---|---|
| East Fork | 46-0052-00 | Bright Lake | NA | 44% | 90 | 2,966 | 1,305 | |
| East Fork | 46-0076-00 | Pierce Lake | NA | 61% | 88 | 275 | 168 | |
| East Fork | 46-0103-00 | Temperance Lake | NA | 64% | 85 | 384 | 246 | |
| East Fork | 46-0051-00 | Okamanpeedan Lake (MN Portion) | NA | 55% | 132 | 20,214 | 11,118 | |
| Main Stem | 07100001-501 | Des Moines River | Windom Dam to Jackson Dam | 55% | 4 | 49,301 | 27,116 | |
| Heron Lake | 07100001-527 | Heron Lake Outlet | Heron Lk (32-0057-01) to Des Moines R (07100001-527) | 50% | 20 | 22,254 | 11,127 | |

## Sediment

| Planning Region | AUID | Reach Name | Reach Description | Percent Reduction | Nearest Priority Resource Point | Existing Load (tons/yr) | Target Reduction (tons/yr) | Comments |
|---|---|---|---|---|---|---|---|---|
| Main Stem | 07100001-551 | Unnamed Creek | String Lake to Des Moines River | 28% | 25 | 1,265 | 354 | Mid-range flow reduction |
| Main Stem | 07100002-505 | Judicial Ditch 56 | Unnamed Cr to Des Moines River | 35% | 3 | 1,781 | 623 | |
| Headwaters | 07100001-503 | Beaver Creek | CD 20 to Des Moines River | 65% | 32 | 11,532 | 7,496 | 07100001-646 |
| Headwaters | 07100001-545 | Des Moines River | Lake Shetek to Beaver Cr | 30% | 33 | 13,216 | 3,965 | |
| Lime Creek | 07100001-546 | Des Moines River | Beaver Cr to Lime Cr | 63% | 29 | 26,030 | 16,399 | |
| Lime Creek | 07100001-535 | Lime Creek | Lime Lake to Des Moines River | 83% | 28 | 10,123 | 8,402 | |
| Lime Creek & Main Stem | 07100001-533 | Des Moines River | Lime Cr to Heron Lake Outlet | 65% | 21 | 25,943 | 16,863 | |

| Planning Region | AUID | Reach Name | Reach Description | Percent Reduction | Nearest Priority Resource Point | Existing Load (tons/yr) | Target Reduction (tons/yr) | Comments |
|---|---|---|---|---|---|---|---|---|
| Main Stem | 07100001-524 | Des Moines River | Heron Lk Outlet to Windom Dam | 55% | 128 | 49,799 | 27,389 | |
| Main Stem | 07100001-501 | Des Moines River | Windom Dam to Jackson Dam | 60% | 4 | 58,235 | 34,941 | |
| Main Stem | 07100001-541 | Des Moines River | Jackson Dam to JD 66 | 40% | 130 | 55,907 | 22,363 | |
| Heron Lake | 07100001-507 | Elk Creek | Headwaters to Okabena Creek | 75% | 6 | 16,439 | 12,329 | 07100001-656 |
| Heron Lake | 07100001-506 | Okabena Creek | Elk Cr to South Heron Lk | 50% | 8 | 15,442 | 7,721 | 07100001-602 |
| Heron Lake | 07100001-505 | Jack Creek, North Branch | Headwaters to Jack Cr | 30% | 13 | 9,238 | 2,771 | 07100001-652 |
| Heron Lake | 07100001-509 | Jack Creek | JD 26 to Heron Lk | 80% | 9 | 11,409 | 9,127 | 07100001-659 |
| Heron Lake | 07100001-529 | Division Creek | Okabena Cr to Heron | 70% | 8 | 15,442 | 10,809 | |

| Planning Region | AUID | Reach Name | Reach Description | Percent Reduction | Nearest Priority Resource Point | Existing Load (tons/yr) | Target Reduction (tons/yr) | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Lk (32-0057-06) | | | | | |
| Heron Lake | 07100001-527 | Heron Lake Outlet | Heron Lk (32-0057-01) to Des Moines R | 70% | 20 | 23,195 | 16,237 | |
| Main Stem | 07100002-501 | Des Moines River | JD 66 to MN/IA border | 55% | 1 | 76,410 | 42,026 | |

# Appendix H:

## Altered Hydrology Analysis

# Technical Memorandum

**From:** Timothy Erickson PE
Houston Engineering, Inc.
**Subject:** Des Moines River Altered Hydrology Analysis
**Date:** January 24, 2022
**Project:** 6539-0005

## 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

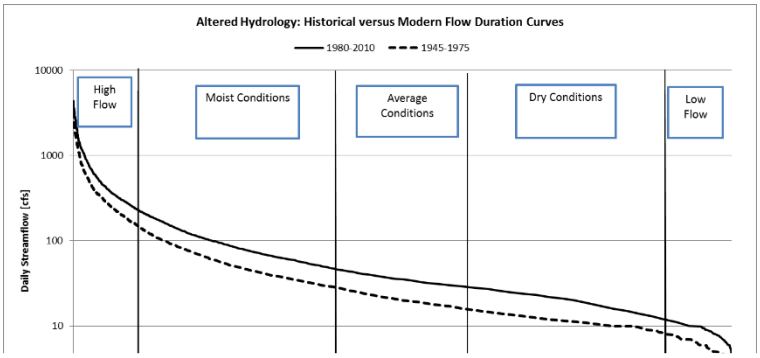



Figure 1. Flow duration curve for the Sand Hill River at Climax, Minnesota. The solid black line shows an increase in daily mean discharge for the 1980 – 2010 period, compared to the early 1945 – 1975 period.

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.

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.

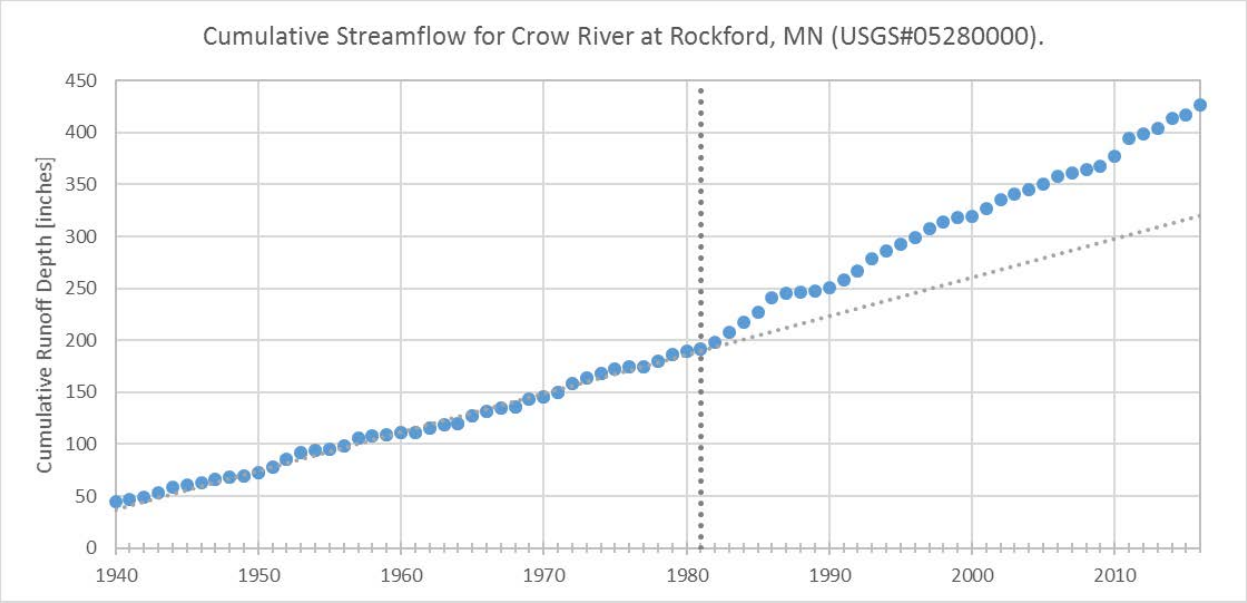



**Figure 2.** Cumulative streamflow for the Crow River at Rockford, MN (USGS Station 05280000).

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 DES MOINES RIVER

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

## *3.1 DES MOINES RIVER*

### 3.1.1 Des Moines River at Jackson, MN (USGS# 05476000)

The USGS long-term, continuous flow gaging station in the Des Moines River at Jackson, MN (USGS# 05476000) and drains approximately 1,250 square miles. The data record starts in 1909 and runs to the 1914, then restarts in 1930 and runs through 2021 (present day). The flow record was downloaded on December 22, 2021. 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**).

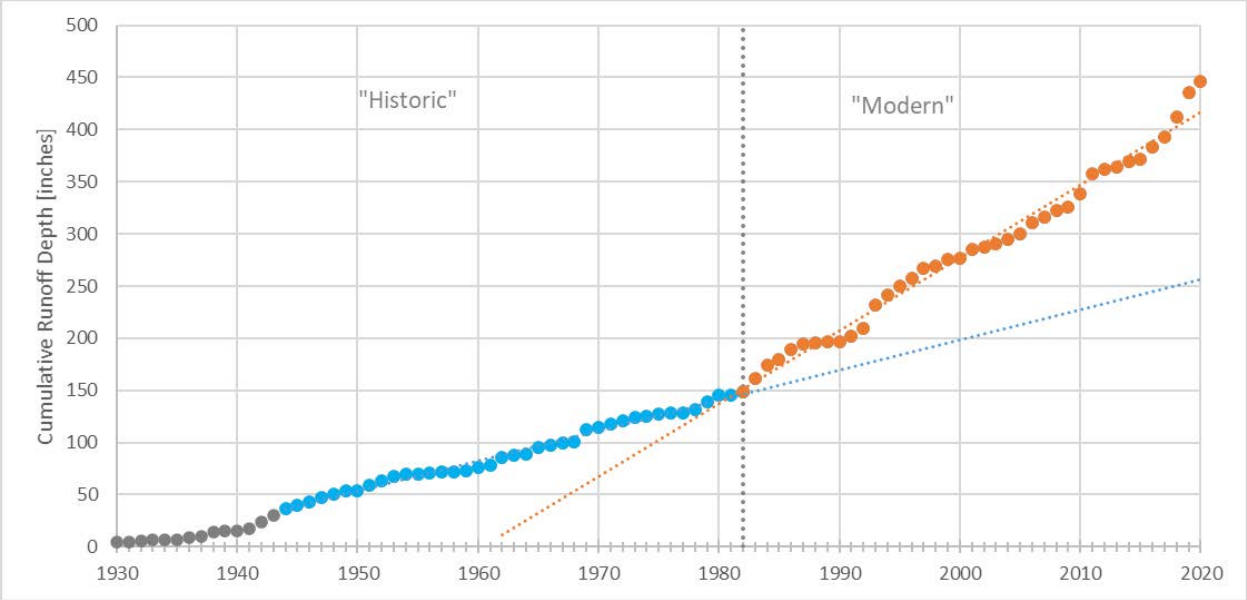



Figure 3. Cumulative streamflow for Des Moines River at Jackson, MN (USGS# 05476000).

No flow records were available from 1914 to part of 1930, points in **Figure 3** start when the flow record begins in 1930. According to the cumulative streamflow analysis, a breakpoint exists around 1982. Therefore, the benchmark ("historic") conditions will include data from 1944-1982 and the altered ("modern") will include data form 1982-2020.

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 Des Moines River at Jackson, MN (USGS# 05476000).

| Group | Metric | % Difference | Altered Hydrology Metric | Evidence of Altered Hydrology for Group |
|---|---|---|---|---|
| Aquatic Habitat | 10-year, Annual Minimum 30-day Mean Daily Discharge | >1,000% | + | Yes, Increasing |
| | 10-year, Annual Minimum 7-day Mean Daily Discharge | >1,000% | + | |
| | Median November (Winter Base) Flow | 335% | + | |
| Aquatic Organism Life Cycle | Magnitude of Monthly Runoff Volumes | 57.8%-to-421% | + | Yes, Increasing |
| | Distribution of Monthly Runoff Volumes | -38.0%-to-104% | + | |
| | Timing of Annual Peak Discharge | 32.7% | + | |
| | Timing of Annual Minimum Discharge | -6.01% | o | |
| Riparian Floodplain (Lateral) Connectivity | 10-year Peak Discharge Rate | 41.9% | + | Yes, Increasing |
| | 50-year Peak Discharge Rate | 3.09% | o | |
| | 100-year Peak Discharge Rate | -10.4% | - | |
| | Average Cumulative Volume above the Historic 10-year Peak Discharge | 14.3% | + | |
| | 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 | 90.4% | + | Yes, Increasing |
| | 2-year Peak Discharge Rate | 86.7% | + | |
| | Average Cumulative Volume above the Historic 1.5-year Peak Discharge | 288% | + | |
| | Average Cumulative Volume above the Historic 2-year Peak Discharge | 186% | + | |
| | Duration above the Historic 1.5-year Peak Discharge | 191% | + | |
| | Duration above the Historic 2-year Peak Discharge | 142% | + | |
| | Flow Duration Curve | 22.2%-to-327% | + | |

# 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 a preliminary goal equal to a representative goal, taken as the average of the 4 methods, across the watershed, realizing that the altered hydrology goals should ideally be established at the 12-digit HUC scale. The average, representative storage goal is **2.34 inches** across the watershed, or **156,227 acre-feet**. 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 7:** Storage goals for rivers in the Des Moines River.

| Stream | USGS ID | Storage Targets | | | |
|---|---|---|---|---|---|
| | | Method 1 | Method 2 | Method 3 | Method 4 |
| Des Moines River at Jackson, MN | 05476000 | 2.55 in. | 3.62 in. | 2.30 in. | 0.91 in. |

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

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# APPENDIX A: METRICS OF ALTERED HYDROLOGY FOR THE DES MOINES RIVER AT JACKSON, MN (USGS# 05476000).

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**.

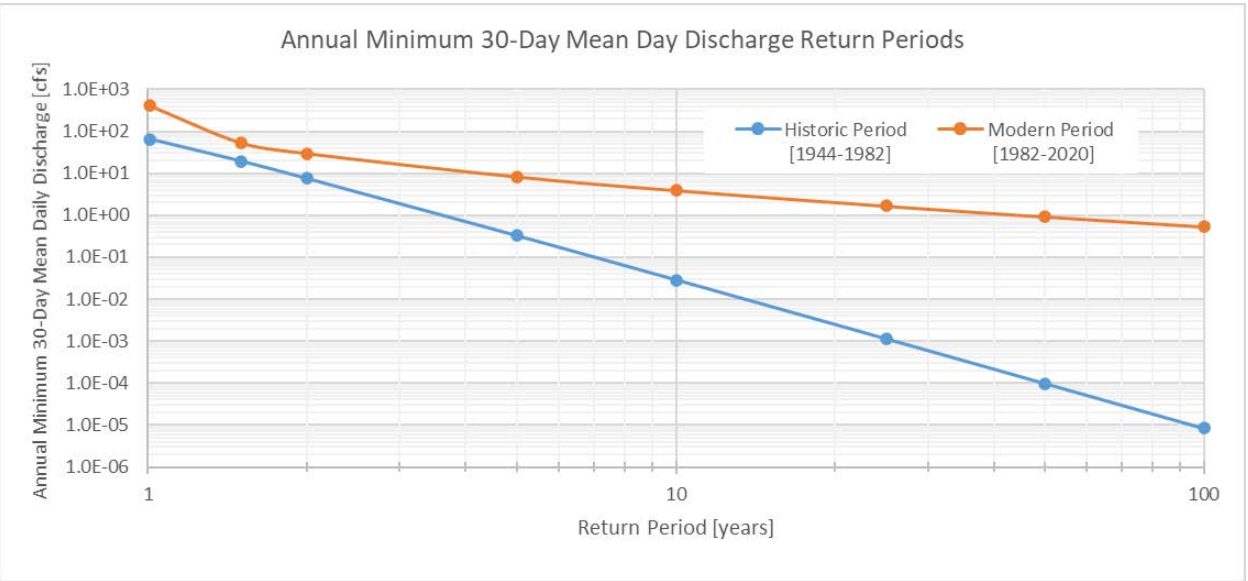


**Figure A.1**. Historical versus modern annual minimum 30-day mean daily discharge versus return period for Des Moines River at Jackson, MN (USGS# 05476000).

**Table A.1:** Summary of annual minimum 30-day mean daily discharge by return periods for the Des Moines River at Jackson, MN (USGS# 05476000).

| Return Period | Historic Period [1944-1982] | Modern Period [1982-2020] | % Diff. | Altered Hydrology Criterion |
|---|---|---|---|---|
| 1.01 | 64.7 | 406.5 | 528% | + |
| 1.5 | 19.4 | 53.5 | 176% | + |
| 2 | 7.5 | 29.9 | 299% | + |
| 5 | 0.3 | 8.3 | 2451% | + |
| 10 | 0.03 | 3.9 | 13478% | + |
| 25 | 0.001 | 1.7 | 145071% | + |
| 50 | 0.0001 | 0.9 | 938750% | + |
| 100 | 0.00001 | 0.5 | 6343858% | + |

+ 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**.

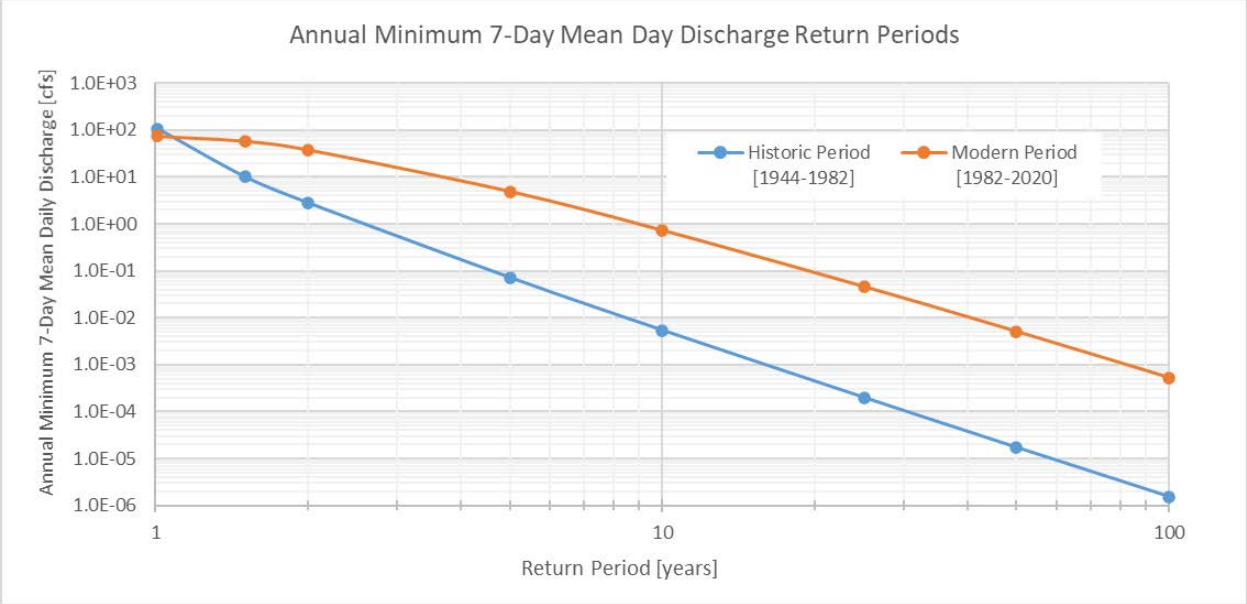


**Figure A.2.** Historical versus modern annual minimum 7-day mean daily discharge return periods for Des Moines River at Jackson, MN (USGS# 05476000).

**Table A.2:** Summary of annual minimum 7-day mean daily discharge return periods for the Des Moines River at Jackson, MN (USGS# 05476000).

| Return Period | Historic Period [1944-1982] | Modern Period [1982-2020] | % Diff. | Altered Hydrology Criterion |
|---|---|---|---|---|
| 1.0101 | 106.3 | 73.5 | -31% | - |
| 1.5 | 10.1 | 57.5 | 469% | + |
| 2 | 2.8 | 37.7 | 1250% | + |
| 5 | 0.1 | 4.9 | 6715% | + |
| 10 | 0.01 | 0.7 | 13309% | + |
| 25 | 0.0002 | 0.05 | 22979% | + |
| 50 | 0.00002 | 0.005 | 29423% | + |
| 100 | 0.000002 | 0.0005 | 34218% | + |

+ 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 Des Moines River at Jackson, MN (USGS# 05476000).

| Return Period | Historic Period [1944-1982] | Modern Period [1982-2020] | % Diff. | Altered Hydrology Criterion |
|---|---|---|---|---|
| Period median November flow [cfs] | 46.0 | 200.0 | 334.8% | + |

+ 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.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**.

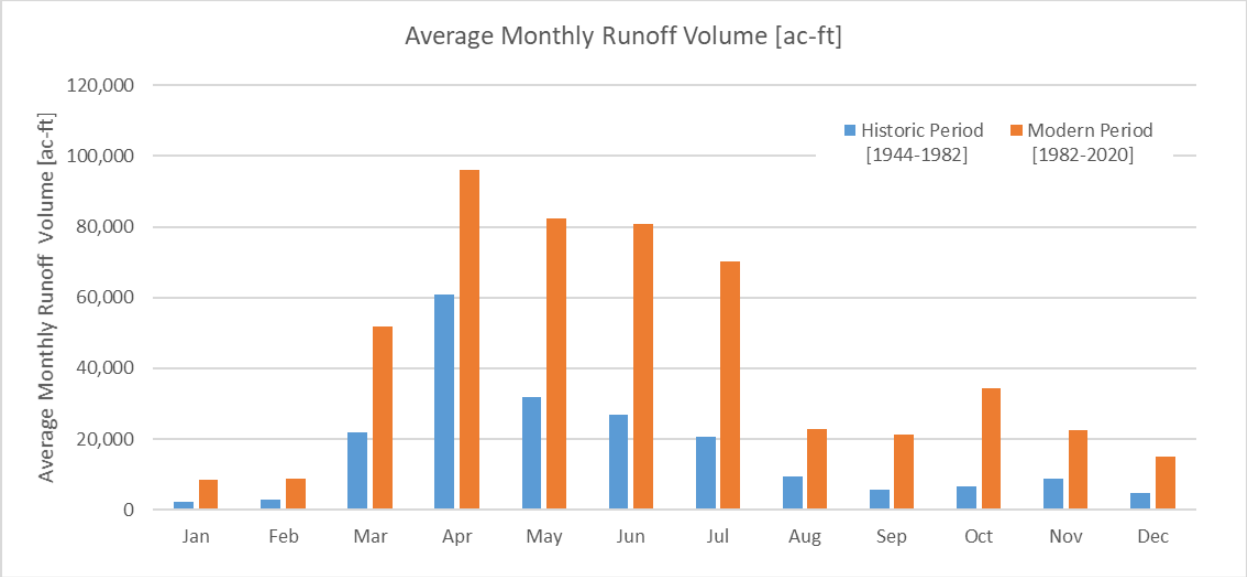


**Figure A.3.** Average monthly runoff volume [ac-ft] in the Des Moines River at Jackson, MN (USGS# 05476000).

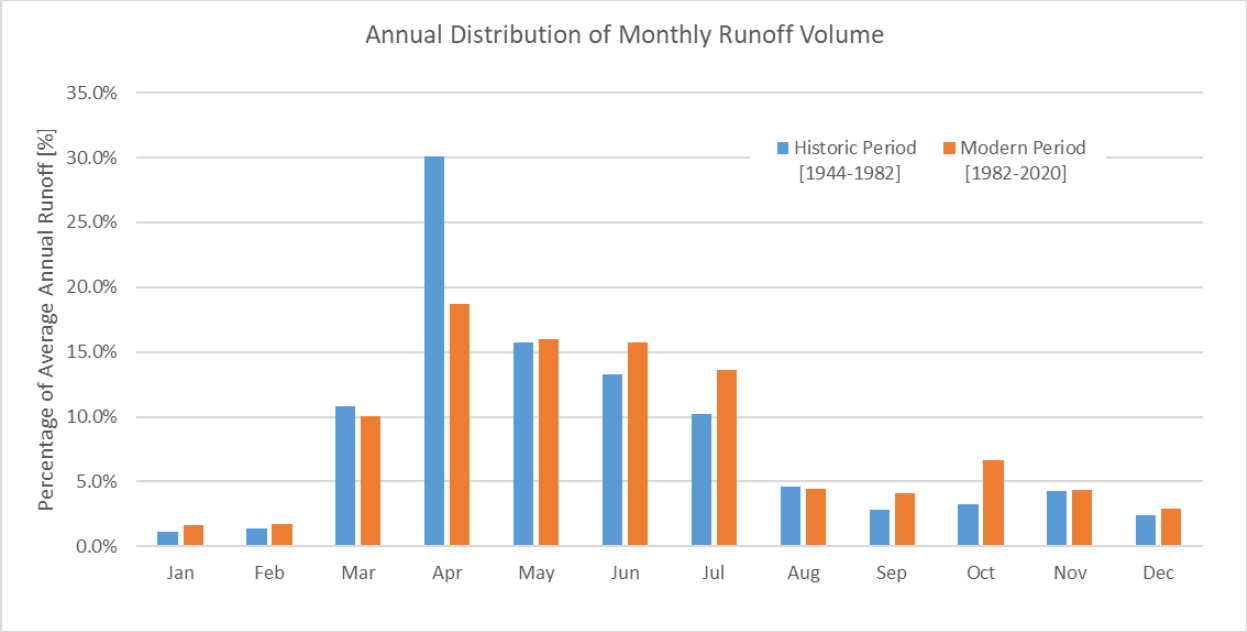


**Figure A.4**. Annual distribution of average monthly runoff volume as a percentage of annual total volume in the Des Moines River at Jackson, MN (USGS# 05476000).

**Table A.4.** Average monthly runoff volume and annual distribution of monthly runoff volumes in Des Moines River at Jackson, MN (USGS# 05476000).

| Month | Average Monthly Volumes [ac-ft] | | | | Distribution of Annual Volume | | | |
|---|---|---|---|---|---|---|---|---|
| | Historic Period [1944-1982] | Modern Period [1982-2020] | % diff. | AH | Historic Period [1944-1982] | Modern Period [1982-2020] | % diff. | AH |
| Jan | 2,271 | 8,563 | 277.1% | + | 1.1% | 1.7% | 48.1% | + |
| Feb | 2,867 | 8,781 | 206.2% | + | 1.4% | 1.7% | 20.3% | + |
| Mar | 21,783 | 51,709 | 137.4% | + | 10.8% | 10.1% | -6.8% | o |
| Apr | 60,827 | 95,979 | 57.8% | + | 30.1% | 18.7% | -38.0% | - |
| May | 31,820 | 82,321 | 158.7% | + | 15.8% | 16.0% | 1.6% | o |
| Jun | 26,747 | 80,835 | 202.2% | + | 13.2% | 15.7% | 18.7% | + |
| Jul | 20,616 | 70,135 | 240.2% | + | 10.2% | 13.6% | 33.6% | + |
| Aug | 9,362 | 22,823 | 143.8% | + | 4.6% | 4.4% | -4.2% | o |
| Sep | 5,624 | 21,199 | 276.9% | + | 2.8% | 4.1% | 48.0% | + |
| Oct | 6,572 | 34,207 | 420.5% | + | 3.3% | 6.7% | 104.5% | + |
| Nov | 8,683 | 22,587 | 160.1% | + | 4.3% | 4.4% | 2.2% | o |
| Dec | 4,775 | 15,001 | 214.1% | + | 2.4% | 2.9% | 23.4% | + |

+ 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
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 Des Moines River at Jackson, MN (USGS# 05476000).

| Statistic | Historic Period [1944-1982] | Modern Period [1982-2020] | % diff. | AH |
|---|---|---|---|---|
| Average | 27-Apr | 4-Jun | 32.71% | + |
| Median | 10-Apr | 26-May | 46.00% | + |
| Standard Deviation | 51 days | 60 days | 18.63% | + |

[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 Des Moines River at Jackson, MN (USGS# 05476000).

| Statistic | Historic Period [1944-1982] | Modern Period [1982-2020] | % diff. | AH |
|---|---|---|---|---|
| Average | 2-Jul | 21-Jun | -6.01% | o |
| Median | 10-Sep | 5-Sep | -1.98% | o |
| Standard Deviation | 117 days | 112 days | -4.86% | o |

[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**.

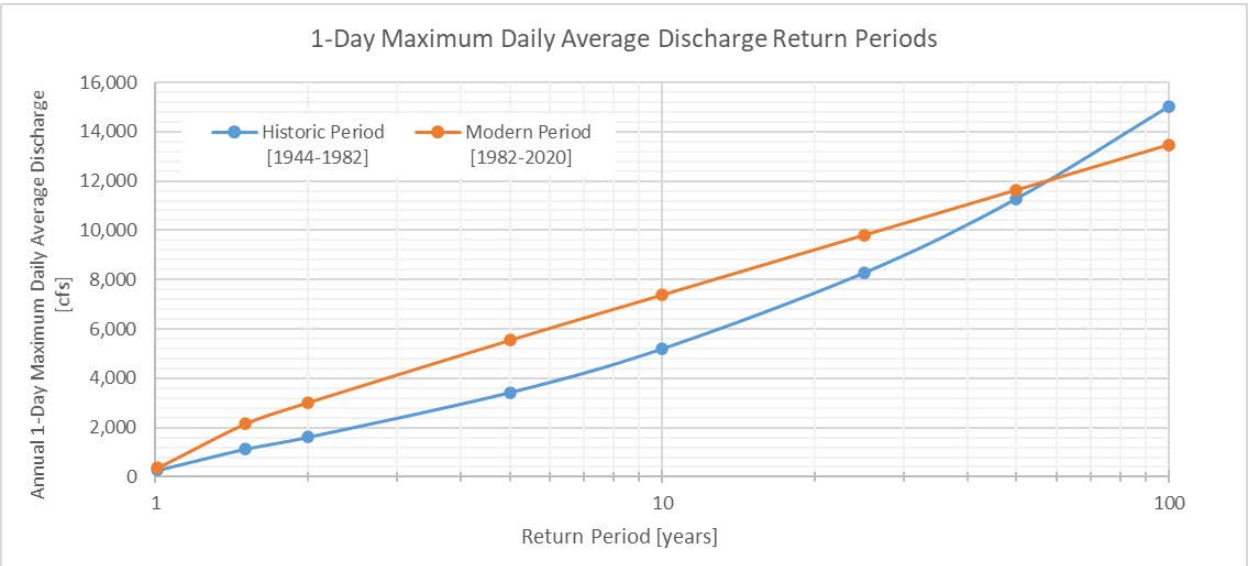


**Figure A.5.** Historical (1940-1975) versus modern (1980-2015) peak discharge return periods for Des Moines River at Jackson, MN (USGS# 05476000).

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 Des Moines River at Jackson, MN (USGS# 05476000).

| Flow Metric | Historic Period [1944-1982] | Modern Period [1982-2020] | % Diff.[1] | Altered Hydrology |
|---|---|---|---|---|
| 5-Year Peak Discharge, Q(5) [cfs] | 3,428 | 5,543 | 61.7% | + |
| Number of years with Discharge (Q) > $Q_H$ (5) | 8 | 16 | 100.0% | + |
| Average number of days per year Q > $Q_H$ (5) | 9 | 30 | 245.7% | + |
| Average annual cumulative volume > $Q_H$ (5) [ac-ft] | 37,678 | 91,569 | 143.0% | + |
| 10-Year Peak Discharge, Q(10) [cfs] | 5,204 | 7,384 | 41.9% | + |
| Number of years with Discharge (Q) > $Q_H$ (10) | 4 | 9 | 125.0% | + |
| Average number of days per year Q > $Q_H$ (10) | 6 | 18 | 216.9% | + |
| Average annual cumulative volume > $Q_H$ (10) [ac-ft] | 39,917 | 45,613 | 14.3% | + |
| 25-Year Peak Discharge, Q(25) [cfs] | 8,276 | 9,804 | 18.5% | + |
| Number of years with Discharge (Q) > $Q_H$ (25) | 2 | 3 | 50.0% | + |
| Average number of days per year Q > $Q_H$ (25) | 5 | 5 | -6.7% | o |
| Average annual cumulative volume > $Q_H$ (25) [ac-ft] | 34,357 | 7,822 | -77.2% | - |
| 50-Year Peak Discharge, Q(50) [cfs] | 11,286 | 11,635 | 3.1% | o |
| Number of years with Discharge (Q) > $Q_H$ (50) | 1 | 0 | NA | o |
| Average number of days per year Q > $Q_H$ (50) | 6 | 0 | NA | o |
| Average annual cumulative volume > $Q_H$ (50) [ac-ft] | 26,742 | 0 | NA | o |
| 100-Year Peak Discharge, Q(100) [cfs] | 15,026 | 13,467 | -10.4% | - |
| Number of years with Discharge (Q) > $Q_H$ (100) | 1 | 0 | NA | o |
| Average number of days per year Q > $Q_H$ (100) | 2 | 0 | NA | o |
| Average annual cumulative volume > $Q_H$ (100) [ac-ft] | 1,086 | 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.

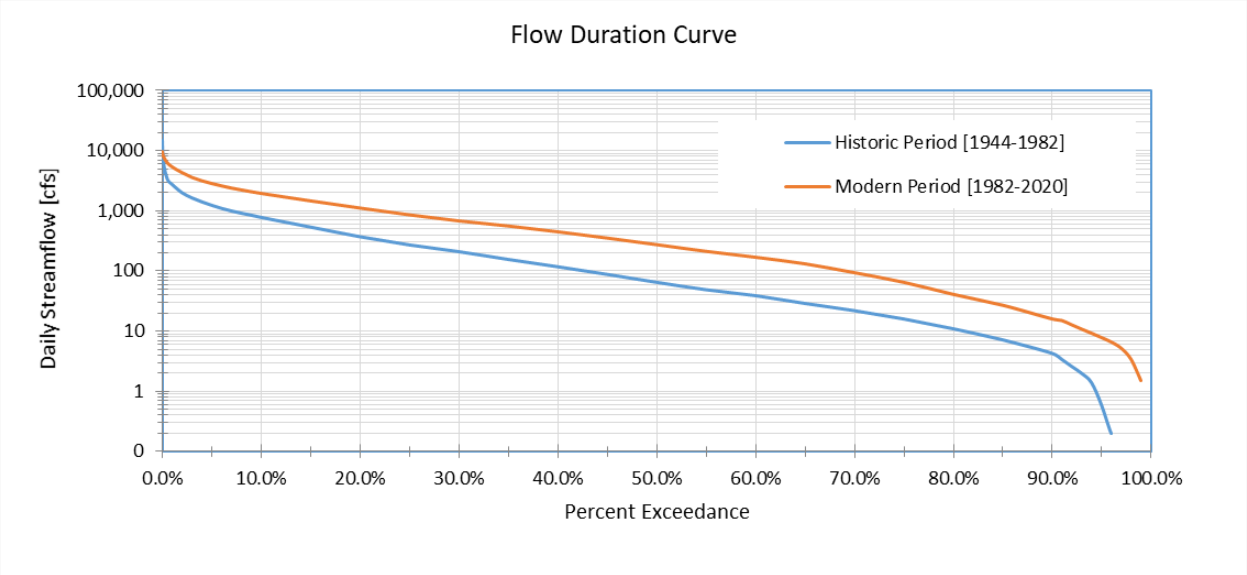


**Figure A.6.** Historical (1940-1975) versus modern (1980-2015) flow duration for Des Moines River at Jackson, MN (USGS# 05476000).

**Table A.8.** Select summary of the flow duration curves for the Des Moines River at Jackson, MN (USGS# 05476000).

| Percent Exceedance | Historic Period [1944-1982] | Modern Period [1982-2020] | % Diff. | Altered Hydrology |
|---|---|---|---|---|
| 0.10% | 6,684 | 8,168 | 22.2% | + |
| 1.0% | 2,740 | 5,407 | 97.3% | + |
| 10.0% | 779 | 1,960 | 151.6% | + |
| 25.0% | 272 | 862 | 216.9% | + |
| 50.0% | 65 | 275 | 323.1% | + |
| 75.0% | 22 | 94 | 327.3% | + |
| 90.0% | 4 | 16 | 272.1% | + |
| 99.0% | 0 | 2 | NA | + |
| 99.9% | 0 | 0 | NA | + |

+ 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 Des Moines River at Jackson, MN (USGS# 05476000).

| Flow Metric | Historic Period [1944-1982] | Modern Period [1982-2020] | % Diff. | Altered Hydrology |
|---|---|---|---|---|
| 1.5-Year Peak Discharge, Q(1.5) [cfs] | 1,127 | 2,145 | 90.4% | + |
| Number of years with Discharge (Q) > $Q_H$ (1.5) | 27 | 32 | 18.5% | + |
| Average number of days per year Q > $Q_H$ (1.5) | 30 | 89 | 191.3% | + |
| Average annual cumulative volume > $Q_H$ (1.5) [ac-ft] | 59,031 | 229,337 | 288.5% | + |
| 2-Year Peak Discharge, Q(2) [cfs] | 1,617 | 3,019 | 86.7% | + |
| Number of years with Discharge (Q) > $Q_H$ (2) | 17 | 30 | 76.5% | + |
| Average number of days per year Q > $Q_H$ (2) | 26 | 63 | 142.4% | + |
| Average annual cumulative volume > $Q_H$ (2) [ac-ft] | 58,973 | 168,929 | 186.4% | + |

+ 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.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 **170,306 AF or 2.55 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 Des Moines River at Jackson, MN (USGS# 05476000) 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 | 2,145 | 1018 | 0.67 | 678.9 |
| 2 | 1,617 | 3,019 | 1402 | 0.50 | 701.1 |
| 5 | 3,428 | 5,543 | 2115 | 0.20 | 422.9 |
| 10 | 5,204 | 7,384 | 2180 | 0.10 | 218.0 |
| 25 | 8,276 | 9,804 | 1528 | 0.04 | 61.1 |
| 50 | 11,286 | 11,635 | 349 | 0.02 | 7.0 |
| 100 | 15,026 | 13,467 | -1559 | 0.01 | 0.0 |
| | | | | Sum (cfs): | 2,089 |
| | | | | Sum (ac-ft/day): | 4,145 |
| | | Number of days: | 58 | Total Volume Goal: | 241,038 AF (3.62 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 Des Moines River at Jackson, MN (USGS# 05476000) 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 | 1,018 | 0.67 | 1,347.0 | 58 | 78,334 |
| 2 | 1,402 | 0.50 | 1,391.0 | 37 | 51,618 |
| 5 | 2,115 | 0.20 | 839.0 | 21 | 17,777 |
| 10 | 2,180 | 0.10 | 432.6 | 12 | 5,395 |
| 25 | 1,528 | 0.04 | 121.3 | 0 | 0 |
| 50 | 349 | 0.02 | 13.8 | 0 | 0 |
| 100 | -1,559 | 0.01 | 0.0 | 0 | 0 |
| | | | | **Total Volume Goal:** | 153,124 AF (2.30 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 **60,438 AF, or 0.91 inches,** across the watershed.

# Appendix I:

## HLWD Rules

# *HERON LAKE WATERSHED DISTRICT*
# *RULES AND REGULATIONS*
# *REVISED APRIL 2005*

Section 1: Introduction.

1.1 Authority. The Heron Lake Watershed District was established by Order of the Minnesota Water Resources Board on February 25, 1970.

1.2 Statutory Policy and Rulemaking Authority. Under Chapter 103D of Minnesota Statutes, it is the policy of the State of Minnesota to authorize the establishment of watershed districts ". . . *to conserve the natural resources of the State by land use planning, flood control, and other conservation projects by using sound scientific principles for the protection of the public health and general welfare and the provident use of the natural resources*". The legislature has granted express statutory authority to watershed districts to adopt rules to accomplish the purposes of Minnesota Statutes, Chapter 103D, and to implement the powers of the managers.

1.3 Watershed Regulatory Policy Statement: The Heron Lake Watershed District has been granted express authority by Nobles, Jackson, Murray and Cottonwood Counties to regulate drainage activities for the general welfare within the watershed district. The goal of such regulation is to provide for the initiation, implementation and enforcement of a comprehensive and uniform system of rules and regulations managing, conserving and controlling of the use of water within the watershed district. In order to continue to develop and implement the watershed district's overall plan, it is desirable and beneficial to manage and control private and public drainage activities affecting water flow between private landowners and/or impacting public drainage systems within the district. Regulation of private and public drainage activities is also desirable and beneficial as a means of data acquisition and record-keeping of all drainage systems within the district as such records assist, aid and facilitate the determination of impact, influence and effect that such private activities have upon public drainage systems and the watershed as a whole. For purposes of these rules, the term *"regulate"* shall be defined as imposing such restraints upon the private rights of land owners to improve their property through tiling and drainage activity as are necessary for the general welfare.

1.4 Jurisdiction and Applicability of Rules. These rules shall apply to and include all of the area, incorporated and unincorporated, including both land and water, within the territory of the Heron Lake Watershed District. These rules shall have the force and effect of law.

1.5 Inconsistent Provisions. If any rule or regulation herein contained is inconsistent with the provisions of the water law of the State of Minnesota, or other applicable state or federal law, then such state or federal law shall govern and the rule or regulation shall be deemed null and void. Any inconsistency of a rule or regulation with a state or federal law will not and shall not be deemed to affect the validity of any other rule or regulation.

1.6 Scope. It is not intended that these rules shall repeal, abrogate, annul, or in any way impair or otherwise interfere with the existing provisions of other laws.

1.7 Severability. These rules and regulations are intended to be severable and in the event that any rule or regulation herein contained is held to be invalid, the remaining rules and regulations shall be deemed to be in full force and effect as if there had been an expungement of the invalid provisions.

1.8 Due Process. These rules and regulations are intended to provide all affected persons and entities with due process of law.

Section 2: Adoption of Existing Laws, Rules, and Regulations.

2.1 Adoption of Water Law. The Board of Managers expressly adopts by reference all of the water law of the State of Minnesota. The Board of Managers reserves the right to impose rules and regulations that are more restrictive than the laws contained within the water law of the State of Minnesota.

2.2 Other Rules, Regulations, or Provisions. The Board of Managers expressly adopts by reference the rules, regulations, and provisions of the following agencies and statutes to the extent that such rules, regulations, and provisions apply to activities regulated by these rules: Minnesota Board of Water and Soil Resources (BWSR); Minnesota Department of Health (MDH); Minnesota Pollution Control Agency (MPCA); Minnesota Department of Natural Resources (MDNR); Minnesota Environmental Quality Board (EQB); U.S. Department of Agriculture (USDA); U.S. Environmental Protection Agency (EPA); U.S. Army Corps of Engineers (ACOE); Local Soil and Water Conservation Districts (SWCD); Nobles, Jackson, Murray, and/or Cottonwood County; Local governmental units, including municipalities and townships; Minnesota Environmental Rights Law, MS Chapter 116B, as amended; State Environmental Policy, MS Chapter 116D, as amended; Minnesota Wetland Conservation Act of 1991, as amended. Where more than one rule, regulation, or provision applies, the most restrictive rule, regulation, or provision shall pertain.

Section 3: Definitions. For purposes of these rules, certain words and terms are defined herein. In absence of a definition for a word or term in these rules, the definition established by statute or case law of the State of Minnesota shall apply unless clearly in conflict, inapplicable, or absurd.

3.1 Agricultural Land: means land used for horticultural, row, close grown, pasture, and hay land crops; growing nursery stocks; animal feedlots; farm yards; associated building sites; and public and private drainage systems and field roads located on any of the foregoing. (MS 103G.005, Subd. 2a)

3.2 Board of Managers, Board, or District: means the Board of Managers of the Heron Lake Watershed District.

3.3 Conditional Use: means a land use or development that would not ordinarily be allowed under existing land use rules or ordinances, but which may be allowed with appropriate controls or conditions.

3.4 General Welfare: means any act or anything tending to improve or benefit or contribute to the safety or well being of the general public or benefit the inhabitants of the watershed district. General welfare shall be synonymous with "public welfare" or "public benefit".

3.5 Impervious Surface: means a constructed hard surface that either prevents or retards the entry of water into the soil and causes water to run off the surface in greater quantities or at an increased rate of flow than prior to development. Examples include, but are not limited to, rooftops, sidewalks, patios, storage areas, roads, streets, driveways, parking lots, or other structural improvements utilizing concrete, asphalt, or compacted soils.

3.6 Shore Impact Zone: means land located between the ordinary high water level of a public water and a line parallel to and one half (½) the distance of the required setback for structures from the ordinary high water mark of the public water; except that on property used for agricultural purposes, the shore impact zone means that land located between the ordinary high water level of a public water and a line parallel to and fifty feet (50') from the ordinary high water mark of the public water.

3.7 Terrace: means an earthen embankment, a channel, or a combination ridge and channel constructed across the existing slope of the land.

Waterway: means a natural or constructed channel, with a permanent grass or vegetative cover, that is shaped or graded to engineered dimensions, established for the stable conveyance of runoff.

3.9 Project: means any construction activity that includes clearing, grading, or excavation. Projects cannot be phased to avoid the permit requirements.

Section 4: Regulation of Activities. The following activities shall require a permit from the Board of Managers of the Heron Lake Watershed District prior to initiation of the activity.

4.1 Installation of agricultural best management practices that require land alteration including surface tile intakes, terraces, waterways, and diversions that have not been designed by the Natural Resources Conservation Service or Soil and Water Conservation District.

4.2 Installation of new surface tile intakes and catch basins.

4.3 Disposal of snow within the shore impact zone.

4.4 The installation or creation of impervious surface. District rules regulating impervious surfaces and the permit process therefore are located in Appendix A to these rules.

4.5 Earth moving projects involving more than 200 cubic yards of excavation or fill; or which disturbs more than 10,000 square feet of soil, and which project, or any part thereof, is located:

- within 300 feet of a stream, storm sewer catch basin, drainage tile intake or a wetland; or,
- within 1,000 feet of a lake.

District rules regulating earth moving projects and the permit process therefore are located in Appendix B to these rules.

Section 5: Permit Application Process: A request for permit or other approval of an activity under these rules shall be commenced by delivering, either in person or by U.S. Mail, a signed application on the form required by the Board of Managers to the office of the Heron Lake Watershed District, PO Box 345, Heron Lake, MN 56137.

5.1 Permit Fees: A $10.00 application fee and a $40.00 inspection fee shall be charged for each storm water permit. A $10 application fee and a $15.00 inspection fee shall be charged for each erosion control plan permit. Design information must be submitted with the application. After-the-fact permits will be subject to the application fee and all other costs incurred by the District. If, in the opinion of the Board of Managers, it is necessary for the watershed district engineer or other consultant to review the application and all exhibits, view the site, and make a report to the watershed district as to the technical implications of the work, costs incurred by the watershed district during this review shall be borne by the applicant.

5.2 Project Plan: A plan, design, or map of the proposed activity shall be attached to the application form. Such plan, design, or map shall be drawn and shall clearly and accurately show all work to be performed, and shall include, either within the plan, design, or map, or by attachment, the following information at a minimum.

5.3 Construction Plan. At the request of the Board of Managers, the plan, design, or map must show the materials to be used, the proposed duration of the activity and/or construction involving the activity, and the proposed initiation and completion dates.

5.4 Stormwater and Water Quality Management. The plan, design, or map must separately address the issues of, and make provisions for, stormwater management and water quality management both during construction and post-construction activities.

5.4.1 As used in these rules, *"stormwater management"* shall include the regulation of the quantity (rate control) and quality of stormwater entering lakes, rivers, streams, or public drainage systems in order to ensure that all nonpoint source pollution, erosion, and sedimentation is minimized.

5.4.2 The term *"water quality management"* shall include the monitoring and control of the quality of the water directly affected by a drainage activity, as well as the receiving waters of a drainage activity, to ensure that minimal degradation in surface or ground water quality occurs.

5.4.3 Stormwater management and water quality management may include structural water management measures (retention areas, swales, infiltration trenches, filter strips, detention basins, vegetative buffer zones, etc.) or nonstructural water management measures (temporary erosion and sedimentation controls, fertilizer and pesticide application controls, solid waste collection, phosphorous abatement and control, etc.) or a combination of both types of management measures.

5.4.4 Stormwater management and water quality management plans shall include a maintenance plan for all structural and nonstructural controls included within the plan, to include: the party responsible for maintenance, a maintenance schedule, and procedures to be followed if maintenance is not performed or is inadequately performed.

5.4.5 The goal of stormwater management under these rules is not to exceed the peak runoff rates existing at the initiation of the proposed

drainage activity as measured by the average of the 10-year, and 100-year runoff producing events of critical duration for the land involved.

5.4.6 The goal of water quality management under these rules is to maintain or improve overall surface and ground water quality.

5.5 Sewage or Waste. The plan, design, or map must be accompanied by or contain a statement as to whether the drainage activity involves the installation, abandonment, or removal of a sewage or waste disposal system.

5.6 Livestock. The plan, design, or map must be accompanied by or contain a statement as to whether livestock will be watered, fed, pastured, or held upon or around the proposed drainage activity. If livestock are involved with the proposed drainage activity, the Board of Managers may require the requestor to devise a livestock management plan that minimizes the adverse impact upon the proposed drainage activity.

5.7 Design, Material Standards. The plan, design, or map must be accompanied by or contain a statement that all culvert and tile emplacement, construction, design, and materials shall conform, at a minimum, to the standards of the NRCS.

5.8 SWCD and NRCS Checkoff. All applications must be reviewed by and bear a certification of the local Soil and Water Conservation District (SWCD) and/or the Natural Resources Conservation Service (NRCS) that the proposed activity does not involve Wetland Conservation Act standards or Swampbuster provisions.

5.9 Notice to Landowners. All requests for permits or other approval shall contain proof of notification of immediate downstream landowners affected by the drainage activity. Proof of notification may consist of a notarized statement of the requestor identifying all landowners actually notified.

5.10 Easement/Access. All permits and other approvals will contain a grant of easement and/or right of access to the watershed district, its Board of Managers, employees, agents, and assigns, for purposes of inspection and monitoring of the drainage activity.

5.11 Completion Time. Unless otherwise stated on the permit or other approval, the drainage activity involved shall be completed within two years or an extension must be requested and approved by the Board of Managers. The Board of Managers shall be notified upon completion of the activity by the permittee or holder of other approval of the Board.

5.12 Additional Information. After initial review of the request, the Board of Managers may require that the applicant provide such additional information as deemed necessary to evaluate the proposed drainage activity in accordance with the required considerations.

5.13 Best Management Practices. All permitted activities shall incorporate best management practices (BMPs). For purposes of these rules, the term *"best management practices"* shall mean practices, techniques, and measures that prevent or reduce water pollution from nonpoint sources and which will minimize erosion of soil and deposition of sediment in private or public drainage systems or waters by using the most effective and practicable means of achieving water quality and runoff goals. BMPs include, but are not limited to, structural controls, nonstructural controls, operational procedures, and maintenance procedures. It is the goal of these rules to ensure that the degree of water quality improvement and runoff protection is maximized relative to the cost of implementing the BMPs. The Board of Managers expressly recognizes that the BMPs approved by MPCA in its handbook "Protecting Water Quality in Urban Areas" satisfy the requirement for BMPs under these rules.

5.14 Restoration. Exposed and/or disturbed soil shall be restored to a condition equivalent to or better than that which existed prior to the drainage activity.

5.15 Spoils. All spoils will be leveled and shall be seeded to hinder erosion.

5.16 Discharge. Wherever feasible, drainage activities will be discharged through marshlands, wetlands, swamps, retention basins, or other diffusing structures.

5.17. Upstream Storage. Wherever feasible, drainage activities will include use of temporary storage areas, retention basins, or other similar structures to maximize upstream storage and reduce peak flows, erosion damage, and sedimentation.

5.18 Filter Strips. Unless otherwise noted in the permit or other approval of a drainage activity, all tile intake and catch basin permits include a requirement for a grass filter strip possessing a radius of 16.5 feet surrounding such device.

5.19 Impervious Surface. Permits for impervious surface will require, at a minimum, the submission of plans utilizing standards and procedures for controlling runoff rates, nutrients, and sediments contained in applicable rules of the MPCA.

5.20 Shoulder and Bank Protection. All water inlets, culvert openings, and bridge approaches shall have adequate shoulder and bank protection in order

to minimize land and soil erosion. For purposes of these rules, the term *"adequate shoulder and bank protection"* shall include by way of example and not by way of limitation: permanent grass or other ground cover, mulch, sod, riprap, retaining walls, and terraces.

5.21 Slopes. Each landowner shall be required to apply BMPs to minimize soil erosion and sedimentation from all drainage activities. At a minimum, the following rules shall apply:

5.21.1 All ditch, watercourse, shore land, and water basin slopes shall be constructed with a side slope as determined by customary engineering practices so as to reasonably minimize land and soil erosion.

5.21.2 All determinations as to whether a side slope reasonably minimizes land and soil erosion shall include the intended capacity of the watercourse or other water body; the depth, width, and elevation; and the character of the soils involved.

5.21.3 Exposed or disturbed soil on slopes or topographic contours of any drainage activity, above the low water mark, shall be mulched, sodded, and/or seeded to hinder erosion and maintained until stabilized by establishment of permanent grass or other approved ground cover.

5.21.4 No agricultural practices shall be permitted upon a slope or topographic contour in excess of ten degrees (10) which slope or contour was created, constructed, or developed by a drainage activity permitted or approved under these rules.

5.22 Riprap. Riprap may not be installed more than five feet waterward of the ordinary high water mark and must conform to the natural alignment of the shore or waterway and not obstruct the flow of water.

5.23 No Estoppel. The issuance of a permit or other approval for drainage activity under these rules shall not constitute an estoppel or limitation of any claim or right of action of the watershed district against the applicant, its contractors, agents, or employees for violation of or failure to comply with the provisions, conditions, or limitations of the permit or other approval granted by the Board of Managers or other applicable provisions of the law.

5.24 Changes to Activity, Plan, or Design. Any new development, redevelopment, addition, change, or modification of an existing drainage activity, or a proposed drainage activity previously approved by the Board of Managers shall require review and re-approval by the Board of Managers under these rules. The Board of Managers may waive the application fee if the requestor has previously paid an application fee within the last two years.

5.25 Termination, Cancellation, and Revocation. A permit or other approval of drainage activity may be terminated, canceled, or revoked as provided by this section. Such termination, cancellation, or revocation shall be with or without notice, provided that where no notice is given, the applicant shall possess the right to appeal said action to the Board of Managers by written request delivered within 30 days of the action to the office of the Heron Lake Watershed District.

5.25.1 Termination shall mean the permit or other approval expired by its own terms or that the drainage activity involved has been completed and approved by the Board of Managers, thereby terminating the permit.

5.25.2 Cancellation shall mean the permit or other approval was suspended, either temporarily or permanently, in whole or in part, upon a determination that such cancellation is deemed necessary to protect the public welfare.

5.25.3 Revocation shall mean the permit or other approval was withdrawn after issuance by the Board of Managers based upon an alleged violation of any of the provisions, conditions, or limitations contained in the permit, license, or other approval granted by the Board of Managers, or for failure to obtain other necessary approvals from, or comply with the requirements of an authority other than the Board of Managers.

5.26 Limited Approval Only. Obtaining a permit or other approval for drainage activity under these rules shall not constitute absolute authority to perform the drainage activity. The applicant remains responsible for obtaining any other required authorization. The permit or other authority is permissive only and shall not release the applicant from any liability nor obligation imposed by Minnesota law, Federal law, or local ordinances and shall be subject to all conditions and limitations imposed by the Board of Managers or hereafter imposed by applicable law. The Board of Managers, by approving a request for permit or other approval of a drainage activity, makes no representations to the applicant that the proposed drainage activity complies or does not comply with existing law. No liability shall be imposed upon or incurred by the watershed district, its Board of Managers, or its officers, agents, and employees, officially or personally, on account of the granting of the permit or other approval, or on account of any damage to any person or property resulting from any act or omission of the applicant or any of its contractors, agents, or employees relating to the drainage activity.

Section 6: Variances: The Watershed District Board of Managers may hear requests for variances from the literal provisions of these rules in instances where their strict enforcement would cause undue hardship because of circumstances unique to the property under consideration. The Board of Managers may grant variances where it is demonstrated that such action will be in keeping with the spirit and intent of these rules.

6.1 The Board of Managers may grant variances only where it is demonstrated that such action will be consistent with the district's watershed management plan and Minnesota water law generally.

6.2 In order to grant a variance, the Board of Managers shall determine that the special conditions that apply to the structure or land in question do not apply generally to other land or structures in the District, that the granting of the variance will not merely serve as a convenience to the applicant, and that the variance will not impair or be contrary to the intent of these rules. A hardship cannot be created by the landowner, the landowner's agent or representative, or a contractor, and must be unique to the property. Economic hardship alone is not grounds for issuing a variance. Land platted within a municipality that has storm water infrastructure installed before the adoption date of these rules, shall be eligible for a variance. The term *"undue hardship"* as used in connection with the granting of a variance shall mean that the property under consideration cannot be put into a reasonable use if these rules were strictly applied and enforced

6.3 A variance shall become void after one year after it is granted if not used.

6.4 A violation of any condition set forth in a variance shall be a violation of the District Rules and shall automatically terminate the variance.

Section 7: Restrictions and Limitations upon Board Action.

7.1 Time deadline for action. The Board of Managers will approve or deny within 60 days a written request for a permit or other governmental approval of drainage activity under these rules. Failure of the Board of Managers to deny a request within 60 days is approval of the request. If the Board of Managers denies the request, it must state in writing the reasons for the denial at the time that the request is denied. The time deadline for permit action begins the day after the Board of Managers first regular meeting following receipt of a written request containing all information required by law or by a previously adopted rule, ordinance, or policy of the watershed. If the watershed district receives a written request that does not contain all required or necessary information, the 60-day limit starts over only if the watershed sends written

notice to the requestor within ten business days of the initial consideration of the request by the Board of Managers telling the requestor what information is missing.

7.1.1 The watershed district's response meets the 60-day limit if the watershed district can document that its written approval or denial action was sent within 60 days of receipt of the written request as defined above.

7.1.2. The time limit in subdivision 6.1 is extended if a state statute, federal law, or court order requires a process to occur before the Board of Managers acts on the request, and the time periods prescribed in the state statute, federal law, or court order make it impossible to act on the request within 60 days. In cases described in this paragraph, the deadline is extended to 60 days after completion of the last process required in the applicable statute, law, or order.

7.1.3. The time limit in subdivision 6.1 is extended if a request submitted to the watershed district requires prior approval of another local, state, or federal agency or board. For purposes of this provision, another local, state, or federal agency or board includes the following: a city, county, town, school district, metropolitan, or regional entity, or other political subdivision. In cases described in this paragraph, the deadline for watershed district action is extended to 60 days after the required prior approval is granted. The watershed district will forward copies of the application to such other state or federal agencies whose approval is required.

7.1.4 The Board of Managers may extend the time limit in subdivision 4.3.1. before the end of the initial 60-day period to protect against serious or significant harm to the public health, safety, or welfare by providing written notice of the extension to the applicant. The notification must state the reasons for the extension and its anticipated length. A decision by the Board of Managers to require an engineering report, environmental impact assessment, or similar preliminary evaluation of a request submitted to the watershed district shall be deemed an act to protect against serious or significant harm to the public health, safety, or welfare.

7.2 Required Considerations. The following criteria shall be considered by the Board of Managers in approving or denying a written request for a permit or other approval of a proposed activity under these rules.

7.2.1 The private or public benefits and costs of the proposed activity.

7.2.2 The present and anticipated agricultural land acreage availability and use affected by the proposed activity.

7.2.3 The present and anticipated land use affected by the proposed activity.

7.2.4 The flooding characteristics of property affected by the proposed activity and downstream for 10 and 100-year flood events and the anticipated impact or effect upon said flooding characteristics of the proposed activity.

7.2.5 The waters to be drained and availability of alternative measures to conserve, allocate, and use the waters – including the potential for storage and retention of such waters.

7.2.6 The anticipated effect of the proposed activity upon water quality – to include construction.

7.2.7 The anticipated effect of the proposed activity upon fish and wildlife resources – to include construction.

7.2.8 The anticipated effect of the proposed activity upon shallow ground water availability, distribution, and use.

7.2.9 The overall environmental impact of the proposed activity.

7.2.10 The adequacy and non-erodability of the outlet for the proposed activity.

7.2.11 The need and reasonableness of the proposed activity.

7.2.12 The anticipated injury or damage to adjoining or downstream property from the proposed activity and potential alternatives avoiding/reducing such injury and damage.

7.2.13 Whether the benefits of the proposed activity outweigh the anticipated harm.

7.2.14 Whether the proposed activity is consistent with the *"general welfare"*. In determining the general welfare, the Board of Managers will consider both agricultural best management practices and water quality best management practices.

7.2.15 Whether, under all the circumstances, the proposed activity constitutes a reasonable use of the land and resources involved. For

purposes of these rules, the term *"reasonable use"* shall be interpreted to incorporate the doctrine of reasonable use; i.e., in affecting a reasonable use for a legitimate purpose a landowner, acting in good faith, may drain his land of surface waters and cast them as a burden upon the land of another, although such drainage carries with it some waters which would otherwise have never gone that way, if there is a reasonable necessity for such drainage; and if reasonable care be taken to avoid unnecessary injury to the land receiving the burden; and if the utility or benefit accruing to the land drained reasonably outweighs the gravity of the harm resulting to the land receiving the burden; and if, where practicable it is accomplished by reasonably improving and aiding the normal and natural system of drainage according to its reasonable carrying capacity, or if, in the absence of a practicable natural drain, a reasonable and feasible artificial drainage system is adopted.

7.3 Reservation of Right to Require Preliminary Analysis. The Board of Managers reserves the right, when in the Board's considered opinion, such action is deemed to be in the public's welfare, to require that any person or entity requesting a permit or other approval of a drainage activity under these rules, procure and pay for an engineering study, environmental impact assessment, or other preliminary analysis determined by the Board of Managers to be beneficial and reasonably necessary to the Board's consideration, evaluation, and determination of the request.

Section 8: Other Regulation of Activities Affecting Drainage. The Board of Managers may enter into or issue letters of understanding, consent agreements, stipulations, orders, or other forms of approval for activities affecting drainage which do not require a permit under these rules. In all such cases, approvals will be entered into or issued upon majority approval by the Board of Managers after notice and hearing at a regular, special, or emergency meeting.

Section 9: Notification of Activities Affecting Drainage.

9.1 Activities Requiring Notification. The following activities shall not be commenced absent notification, not less than 60 days prior to the initiation of the activity, to the Board of Managers.

9.1.1. Removal, conversion, or land-use change of pasture land, agricultural land, or residential, commercial or industrial sites.

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9.1.2. Construction or expansion of feedlots within the watershed. Expansion shall mean an increase in animal units or geographic size.

9.1.3. Removal of trees, brush, or other obstructions within a watercourse, ditch, or natural drainage way.

9.1.4. Maintenance performed by a private individual or entity to a public drainage system.

9.1.5. The alteration or modification of, or construction activity upon, a lake shore or land located within the shore impact zone.

9.1.6. The placement of fill, construction activity, or drainage activity within a wetland. For purposes of these rules *"wetland"* shall mean 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 possess the following attributes: (1) have a preponderance of hydric soil; (2) are inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and (3) under normal circumstances support a prevalence of such vegetation. *"Wetlands"* shall include all wetlands as designated by the ACOE, the Wetland Conservation Act, FSA, NRCS, and/or the public waters inventory.

9.1.7. Any change in course, current or cross section – including any modification, alteration, or change to the bed, banks, or shores – of a public water of the State of Minnesota, as listed on the public waters inventory of the applicable county.

9.1.8. The disposal of snow within a shore impact zone or within or upon a public water.

9.1.9. Construction projects involving the movement, removal, or disturbance of earth from land areas greater than 43,560 square feet (one acre) in size.

9.1.10. Pumping water, either directly or indirectly, into a private or public drainage system. For purposes of this rule, the term *"pumping water"* shall be defined as the movement of water by artificial, natural, or mechanical means from one location to another at a rate exceeding two (2) gallons per minute, and when more than five hundred (500) gallons of water is moved in a single 24 hour period.

9.1.11. The alteration, modification, replacement, or removal of a private bridge or culvert. For purposes of these rules, a *"culvert"* shall be

any perforated or non-perforated tile, conduit, cylinder, tube, or pipe larger than twenty-four (24) inches in diameter.

9.1.12. Any alteration, modification, or construction activity within the area located between the high water mark and the low water mark of a waterway, ditch, stream, river, channel, lake, water basin, water body, public drainage system, or a private drainage system which utilizes a public water or drainage system as an outlet.

9.1.13. The installation, modification, replacement, or removal of any reservoir, catch basin, or water basin or other water impoundment structure. For purposes of these rules, the term *"water impoundment structure"* shall mean a man-made structure designed to retain or contain runoff water, not including natural or man-made pits or ponds in which water is collected and maintained primarily by subsurface seepage or percolation.

9.2 Form and Place of Notification. The notice required by this section must be in writing and delivered to the office of the Heron Lake Watershed District, PO Box 345, Heron Lake, Minnesota 56137.

Section 10: Effect on Other Drainage Law.

10.1 No Effect. These rules and regulations shall not be deemed to have any impact, influence, nor effect upon the requirements for drainage projects regulated and controlled by Minnesota Statutes Chapter 103E and 103D involving public drainage systems.

10.2 Responsibility. It remains the responsibility of the person or entity engaging in an activity which requires a drainage project petition prior to initiation pursuant to Minnesota Statutes Chapter 103E or 103D to make appropriate application to the drainage authority possessing jurisdiction.

Section 11: Enforcement Powers. The Board of Managers may enforce any violation of a watershed district's rules and regulations, or the terms, conditions, and/or limitations of a permit or other approval of a drainage activity issued thereunder, through injunction, action to compel performance, restoration, abatement, or other appropriate relief in the district court and/or by referral of criminal misdemeanor charges to the appropriate county attorney office.

11.1 A violation of a rule, regulation, order, stipulation, agreement, or permit issued by the Board of Managers under these rules and regulations shall be a

misdemeanor as that term is defined by Minn.Stat. § 609.02, Subd. 3, as amended.

11.2 Concurrent Authority to Enforce Water Law. The enforcement powers described herein are not exclusive to the watershed district, but are concurrent with all county, state, and federal agencies possessing authority to regulate the activities embraced herein.

Section 12: Appeal of Decision by Board of Managers.

12.1 Reconsideration. Any person aggrieved by a decision on a permit or other approval of the Board of Managers shall possess the right to appeal for reconsideration to the Board of Managers by making a written demand for a hearing within 30 days of the person receiving written notice of the decision.
12.2 Appeal to County Board. Any person aggrieved by a decision of the Board of Managers upon a request for reconsideration shall possess the right to appeal the Board's decision to the appropriate Board of County Commissioners by making a written demand to the County Commissioners to be placed upon the County Board's agenda. Said demand shall be made within 30 days of the Board of Managers final decision.

12.3 Appeal to District Court or BWSR. Any person may appeal a rule, permit decision, or order made by the Board of Managers by appropriate action to the District Court or by appeal to the Board of Water and Soil Resources. An appeal of permit decision must be filed within 30 days of the Board of Managers' final decision.

Section 13: Adoption or Amendment of Rules.

13.1. Procedure. Rules of the Heron Lake Watershed District shall be adopted or amended by a majority vote of the Board of Managers after public notice and hearing. Rules must be signed by the secretary of the Board of Managers and recorded in the Board of Managers' official minute book in accordance with MS 103D.341, Subd. 2, as amended.

13.2 Repeal of Rules. All rules and regulations bearing an earlier date of adoption or amendment than these rules shall be of no further force or effect and shall be repealed on the date that these rules become effective. Hereafter, any adoption or amendment to these rules by the Board of Managers shall act as a repeal of these rules to the extent that such adoption or amendment is inconsistent herewith.

Section 14: Effective Date of Rules.

14.1 Effective Date of Rules. These rules shall be effective upon the date of the occurrence of the last of the following actions:

14.1.1 Approval of the rules by the Board of Water and Soil Resources.

14.1.2 Approval of the rules by the Board of Managers after notice and hearing and publication as required by law.

Filing of the rules with the County Recorders of Nobles, Jackson, Murray, and Cottonwood Counties, and with the governing body of each municipality located, in whole or in part, within the watershed district.

These rules are hereby adopted pursuant to Minnesota Statute Chapter 103D on this 21st day of May, 2002.

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Mike McCarvel
Secretary
Heron Lake Watershed District

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Appendix A

HERON LAKE WATERSHED DISTRICT
AND OKABENA-OCHEDA WATERSHED DISTRICT
WATER MANAGEMENT PERMITTING RULES

EROSION CONTROL AND STORMWATER MANAGEMENT

Purposes and Policy. The purpose of this section is to afford reasonable protection to the water quality and habitat of the Heron Lake and Okabena-Ocheda watershed districts' lakes and streams. Erosion control measures provide for the prevention of nutrient, sediment and other pollutant loading from soils exposed during construction. Runoff storage and treatment systems provide for the filtration of nutrients, sediments, and other pollutants from storm flows; protection of stream beds and banks and mitigation of downstream flooding through moderation of peak flows both into and within the resource; preservation of aquatic and terrestrial habitat; protection of scenic resources; and maintenance of property values.

To accomplish these purposes, the Heron Lake and Okabena-Ocheda watershed districts hereby adopt, by reference, the standards put forth in the Minnesota Pollution Control Agency's (MPCA) *General Permit Authorization to Discharge Stormwater Associated with Construction Activity Under The National Pollutant Discharge Elimination System/State Disposal System Permit Program*, also known as the NPDES Phase II Permit, along with any future amendments.

1. Permit Coverage and Limitations

1.1 A watershed district and NPDES Phase II permit shall be required, and all construction site erosion control provisions of this permit shall apply, to land disturbing activities associated with construction activity and small construction activity as defined below.

1.1.1 Construction activity includes clearing, grading and excavation, that disturbs land of equal or greater than five (5) acres and includes the disturbance of less than five (5) acres of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb five (5) acres or more.

1.1.2 Small construction activity includes clearing, grading and excavation, that disturbs land of equal to or greater than one (1) acre, and includes the disturbance of less than one (1) acre of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than one and less than five (5) acres.

1.1.3 For drainage ditches, small construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the facility.

2 Stormwater Pollution Prevention Plan: Permits and Administration.

2.1 No activity meeting the requirements for an NPDES Phase II Permit shall occur before a permit is issued from the Heron Lake or Okabena-Ocheda watershed district.

2.2 The applicant must provide the following when requesting a watershed district permit:

2.2.1 A completed watershed district application;

2.2.2 A copy of the Stormwater Pollution Prevention Plan (SWPPP) prepared for the MPCA NPDES Phase II Permit Program;

2.2.3 A proposed timetable and schedule for completion and installation of all elements of approved erosion control and stormwater management plans and a proposed schedule for completion of construction; and

2.2.4 A $10.00 application fee and $40.00 site inspection fee.

3 Permit Conditions

3.1 The SWPPP shall be implemented prior to the start of any land disturbing activity and shall be maintained over the duration of the project. Permanent stormwater components of the plan shall be maintained in perpetuity.

3.2 The permittee is responsible for the successful completion of the SWPPP. The permittee shall be liable for all costs incurred, including environmental restoration costs resulting from noncompliance with an approved plan.

3.3 Application for a permit shall constitute express permission by the permittee and landowner for the watershed district Board of Managers, employees, agents and assigns to enter the property for purposes of inspection, monitoring a project for compliance with the SWPPP, and if necessary, requiring curative action.

4 Permit Transfer

When the owner or operator changes (e.g. an original developer sells portions of the property to various homebuilders), the new owner or operator must submit to the watershed district a copy of the change of ownership/subdivision short form application that was sent to the MPCA as a requirement of the Stormwater Phase II Permit Program.

5 Plan or Permit Amendments

Any major modification to an approved SWPPP, construction schedules or alterations to accepted sequencing of land disturbing site activities shall be approved by the watershed district.

6 Fees

A $10.00 application fee and a $40.00 inspection fee shall be submitted with the erosion control and stormwater management permit application. Application fees are waived for public entities. After-the-fact permits will be subject to the application fee and all other costs incurred by the District. If, in the opinion of the Board of Managers, it is necessary for the watershed district engineer or other consultant to review the application and all exhibits, including the SWPPP, view the site and make a report to the watershed district as to the technical implications

of the work, costs incurred by the watershed district during this review shall be borne by the applicant. Public entities are not exempt from these costs.

7 Termination of Coverage

A permittee wishing to terminate an erosion control and stormwater management permit must submit to the watershed district a copy of the Notice of Termination (NOT) form sent to the MPCA. Compliance with the erosion control and stormwater management permit is required until the NOT is received by the watershed district.

When residential lots are transferred to the home owner, the permittee must distribute the MPCA's "homeowner factsheet" to the homeowner to inform the homeowner of the need for, and benefits of, practices to achieve final stabilization of the lot.

8 Compliance and Enforcement

8.1 The watershed districts will perform field inspections on all construction sites that disturb one acre or more to determine if:

8.1.1 The MPCA NPDES Phase II Permit application and a watershed district permit have been acquired.

8.1.2 There is a Stormwater Pollution Prevention Plan (SWPPP) for the site and it is being followed.

8.1.3 The Best Management Practices called for in the SWPPP are working properly.

8.2 The watershed districts, during inspections, will record deficiencies and violations of permitting rules and SWPPP's. Recommendations for correcting deficiencies and violations will be distributed to landowners, contractors and permittees.

8.3 The watershed districts, when necessary, will exercise enforcement actions up to and including issuing "stop work orders" for sites that do not comply with MPCA NPDES Phase II and watershed district permit requirements.

8.4 The watershed districts will make non-compliance determinations and referrals to MPCA to take enforcement action in the following situations.

8.4.1 All non-permitted sites that disturb more than 1 acre.

8.4.2 Permitted and non-permitted sites where serious environmental damage has occurred to surface waters.

Appendix B

HERON LAKE WATERSHED DISTRICT
AND OKABENA-OCHEDA WATERSHED DISTRICT
WATER MANAGEMENT PERMITTING RULES

EROSION CONTROL ON CONSTRUCTION SITES SMALLER THAN ONE ACRE

**Purposes and Policy**. The purpose of this section is to afford reasonable protection to the water quality and habitat of the Heron Lake and Okabena-Ocheda watershed districts' lakes and streams. Erosion control measures provide for the prevention of nutrient, sediment and other pollutant loading from soils exposed during construction.

1. Earth Moving Projects: A district permit will be required for any earth moving project which will result in:

- grading involving more than 200 cubic yards of cut or fill and which project, or any part thereof, is within 300 feet of a water of the state or is within 1000 feet of a lake; or
- disturbance of more than 10,000 square feet of soil and which project, or any part thereof, is within 300 feet of a water of the state or is within 1000 feet of a lake.

Waters of the state include: street gutters, stormsewer catch basins, natural streams, drainage ditches, drainage tile intakes and wetlands. The purpose of the permit is to insure that adequate erosion control measures are taken before, during and after the earth moving project.

2. Permit Requirements: Permit applicants must submit one set of the following documents to the Board for its review:

2.1 A Completed Permit Application Form. A request for permit under these rules shall be commenced by delivering, either in person or by U.S. Mail, a signed application on the form required by the Board of Managers to the office of the Okabena-Ocheda Watershed District, 1567 McMillan Street, Suite 3, Worthington, MN 56187.

A $10.00 application fee and a $15.00 inspection fee shall be charged for each erosion control plan permit. Application fees are waived for public entities. Erosion control plan information must be submitted with the application. After-the-fact permits will be subject to the application fee and all other costs incurred by the District.

If, in the opinion of the Board of Managers, it is necessary for the watershed district engineer or other consultant to review the application and all exhibits, view the site, and make a report to the watershed district as to the technical implications of the work, costs incurred by the watershed district during this review shall be borne by the applicant.

2.2 A set of Project Plans, including at least:

- A scale drawing of the site showing property lines and delineation of lands under ownership of the applicant and the proposed earth moving project.
- An Erosion Control Plan showing proposed methods of retaining waterborne-sediments onsite during the period of construction, and shall specify methods and schedules to determine how the site will be restored, covered, or revegetated after construction. *[Note: an erosion control plan does not require the signature of a registered professional engineer.]*

2.3 In addition, the permit applicant shall provide specific measures to control erosion based upon recognized engineering standards and the grade and length of the slopes on the site, to include--at a minimum--the following:

2.3.1 Silt fences or other approved devices shall be placed near the toe of the slopes to prevent soil from moving offsite. All devices shall be installed in accordance with the adopted standards. All silt fences and other devices must be replaced, supplemented or repaired when they become non-functional or sediment reaches the height defined in the adopted standards. These repairs must be made within 24 hours of discovery or as soon as field conditions allow.

2.3.2 Diversion channels or dikes and pipes shall be provided to intercept all drainage at the top of slopes that have grades of more than 10:1. Also, diversion channels or diked terraces and pipes shall be provided across said slopes if needed to ensure that the maximum flow length does not exceed 100 feet. No unbroken slopes longer than 75 feet on grades steeper than 3:1 shall be allowed.

2.3.3 Require that a device meeting the approved standards be installed, around each catch basin inlet on the site. The device shall remain in place until final stabilization of the site occurs.

2.3.4 Ensure that flows from diversion channels or pipes are routed to sedimentation basins or appropriate energy dissipaters in order to prevent transport of sediment to outflow conveyors and to prevent erosion and sedimentation when runoff flows into the conveyors.

Any temporary of permanent drainage ditch that drains water from a construction site, or diverts water around a site, must be stabilized within 200 linear feet of the property boundary. Stabilization and energy dissipation practices, where needed, must be installed within 24 hours of the connection to surface water.

2.3.5 Provide that site-access roads be graded or otherwise protected with a device or devices meeting the approved standards to prevent sediment from leaving the site via the access roads.

2.3.6 Require that soils tracked from the site by motor vehicles be cleaned daily (or more frequently, as necessary) from paved roadway surfaces throughout the duration of construction.

2.3.7 Assure that all erosion and sediment control measures be deployed, inspected and maintained for the duration of site construction. If construction operations interfere with these control measures, the devices may be removed or altered as needed but shall be restored to serve their intended function at the end of each day.

2.3.8 Specify that all exposed areas must have temporary erosion protection or permanent cover for the exposed soil areas year round according to the following table of slopes and time frames:

| **Type of Slope** | **Time*** |
|---|---|
| Steeper than 3:1 | 7 days |
| 10:1 to 3:1 | 14 days |
| Flatter than 10:1 | 21 days |

*Maximum time an area can remain open when the area is not actively being worked.

A schedule of significant grading work will be required as part of the erosion and sedimentation control plan.

2.3.9 Require that temporary erosion protection and permanent cover be provided in accordance with the adopted standards.

2.3.10 Maintain an undisturbed grassed area, or install and maintain silt fence or other approved device, or provide a 4-foot wide sodded area along the curb line of all streets adjacent to the site and along all property boundaries where runoff could leave the site.

2.3.11 Erosion control practices must be maintained until final stabilization of the site occurs. (70 percent vegetative cover is achieved.)

# Appendix J:

## Regulatory Comparison Table

# Regulatory Comparison Table

Many of the issues affecting priority issues can be addressed in part through administration of statutory responsibilities and ordinances. This document is intended to be used to summarize the existing local rules, ordinances and statutes that are currently being administered by planning entity, to understand areas of duplication, gaps, and opportunities.

| Statute, Ordinance, or Rule Name | Cottonwood | Jackson | Lyon | Martin | Murray | Nobles | HLWD |
|---|---|---|---|---|---|---|---|
| Shoreland Management | Cottonwood County Zoning Ordinance 28, Section 17 | Jackson County Development Code, Section 610 | Zoning Ordinance, adopted April 1, 2015; Article 17 | Martin County Zoning Ordinance Chapter 13 | Murray County Zoning Ordinance | Nobles County Land Use Ordinance Section 609 | See Rules |
| Floodplain Management | Cottonwood County Zoning Ordinance 28, Sect. 12F-1 | Jackson County Development Code Section 609 | Zoning Ordinance, adopted April 1, 2015; Article 6 | Martin County Zoning Ordinance | Murray County Zoning Ordinance | Nobles County Land Use Ordinance Section 611 | See Rules |
| Subsurface Sewage Treatment System (SSTS) | Cottonwood County SSTS Ordinance 38 | Jackson County Development Code, Section 716 | Zoning Ordinance, adopted April 1, 2015; Article 24 | Martin County SSTS Ordinance | Murray County Zoning Ordinance | Nobles County SSTS Ordinance Section 719 | See Rules |
| Solid Waste Management | Cottonwood County Zoning Ordinance 19 | Jackson County Solid Waste Ordinance 101 | MPCA; all waste disposed of at Lyon Co Landfill | Martin County Solid Waste Ordinance | Murray County Solid Waste Ordinance | Nobles County Solid Waste Management Ordinance | See Rules |
| Hazard Management | Cottonwood County Zoning Ordinance 28, Sect. 26 | Jackson County Solid Waste Ordinance 101 | None listed | Martin County All-Hazard Mitigation Plan | Murray County All Hazard Mitigation Plan | Nobles County All Hazard Mitigation Plan | See Rules |

| Statute, Ordinance, or Rule Name | Cottonwood | Jackson | Lyon | Martin | Murray | Nobles | HLWD |
|---|---|---|---|---|---|---|---|
| Feedlots | Cottonwood County Zoning Ordinance 2, Sect. 13 | Jackson County Development Code Section 727 | Zoning Ordinance, adopted April 1, 2015; Article 19 | Martin County Feedlot Ordinance | Murray County Zoning Ordinance | Nobles County Land Use Ordinance Sect. 725 | See Rules |
| Buffers | Cottonwood County Ordinance Section 42 | Jackson County Development Code Section 736 | SWCD administers the Buffer Law | Martin County Buffer Ordinance | None Listed | None listed | See Rules |
| Wetland Conservation Act | State law | State law | SWCD is authority and administrator for entire county including cities | State law | Murray SWCD Minnesota Rule Chapter 8420 | Nobles SWCD | See Rules |
| Aquatic Invasive Species (AIS) | None listed | None listed | State - MN DNR | None listed | None Listed | None listed | See Rules |
| Construction Erosion Control | Default to state | Jackson County Development Code Section 710 | Stormwater / site development provisions. None related to agricultural land | Default to state | Managed through Murray County Zoning Ordinance | Administered by Okabena-Ocheda Watershed District | See Rules |
| Wellhead Protection | None listed | None listed | Setbacks / other requirements for various activities. Land-Use Permits are required before installing a new well | None listed | None Listed | None listed | See Rules |

| Statute, Ordinance, or Rule Name | Cottonwood | Jackson | Lyon | Martin | Murray | Nobles | HLWD |
|---|---|---|---|---|---|---|---|
| Public Drainage Systems | Default to state | MS 103E | Setbacks to Judicial and County Ditches and Tiles are required for various activities. | Martin County Multi-Purpose Drainage Management Plan | MS 103E | MS 103E | See Rules |
| Land Use | Cottonwood County Planning and Zoning Office | Jackson County Comprehensive Land Use Plan | Zoning Ordinance, adopted April 1, 2015 | Martin County Land Use Plan | Managed through Murray County Zoning Ordinance | Nobles County Land Use Ordinance | See Rules |

# Appendix K:

## 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<br>§103E.731<br>§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<br>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<br>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 L:

## Formal Review Comment Response Table

| Commenter | Plan Section | Page / Paragraph | Comment | Material | Editorial | Note | Change (Y/N) | Resolution |
|---|---|---|---|---|---|---|---|---|
| MDH | 5 | 81- Education and Outreac | MDH recommends Output for Activity EO-2 could be 1 clinic or outreach event / year | X | | | Y | Revised as suggested |
| MDH | Multiple | 10, 66, 74 | Red Rock Rural Water Drinking Water Supply Management Areas (DWSMAs) in figures | | X | | Y | Maps revised in figures suggested |
| MPCA | | | The MPCA suggests that tasks focusing on education and outreach be targeted to respective priority areas to coincide with reaching priority goals. | | | | Y | Actions in watershed-wide tables revised where able to target priority areas |
| MPCA | 5 | 84- RA-4 | MPCA is listed twice as an implementation partner and should only be listed once. | | X | | Y | Revised as suggested |
| MPCA | 5 | 84- RA-5 | The task of reviewing septic system records for compliance assessment will be primarily the responsibility of the counties. Please list the counties first as the lead organization while keeping MPCA underlined as a second lead agency. | X | | | Y | Counties added to action as lead |
| MDA | 6 | 89, below table | In addition to the MDA's Township Testing Program, please also include "MDA's Pesticide Water Quality Monitoring." The MDA collects water samples from agriculture and urban areas of Minnesota and analyzes water for up to approximately 150 different pesticide compounds that are widely used and/or pose the greatest risk to water resources. | x | | | Y | Added MDA's Pesticide Water Quality Monitoring to narrative |
| MDA | Whole document | | One of MDA's roles that relates to the 1W1P process is technical assistance. The MDA maintains a variety of water quality programs including research, on-farm demonstrations, as well as ground and surface water monitoring. Our goal is to provide you with the data from the programs to help address resource concerns and further engage the agricultural community in the 1W1P process, including the watershed wide and planning region focus of the implementation schedule. | | | X | N | Noted for implementation, with thanks |
| DNR | Whole document | | A recent DNR evaluation of hydrologic change in the watershed indicates that channel erosion and prevalent flooding have been increasing unabated since the early 1980s, putting additional strain on public infrastructure. | | | X | N | Comment noted for implementation. Altered hydrology and streambank erosion are priority issues in the plan (Priority A and B, respectively). |
| DNR | Whole document | | The plan identifies the importance of groundwater recharge and water storage on the landscape. A potential conflict may develop with the increasing dominance of agricultural drain tile and drainage systems throughout the planning area. | | | X | N | Comment noted for implementation |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DNR | Whole document | | As a goal, the plan seeks to minimize local and downstream impacts by restoring hydrologic functions and keeping precipitation and runoff on the landscape. This will aid in achieving the surface water quality goals noted in our priority concerns letter. Targeted best management practices will help restore streams, rivers, and lakes. The plan recognizes this and will pursue targeted implementation projects that significantly reduce nitrates and phosphorus while improving soil health. | | | X | N | Noted for implementation, with thanks |
| DNR | 3 | 21 | As noted on page 21 of the plan, these goals are complicated by the threat of invasive species like the zebra mussels at the top of the watershed in Lake Sarah. | | | X | N | Comment noted for implementation |
| DNR | 4 | | The measurable goals in Section 4 are established using PTMApp Phosphorous (P) and Nitrogen (N) loading estimates. This is highly effective for land management practices, but the absence of in-channel sources of P and N from the PTMApp data should be emphasized more throughout the goals. Stream stability issues result directly from ineffective or erroneous land stewardship decisions that cannot be mitigated after the excess water volumes enter the stream, river, or lake system. | X | | | N | See page 24: "Second, PTMApp only accounts for the loading coming from surface runoff, and therefore does not consider point-source contributions or in-channel sources. More information on the theory and mechanics of PTMApp may be found in Appendix F." |
| DNR | | | 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, with 23 lakes in the watershed impaired by excess nutrients, this challenge is daunting. | | | X | N | Comment noted for implementation |
| DNR | 4 | 35 | As detailed in the plan, the desired future condition of 2.34 inches of water storage across the entire watershed is a bold goal. We will work confidently with all partners to meet or exceed this goal. | | | X | N | Noted for implementation, with thanks |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DNR | | | Historically, most public drainage improvement projects in the Des Moines River Watershed have not met the goals of this plan. The storage and altered hydrology section of the plan considers options to offset the impact of tiled drainage and recognizes that drain tile density is likely to expand into currently undrained areas. While the DNR is hopeful the watershed plan will influence future public and private drainage projects, the options considered in the plan for offsetting tile drainage impacts may not be enough to produce measurable results. Consider seeking more firm and specific commitments from the drainage authorities, so as to develop projects with numeric goals, moderate drainage coefficients, and landscape-suitable water storage alternatives. | | | X | N | Comment noted for implementation |
| DNR | | | (cont) Per statute requirements, the DNR is responsible for reviewing and commenting on drainage improvement projects' adherence to the MN Statute including 103E.015 that includes 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 and county and watershed district water planning authorities about potential external sources of funding 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. | | | X | N | Comment noted for implementation |
| DNR | | | (cont) Drainage authorities must strive for accurate hydrology modeling for proposed drainage projects to demonstrate reductions in peak flows, flow event duration and total annual flow contributions. The DNR will also strive for such accuracy and mitigation commitments from the drainage authorities on future projects, to ensure public waters, fish and wildlife habitats are protected. | | | X | N | Comment noted for implementation |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DNR | | | Clean drinking water is a precious limited resource that we often take for granted. Increasing demand from domestic, agricultural, municipal and industrial water users can strain shallow aquifers and well fields. This watershed does not exhibit a surplus of available drinking water sources from deep aquifers. Therefore, conservation initiatives and new technologies designed to reduce overall water use must continue to be addressed by municipal councils and staff, rural water boards and even private well owners. A sustainable water supply requires consistent monitoring, management and implementation of water conservation measures throughout this watershed. | | | X | N | Agreed- Groundwater recharge is a Priority A issue |
| DNR | | | (cont) The 5,000 acres of conservation practices within DWSMA areas is a significant step towards this groundwater protection need. Nearly all the city and rural residents in this watershed are using water from these shallow aquifers where the water has only been retained in these aquafers for 10 years or less. So daily decisions in these key shallow aquafer recharge areas will have a significant impact within a relatively short timeframe while also protecting this replenishable water resource for future generations. | | | X | N | Comment noted with thanks |
| DNR | | | All lakes in this watershed can benefit from improved water quality and quantity, entering and leaving the lakes. The focus area watersheds identified in this Plan appear to largely target lakes noted in the DNR priority letter. Measuring improvements to each of these lake resources varies greatly depending on the water quality impairment. For example, the aquatic recreation impairment on lakes such as Shetek, Sarah, Talcot, Lime, Buffalo and Heron Lake may benefit from being within the *High Goal Focus watersheds of the Plan* . However, several other recreational lakes including, East and West Graham, Currant and Yankton could benefit from similar practices regardless of the documented impairment. | x | | | N | See pages 34 and 46: Lakes are in High goal category for either lake shoreline and/or phosphorus loading (request clarification on Buffalo). |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DNR | | | About 75% of streams in the Upper Des Moines, and 80% of streams in the East Fork Des Moines, have been channelized or impounded. These altered watercourses exhibit limited floodplain connectivity, excessive bank erosion and poor fish and wildlife habitat. To combat this degradation requires adopting resilient and progressive land use and land management practices. This local watershed plan builds on a framework to address the principles detailed in the DNR watershed characterization report. This includes increases in perennial vegetation to slow and filter runoff, increase water retention, reduce erosion, filter sediment and nutrients, stabilize banks, provide fish and wildlife habitat and connect habitat corridors. Streambank and Channel Erosion and Enhanced buffers are only a Priority B in the Plan while we believe these need to be a Priority A. The DNR recommends that the portions of Lime Creek, Okabena and Jack Creek, Beaver Creek and the Des Moines River systems currently demonstrate altered hydrology and suffer from substantial stream bed and bank erosion and could benefit significantly from adding or enhancing riparian buffers and streambank practices. As an example, Beaver Creek in Murray County exhibits some of the most significant stream bank erosion, detachment from the floodplain and stream bed aggradation, which are all reasons why Beaver Creek should be consider a Priority A initiative response. | x | | | N | Issues have been considered and prioritized by the Steering Committee and TAC, and have been confirmed by the Policy Committee for this plan. |
| DNR | | | The Des Moines River watershed has abundant natural resources unique to Minnesota, however protecting, restoring, enhancing habitat and additional public recreation opportunities need more consideration. The watershed is home to many documented Species of Greatest Conservation Need (SGCN) as well as endangered and threatened species. Many of these are grassland dependent species. Several of the measurable goals of this Plan will improve habitat for SGCN. This watershed provides critical habitat for the Blanding's Turtle, Dakota Skipper, Poweshiek Skipper and Prairie Bush Clover. | | | X | N | Comment noted for implementation. Wildlife habitat is a Priority B issue for this plan with goals and action items accordingly. |

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| DNR | | | The enhancement of recreational opportunities is a great chance to partner with other funding agencies toward improvements on such key resources as the Casey Jones State Trail, Lake Shetek State Park, Kilen Woods State Park and many other municipal and county parks. One significant underutilized recreational opportunity in this watershed is the Des Moines River. Working to develop a State Water Trail on this river system would enhance this use and appreciation for this significant natural resource. Important bird watching areas are also adjacent along the Des Moines River valley, around Heron Lake, and the Prairie Coteau Complex providing other benefits. | | | X | N | Comment noted for implementation with thanks |
| DNR | | | Scheldorf Creek is the only stream in the watershed that is groundwater dependent and meets water temperature thresholds for supporting a trout fishery. Protection of groundwater recharge for this stream is critical to maintain consistently cooler water temperatures and sustainable stream flows for the fishery. The Groundwater Recharge protection (priority A) measurable goals, including the areas of DWSMA protection can help improve and protect this key groundwater resource. | | | X | N | Comment noted for implementation with thanks |
| DNR | | | Dam modification projects are advised on Lake Shetek, Lake Sarah, and Talcot Lake since these aging structures were not designed for today's escalating hydrologic conditions nor do they support aquatic organism and fish passage. It is likely that one or more of these dams will need to be critically evaluated within the next 10 years. This Plan help establishes hydrology and aquatic connectivity goals and a framework that should simplify guidance to LGUs or other entities proposing removal, repair or replacement projects. | | | X | N | Comment noted for implementation with thanks |
| BWSR | Whole Document | | We appreciate that the group has identified a tiered implementation based on funding levels. Identifying efficiencies using known funds when compared to the total amount needed is valuable information in determining necessary funding allocations | | | X | N | Comment noted for implementation with thanks |
| BWSR | Whole Document | | The baseline implementation level assumes statutory obligation and ordinance implementation levels will go unchanged. Will the local government units (LGU) self-report an audit to the partnership to ensure that this is taking place? | X | | | N | For local discussion |

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|---|---|---|---|---|---|---|---|---|
| BWSR | Whole Document | | The progress toward goal breakdown charts by planning region will be useful in building implementation plans, the planning group is to be commended for building implementation schedules specific to planning regions. | | | X | N | Comment noted for implementation with thanks |
| BWSR | ES | 6 | Good summary of targeted implementation goals; will be a useful starting point for pace of progress and measuring progress toward the plan in reporting | | | X | N | Comment noted for implementation with thanks |
| BWSR | 2 | 9 | Figure 2.4 – the corresponding plan view of this cross section with an outline of the Des Moines River would be helpful | X | | | N | Figure provided by group |
| BWSR | 5 | 55 | The planning group is to be commended for its prioritization planning issues as opposed to political geography; we encourage the planning group to observe the planning area's "high" priority subwatersheds of each issue when ranking for implementation and consider them to be the place to start with funds. | | | X | N | Comment noted for implementation with thanks |
| BWSR | 5 | 57-58 | "Planning Region Summaries" (Figure 5.6) – This is a good section; adds benefit to this plan which should make implementation tracking as well as grant goal pace of progress explanation easier | | | X | N | Comment noted for implementation with thanks |
| BWSR | 5 | Targeted Implementation Tables | May be helpful to reference relevant priority issue page and attendant map in the "focus area" column of each action item | | X | | Y | Revised as suggested |
| BWSR | 5 | 80 | Capital Improvement Projects chart – expand on the description of the Martin SWCD project. | X | | | Y | More detailed added |
| BWSR | 7 | 98 | Table 7.4*– Funding Level 2 – "Plan Admin" pie slice is maroon should be plum colored (*Should be "Figure 7.1" thereby making Table 7.5 into "7.4" along with all verbiage changes) | | X | | Y | Revised as suggested |
| BWSR | 7 | Whole section | An Implementation Agreement should be developed to further identify the structure of decision making, financial and admin responsibilities | | | X | N | Noted for action |