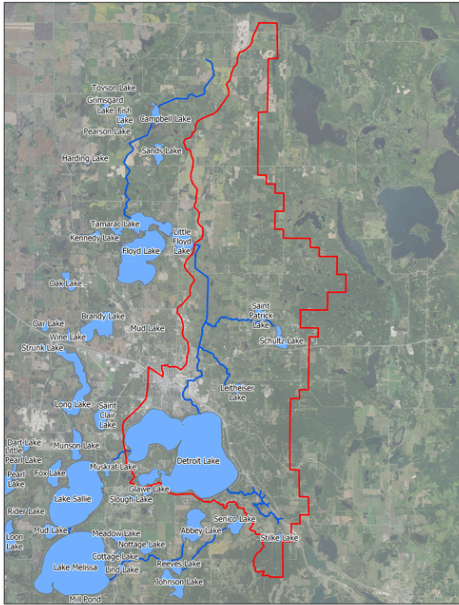
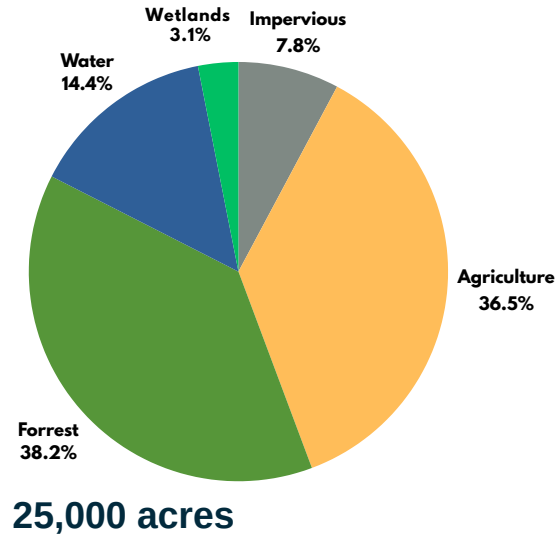


## ➤➤➤ GENERAL INFORMATION



### LAND USE:



### MAJOR LAKES

- Big Detroit
- Little Detroit
- Curfman (Deadshot Bay)

### SHALLOW LAKES

- Leitheiser
- Schultz
- St. Patrick

### STREAMS / DITCHES

- Pelican River (Ditch 13)
- Sucker Creek

Water Body	Status	Summary
Big Detroit	Enhance	Enhance condition to prevent future impairment. Nearly Impaired/Degrading trend.
Little Detroit/Curfman	Protect	Maintain good condition and protect against future risks
Pelican River/Ditch 13	Impaired	Impaired for Bacteria, Low dissolved oxygen, fish & invertebrate bioassessments.

## ➤➤➤ PRWD GOALS FOR THE WATER MANAGEMENT AREA

- Decrease tropic index of Big Detroit by 5%
- Maintain improvements in Little Detroit's water quality
- Manage Total Maximum Daily Loads (TMDLs) in the Pelican River
- Promote shorelines practices that are resilient to fluctuating water levels.
- Ensure a sustainable groundwater supply.
- Prevent establishment of new invasive species and manage existing invasive species
- Protect and improve wildlife habitat in near shore areas
- Maintain healthy fish communities.

# DETROIT/RICE WATER MANAGEMENT AREA

2  
2023

## ➤➤➤ BEST MANAGEMENT PRACTICES (BMPS)

The Watershed District offers a BMP program to reimburse homeowners a portion of the cost to install landscaping practices that:

- protect or restore the quality of our lakes and rivers
- protect or restore native plant communities and wildlife habitats
- install innovative approaches to stormwater treatment at the source

## BMP NUMBERS

- 4 BMP projects Funded
- \$2,440.50 paid to homeowners and community organizers as reimbursement.
- 3 Shoreline projects
- 1 Pollinator project

## DISTRICT HIGHLIGHTS



## RULES AND PERMITS NUMBERS

- 69 Shore Impact Zone Permits (sand blankets, riprap, shoreline vegetation)
- 2 Subdivisions/Planned Unit Developments
- 7 Commercial Stormwater Management
- 8 Residential Stormwater Management
- 4 Roads, Parking Lots, Bridges, Culverts, or Storm Sewer Projects
- 5 Underground Cable Projects

## ➤➤➤ REGULATORY AND PERMITTING PROGRAMS

Watershed Districts are mandated by the legislature to adopt rules. Regulation plays an important role in preventing and mitigating water resource issues. The regulatory program sets standards that must be met by entities that develop or otherwise disturb land within the District. The regulatory program is intended to provide for consistent application of resource protection from impacts related to land use change throughout the watershed.

PRWD works in cooperation with property owners, contractors and engineers, and local government units to maintain or increase the water quality in our district through the rules and permitting process. The largest number of permits are issued each year for Shore Impact Zone Alterations. However, our office also permits the stormwater management for Subdivisions, Planned Unit Developments, Commercial and Residential Construction, Roadways, and Underground Utilities.

## ➤➤➤ ENVIRONMENTAL EDUCATION

One of the great joys for our staff is sharing our knowledge and passion for our lakes and rivers with the young people in our community.

One of the most effective ways we have found is to make sure our local schools have the resources to get kids out into nature. Each year we fund transportation costs for field trips to Hamden Slough, Ike Fisher Farm, and Sucker Creek Preserve.

PRWD also administers a small grant program to help educators purchase science supplies for their classrooms and we routinely give presentations to students in classrooms and on field trips.

## EDUCATION NUMBERS

- \$571.75 for classroom supplies and event sponsorships
- \$3,428.45 for transportation costs for environmental field trips.
- 6 classes of 5th, 7th, & 8th Grade received education on Aquatic Invasive Species
- 400 fourth grade students from Detroit Lakes, Frazee Vergas, and Lake Park Audubon attended Waterfest



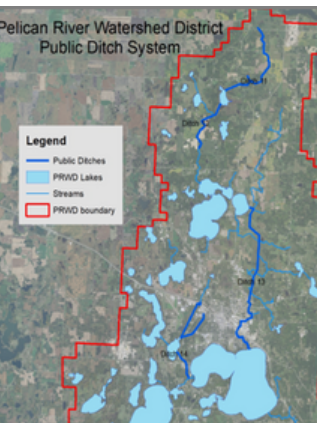
## DRAINAGE NUMBERS

- 7 Beaver Dams Removed
- 31 Beaver Trapped
- 0 Buffer Enforcement Actions

## ➤➤➤ DRAINAGE AUTHORITY

In the late 1990's, PRWD assumed drainage authority of Becker County Ditch 11/12 (Campbell Lake/Creek area), 13 (Floyd Lake, Rice Lake, City of Detroit Lakes area), and 14 (St. Clair Lake, City of Detroit Lakes area).

Most of the District's work as the Drainage Authority centers on beaver control and removing debris blockages from the drainage channel. In addition, these systems are governed by a MN Buffer Rule and the District is responsible for enforcement of the required buffers.





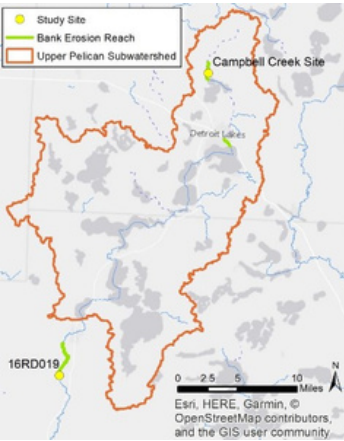
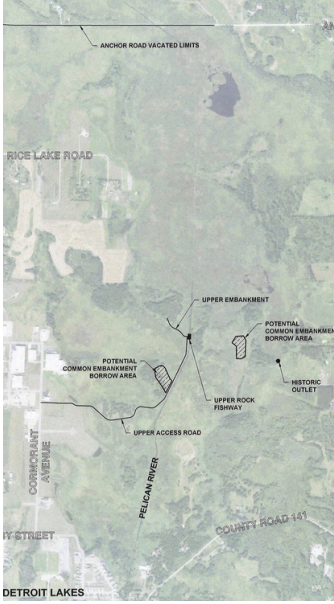
# DISTRICT-WIDE PROJECTS



## ➤➤➤ RICE LAKE RESTORATION

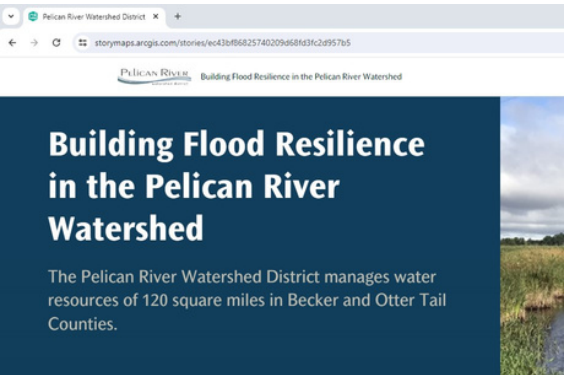
In the 1970's, the Rice Lake Wetland, was identified as the primary source and contributor of "legacy" phosphorus loading to Big Detroit. To address this issue, the wetland was restored in 2022 (see photo on the right with the construction of rock arch rapids to raise the wetland water level and to allow for fish passage). This wetland is located between Little Floyd Lake and HWY 34. 2023 monitoring results showed a decrease in phosphorus from the wetland to the Pelican River from previous years data.

Another downstream structure near Terry Street will be built in 2024 to further lower phosphorus levels to the Pelican River and downstream Detroit Lake.



## ◀◀◀ CAMPBELL CREEK 319 PROJECT

The District was awarded a federal 319 grant to address excessive sediment and phosphorus in the Campbell Creek sub-watershed area. In early 2024, the project area workplan was approved by the Environmental Protection Agency to construct: (1) 3,750 linear feet of streambank stabilization above and below Becker County HWY 149 using a variety of practices, (2) a multi-stage drainage and control structure near Campbell Lake, and (3) a grade stabilization project in a nearby farm field. The planning, design, and engineering work is starting this summer, with construction to occur in 2025 and 2026 for an estimated cost of \$500,000. The grant will be matched using Otter Tail 1W1P grant and District funds.



## ➤➤➤ FEMA FLOOD MITIGATION GRANT

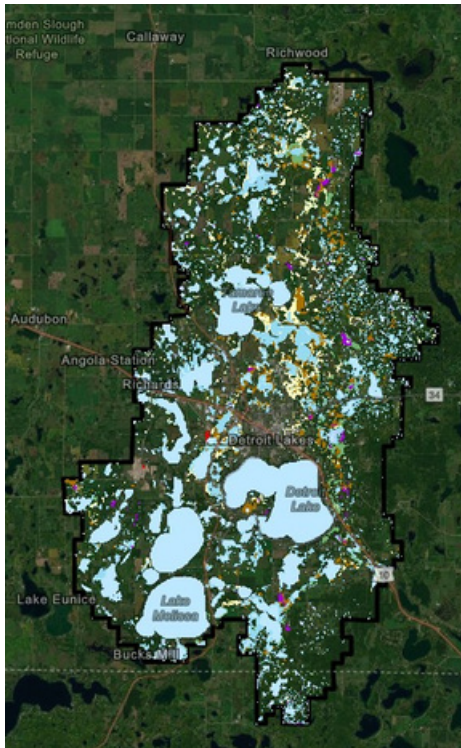
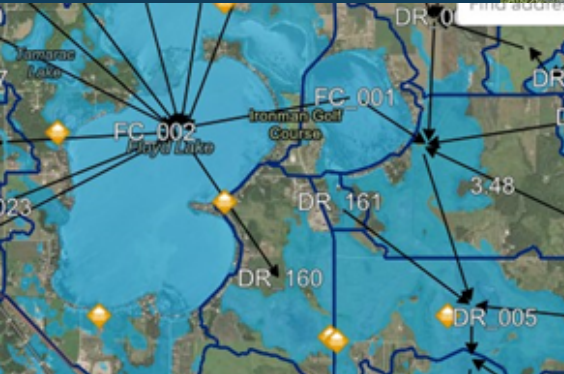
PRWD is completing the FEMA Flood Mitigation project in 2024. A Hydrologic & Hydraulic (H&H) model map was developed to identify flood prone areas. This information will assist with developing future projects to reduce flood risk.

Four flood prone areas were identified.

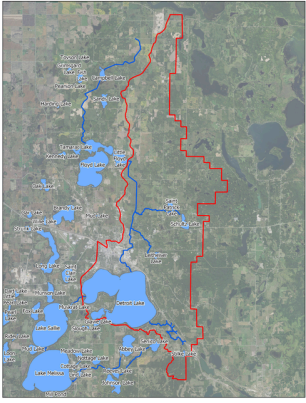
- Highway 21 at Rice Lake Road
- Pelican River at North Shore Drive
- Sucker Creek at Mountain Road
- East Munson Drive

You can report observed flooding at the PRWD website under the resources tab under Special Studies.

<https://prwd.org/resources/fema-flooding-study/>







The Detroit/Rice WMA has 5 lakes within its borders (Detroit, Curfman, Saint Patrick, Schultz, Leitheiser, and Stilke). In 2023, the District performed water quality surveys on Big and Little Detroit Lake as well as the Rice Lake stream system.

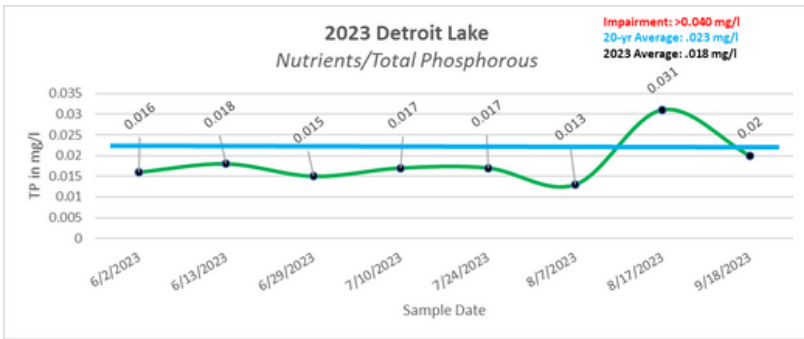
Water quality data for 2023 testing is included in the pages that follow. For more detailed information on historical water monitoring in this area, please see the 'Our Water' Section of our website at [www.prwd.org](http://www.prwd.org).



## LAKE WATER QUALITY NUMBERS 2023

BIG DETROIT	2023 Average	20 Year Average	MNPCA Lake Standards
Total Phosphorus (TP)	0.018 ug/L	0.024 ug/L	> 0.040 ug/L
Chlorophyll-a (Chl-a)	3.95 ug/L	6.68 ug/L	> 14 ug/L
Secchi depth	16 feet	11 feet	< 4.6 feet

### TOTAL PHOSPHORUS

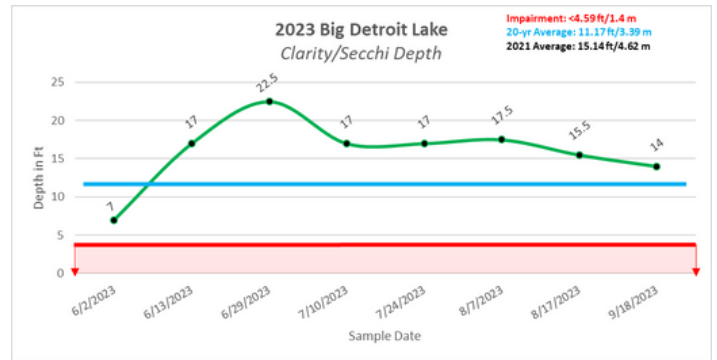


**Phosphates** are chemicals that enter waterways from both natural and human caused sources. Phosphates become detrimental when they over-fertilize aquatic plants and increase the rate of natural eutrophication. Eutrophication results in an increase in the carbon content and the amount of "mucky" or organic-laden sediments. This in turn leads to nuisance conditions such as algal growth.

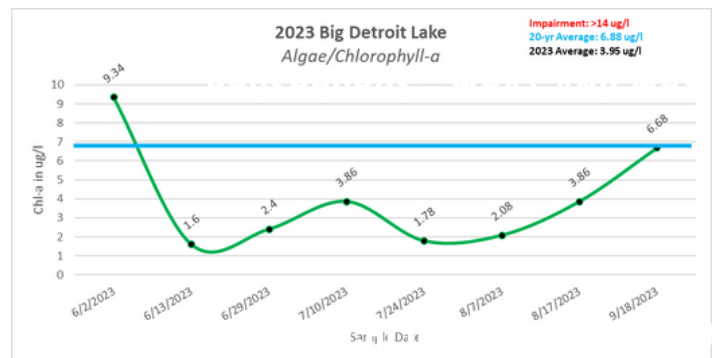
**Chlorophyll-a** is a naturally occurring compound found in all algae. Measuring Chlorophyll-a concentration in lake water is a reasonable estimation of the presence or absence of algal growth in a lake system. An increase in the biomass of algae in a body of water can result in decreased levels of dissolved oxygen, which is needed by many aquatic animals to survive.

A **Secchi** depth measurement is a visual measure of water clarity through water column. Measuring clarity of the water is another test of eutrophication of a water body.

### SECCHI DEPTH



### CHLOROPHYLL-A





# LITTLE DETROIT

2023 Average

20 Year Average

MNPCA Lake Standards

Total Phosphorus (TP)

0.018 ug/L

0.018 ug/L

> 0.040 ug/L

Chlorophyll-a (Chl-a)

5.84 ug/L

3.94 ug/L

> 14 ug/L

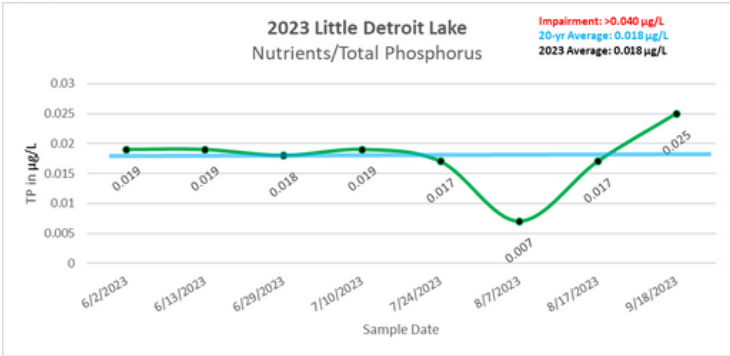
Secchi depth

10 feet

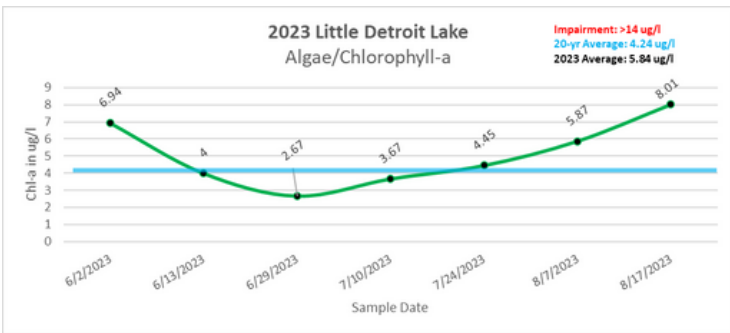
12 feet

< 4.6 feet

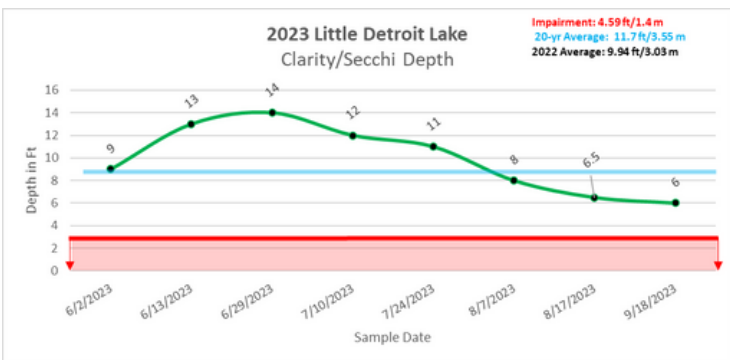
## ▶▶▶ TOTAL PHOSPHORUS



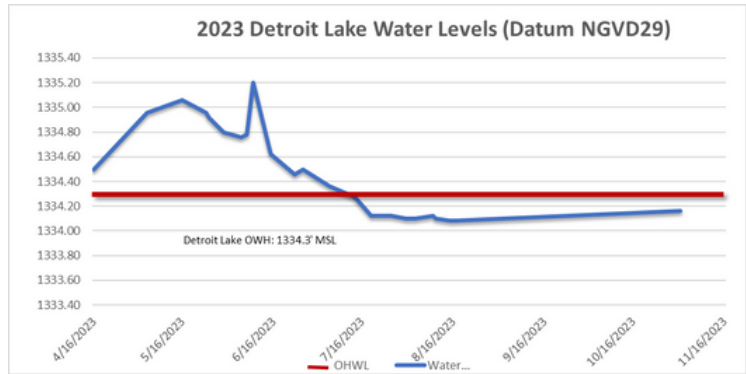
## ▶▶▶ CHLOROPHYLL-A



## ▶▶▶ SECCHI DEPTH

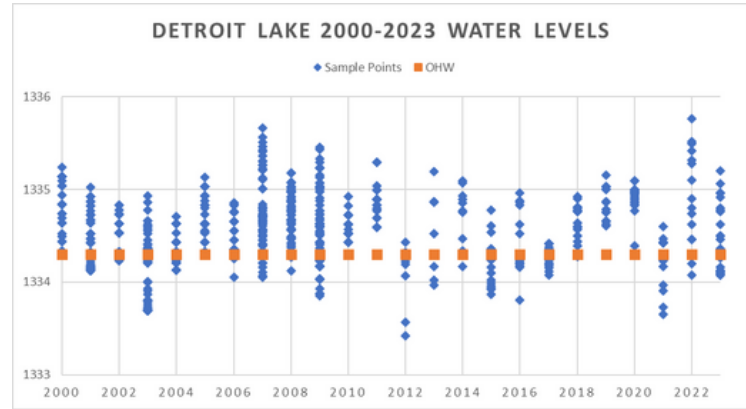


## ▶▶▶ WATER LEVELS

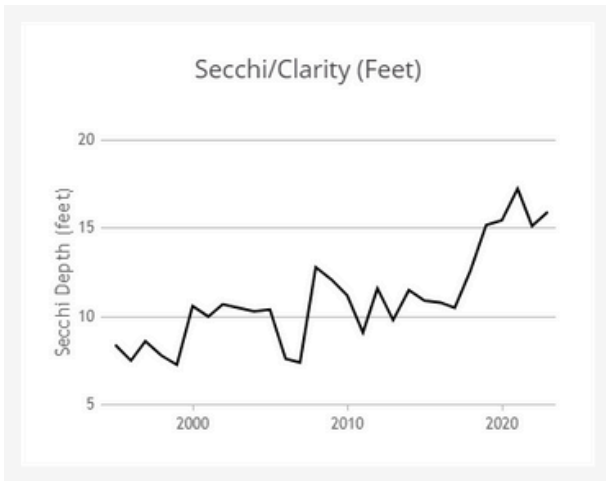
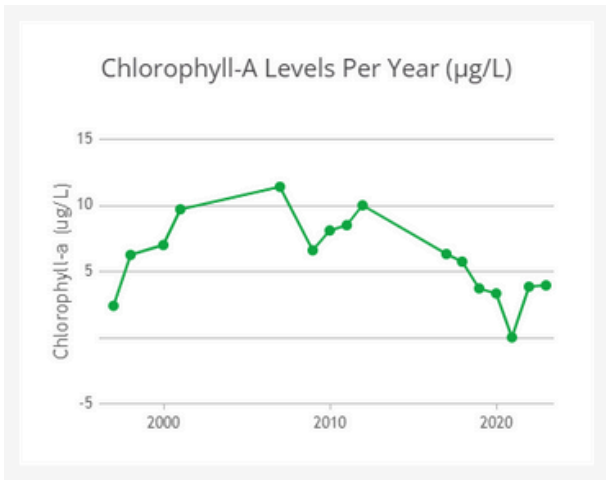
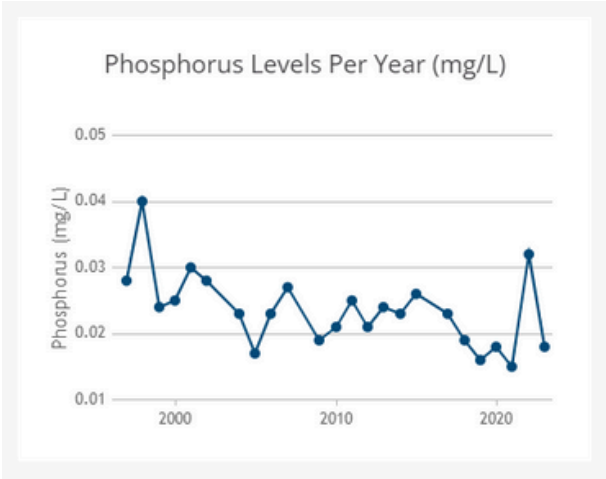


Big and Little Detroit share a common outlet and OHWL. The water level for Detroit Lake is measured at the outlet under Becker County HWY 6/West Lake Drive. In spring 2023, water levels were above the OHWL. Mid-June, water levels dropped dramatically due to drought conditions and remained below the OHWL to ice-in.

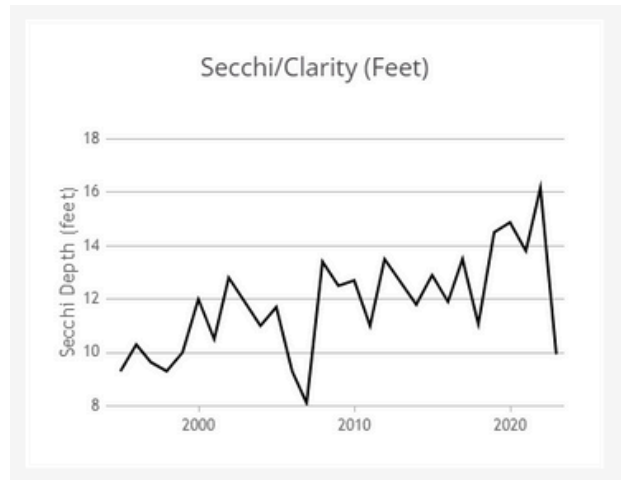
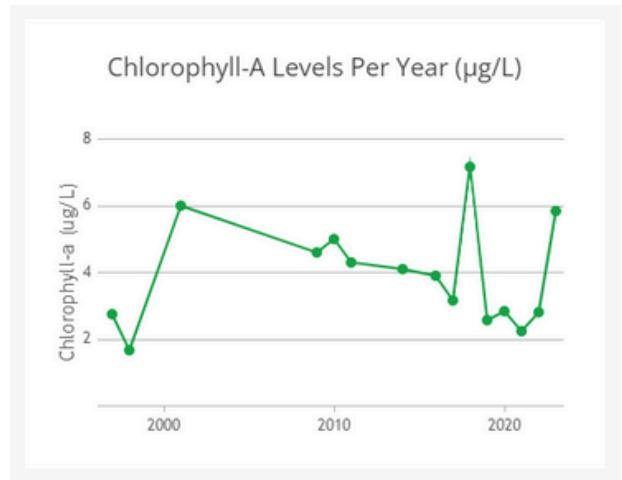
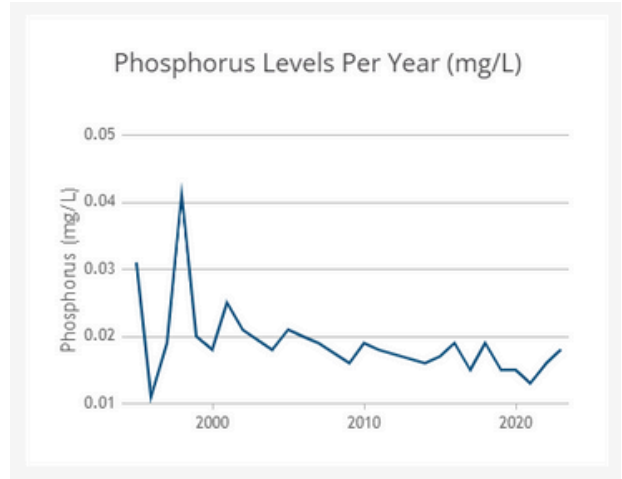
Historic water levels have fluctuated throughout the years, based on weather conditions as seen in the chart below.



## BIG DETROIT LAKE 1997 TO 2023



## LITTLE DETROIT LAKE 1997 TO 2023





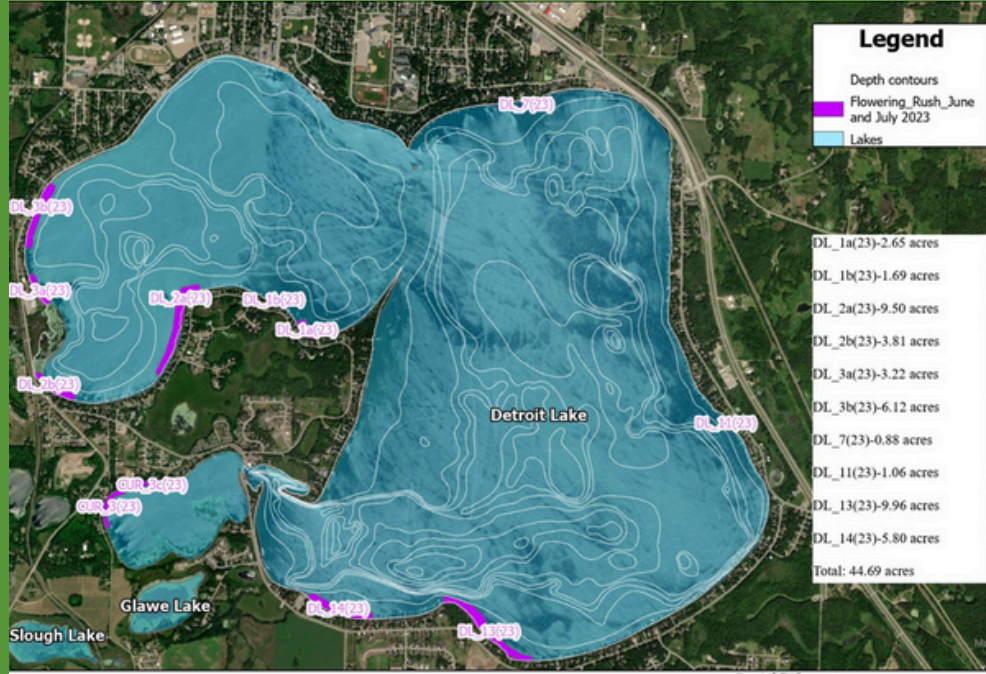
# ➤➤➤ AQUATIC INVASIVE SPECIES (AIS) MANAGEMENT

## FLOWERING RUSH 2023

- 44.7 acres Flowering Rush treatment on Big & Little Detroit - \$16,791.44
- 4.97 acres Flowering Rush Treatment on Curfman - \$1,884.74

For 2024, the District will be mapping Flowering Rush locations and density levels in mid-June and mid-July for treatments. Treatments are conducted based upon plant growth, with first round application in late June or early July. The District aims to avoid treatment during the Fourth of July holiday period. Areas requiring a second treatment will be treated by mid-August.

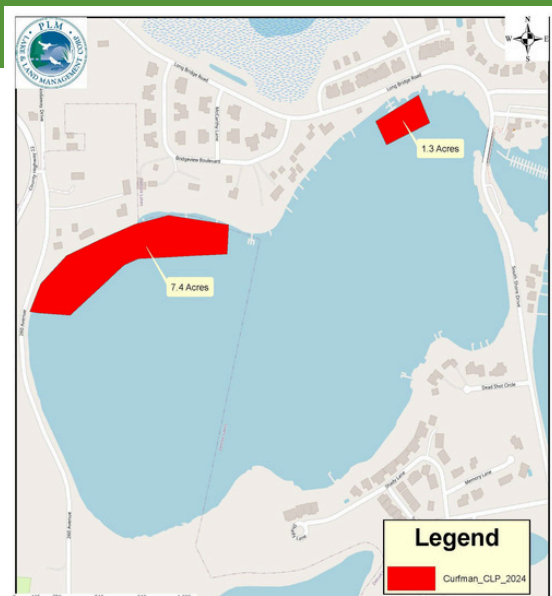
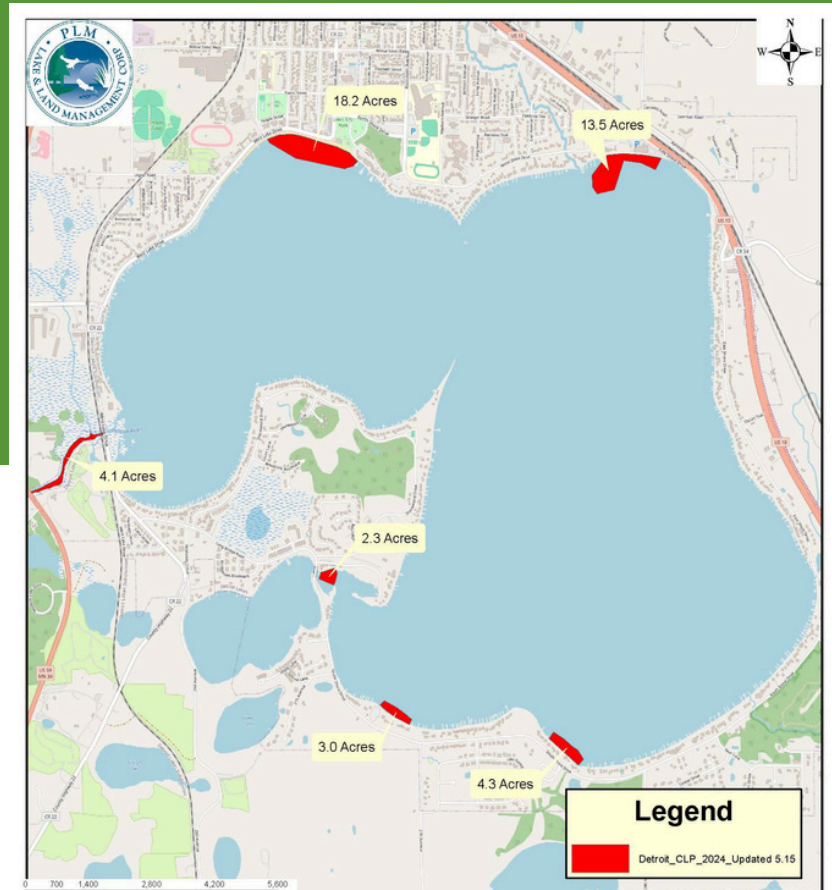
Watch our website and social media for updates on treatment dates and locations.



## ➤➤➤ CURLY-LEAF PONDWEED TREATMENT 2024

- 41 acres on Big & Little Detroit - \$11,210.00
- 4.97 acres on Curfman - \$2,010.00
- Treatment Date: May 20, 2024

In 2023, no treatments for CLP were conducted due to unusual delayed growth patterns in the spring. MN DNR restricts treatment timing according to lake water temperature. When CLP growth was evident, the water temperature was above the MN DNR limits for treatment. In 2024, the District has contracted with Minnesota State University - Mankato to research other herbicides and application rates to more effectively manage CLP.





# STREAMS & DITCHES

The District monitors 4 monitors sites on the Pelican River/Ditch 13, starting at the Little Floyd Lake outlet, through the Rice Lake Wetland, and at the inlet of Detroit Lake. There is also one monitoring site on Sucker Creek which flows into Detroit Lake.

## PELICAN RIVER - DITCH 13

Water quality continues to improve in the Rice Lake Wetland restoration project area.

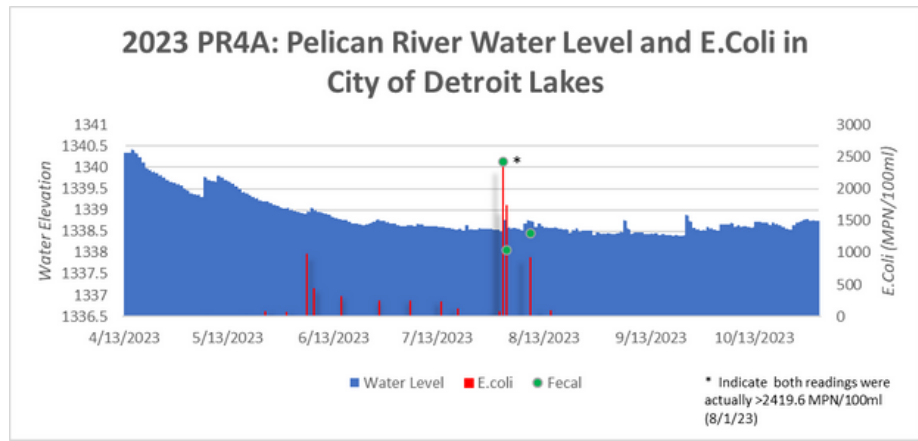
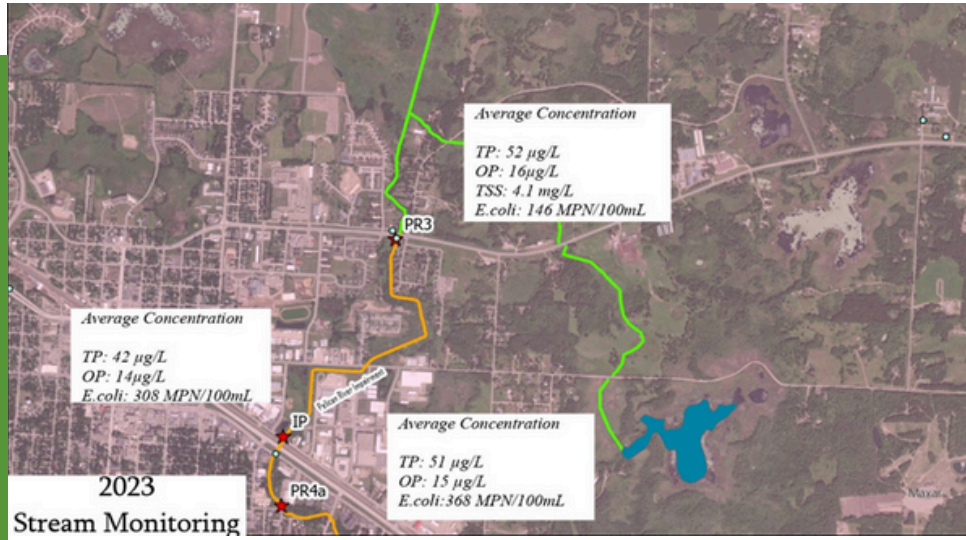
However, in the river segment in between Highway 34 and the North Shore Drive/river inlet to Detroit Lake, elevated *E. coli* level continue to be detected after rainfall events.

High *E. coli* levels were first detected by the MPCA during watershed monitoring and assessment in 2016.

In 2023, monitoring showed *E. coli* levels elevated directly after rainfall events.

However, during normal water flow conditions, the *E. coli* levels were within acceptable MPCA limits.

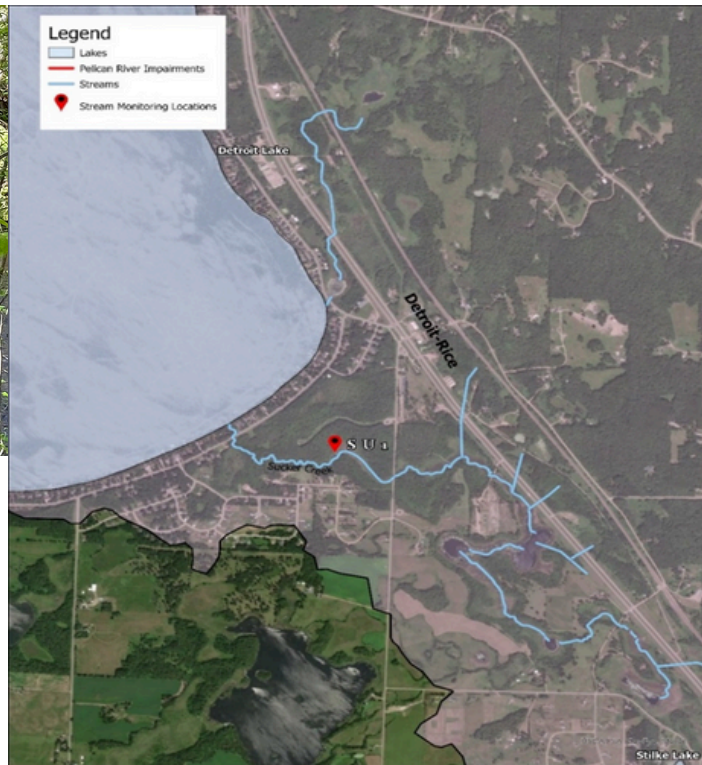
In 2024, the District will continue monitoring and working with the City of Detroit Lakes to determine the source of the *E. coli*. The district continues to monitor these locations and look for solutions.



## SUCKER CREEK



Staff collected 15 samples from May – mid August, until the creek stopped flowing. Average TP was at 34 µg/L and OP was at 19 µg/L. TP concentrations consistently spiked during storm events, affecting the annual average concentrations. Dissolved Oxygen (DO) readings averaged 8.1 mg/l, sufficient for trout to use the stream for spawning.





## HOW CAN YOU HELP YOUR SHORELINE?

- **Imitate Nature** - The **native trees, shrubs, and vegetation** strengthens shoreline structural integrity. The deep roots of these plants bind the earth together while their foliage and branches protect the ground from rainfall and winds.
- **Keep slopes gentle** - The gradual slope of a natural shoreline absorbs the energy of waves. A steep, eroded slope or retaining wall allows waves to crash into the shore, increasing erosion and causing that wave energy to cause damage on adjacent shorelines.
- **Employ “soft armoring” whenever possible** - By “soft armoring” we refer to live plants, logs, root wads, vegetative mats, and other methods that eliminate or reduce the need for “hard armoring”, such as rock rip-rap. Soft armor is alive and so can adapt to changes in its environment as well as reproduce and multiply. It also provides habitat for fish and wildlife.
- **Mix it up** - On natural shorelines, you will see a wide diversity of materials: live trees, dead branches, stumps, rocks of many shapes and sizes, silt, sand, cattails, grasses, flowering plants, etc. By imitating this variety, you can maintain or reproduce the natural value of the shoreline and have an effective, resilient, and eye-pleasing shoreline. Working with these natural and locally available materials can also dramatically cut project costs. In the end, a mix of techniques may yield the best project.

## 2023 SHORELAND PERMITS

### Total Permits

- 34 on Detroit
- 2 on Curfman

### Permitted Actions for Detroit and Curfman (note, many permits include more than one action)

- 6 Stormwater Permits
- 30 Shore impact zone permits
- 11 Permits for riprap - 8 install, 3 repair
- 8 Sand blanket - 3 install, 1 replenish, 1 remove
- 1 retaining wall removed
- 12 shoreline vegetation restorations
- 3 regrade of shoreline - 1 berm installation, 2 raingardens
- 8 tree removal and replacements.
- 4 lake access - 2 installs, 2 repair

**Keep in mind that healthy trees are often the cornerstones of a stable shoreline.**

## SPOTLIGHT RESTORATION

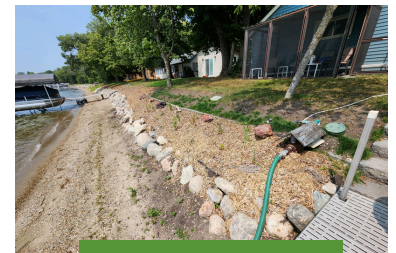
This property in 2022 utilizing Watershed Best Management Processes (BMP) funding. The homeowner removed the old railroad tie retaining wall and replaced with erosion controlling native plants and a small toe of riprap. PRWD reimbursed the homeowner \$500 for plants, mulch and erosion control materials.

Reasons to love this:

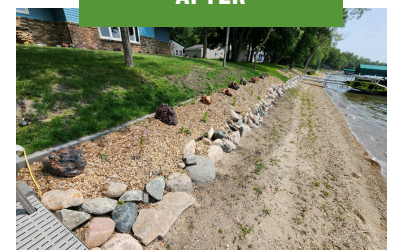
- Plants hold, especially native plants. Plants put down roots which will protect the shore against fluctuating water levels.
- The gentle slope lessens the risk for ice push damage on the shore
- Shrubs and trees provide habitat for wildlife.



BEFORE



AFTER



## WINTER - JAN TO MAR

High Temp: **46** degrees F (2/8/2023)  
 Low Temp: **-24** degrees F (2/2/2023 & 2/3/2023)  
 Precipitation: **1.69** inches, Snowfall: **40.00** inches.  
 Days of precipitation greater than 0.5": **1**  
 Days of precipitation greater than 0.5" 5-yr average: **0.4** (2018-2022)  
 Drought status: Moderate Drought (D1) to Abnormally Dry (D0)

## SPRING - APR TO JUN

High Temp: **91** degrees F (6/20/2023)  
 Low Temp: **3** degrees F (4/7/2023)  
 Precipitation: **5.66** inches, Snowfall: **5.00** inches  
 Days of precipitation greater than 0.5": **4**  
 Days of precipitation greater than 0.5" 5-yr average: **6.4** (2018-2022)  
 Drought status: Abnormally Dry (D0) to Moderate Drought (D1)

## SUMMER - JUL TO SEPT

High Temp: **95** degrees F (9/2/2023)  
 Low Temp: **43** degrees F (9/17/2023)  
 Precipitation: **8.56** inches, Snowfall: **0.00** inches.  
 Days of precipitation greater than 0.5": **7**  
 Days of precipitation greater than 0.5" 5-yr average: **7.8** (2018-2022)  
 Drought status: Moderate Drought (D1) to Severe Drought (D2)

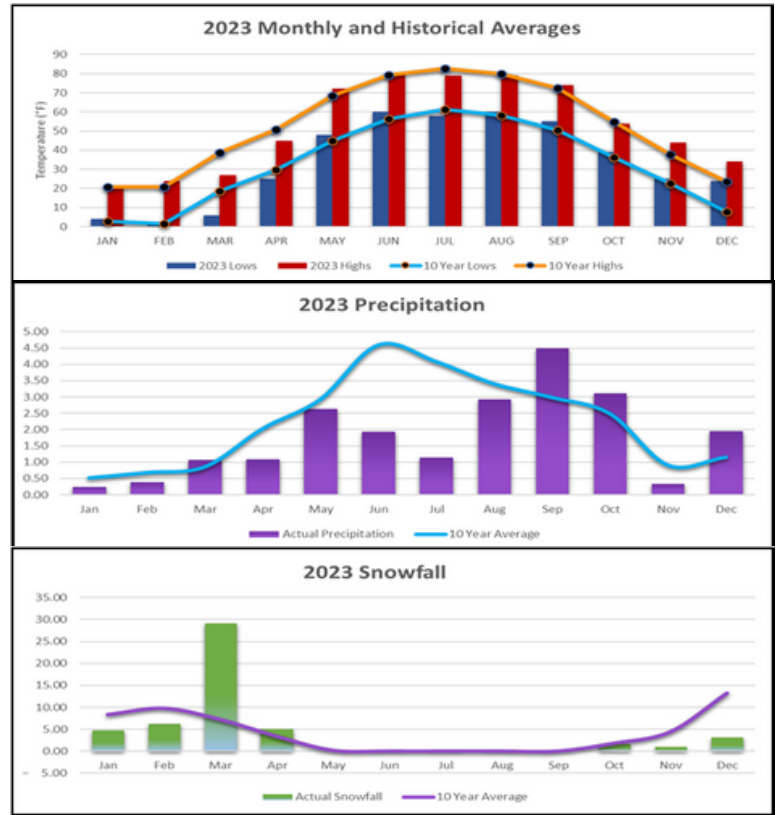
## FALL - OCT TO DEC

High Temp: **88** degrees F (10/1/2023)  
 Low Temp: **2** degrees F (11/27/2023)  
 Precipitation: **5.41** inches, Snowfall: **5.86** inches.  
 Days of precipitation greater than 0.5": **1**  
 Days of precipitation greater than 0.5" 5-yr average: **3.4** (2018-2022)  
 Drought status: Moderate Drought (D1) to Abnormally Dry (D0)



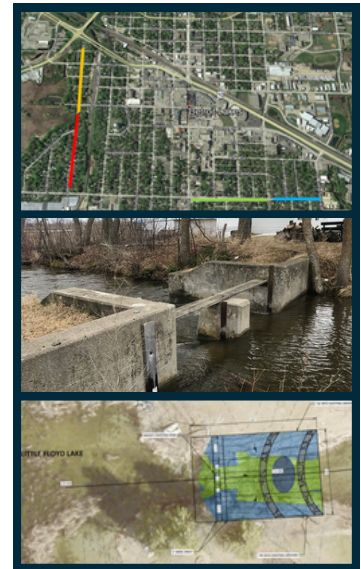
# CLIMATE

10  
2023



## WHAT TO WATCH IN 2024

- **Little Floyd Lake Rock Arch Rapids** - In collaboration with the MN DNR, the current Little Floyd Lake dam will be constructed into a rock arch rapids to improve fish passage.
- **District Rules Revision** - PRWD will be updating and clarifying its Water Management Rules in 2024. Look out for stakeholder meetings in the summer of 2024 to add your input!
- **Willow Street Stormwater Management** - The feasibility study will provide measures to increase phosphorus removal of stormwater runoff to St. Clair Lake.
- **Bucks Mill Dam Modification** - in collaboration with the MN DNR, PRWD will undertake design and construction on the addition of a rock arch fishway to Buck's Mill Dam.



### STAFF:

- TERA GUETTER, ADMINISTRATOR
- GINA KEMPER, WATER RESOURCES COORDINATOR
- SHANNA BACH, OFFICE COORDINATOR
- COLTON UTECHT, SHORELAND TECH

### BOARD OF MANAGERS:

- RICK MICHAELSON - PRESIDENT
- LAURIE OLSON - VICE PRESIDENT
- CHRIS JASKEN - SECRETARY
- PHIL HANSEN - TREASURER
- DENNIS KRAL
- ORRIN OKESON
- CHARLES JASKEN

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WELLS FARGO BUILDING  
DETROIT LAKES, MN 56501