LOWER MINNESOTA RIVER
WATERSHED DISTRICT

November 2023 Administrator report
From: Linda Loomis, Administrator
To: LMRWD Board of Managers

In addition to items on the meeting agenda, the following District projects and issues were addressed during the month:

## Other Work

**Lower Minnesota River East One Watershed One Plan**
See the report included with the November 15, 2023, meeting materials for an update. The Steering Committee will meet at 10:00 am on Wednesday, November 15, 2023. The Policy Committee meeting for November 16, 2023 has been cancelled.

Project website: website.

**2024/2025 Watershed Based Implementation Funding**
BWSR expects that convene processes to allocate funds under this round of Watershed Based Implementation Funding will begin in early 2024. They are planning information sessions with that schedule in mind. The LMRWD will likely convene the meeting.

As reported in September, the LMRWD Watershed Planning Area has been allocated $217,485 and the Lower MN River East will receive $538,396 in 2024. The LMRWD Watershed Planning Area corresponds to the boundaries of the LMRWD.

**MN Watersheds**
The LMRWD received a request from MN Watersheds to consider re-joining the organization. I informed them that the Board has removed dues to MN Watershed from its budget. She asked why and I explained that whenever the LMRWD expresses concerns it has regarding the increasing amounts of sediment coming into the MN River, MN Watersheds and its membership dismiss those concerns and are unwilling to acknowledge the situation the LMRWD faces with the MN River. It is not an organization that seems to want to be a partner, but only wants dues from the LMRWD without providing any benefit in return. The response I received was; “I will have to think about that”.

**Carver WMO**
Carver WMO has reached out to the LMRWD about educating Carver County businesses about Chloride pollution. Last year they developed a smart salt business education kit targeted to cities in Carver County. The Kits were hand-delivered to downtown businesses in both Chaska and Waconia, which enabled them to have a conversation with the business. The intent was to target small businesses and their employees, those individuals that may be hand spreading salt on walkways.

This year they plan to target businesses in Carver, Cologne and Norwood-Young America. Since parts of Carver fall within the LMRWD, they have reached out to us to see if there are additional areas the LMRWD would like to target and if we would like our logo on the letter. The LMRWD logo

was sent to Carver WMO. The letter that is being distributed is attached for the Board's information.

**US Army Corps of Engineers Continental Marsh**
At the July 19, 2023, meeting, the Board was informed of a request from the US Army Corps of Engineers (USACE) to place material needed for a repair project, on the LMRWD dredge placement site. The Board agreed to allow temporary placement of the material, as long as it did not interfere with the ability to store dredge material. The USACE did not believe that there would be any interference and is now getting ready to begin the project. The USACE conducted an inspection of the area in preparation for work to commence and noticed that Vernon Avenue was blocked. I checked in with Eureka Fiber, who has planned to install Fiber-optic cable. Eureka's work has not begun, so the blockage was from TH 13 work. The USACE will have to coordinate with MnDOT and Eureka to bring in materials needed for the repair.

The USACE expects to let the project the week of the 13th and once a contract has been executed, the USACE expects the contractor to begin bringing in materials needed for the repair. At the time the request was made, the LMRWD Board had several questions. The USACE has prepared a Power Point presentation that details the project. The Power Point is attached.

**Peterson Wetland Bank update**
The LMRWD authorized a permit for this project subject to receipt of approvals from the various cities required to permit the project. The City of Eden Prairie conditioned its approval upon receipt of approval by the LMRWD. The applicant has been wanting to start construction of the project, but the City of Eden Prairie would not allow the start until it received the permit from the LMRWD.

The City of Eden Prairie typically does not approve permits until erosion control has been placed and inspected by the City. The applicant and later the City contacted the LMRWD to figure out how to get this project underway. The City has collected financial assurance, so the LMRWD administratively authorized work to begin without the permit from the City of Eden Prairie. The applicant thought it might be getting too cold to begin work, however with the prediction of warmer weather it may be possible to get work underway this month.

**MPCA – Lower Minnesota River Watershed Assessment**
On Tuesday October 31, 2024, MPCA held a meeting to discuss the process and first round findings for the TMDLs and WRAPS update process. President Barisonzi and Manager Salvato joined the meeting. The MPCA explained this project moving forward. The PowerPoint presentation made at the meeting is attached in .pdf format and here is a link to the recording of the presentation (You Tube); https://www.youtube.com/watch?v=6SVGKnKRhJw

Information for the previous round of assessments can be found by visiting the MPCA website using this link: Lower Minnesota River Watershed. The last assessment was completed in 2015.

## Watershed Plan Projects

**MAC Boundary Adjustment:** This item is on the November 15, 2023, agenda.

**West Chaska Creek Re-meander:** No new information to report since the update.
Project website: https://storymaps.arcgis.com/stories/1695a2cf90b44ddba730aad399196405

**Seminary Fen Ravine Restoration Area C2**: No new information to report since last update. Here is a link to the feasibility report Area C-2.

**Spring Creek:** An update on this project is in the November meeting materials.

**Gully Inventory and Assessment:** There is no new information to report on this project since the last update.

**Minnesota River Study Area #3:** An update on this project is in the November meeting materials.

**Minnesota River Floodplain Modeling:** There is no new information to report since the last update.

**Vernon Avenue Dredge Material Management:** An update for this project is in the November meeting materials.

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## Upcoming meetings/events

*Managers are invited to attend any of these meetings. Most are free of charge and if not the LMRWD will reimburse registration fees. Please contact LMRWD administrator if you have any questions.*

- Lower MN River East 1W1P Steering Committee meeting – Wednesday, November 15, 2023, 10:00 am to 12:00 noon – virtual
- UMWA (Upper Mississippi Waterway Association) monthly meeting – November 16, 2023, 11:30 pm, Lilydale Pool & Yacht Club
- Lower MN River East 1W1P Policy Committee meeting – October 19, 2023, 3:00pm to 5:00 pm, hybrid on at 181 W Minnesota Street, Le Center, MN or virtual (MS Teams)
- MN Watershed Annual Conference and Tradeshow – November 28 – December 1, 2023, Arrowwood Conference Center – Alexandria
- LMRWD Citizen Advisory Committee meeting – Tuesday, December 5, 2023, 4:30pm, location TBD
- River Resource Forum – Tuesday & Wednesday, December 5 & 6, 2023, MN Valley National Wildlife Refuge Visitor Center 3815 American Boulevard, Bloomington
- Metro Watersheds – Tuesday, January 16, 2024, via Zoom

**Carver County Water Management Organization**
**Planning and Water Mgmt. Dept.**
600 East 4th Street
Chaska, Minnesota 55318
www.carvercountymn.gov/water

# Help Protect Our Waters

Wintertime brings a surge of chloride pollution into our lakes and rivers. When we use de-icing salt on our sidewalks, driveways, and roads, much of that salt ends up in bodies of water where it dissolves into chloride.

De-icing salt pollutes our lakes and streams.

## The Salt Problem

High chloride levels are toxic to fish, aquatic insects, and amphibians, and harms the aquatic ecosystem. It doesn't take much – just one teaspoon of salt contains enough chloride to permanently pollute five gallons of water! So far, the Minnesota Pollution Control Agency has identified 54 lakes and streams in Minnesota with chloride levels high enough to harm fish and other aquatic life, and 75 more water bodies are approaching unsafe levels.

Salt is also corrosive, damaging parking lots, walkways, and buildings. According to the Environmental Protection Agency, maintenance and repair of salt damage to roads, bridges, and automobiles in the U.S. costs around $5 billion each year.

**Chloride is a permanent pollutant.** Once in a lake or river, it's impossible to remove it safely and cost-effectively. *The only way to reduce chloride levels in water is to use less salt.*

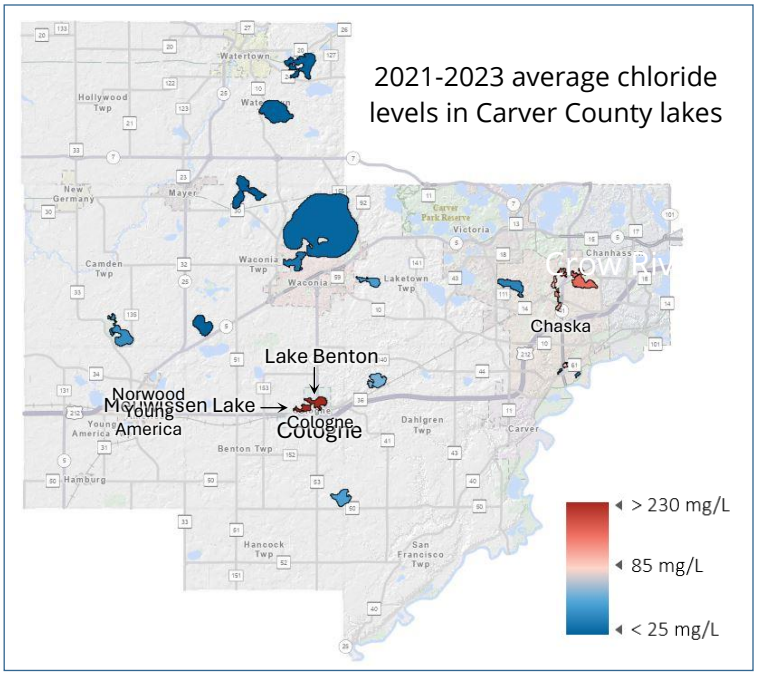
## Keep Safe and Salt Smart

### The enclosed items can help your business adopt smart salt practices!

- **Salting cup:** Store with your salt bucket to measure salt use. More salt does not mean more sidewalk safety, but it does mean higher salt costs.
- **"Using salt wisely" flyer:** Hang up this flyer near your door or wherever salt is stored to remind staff of smart salt tips.
- **Salt Smart pledge cards:** Use these cards to share best salting practices with your employees and customers.
- **"Fight Snow and Ice" brochure:** Tips to select the best method to keep walkways ice-free.
- **"Hire a Smart Salter" flyer:** Learn how to hire a snow removal contractor dedicated to keeping Minnesota lakes healthy.
- **Smart Salting stickers:** Place these stickers on your salt bucket and shovel to remind yourself to keep up best salting practices.
- **"We are Salt Smart" window cling:** Use this cling to advertise to your customers that you are dedicated to keeping our water clean.

# How healthy is our water in Carver?

County wide, many of our lakes and streams are seeing increasing salt levels as the County continues to grow. So far, no lakes sampled in the county currently exceed the state standard for chloride, but Benton and Meuwissen Lakes (Cologne) and the Grace Chain of Lakes (Chaska) are close. Keep up the good work in the City of Carver and follow the steps in this packet to keep salt out of our lakes.




# Be part of the solution

You can have safe walkways and healthy waters by following smart salt practices.

**Pledge to use smart salt practices.**
Use the Smart Salting pledge cards, flyer, and window cling to educate your employees and advertise to your customers that your business is committed to protecting our water while keeping walkways ice-free.

## Smart Salt Practices

### 1. Shovel
Shovel early and often. Clear your walkways before snow turns to ice. Apply salt only if necessary!


### 2. Select
Choose the right tool for the job. Most salt doesn't melt ice below 15°F. Use sand for traction instead!

### 3. Scatter
Aim for 3 inches of space between salt granules for most effective salting. More salt does not equal more melting.

### 4. Sweep
Clean up leftover salt and sand to save and reuse as you need it. This reduces pollution and saves money!

*Graphics courtesy of cleanwatermn.org*

# Contact

Questions or concerns? Reach out to us!

**Madeline Seveland**
Carver County Water Management Organization
952-687-7586
mseveland@co.carver.mn.us

The Carver County Water Management Organization works to keep our local lakes, rivers, streams, and wetlands healthy and enjoyable for aquatic life and communities. We are working to improve water quality by reducing chloride pollution in our waterways.

# Repair Design Concept

Minnesota River Natural Levee Failure

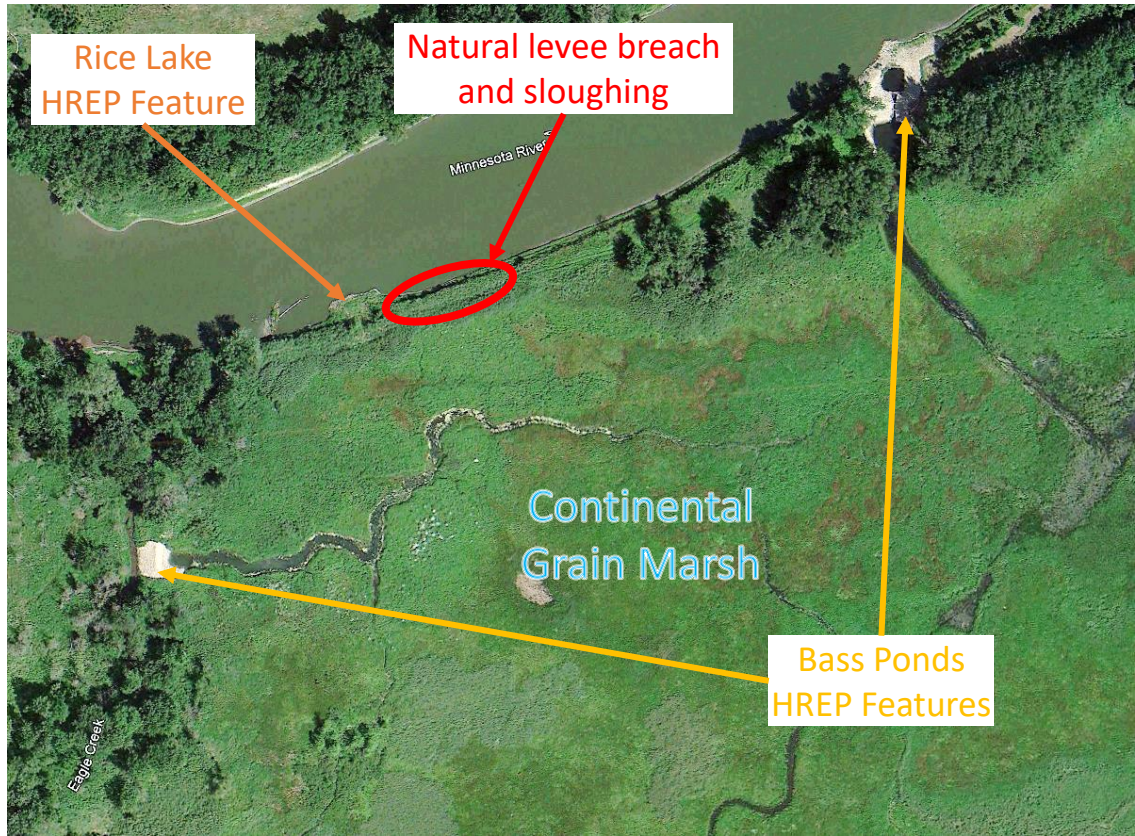
(Rice Lake HREP and Bass Ponds HREP)

11/08/2023

# Background

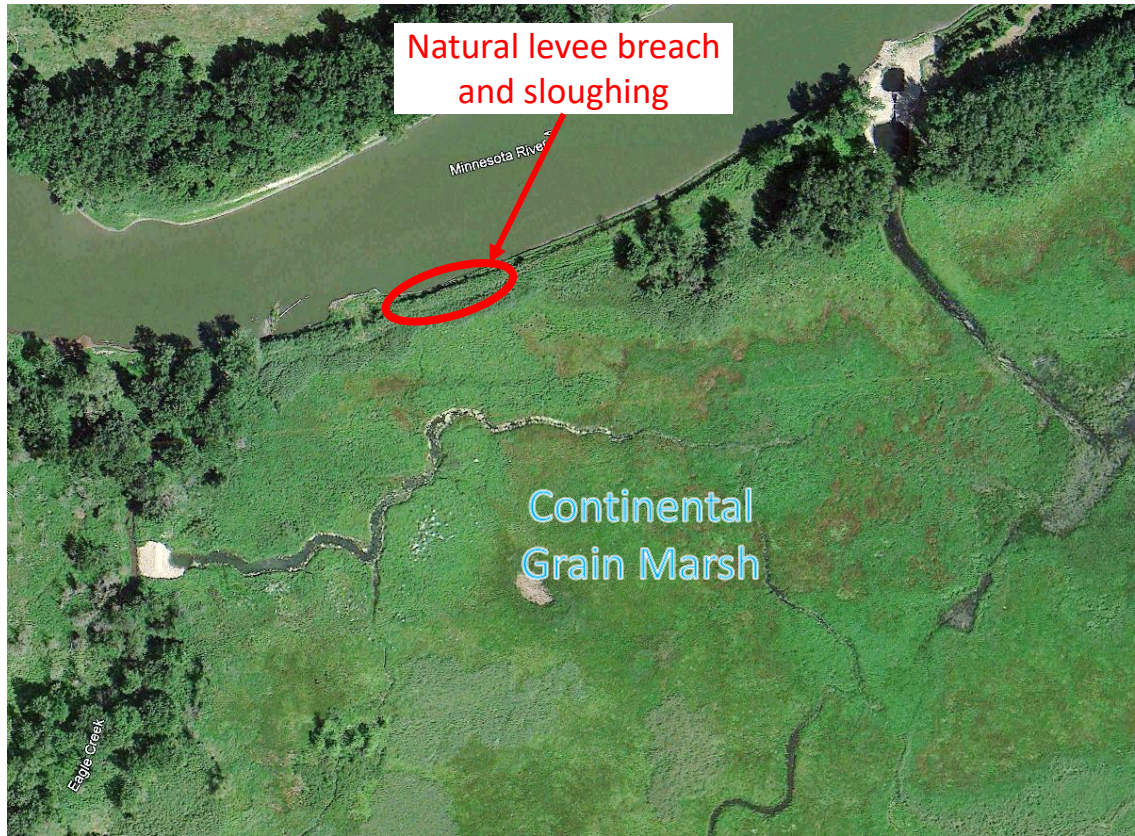
- In June 2023 Refuge staff documented a breach in the Minnesota River natural levee adjacent to Continental Grain Marsh (CGM). The natural levee is overtopped annually by Minnesota River flows and has experienced gradual erosion and become narrower. During the Rice Lake HREP (1996-1999) the extra granular fill was placed in a small reach of the natural levee for access road improvement. As part of the most recent Bass Ponds HREP, shoreline stabilization was not considered in this area as the team determined that the area appeared to be relatively stable and was not worth the additional cost.

- The Bass Ponds HREP included 5 stoplog structures across 3 lakes and 1 marsh. At this location, the CGM single bay concrete stoplog structure was constructed to maintain and lower water elevations in the marsh. Including the excavation and two plugs to complete this system, it totals a $1M investment and achieves habitat benefits for migratory waterfowl. The new breach jeopardizes the function of the CGM structure and threatens to be a loss of habitat benefits over this basin (approximately 25% of the project area).



# Now What?

- The Corps PDT gathered survey data to better understand the extent of the breach. Currently water from the marsh is flowing through multiple small and widening channels into the Minnesota River. A reach of the natural levee has also sloughed towards the river. The team believes that if the problem is not addressed before the next spring flood, there is a strong possibility that the failure will get worse and more expensive.
- The team developed a plan that would protect the existing breach by placing riprap to plug this area to a specified top elevation.
- Repairs to this area are within the pre-breach footprint and top elevations, so a no-rise analysis is not necessary.

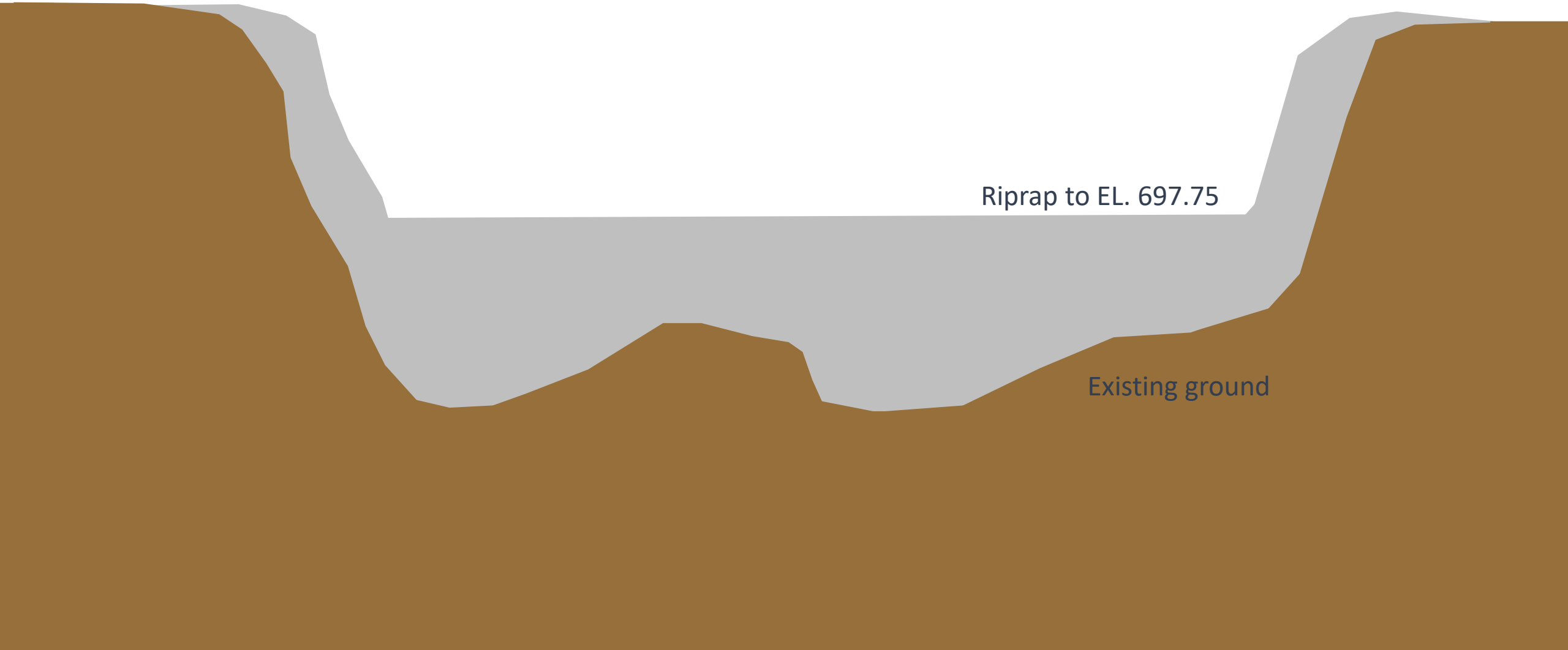


Evidence of Sloughing of Natural Levee

Breach of Natural Levee

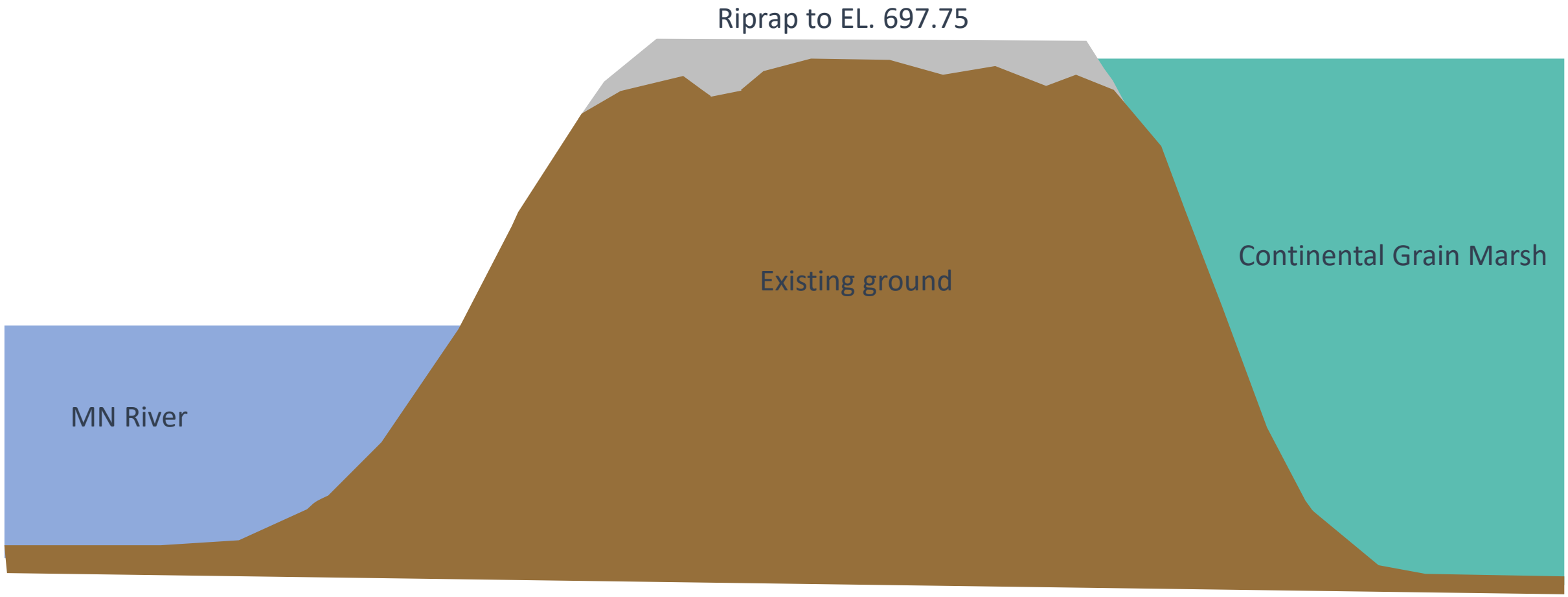
Repair Design (Section View)

- R45 riprap layer placed to EL. 697.75 minimum 24-inch thickness.
- Geotextile layer included to limit flow through the riprap which allows the marsh to hold water to top of riprap.
- The riprap layer is installed on existing ground with no excavation to be completed.



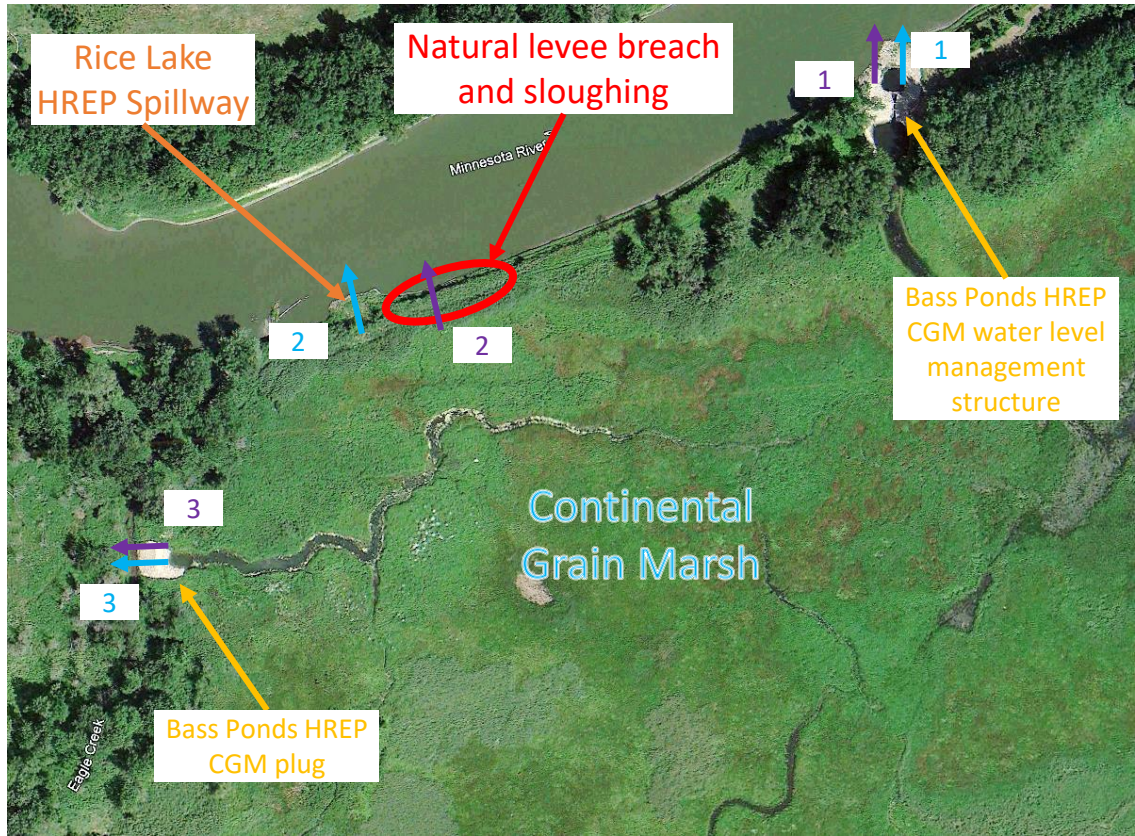
Repair Design (Profile View)

- R45 riprap layer placed to EL. 697.75 minimum 24-inch thickness.
- Geotextile layer included to limit flow through the riprap which allows the marsh to hold water to top of riprap.
- The riprap layer is installed on existing ground with no excavation to be completed.



# How Does this Change the Marsh Function?

- Pre-Breach:
  - During the Bass Ponds HREP, CGM flow outputs were designed to either exit the CGM water level management structure during a drawdown OR exit over the Rice Lake HREP spillway during pool elevations higher than CGM "optimal pool" (698.4 feet NAVD88). The CGM plug on the western side of the marsh was designed during the Bass Ponds HREP to overtop last to avoid marsh inputs into Eagle Creek (designated trout stream).
    - These flow directions and the overtopping order are indicated by the blue arrows and numbers)
- Post-Breach Repair:
  - CGM outputs are now designed to either exit the CGM water level management structure during a drawdown OR exit over the repaired breach during pool elevations higher than the repair elevation (697.75 feet NAVD88). The CGM plug on the western side of the marsh is still designed to overtop last to avoid marsh inputs into Eagle Creek. The repair location will act as the first overtopping location of the MN River natural levee in the CGM project area. Constructing this repair lower than other project features in CGM will hopefully provide some longevity to the MN River natural levee.
    - These flow directions and the overtopping order are indicated by the purple arrows and numbers)







# Lower Minnesota River Monitoring and WRAPS Update

What we learned and where we are going

MINNESOTA POLLUTION CONTROL AGENCY

# Agenda

- **Introductions**
- **Watershed Approach and Watershed Background** – *Brittany Faust, Bryan Spindler*
- **Watershed Approach Results and Permitting**
  - Biological Monitoring and Assessment (Streams and Lakes) – *Joel Chirhart, Jessica Massure (DNR)*
  - Streams and Lakes Chemistry Monitoring and Assessment – *Kalley Guerdet*
  - Stressor Identification (Streams and Lakes) – *Mike Koschak and Chandra Henrich, Jessica Massure (DNR)*
  - WPLMN Overview – *Kelli Nerem*
  - Geomorphology - *Jon Lore (DNR)*
  - Point Source Monitoring – *Matt Lindon, Dennis Wasley, Marco Graziani*
  - MS4 - *Anna Bosch*
  - Total Maximum Daily Loads (TMDLs) and WRAPS – *Brittany Faust, Bryan Spindler*
- **Watershed Approach Updates**
  - Project Charter – *Brittany Faust, Bryan Spindler*
  - Surface Water Monitoring Design Update – *Kalley Guerdet*
- **Local Partner Involvement in Next Steps**
  - SWMR Process, Local Requests, SWAG – *Kelly O'Hara*
  - Introduction of Map on Arc GIS Online – *Mel Markert*
  - Watershed Plans and Monitoring Considerations – *Brittany Faust, Bryan Spindler*
  - Next Steps – *Brittany Faust, Bryan Spindler*

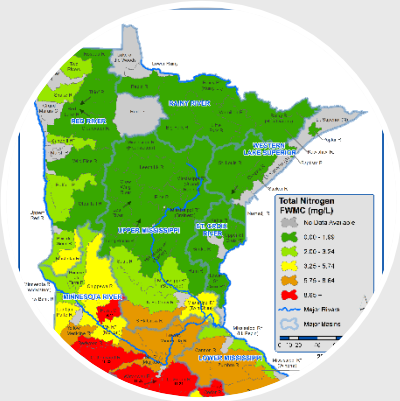
# Introductions

- Name
- Affiliation

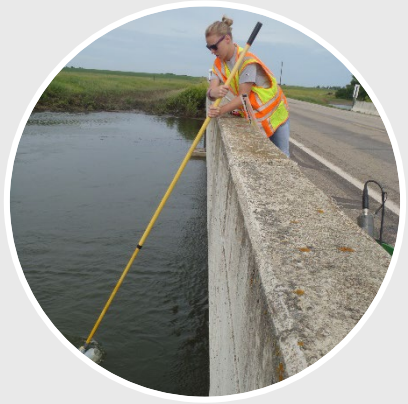
# Background Q: Why do Watershed work? A: CWA and CWLA requirements

Establish standards to protect beneficial uses:

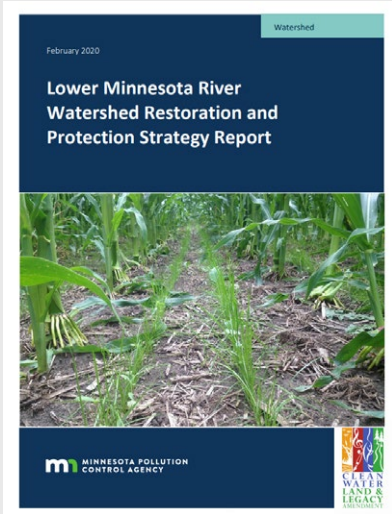
- Aquatic Life
- Aquatic recreation
- Drinking Water




Identify pollutant sources and reductions needed



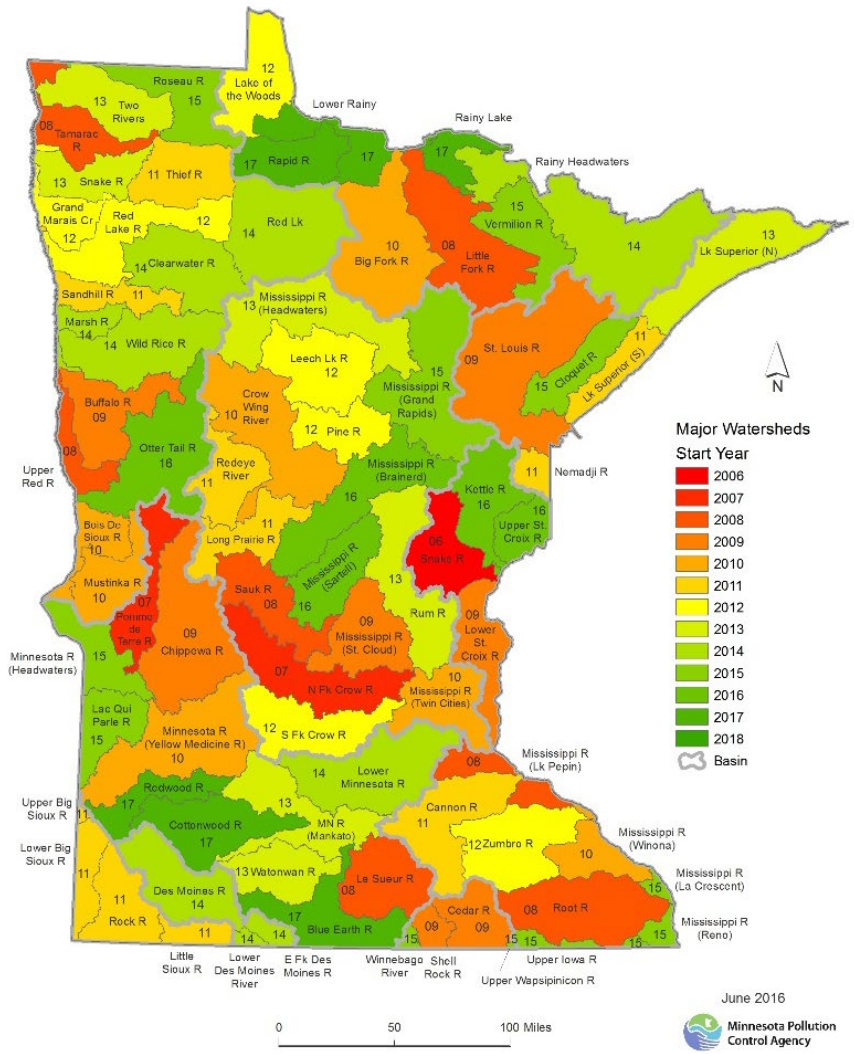
Monitor waters and assess against standards and list those that do not meet standards




Develop strategies to achieve needed pollutant reductions

# The Watershed Approach Framework

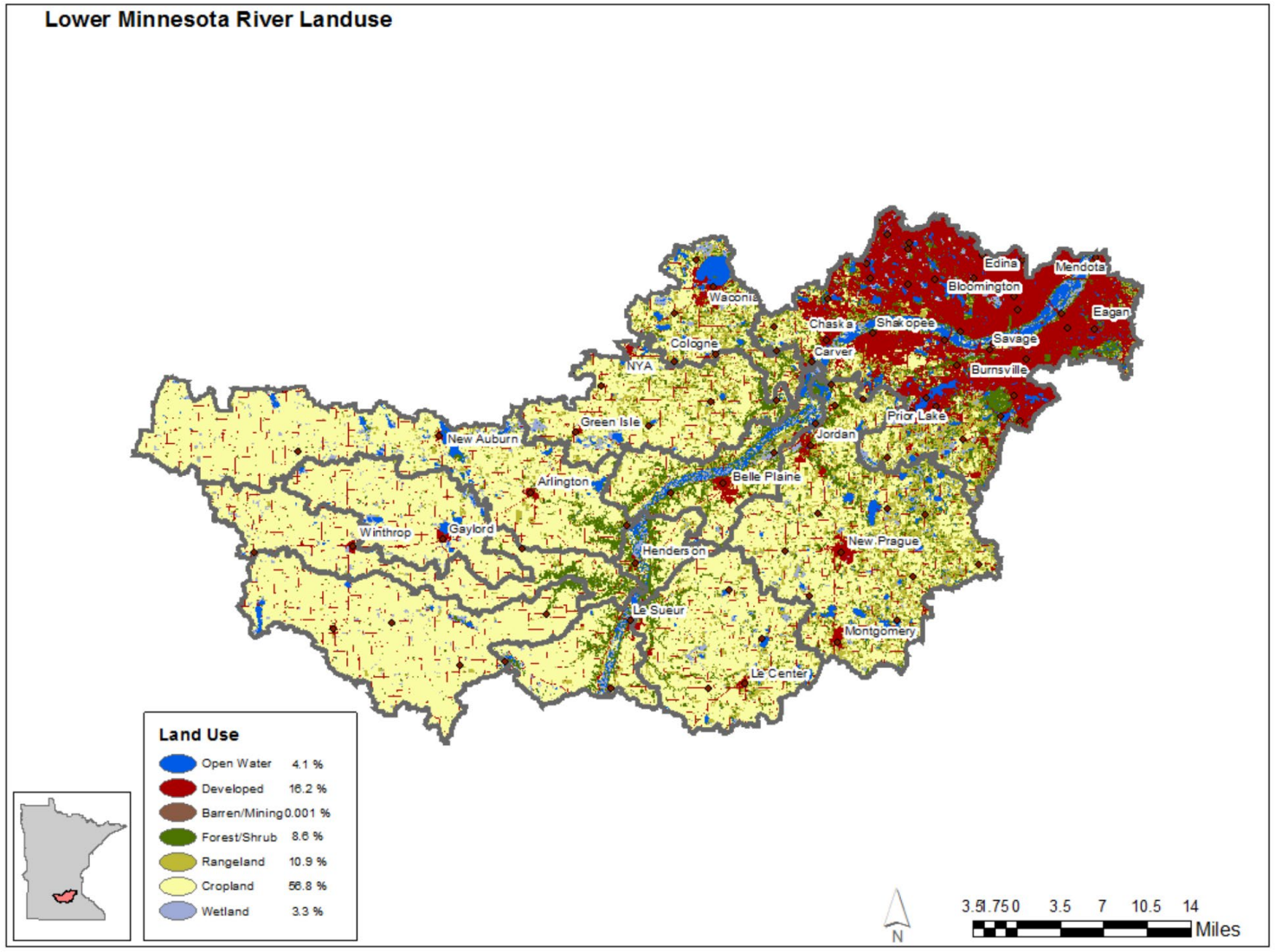
# Watershed Approach – Monitoring




Primary Goal: Evaluate condition of surface water to inform management actions

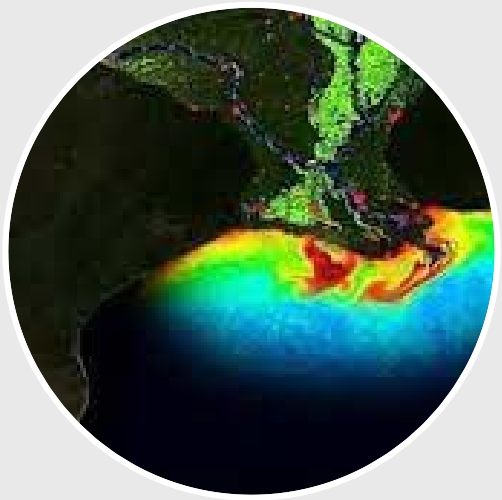
- Track water quality status and trends
- Identify stressors associated with impairments
- Effectiveness monitoring
- Inform watershed restoration and protection strategies (WRAPS)
- Address permitting needs
- Work with local partners

# Background: Lower Minnesota River Watershed



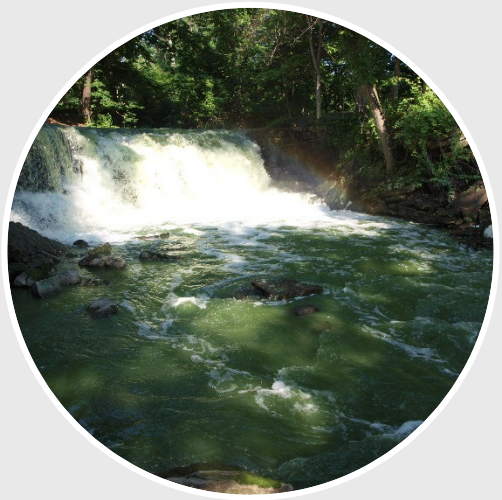

- Second-largest and most downstream watershed in the Minnesota River Basin- 1,760 square miles
- Rural counties of the watershed tributaries include the Rush River and High Island Creek
- Tributaries in urban counties include Bevens Creek, Carver Creek, Sand Creek, Nine Mile Creek, and the Credit River
- Many lakes especially in the eastern side of Watershed
- Most of the people in the Minnesota River Basin live in this watershed

# What we monitor- Chemistry



**Nitrogen**

= blue babies;
sick fish and bugs;
Gulf of Mexico dead zone



**Phosphorus**

= green water;
low oxygen;
dead fish

**Chloride**

= High amounts impact aquatic life and drinking water

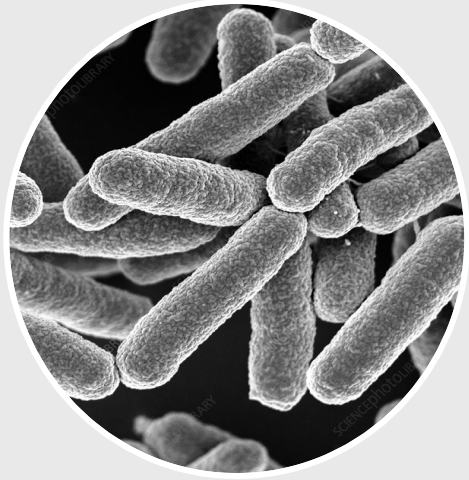
# What we monitor- Other Parameters

***Total Suspended Solids***

*= chocolate milk rivers; no light for good aquatic plans, buried bugs and fish eggs*

**Fish and invertebrate communities**

= balanced communities indicate good watershed health



***E. coli***

= bacteria levels serve as indicator of pathogens in surface water

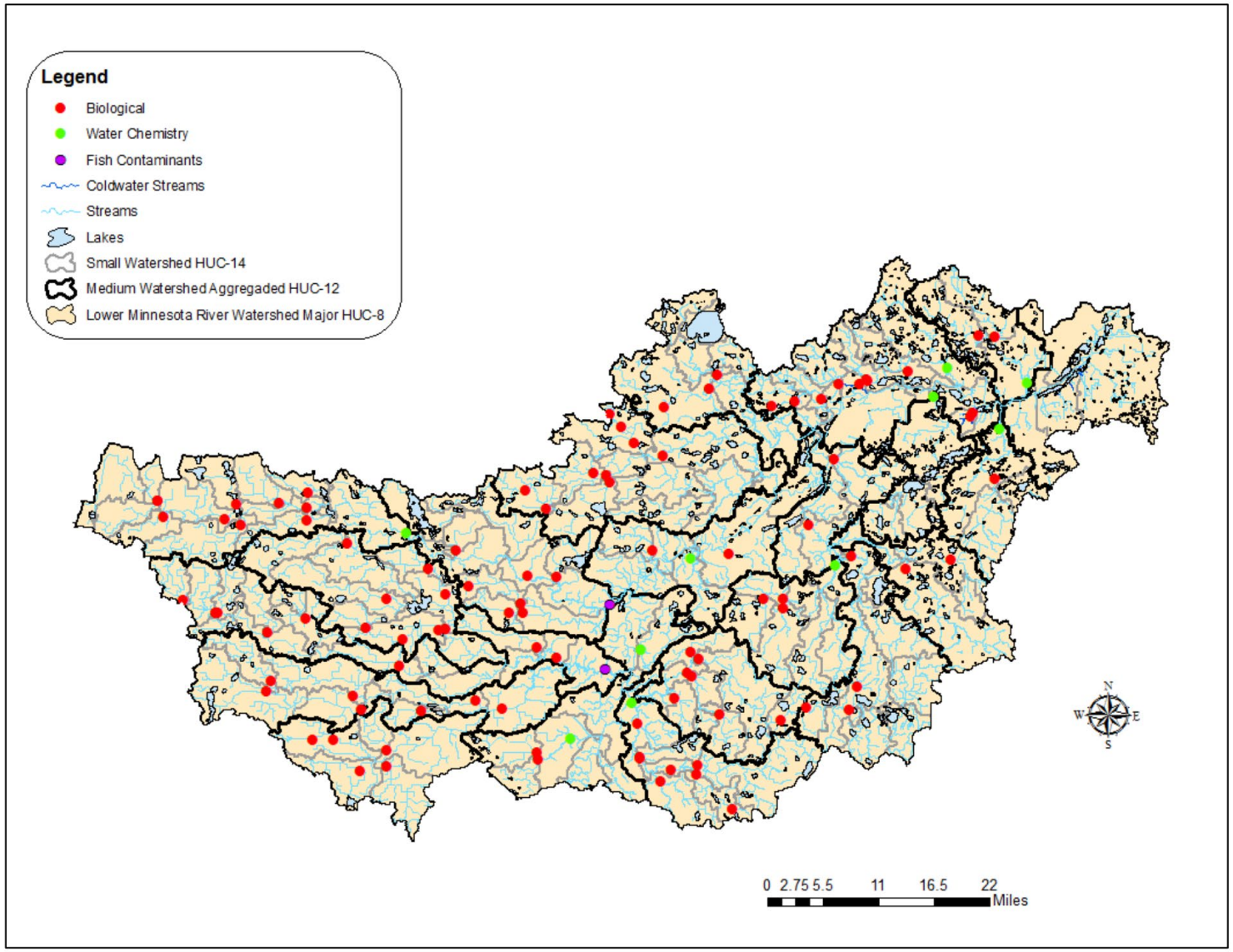
# Surface Water Monitoring - Biology

- Biological monitoring is conducted by the MPCA (streams) and DNR (lakes)
- One time fish, invertebrate, chemistry sample, and habitat assessment for streams, fish and plant sampling for lakes
- Direct assessment of the health of the aquatic community
- Important for delisting waters, problem investigation, to address stressor identification needs, or for permitting needs

# Surface Water Monitoring – Stream Chemistry

- Focuses on nutrients, sediment, bacteria, and sonde (DO, pH, temp) measurements
- Monitoring completed by MPCA staff and locally via contracts from MPCA – two years of sampling will be funded
- Data can be used to delist waters, fill gaps identified by modeling, track changes in priority waters near the impairment threshold, inform permit limits, and problem investigation.

# Cycle 1 Intensive Watershed Monitoring



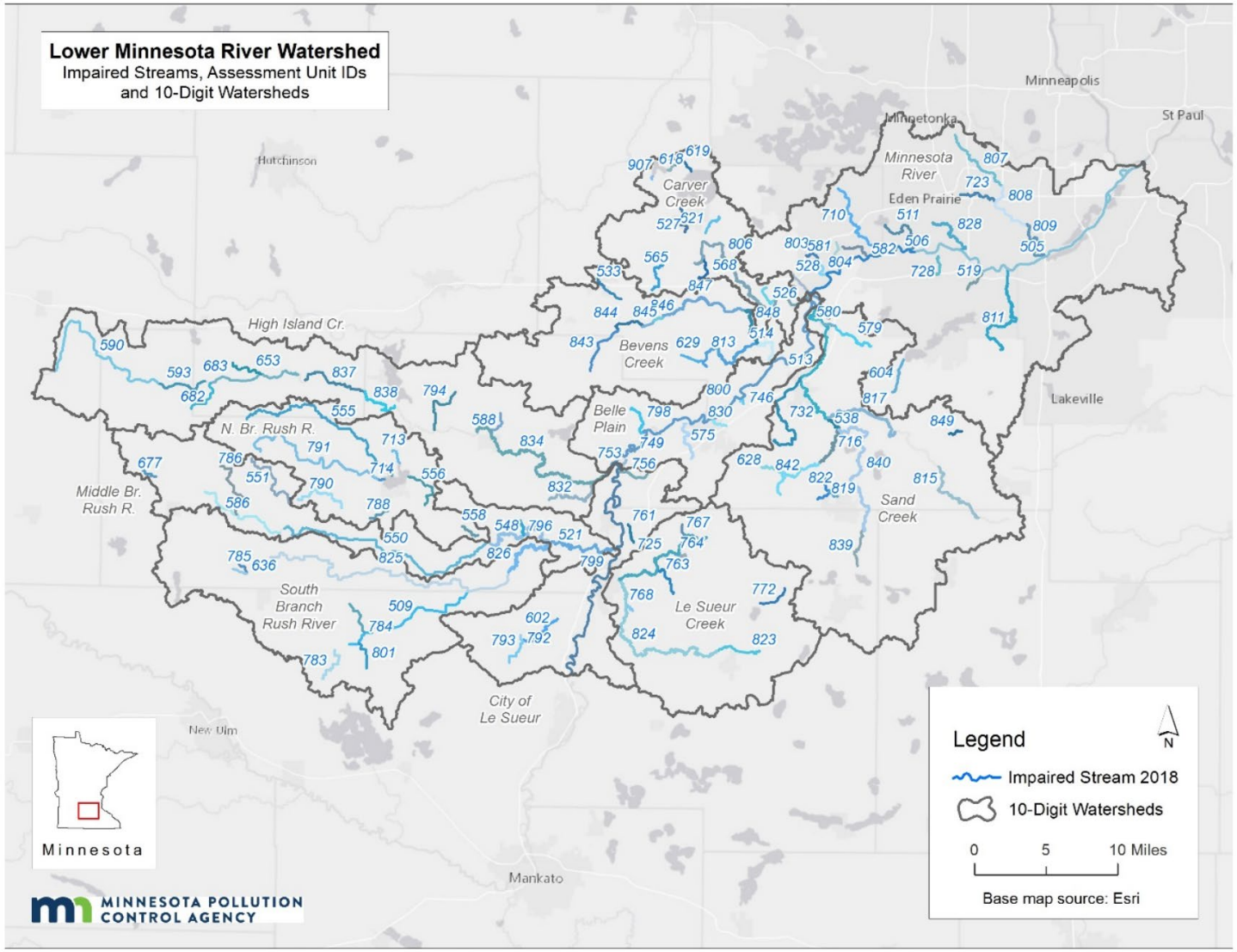

- Goal: Determine baseline condition of resources in the watershed

- 90 new biological monitoring stations; 42 existing biological stations were revisited in 2014/2015.

- 22 stations were established and sampled intensively for water chemistry

- 7 lakes were sampled for water chemistry in 2014, and 4 lakes were sampled in 2015. 23 lakes were monitored for fish community by the MN DNR

# Cycle 1 Stream Assessment Results




- 117 streams assessed, with 15 supporting Aquatic Life, and 3 stream reaches supporting of Aquatic Recreation
- 80 stream reaches did not support Aquatic Life and 47 stream reaches did not support Aquatic Recreation
- 74 of the aquatic life impairments were based on biological data; 6 reaches were found to have aquatic life impairments solely based on water chemistry data

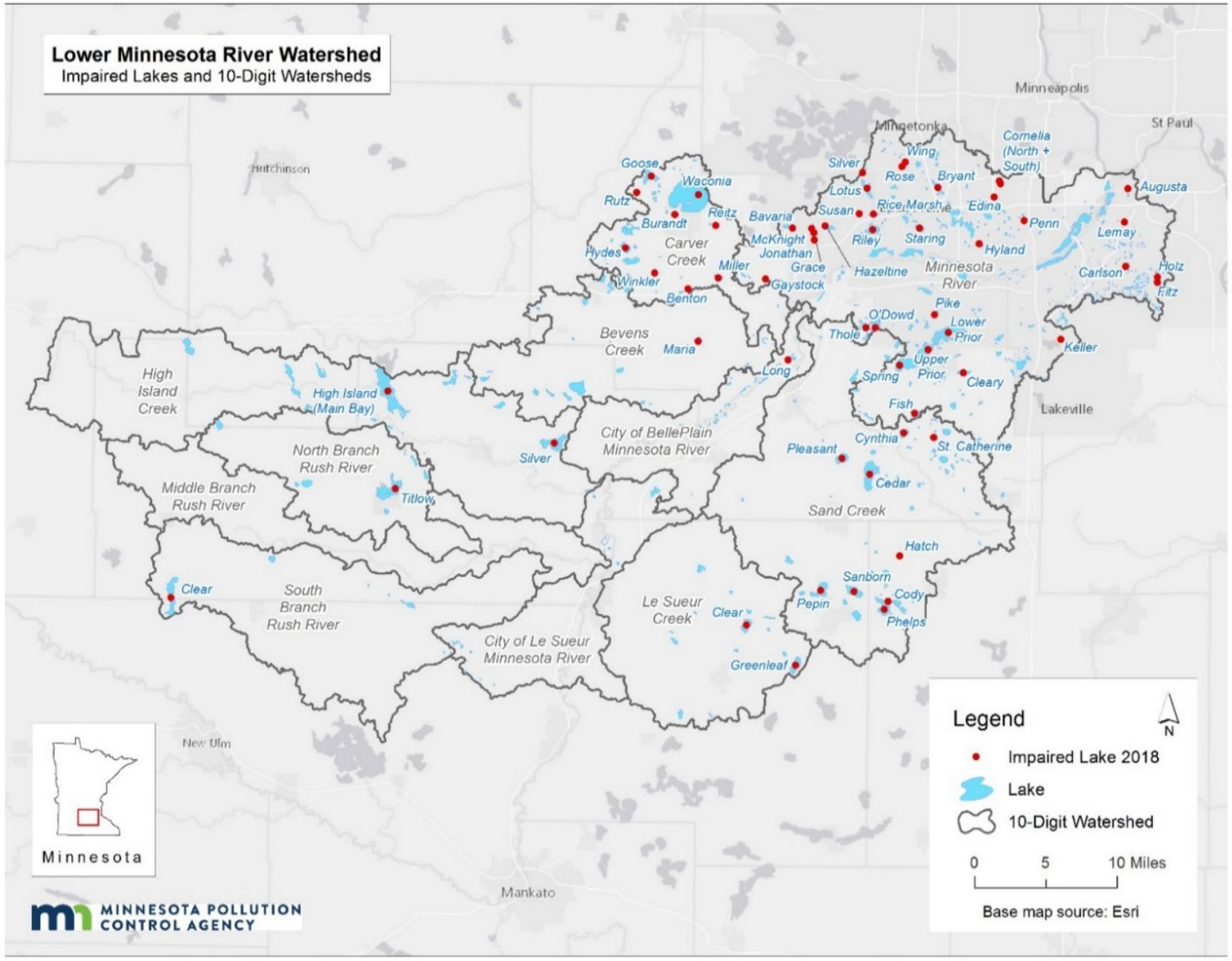
| Parameter | Number of Impaired Waterbodies |
|---|---|
| Fish Bio | 65 |
| Invert Bio | 56 |
| E coli | 29 |
| Fecal Coliform | 28 |
| Chloride | 7 |
| Nutrients | 9 |
| Dissolved Oxygen | 2 |
| Turbidity | 25 |
| TSS | 1 |

*Chart represents all up-to-date listed impairments as of 2022.

# Surface Water Monitoring – Lakes Chemistry

- One to two years of sampling will occur
- Focuses on nutrients, algae and clarity
- Monitoring completed by MPCA staff and locally via contracts from MPCA
- MN DNR samples fish on a subset of lakes: Lake IBI
- Data can be used to delist waters, track changes in priority waters near the impairment threshold, inform permit limits, and problem investigation.

# 2016 Lake Assessment Results




- 133 lakes were assessed, with 44 supporting aquatic recreation and 6 supporting aquatic life use
- 18 new lake impairments for aquatic recreation. 37 existing impairments for aquatic recreation remain.
- 8 lakes were found to not support aquatic life use.
- 3 lakes were put through the delisting process, and 2 lakes with aquatic recreation impairments were corrected and removed from impaired waters list during assessment review.

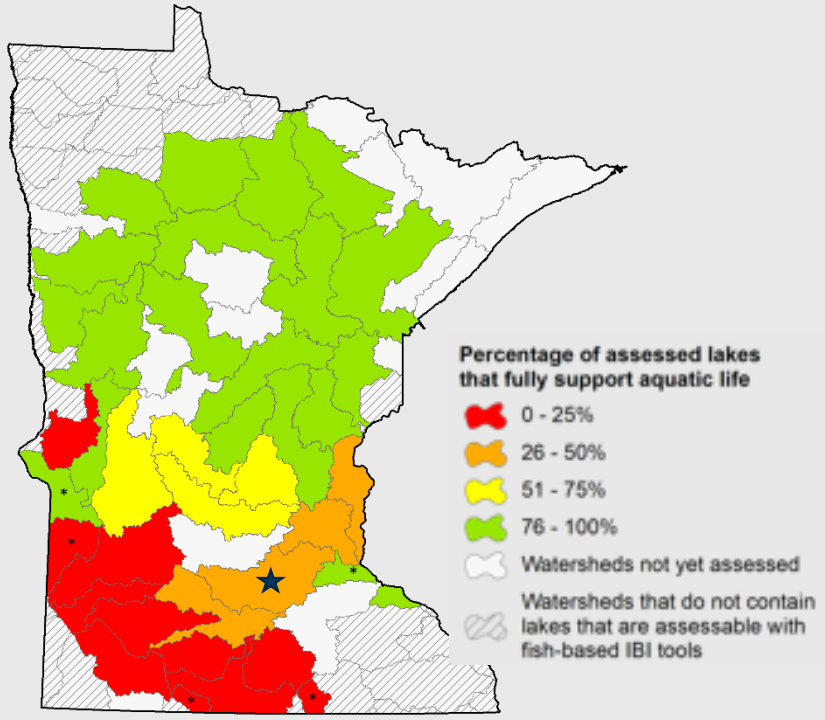
| Parameter | Number of Impaired Waterbodies |
|---|---|
| Fish Bio | 8 |
| Mercury in Fish | 34 |
| Nutrients | 52 |

*Chart represents all up-to-date listed impairments as of 2022.

# Lower Minnesota Watershed
# Lake Fish Index of Biological Integrity (FIBI) Update

- Statewide **747** lakes have been assessed
- Fish IBI Eligible lakes: >100 acres, non-winterkill lakes

| Lower MN Cycle 1 AQL Assessment | # of Lakes |
|---|---|
| Fully Supporting (FS)<br>• Mitchell (27-0070-00)<br>• Staring (27-0078-00)<br>• McMahon (70-0050-00)<br>• Thole (70-0120-01) | 4 |
| Fully Supporting – Vulnerable (FS - V) | 2 |
| Not Supporting (NS) | 8 |
| Insufficient Information (IF) | 3 |
| Insufficient Information – Vulnerable (IF - V) | 2 |
| Not Assessable (NA) | 6 |
| **Total Assessed Lakes** | **25** |





- Jessica Massure| DNR Lake FIBI Program Biologist
  - *Jessica.massure@state.mn.us* 218-203-4319


- October 2023 Update

DEPARTMENT OF NATURAL RESOURCES

| Lake | Assessment Decision (FIBI) | Stressors | | | | Notes |
|---|---|---|---|---|---|---|
| | | Eutrophication | Physical Habitat Alteration | Altered Interspecific Competition | Sedimentation | |
| Riley (10-0002-00) | Not Supporting (NS) | X | X | X | | Cycle 2 Survey Completed 2021, Prelim NS |
| Lotus (10-0006-00) | NS | X | X | *Inconclusive* | X | Cycle 2 Survey Completed 2021, Prelim NS |
| Bavaria (10-0019-00) | NS | X | X | X | | Cycle 2 Surveys in progress |
| Waconia (10-0059-00) | NS | X | X | X | | Cycle 2 Survey Completed 2022, Prelim NS |
| Crystal (19-0027-00) | Vulnerable | X | X | | | Cycle 2 Survey in progress |
| Orchard (10-0031-00) | Vulnerable | X | X | | | Cycle 2 Survey in progress |
| Bryant (27-0067-00) | NS | X | X | X | | Cycle 2 Survey in progress |
| Lower Prior (70-0026-00) | NS | X | X | X | | Cycle 2 Survey in progress |
| Spring (70-0054-00) | NS | X | X | X | X | Cycle 2 Survey in progress |
| Fish (70-0069-00) | Vulnerable | X | X | X | | Cycle 2 Survey in progress |
| Upper Prior (70-0072-00) | Vulnerable | X | X | X | | Cycle 2 Survey in progress |
| O'Dowd (70-0095-00) | NS | X | X | | | Cycle 2 Survey Completed 2022, Prelim NS |

# Streams Stressor Identification

- SID investigates biological impairments to determine stressors to the fish and aquatic invertebrate communities
- Common stressors in Lower Minnesota River watershed during Cycle 1
  - Water chemistry – sediment, dissolved oxygen, eutrophication
  - Lack of stream habitat
  - Connectivity
  - Altered hydrology

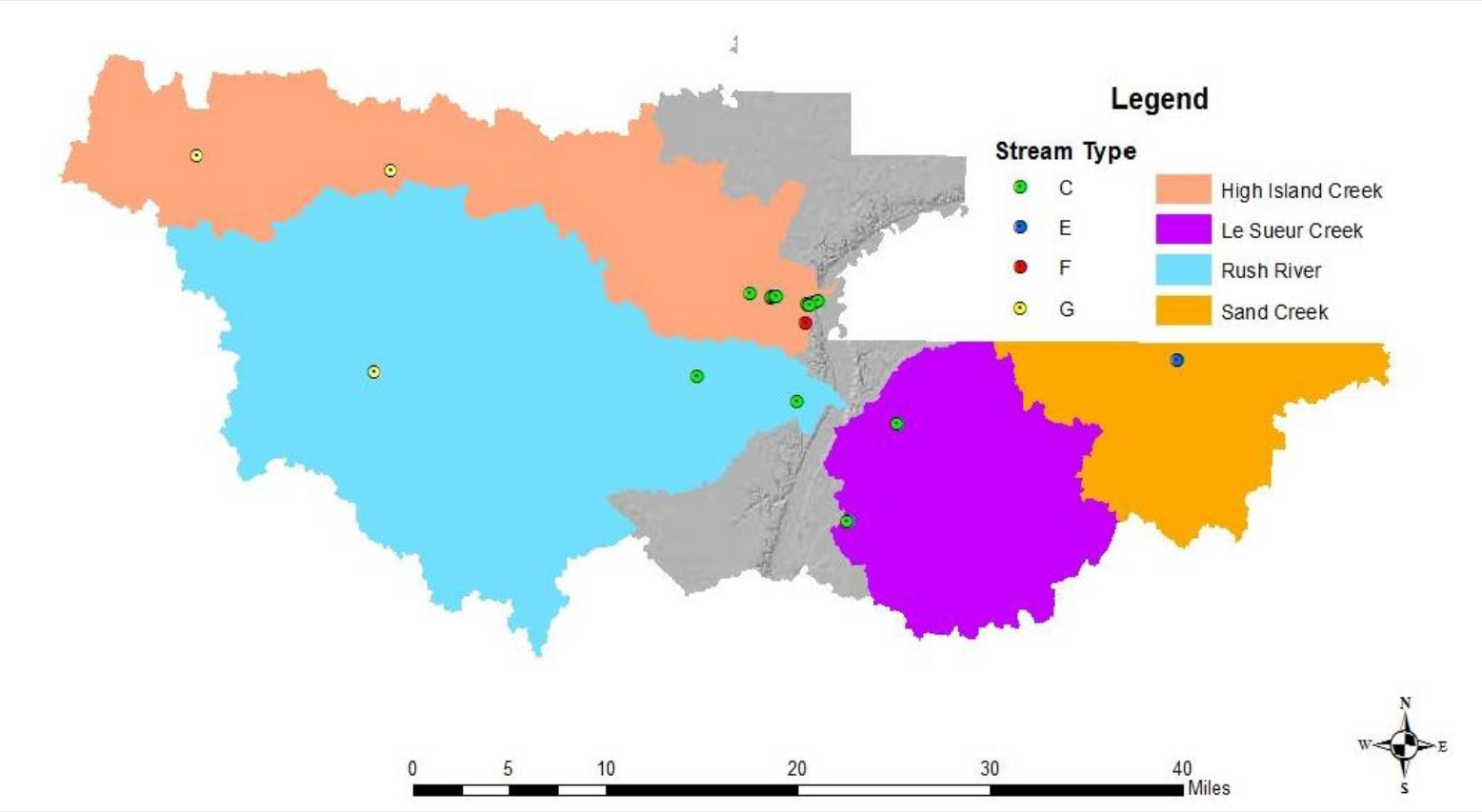
# Streams Stressor ID Results

| | Number of Stream Reaches | | |
|---|---|---|---|
| **Parameter** | Stressor | Inconclusive | Not a Stressor |
| Temperature | 0 | 0 | 73 |
| Dissolved Oxygen | 25 | 25 | 24 |
| Eutrophication | 45 | 29 | 0 |
| Nitrate | 40 | 7 | 27 |
| Suspended Solids | 40 | 8 | 26 |
| Habitat | 60 | 6 | 8 |
| Connectivity | 16 | 2 | 56 |
| Altered Hydrology | 47 | 17 | 10 |

CD 50

- Poor habitat conditions were, by far, the most prevalent stressor.
- Altered hydrology and connectivity are also significant issues.
  - Changes to flow regime can also impact other stressors.
- Nutrient (Eutrophication, Nitrates) issues are primarily in the headwaters or agricultural dominated areas.
- Table does not show it, but Conductivity was also found to be a stressor in 2 reaches. Will follow up with chloride sampling.

# DNR Geomorphology Monitoring First Cycle




Measurable Components from first time through watershed:

Hydrology,

Connectivity,

Geomorphology.

Deviations from natural or stable conditions can have detrimental impacts on the other two components, water quality and biological communities.

# WARSSS Potential for Cycle 2

- Watershed Assessment of River Stability and Sediment Supply
  - Other examples in Minnesota
  - Highly intensive GIS and field work on a small scale watershed
  - Generally leads to a breakdown of upland and stream sediment contributions by catchment

# WARSSS Example – Wells Creek

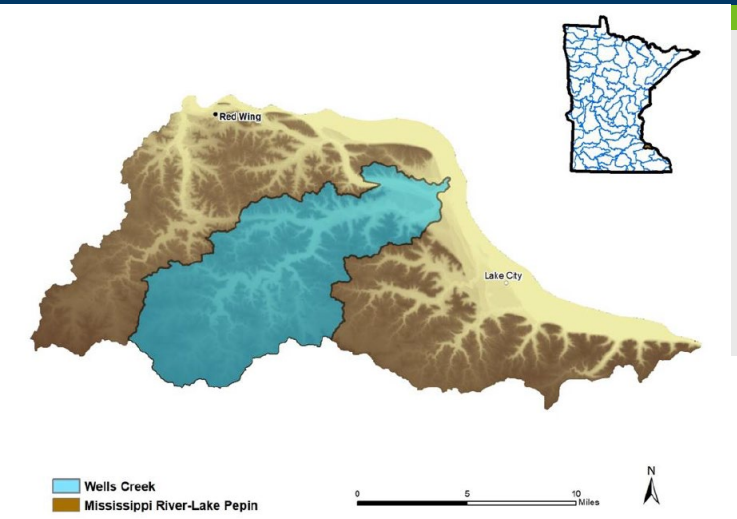



Figure 1. Minnesota river HUC-08 watersheds and location of Wells Creek within Mississippi River - Lake Pepin.

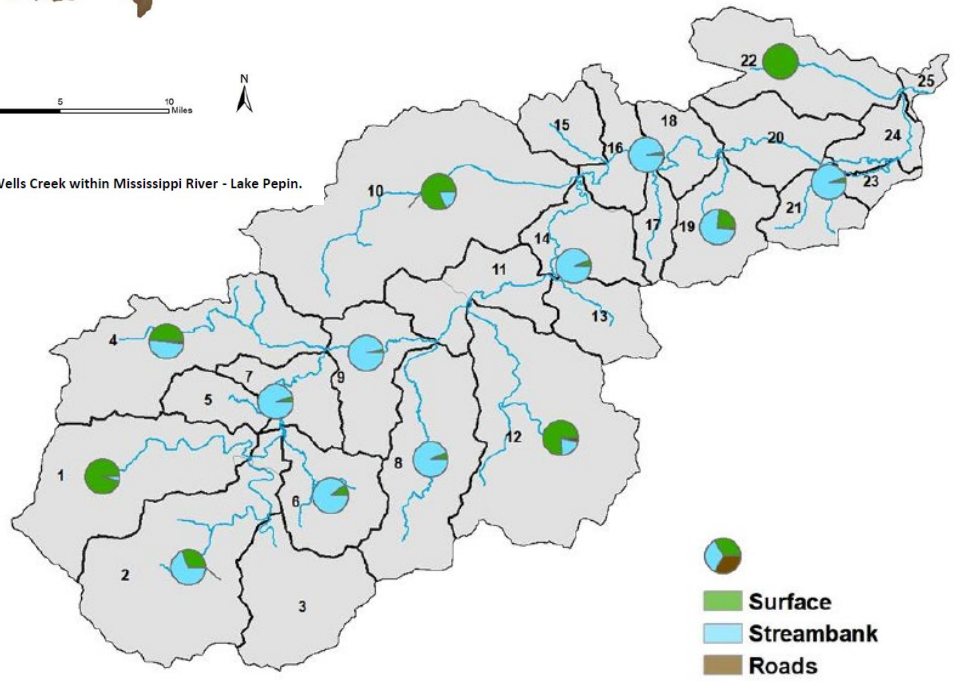



Figure 59. Breakdown of sediment source contributions in each catchment

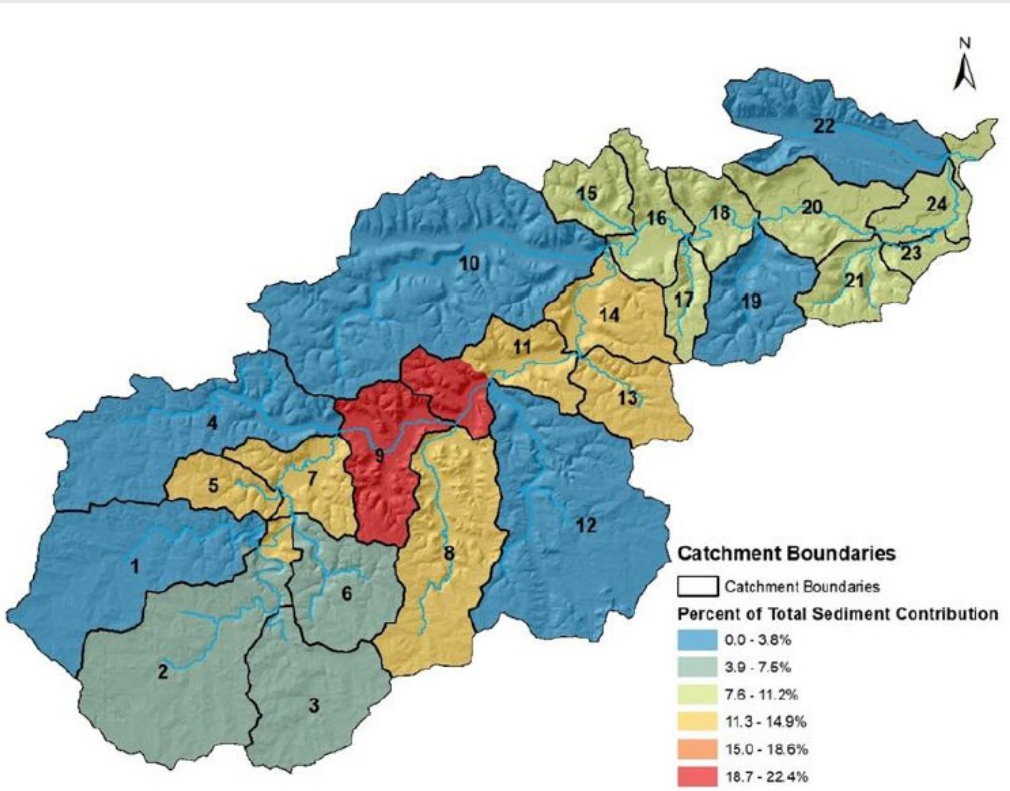
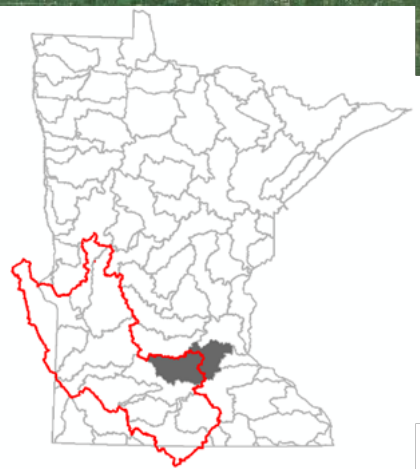
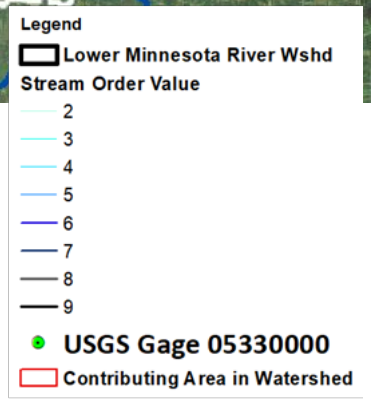



Figure 4. Percent contribution of total sediment input by catchment.

# Lower Minnesota River Watershed

Gage Data:
Minnesota River at Jordan
USGS Gage 05330000





DEPARTMENT OF NATURAL RESOURCES

# Evaluation of Hydrologic Change (EHC) Technical Summary

## Lower Minnesota River Watershed

Hydrologic Unit Code: 07020012
DNR Major Watershed ID: 33

November 2022

CLEAN WATER LAND & LEGACY AMENDMENT

## Key Hydrologic Changes

Identified below are selected key hydrologic change dynamics from the EHC analysis for this watershed. Additional results are provided in **Table 1** and specifics about each metric are described in the EHC Summary Table and Metrics section. Additional context and analysis can be provided by DNR Area Hydrologists and other staff.

### Hydrologic Conditions Changed in 1991

The EHC identified 1991 as the point of greatest hydrologic change within the watershed with a strong secondary change point in 1983 centered around changes in precipitation. The change point analysis selected 1991 as the year of greatest hydrologic change, which also falls in line with other watersheds in the Minnesota River basin.

### Increased Discharge

Flow volumes have more than doubled in the watershed. Every inch of precipitation is resulting in twice as much water reaching the flow gage. The average rate of flow increases has also doubled leading to increased erosive power traveling through the watershed during rain events.

### Greater Flood Flows

Annual peak flows have increased by almost 80% on average with post-change point values occurring above the 25$^{th}$ percentile in all years. Rise rates have doubled indicating the rapid concentration of water as it leaves the landscape and enters the river network. The average peak flow occurrence date has also shifted from mid-April to early June with the average sustained 30-day max flow in the post-change period (after 1991) equaled to the channel forming flow metric (1.5 year return interval flow). Such prolonged high-flow conditions are likely impacting many aspects of watershed health.

### Channel Forming Flows

Bankfull flows are a key factor in moving sediment and shaping stream channels. They are depicted in the EHC by the 1.5-year return interval flows. This metric has increased significantly (by 123%) when compared to the period before the 1991 change point. The prior 1.5 year return interval flow volumes are occurring three times as often in the post period. Based on these findings, one would expect stream instability with channel widening and downcutting along with signs of sediment buildup (aggradation) in the main channels forming large point and mid-channel bars.

### Storage Capacity

The water balance table for this watershed (**Table 5**) shows changes in discharge, evapotranspiration, and precipitation. The change in average annual precipitation before and after the 1991 change point was 3.6 additional inches across the watershed. Similarly, the average difference in discharge before and after 1991 was 3.8 inches. Having a greater volume of water leaving the watershed on average indicates the need for water storage in strategic places while emphasizing retaining precipitation as close as possible to the location in which it lands.

| Hydrologic Group | Metric | Magnitude Change (%) | Magnitude Impact | RVA Change (%) | RVA Impact |
|---|---|---|---|---|---|
| Annual Values | Annual Precipitation | 15 | Moderate | -27 | Major |
| | Annual Discharge | 122 | Extreme | -47 | Major |
| | Annual Peak Discharge | 80 | Extreme | -33 | Major |
| | Annual Runoff Ratios | 97 | Extreme | -47 | Major |
| Low Flows | 7-Day Minimum | 141 | Extreme | -45 | Major |
| | August Median Base Flow | 126 | Extreme | -3 | Neutral |
| | 90% Flow Duration | 190 | Extreme | -100 | Extreme |
| Moderate Flows | May Median Flow | 185 | Extreme | -66 | Extreme |
| | 50% Flow Duration | 205 | Extreme | n/a | n/a |
| | 1.5 Year Return Interval Flows | 123 | Extreme | n/a | n/a |
| | Annual Baseflow | 126 | Extreme | -47 | Major |
| High Flows | 10% Flow Duration | 110 | Extreme | 189 | Extreme |
| | 5 Year Return Interval Flows | 74 | Extreme | n/a | n/a |
| | 10 Year Return Interval Flows | 60 | Extreme | n/a | n/a |
| | 3-Day Maximum | 96 | Extreme | -31 | Major |
| Flow Timing | Julian Day Max Flow | 42 | Major | 3 | Neutral |
| | Julian Day Min Flow | 92 | Extreme | -10 | Moderate |
| Flashiness | High Pulse Count | 50 | Major | 24 | Major |
| | Low Pulse Count | -100 | Extreme | -17 | Moderate |
| | Number of Reversals | -10 | Moderate | 31 | Major |
| | Rise Rate | 118 | Extreme | -24 | Major |

| Impact Concern Legend | | | | | | |
|---|---|---|---|---|---|---|
| >50 Extreme | 20 to 50 Major | 10 to 20 Moderate | 10 to -10 Neutral | -10 to -20 Moderate | -20 to -50 Major | < -50 Extreme |

Table 1. EHC summary table for the Minnesota River near Jordan (05330000) (1991 Change Point)

# Summary Table

The Evaluation of Hydrologic Change (EHC) identified 1991 as the most significant hydrologic change point within the watershed stream gage monitoring period of record.

When comparing the pre-1991 period to the post:

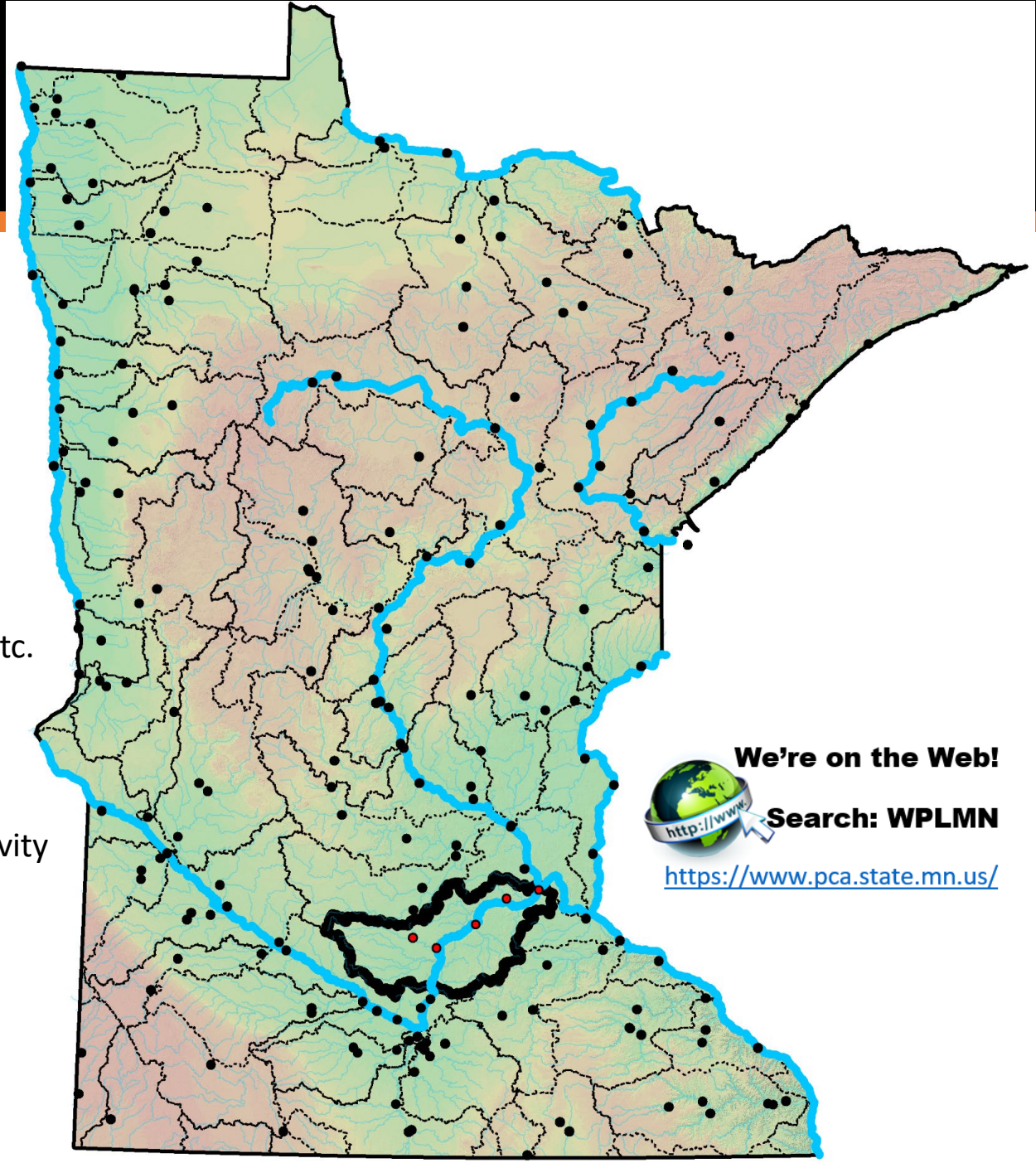
- All flow metrics increased substantially, while precipitation increased by only 15%
  - Indication that water storage and water retention are minimal in the watershed

- 1.5 year return interval flows (bankfull) more than doubled with an increase of 123% since the 1991 change point
  - Increase in channel forming discharge and subsequent channel degradation increase the channel bank and bed erosion rates.


Source: swnewsmedia.com

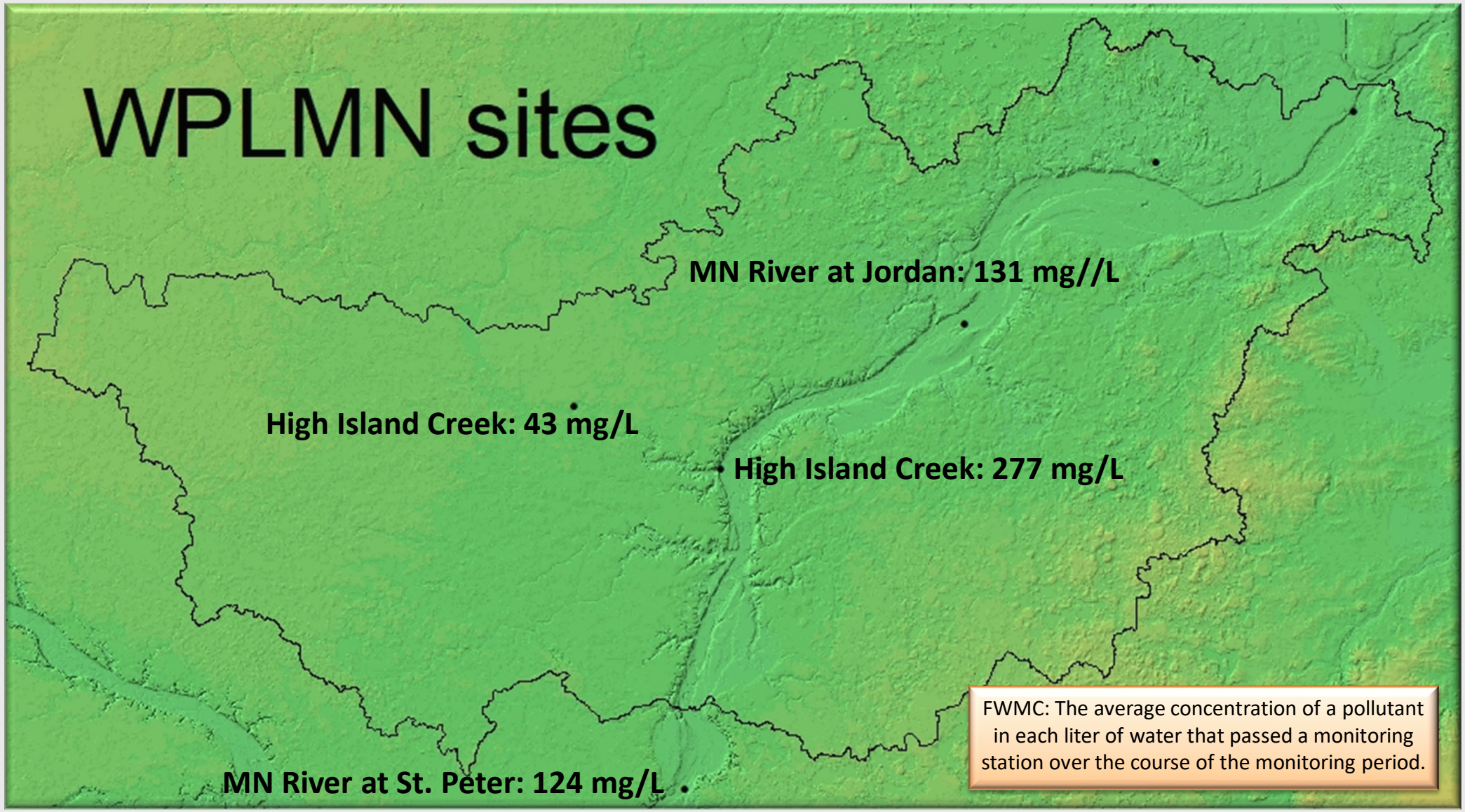
# Watershed Pollutant Load Monitoring Network (WPLMN)

- **Ongoing long-term monitoring**
  - Sites are fixed and not impacted by 10-year cycle
- **Purpose:**
  - Statewide comparison in water quality
  - Determine pollutant origins
  - Track trends
  - Chemistry & pollutant load data for assessments, WRAPS, 1W1P, etc.
- **MPCA staff and local partners collect samples and analyze data**
  - Nitrogen, phosphorus, and sediment
  - Field measurements: dissolved oxygen, pH, temperature, conductivity
- **DNR and USGS provide streamflow**
- **5 sites in the Lower Minnesota River watershed**
  - Minnesota River (2)
  - High Island Creek (2)
  - Purgatory Creek (1)



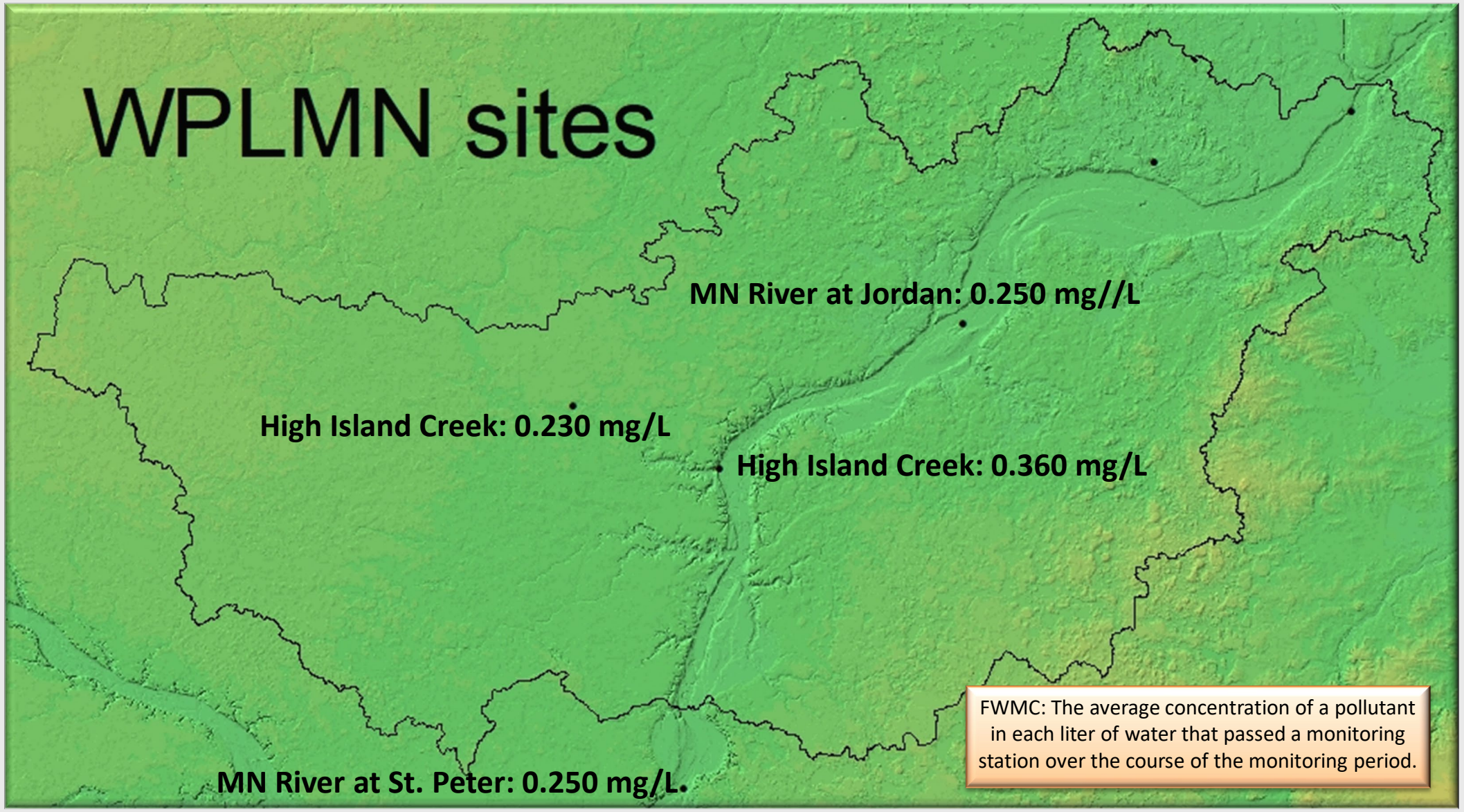
# Flow weighted mean concentrations - Sediment

Data Viewer



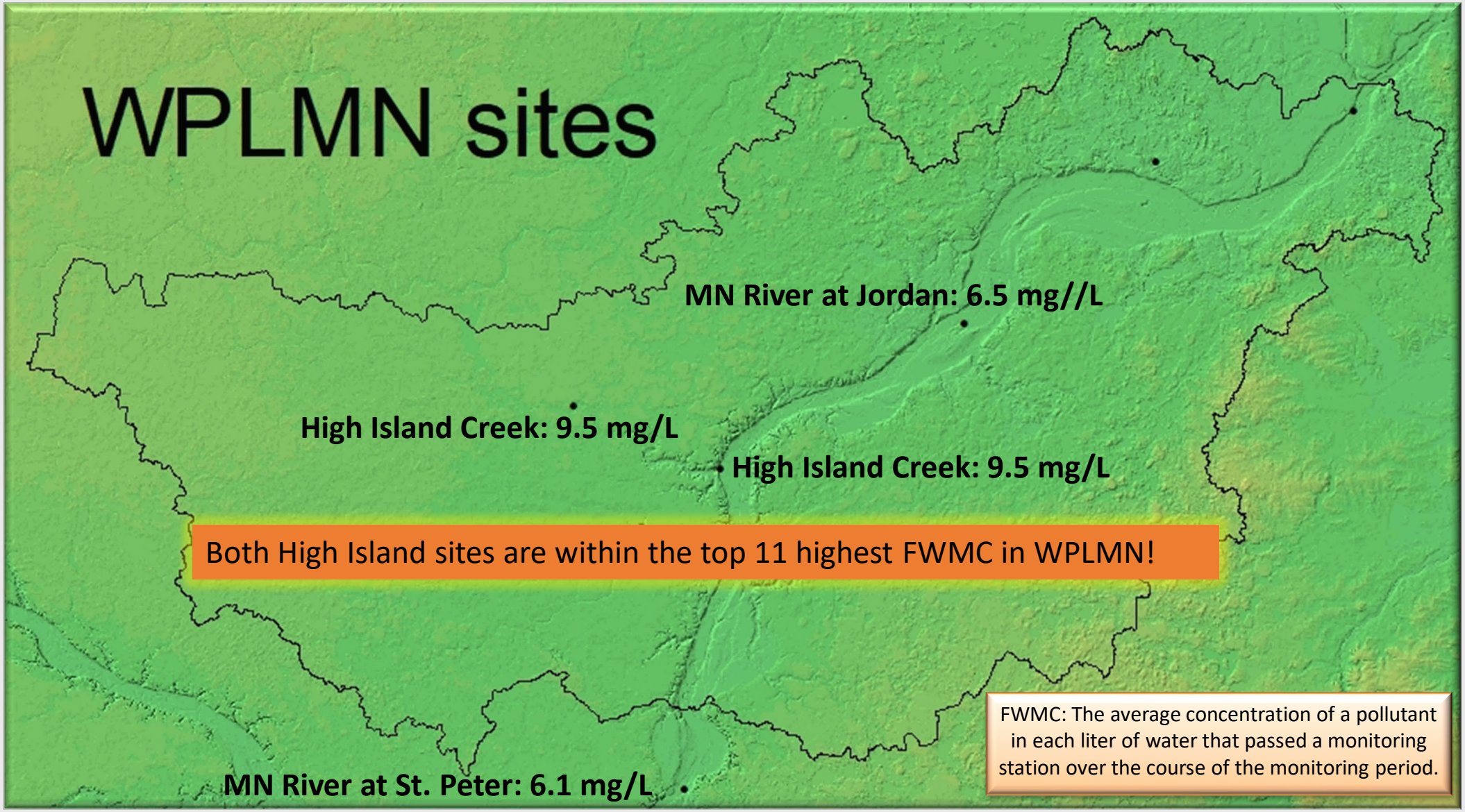
# Flow weighted mean concentrations - Phosphorus

Data Viewer

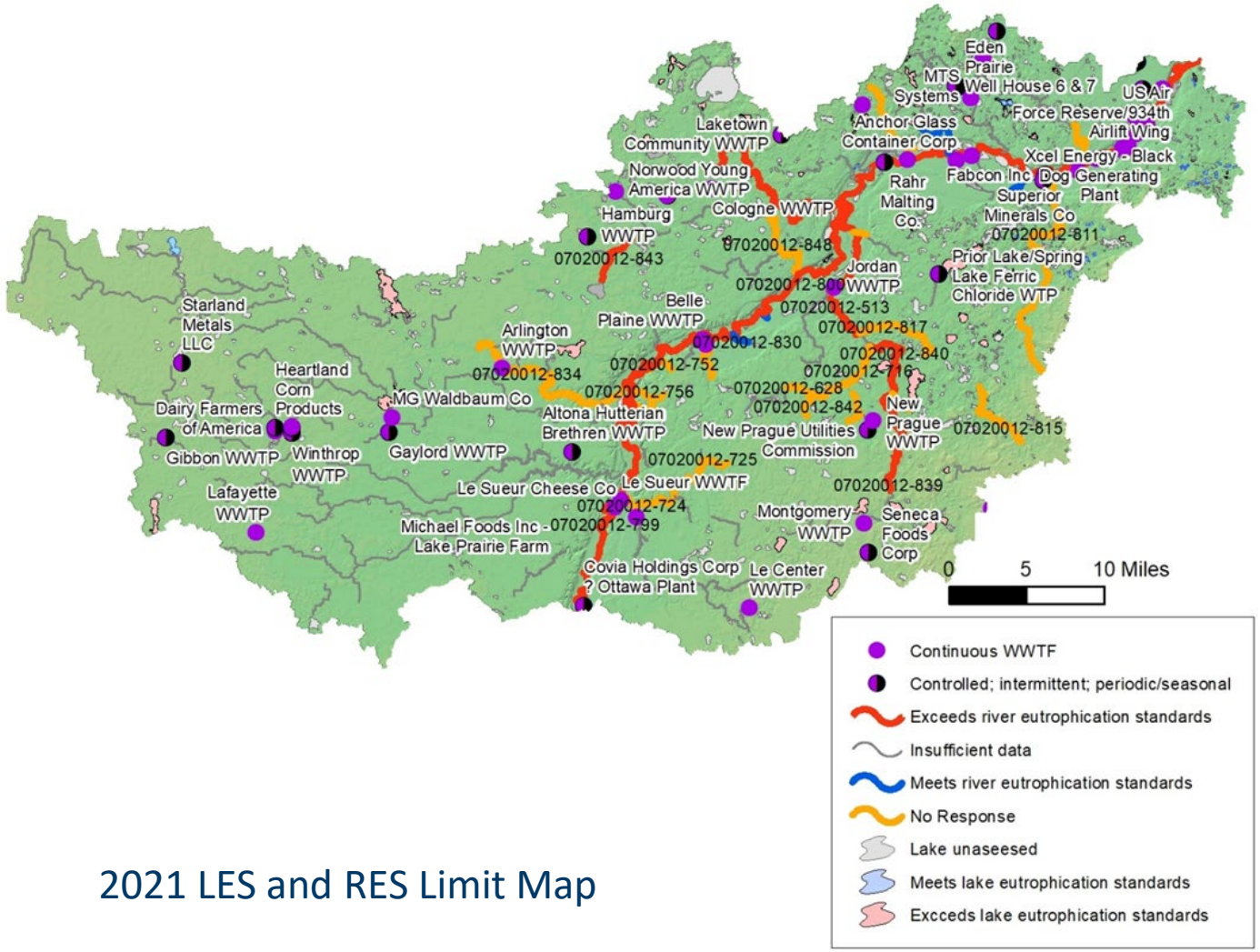


# Flow weighted mean concentrations – Inorganic Nitrogen

Data Viewer



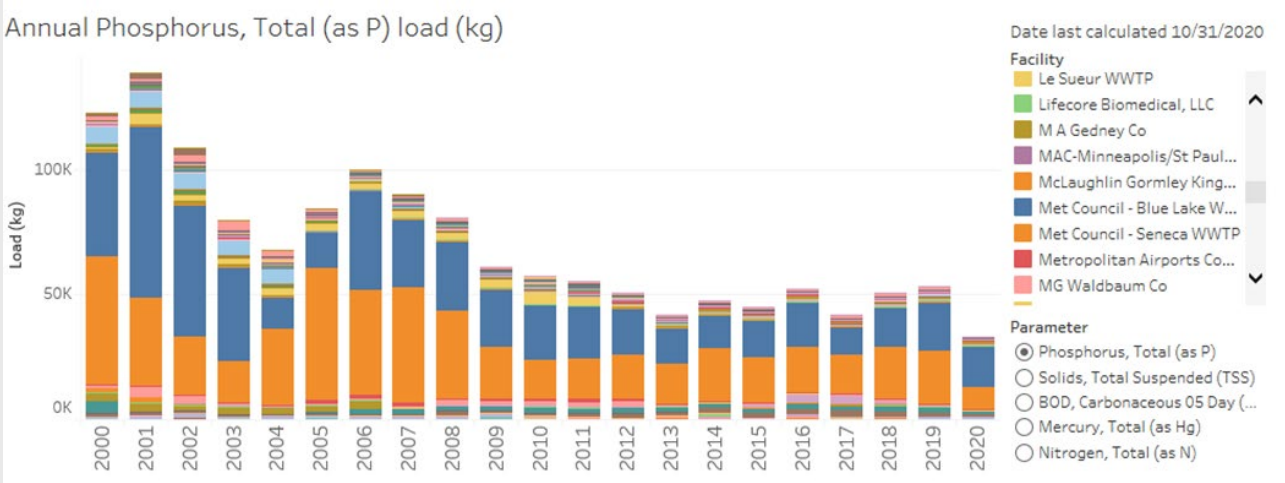
# Point Source – Permitting




2021 LES and RES Limit Map

- 49 NPDES Permits in the Watershed
- Effluent limits based  Impairments, TMDLS and other requirements
- New monitoring request to better understand eutrophication in headwaters downstream of point sources
  - Phosphorus
  - Sulfate
  - Chloride

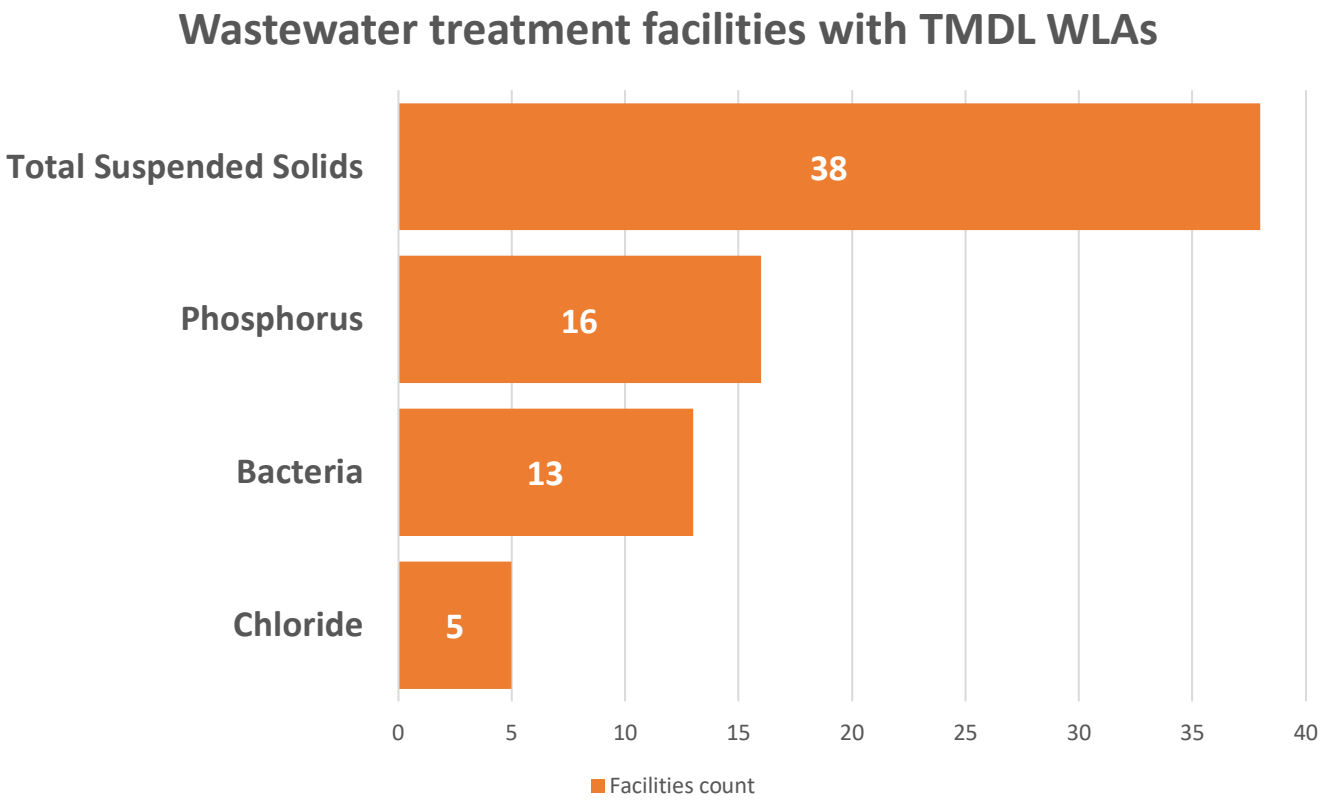
# Limits Past and Future

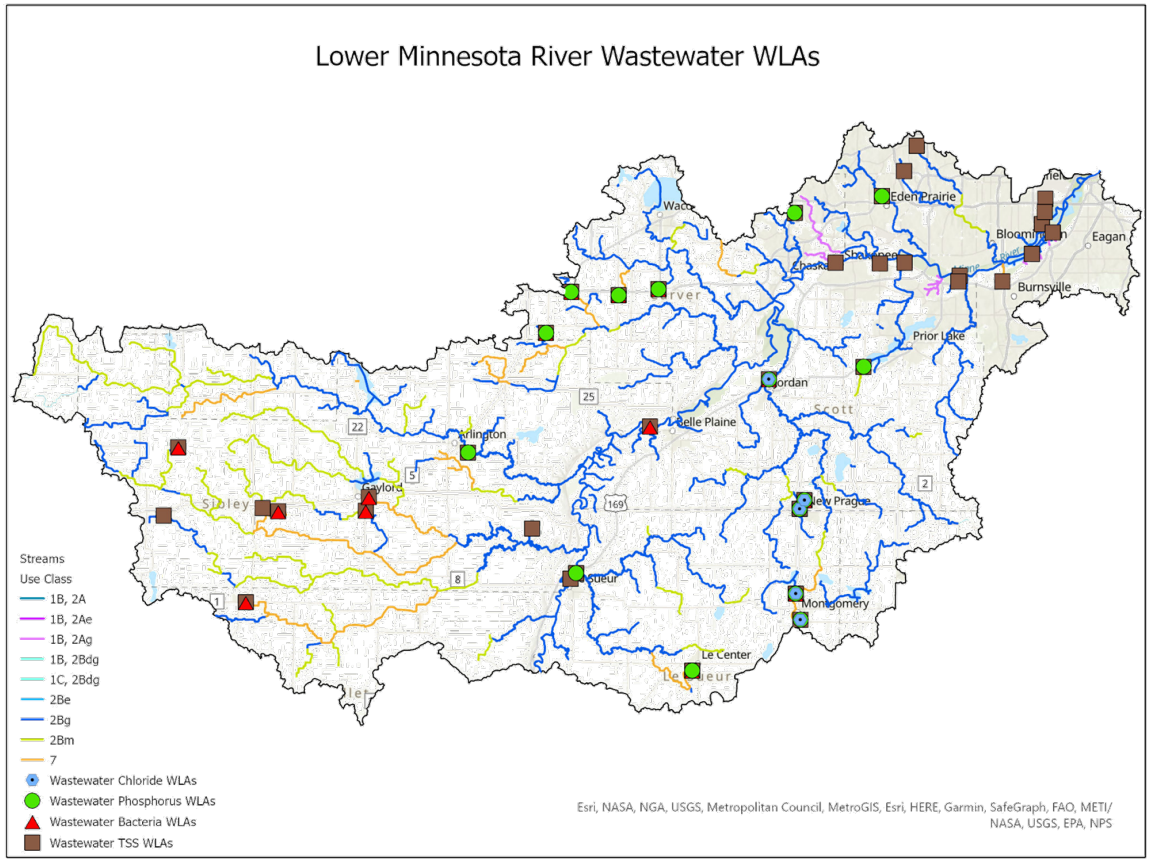



- Limits are based on the most restrictive wasteload allocations (WLA)
  - Local rivers
  - Local lakes
  - Mainstem of the Minnesota River
  - Mississippi River
  - Lake Pepin
- Some of the allocations are seasonal and some are annual which can result in multiple limits.

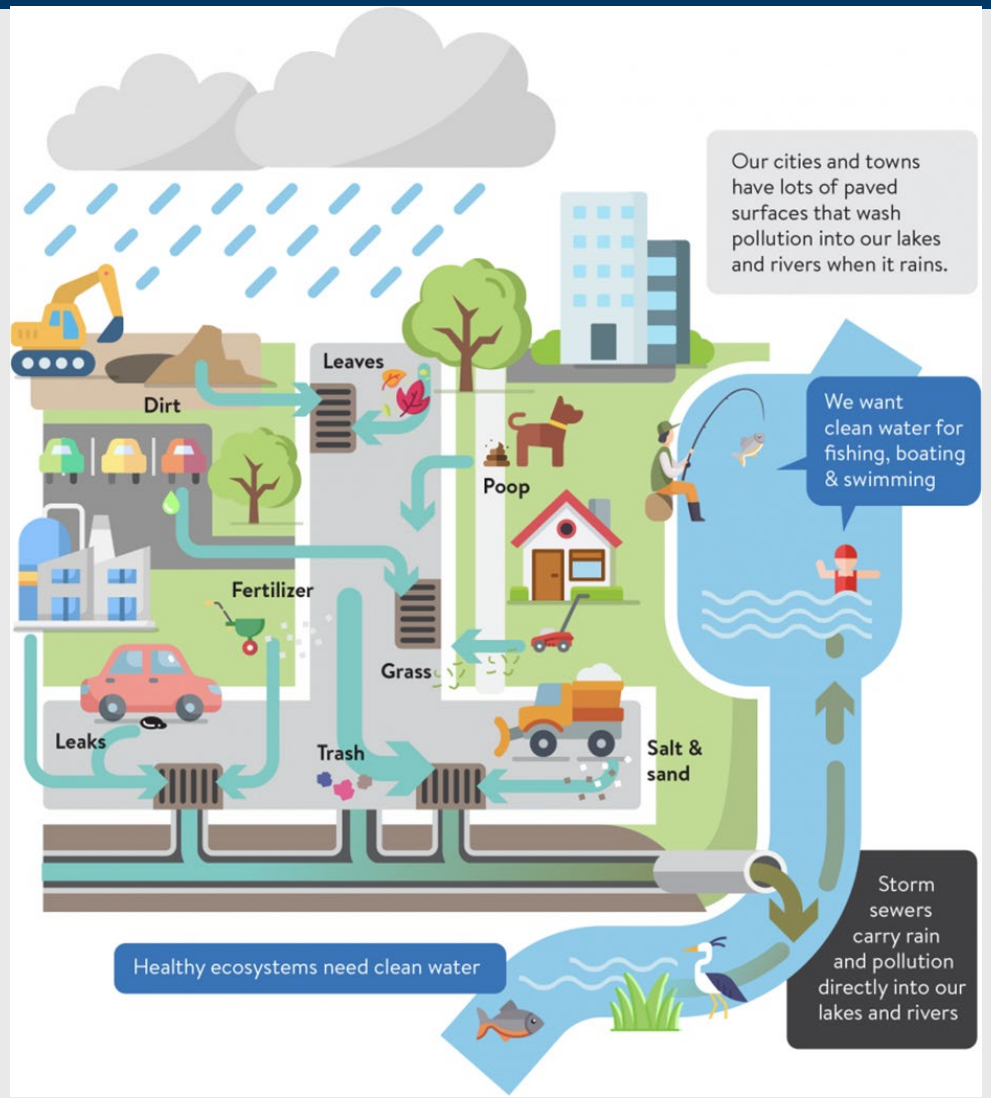
# Wastewater WLAs

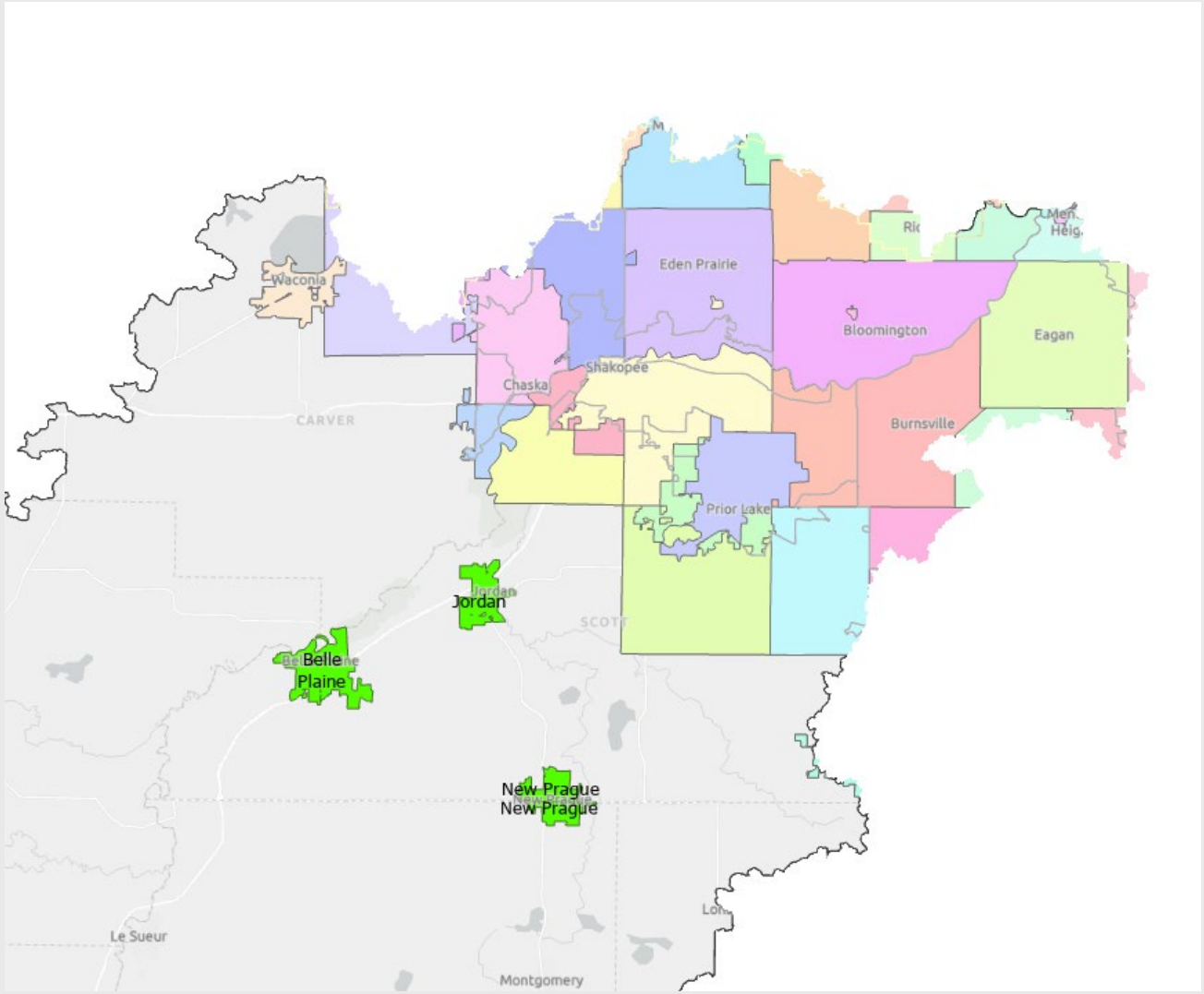
| | Chloride | Bacteria | Phosphorus | Total Suspended Solids |
|---|---|---|---|---|
| **WLAs** | 14 | 20 | 17 | 132 |
| **Number of facilities** | 5 | 13 | 16 | 38 |
| **% Compliance with Limits** | 2% | 100% | 98% | 99% |
| **Number of samples** | 133 | 284 | 878 | 3,970 |



# Municipal Separate Storm Sewer System (MS4)




[Total Maximum Daily Loads (TMDLs) - Minnesota Stormwater Manual (state.mn.us)]

# Total Maximum Daily Loads (TMDLs)

- Maximum amount of pollutant water body can receive without violating WQ standards
- Allocates allowable loads to point sources and non-point sources
- Estimates reductions needed to achieve WQ standards
- Common TMDLs in Lower Minnesota watershed
  - Chloride
  - TSS/turbidity (sediment)
  - Bacteria (*E. coli*)
  - Lake nutrients
- Lower Minnesota River Eutrophication TMDL
- 18 TMDL reports in LMR Watershed and 2 basin-wide projects

# TMDL Summaries

| Parameter | Impairments | Stressors | Completed TMDLs |
|---|---|---|---|
| E coli | 29 | -- | 29 |
| Fecal Coliform | 24 | -- | 24 |
| Fish Bio | 74 | -- | 4 |
| Invert Bio | 56 | -- | 1 |
| Mercury in Fish | 35 | -- | 28 |
| Nitrate | 0 | 40 | 0 |
| Nutrients | 57 | 45 | 57 |
| Turbidity/TSS | 26 | 40 | 26 |
| Chloride | 7 | -- | 7 |
| Acetochlor | 1 | -- | 0 |

# Watershed Restoration and Protection Strategies (WRAPS)

- WRAPS synthesizes data, trends, SID, TMDL, modeling, and local priorities for HUC8 watersheds
- Establishes 10-year targets and ultimate goals for protection and restoration of streams, lakes, and the entire HUC8
- Process leverages expertise of local partners – counties, SWCDs, Watershed Districts
- Develops high level strategies for restoration and protection of surface water resources
- Used for local water planning to implement practices on the landscape
- Iterative process
- Public Participation Emphasized under two contracts

# Cycle 1 Links

Lower Minnesota River Watershed MPCA Webpage

Lower Minnesota River Watershed Monitoring and Assessment Report

Lower Minnesota River Watershed Streams Stressor ID Report

Lower Minnesota River Watershed Lakes Stressor ID Report

Lower Minnesota River TMDL Reports Part I, Part II, Part III

Lower Minnesota River Watershed WRAPS Report

Lower Minnesota River Watershed Approach Civic Engagement Project Summary

Older Lower Minnesota River Watershed: TMDL projects

Lower Minnesota River Watershed Characterization Report

# Coming up next

# Watershed WRAPS Update Project Charter

- Provide high level project overview; work plan for contracts will include the specifics
- Synthesize & synchronize LGU/ state agency priorities and timeline in context with MPCA permitting program needs and MPCA Mission
- Documentation of collaborative discussion with LGUs and agency partners on purpose and scope of WRAPS update
- Identify deliverables and who is responsible for completing each deliverable
- Help track site selection for surface water monitoring request process
- Outline project cost for watershed program budgeting. Cost associated with each deliverables
- To be revisited annually and updated with the partners as new information becomes available

# Surface Water Monitoring Update: What's New

1) Change in Goal: Measuring progress and filling in gaps to inform WRAPS and local planning efforts.
2) Requesting local input on monitoring locations (**S**urface **W**ater **M**onitoring **R**equests process)
3) Reducing biological and chemistry monitoring sites
    - Sites that did not work well in 2014
    - Sites that now have new redundant monitoring occurring (e.g., WPLMN)
    - Less small headwater sites and where biology is not reflective of the watershed

- Drivers for updating the process:
    - Right size our monitoring program – gather data where needed; already did a watershed wide monitoring approach (2014-2015)
    - 2025 focus includes reducing MPCA sites and adding monitoring where it meets local and state priorities

# How to get involved

- MPCA will be inviting local partners to submit a proposal for monitoring needs in the Lower Minnesota River Watershed for 2025 and 2026 monitoring.

# How to get involved

## MPCA to provide:

- Updated, draft WRAPs Project Charter
- Today's presentation and affiliated links
- Factsheet on SWAG process
- Maps of monitoring stream sites and lakes MPCA Statewide Monitoring Request Site Selection (arcgis.com)

## Local Partner tasks:

- Convene with your watershed technical/monitoring team (if it exists) to talk through needs in your watershed and capacity to undertake contract work
- Review draft watershed charter and priority areas to determine future monitoring needs
- Ask questions! MPCA monitoring staff are happy to gather additional info or talk you through our current design

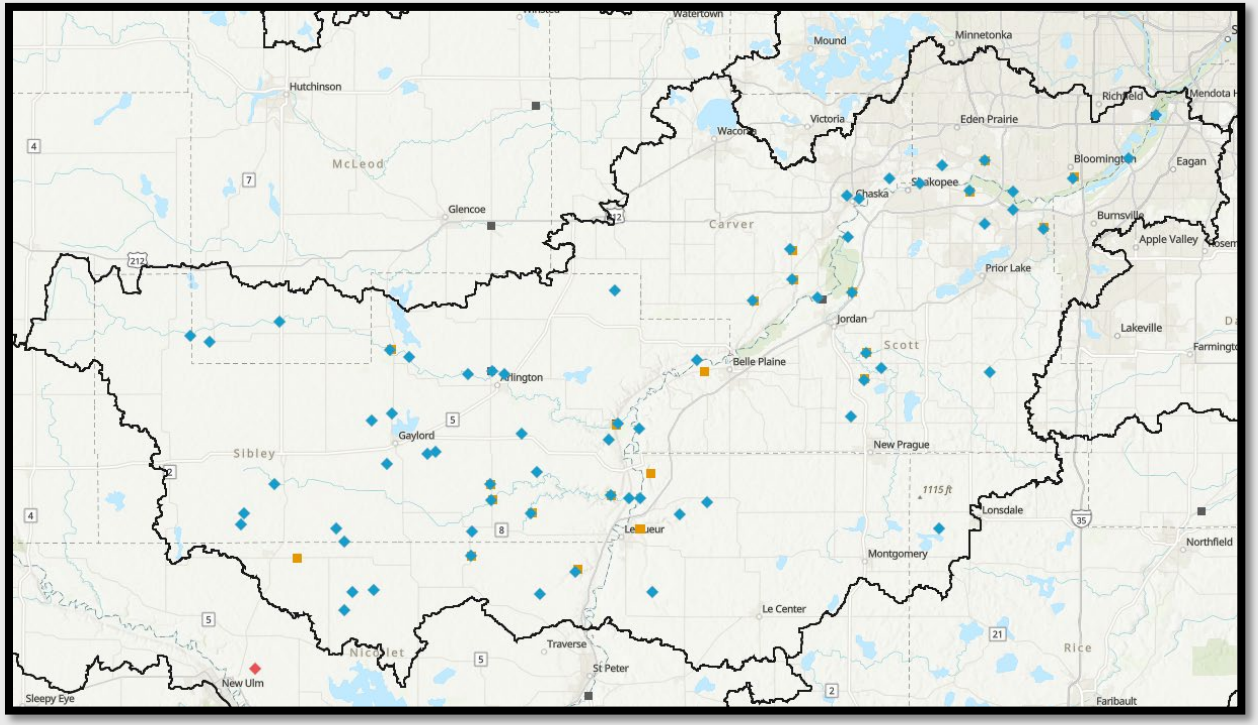
# Surface Water Assessment Grant (SWAG)

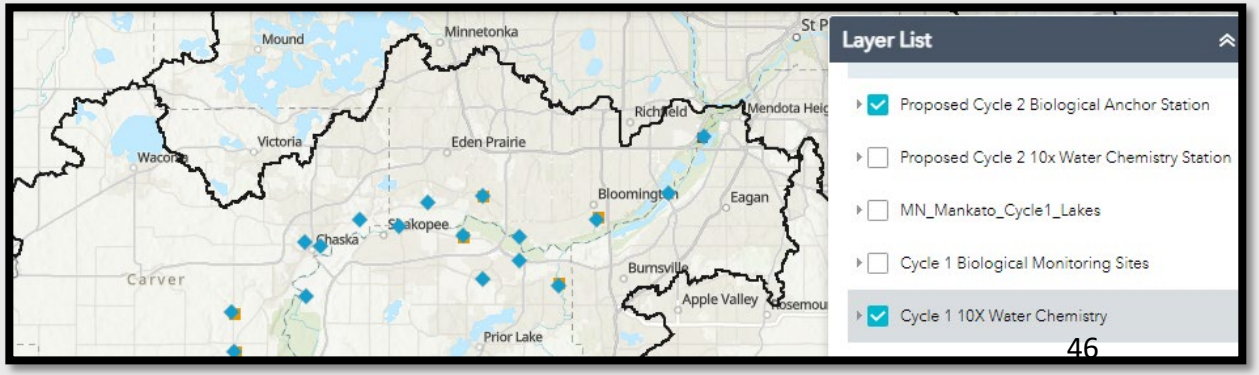
- Seeking local participation to perform chemistry monitoring within lakes and streams.
  - Approved SWMR and Core locations
- Consider interest and capacity.
- Costs are reimbursed
- Primarily contract w/ local governmental units
  - Subcontractors allowed
- Final list of approved sites released Late Summer of 2024.
- Local cooperation with site selection is preferred to avoid an RFP

# Map Products

**Statewide Surface Water Monitoring Request Application**

- Map link will be sent to local partners and is publicly available.
  - Hosted in ArcGIS Online
  - Do not need an account to view the map
  - Content can be imported into ArcPro
- Map will include data to assist with site request planning.
  - Cycle I and II sites
  - WPLMN
  - Impairments
  - Stressors
  - Land use
  - Enivronmental Justice Areas
- Functionality to view and search for specific features.
  - Watersheds
  - Waterbodies
  - Sites



# WD and WMO Monitoring Priorities

| Black Dog WMO | Carver County WMO | Eagan-Inver Grove Heights WMO | Lower Minnesota River WD | Nine Mile Creek WD | Prior Lake-Spring Lake WD | Richfield-Bloomington WMO | Riley-Purgatory Bluff Creek WD | Scott WMO |
|---|---|---|---|---|---|---|---|---|
| Crystal Lake | Bavaria Lake | LeMay Lake | Courthouse Lake | Bryant Lake | Lower Prior Lake | Wright's Lake | Hyland Lake | Cedar Lake |
| Keller Lake | Hydes Lake | Blackhawk Lake | Brickyard Lake | Bush Lake | Upper Prior Lake | Smith Pond Lake | Ann Lake | Cleary Lake |
| Kingsley Lake | Waconia Lake | Cliff Lake | Eagle Creek | Lake Cornelia | Spring Lake | Richfield Lake | Duck Lake | Cynthia Lake |
| Lac Lavon | Bevens Creek | Fish Lake | | Lake Edina | Fish Lake | Wood Lake | Idlewild Lake | Geis Lake |
| Orchard Lake | Carver Creek | O'Leary Lake | | Rose Lake | Pike Lake | | Lotus Lake | Hanrehan Lake |
| | East Chaska Creek | North Lake | | Smetana Lake | Arctic Lake | | Lucy Lake | Hickey Lake |
| | West Chaska Creek | Bald Lake | | Wing Lake | Sutton Lake | | Mitchell Lake | Kane Lake |
| | | Quigley Lake | | Arrowhead Lake | Buck Lake | | Red Rock Lake | Lennon Lake |
| | | Carlson Lake | | Birch Island Lake | Haas Lake | | Rice Marsh Lake | McMahon Lake |
| | | Thomas Lake | | Glen Lake | Crystal Lake | | Riley Lake | Murphy Lake |
| | | Schwanz Lake | | Indianhead Lake | Rice Lake | | Round Lake | O'Dowd Lake |
| | | Hay Lake | | Lake Holiday | Cates Lake | | Silver Lake | Pleasant Lake |
| | | Holz Lake | | Lone Lake | Jeffers Pond | | Staring Lake | St. Catherine Lake |
| | | Fitz Lake | | Minnetoga Lake | Swamp Lake | | Susan Lake | Schneider Lake |
| | | | | Mirror Lake | Prior Lake Outlet Channel | | Riley Creek | Thole Lake |
| | | | | Normandale Lake | Unnamed Creek (County Ditch 13) | | Bluff Creek | Upper Sand Creek |
| | | | | Southeast Anderson Lake | Buck Lake Creek | | Purgatory Creek | Middle Sand Creek |
| | | | | Southwest Anderson Lake | Cates Creek | | | Picha Creek |
| | | | | Nine Mile Creek | | | | Porter Creek |
| | | | | | | | | Credit River |

# LMR-East 1W1P Monitoring Need Considerations

Currently in draft – estimated submittal to BWSR in June 2024

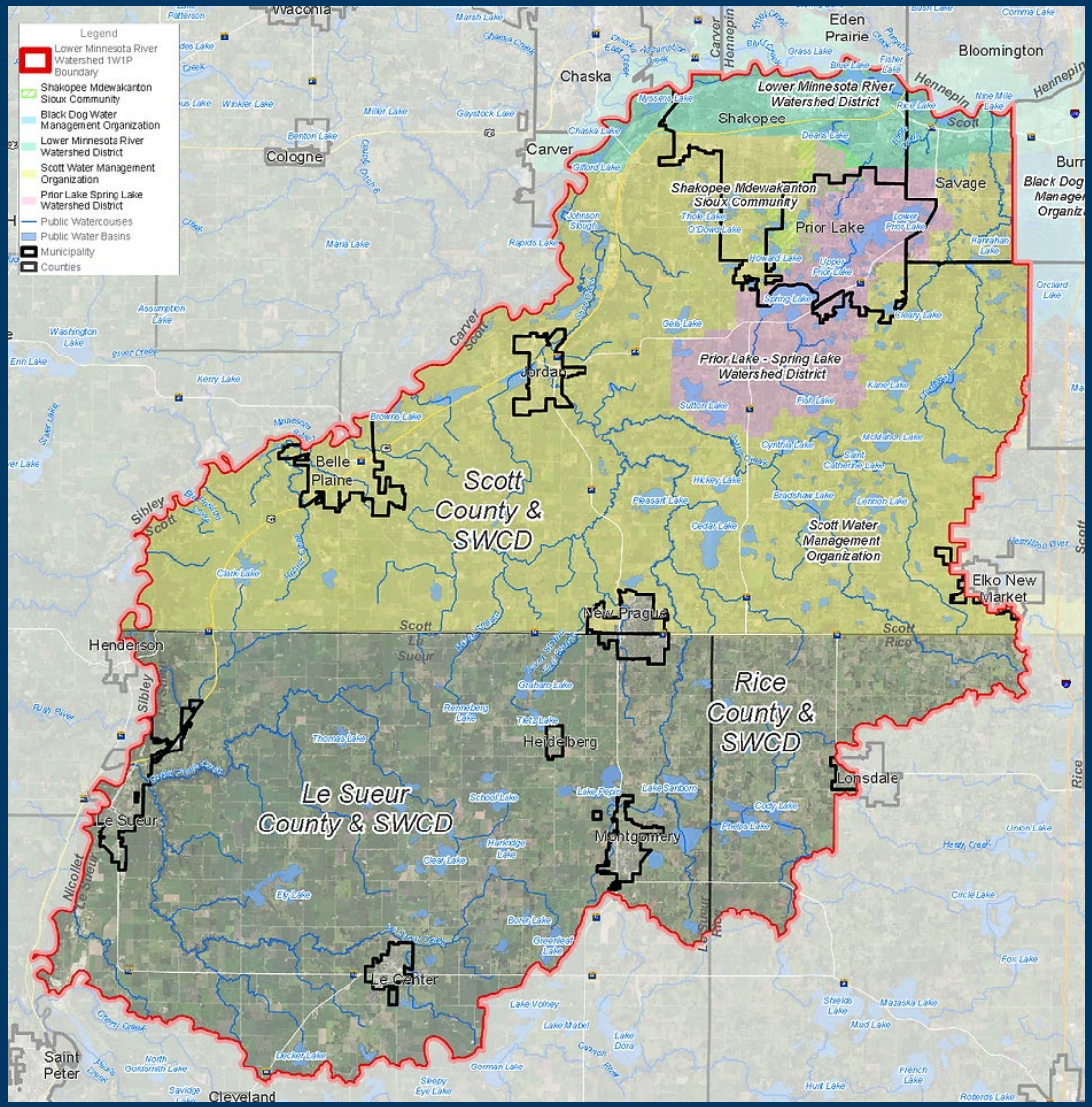
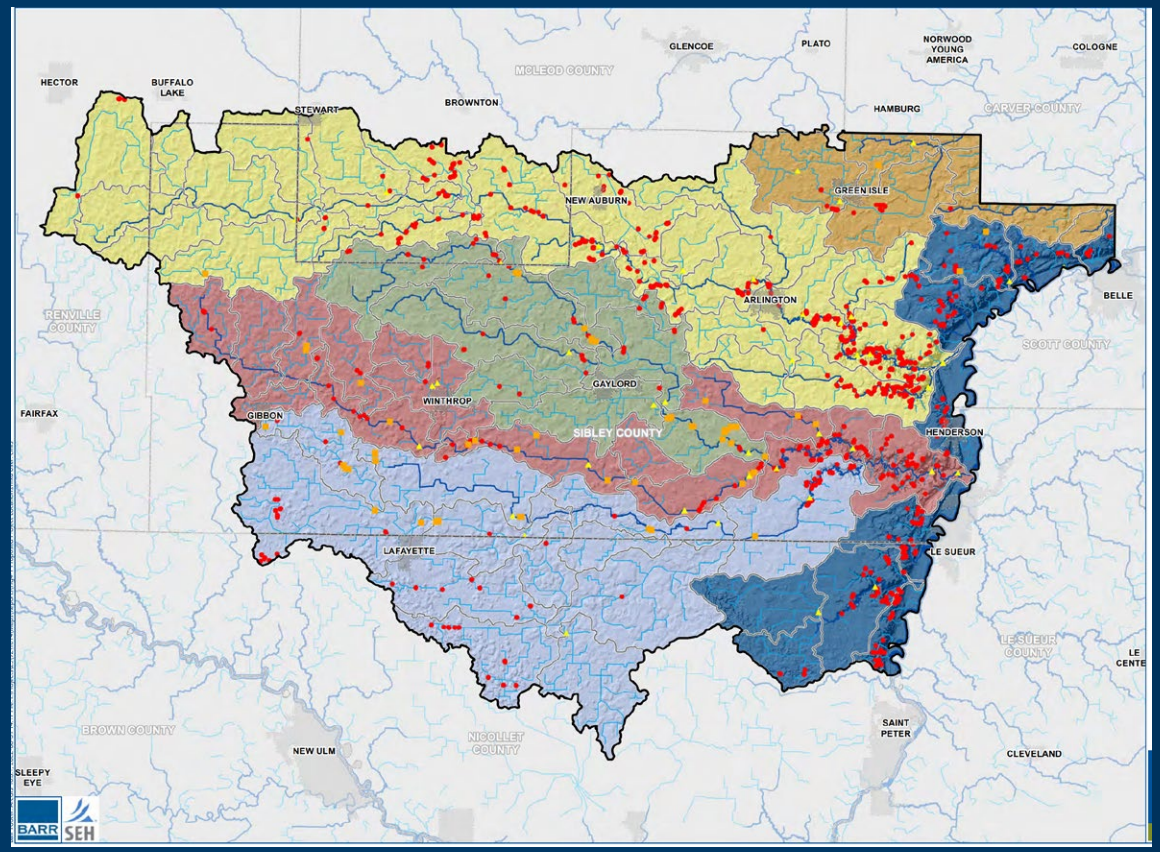



*Image from lowermnrivereast.org/about-1*

# Lower Minnesota River West 1W1P Monitoring Need Considerations

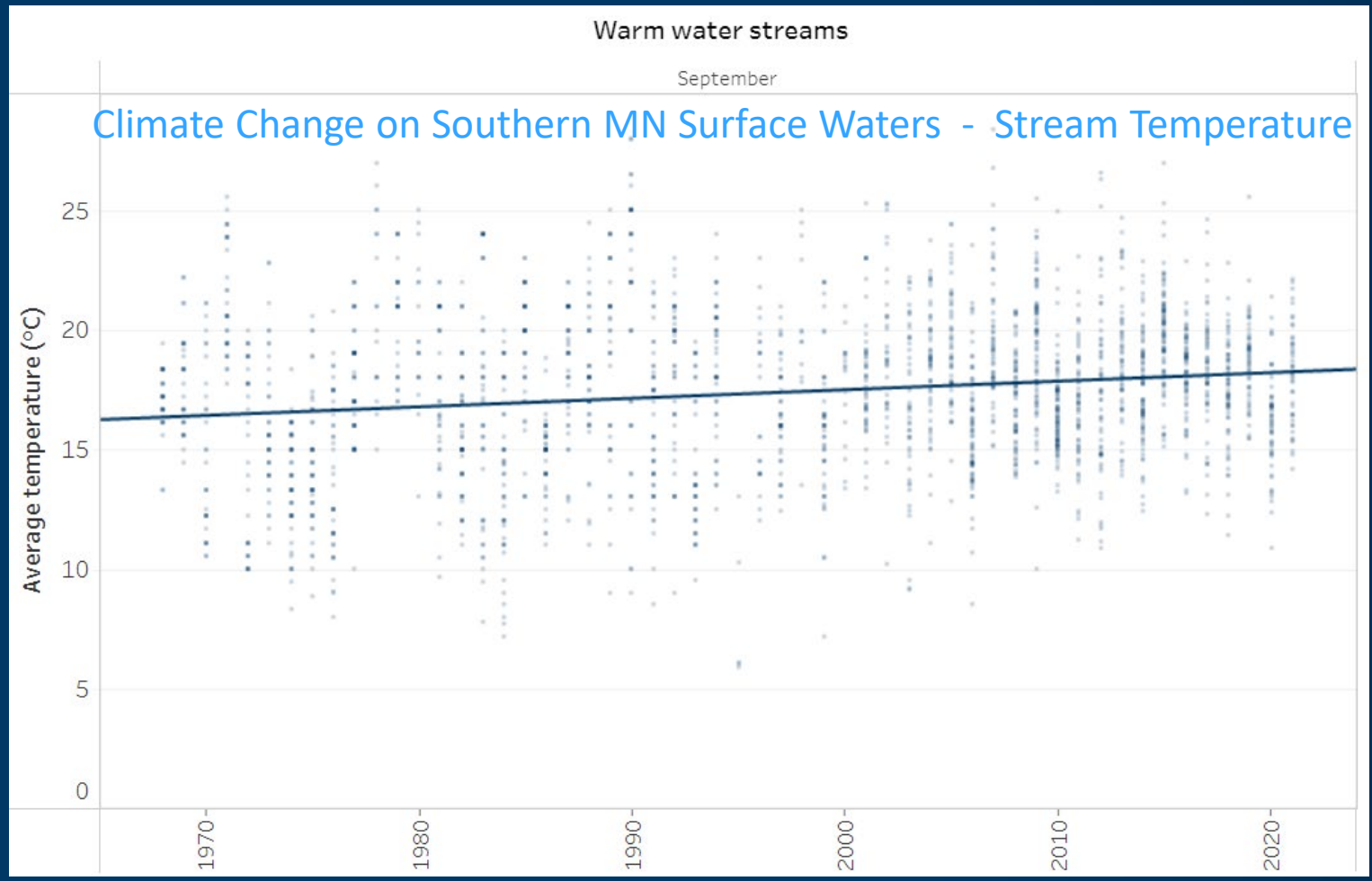
- **Subwatersheds- Streams**
  - Bevens Creek/ Silver Creek/ NE Sibley County
  - High Island Creek
  - North Branch Rush River
  - Middle Branch Rush River
  - South Branch Rush River
  - Minnesota River (Le Sueur and Belle Plaine subwatersheds)
- **Lakes**
  - Bakers
  - Clear
  - High Island
  - Indian
  - Round Grove
  - Sand
  - Titlow
  - Washington



# Climate Change Considerations

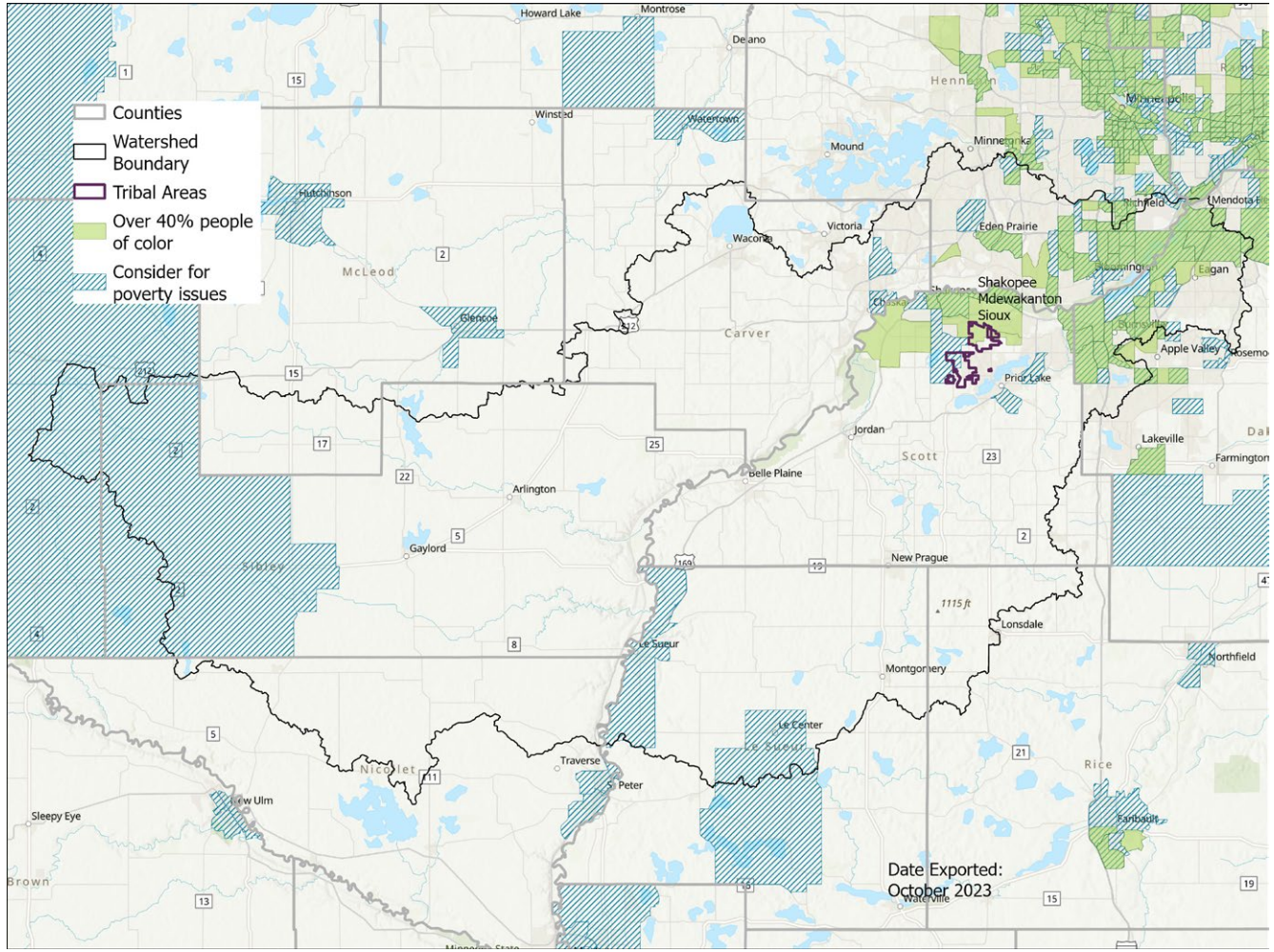
*Climate change monitoring is on different scales and different agencies*

- EPA National Aquatic Resource Surveys
- WPLMN
- Long-Term Bio Stations (Reference Sites Statewide) & Anchor Stations
- Sentinel Lakes
- Consider climate change during WRAPS Process




*Data from: https://public.tableau.com/app/profile/mpca.data.services/viz/ClimateChangeandMinnesotasSurfaceWaters/Lakeicedurations*

# Environmental Justice Considerations




**Policy statement**: The Minnesota Pollution Control Agency expects the fair treatment and meaningful involvement of communities of color, Indigenous communities, and low-income communities in agency actions and decisions that affect them. It is the policy of the MPCA that an outcome of its work, in addition to protecting and improving the environment and public health, must address environmental justice concerns.

**Goal:** Through the uses of tools and resources for monitoring, modeling, risk assessment and cumulative impacts analysis, strive to identify and understand environmental impacts, inform and target efforts to address past and present impacts, and avoid future disproportionate impacts.

# Timeline for 2025 Watershed Monitoring Planning

| Date | Action |
|---|---|
| November 2023 | **External watershed meeting to kick off site selection process** |
| Jan/Feb 2024 | **Meet with local partners to introduce and develop monitoring needs and (Surface Water Monitoring Request (SWMR) Process** |
| March 2024 | **Monitoring Site Requests are due to the MPCA monitoring staff** |
| Spring/Summer 2024 | MPCA review proposals, budgeting, etc. **SWMR Approval list sent to local partners in late summer** |
| Mid-October 2024 | **Meeting with local partners to discuss SWMR Approved sites and start SWAG contracting process** |
| October/November 2024 | SWAG Work plan and budget development by local partners |
| Dec/Jan/Feb 2025 | SWAG Monitoring Contract developed/finalized by MPCA |
| March 2025 | SWAG Contract executed; prep for field season begins |
| May – September 2025 | Field Season 1 |
| May – September 2026 | Field Season 2 |
| January 2027 | Contract ends; water quality assessments begin |

# Questions?

**Watershed Project Managers:** *Brittany.Faust@state.mn.us; Bryan.Spindler@state.mn.us*

**Biological Monitoring Lead:** *Joel.Chirhart@state.mn.us*

**Water Chemistry Monitoring Lead:** *Kalley.Guerdet@state.mn.us*

**SWAG:** *Kelly.OHara@state.mn.us*

MINNESOTA POLLUTION CONTROL AGENCY