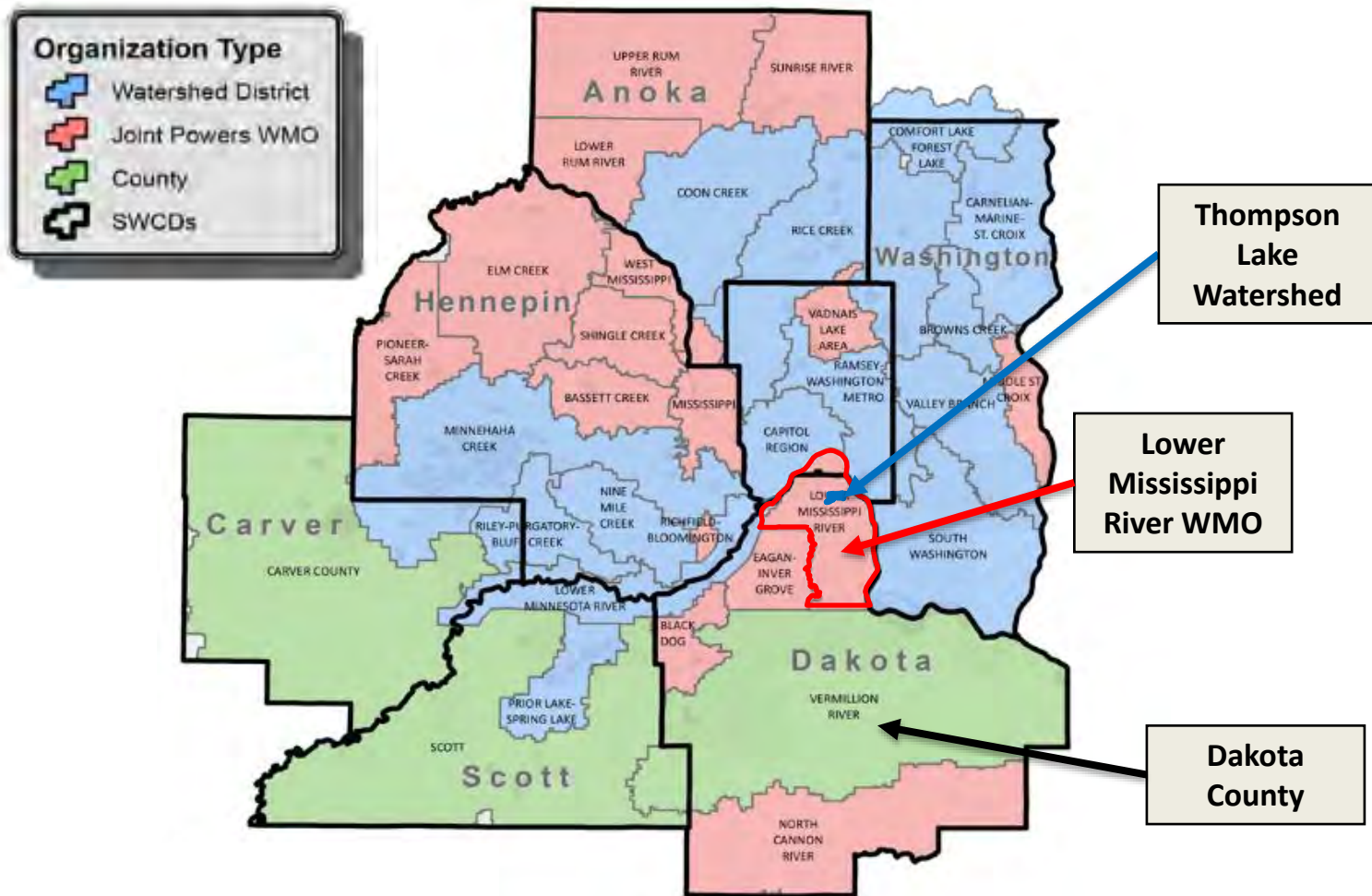


# THOMPSON LAKE RESTORATION

## A TALE OF TWO PROJECTS: CONTAMINATED SEDIMENT REMOVAL AND STORMWATER IMPROVEMENT PROJECT

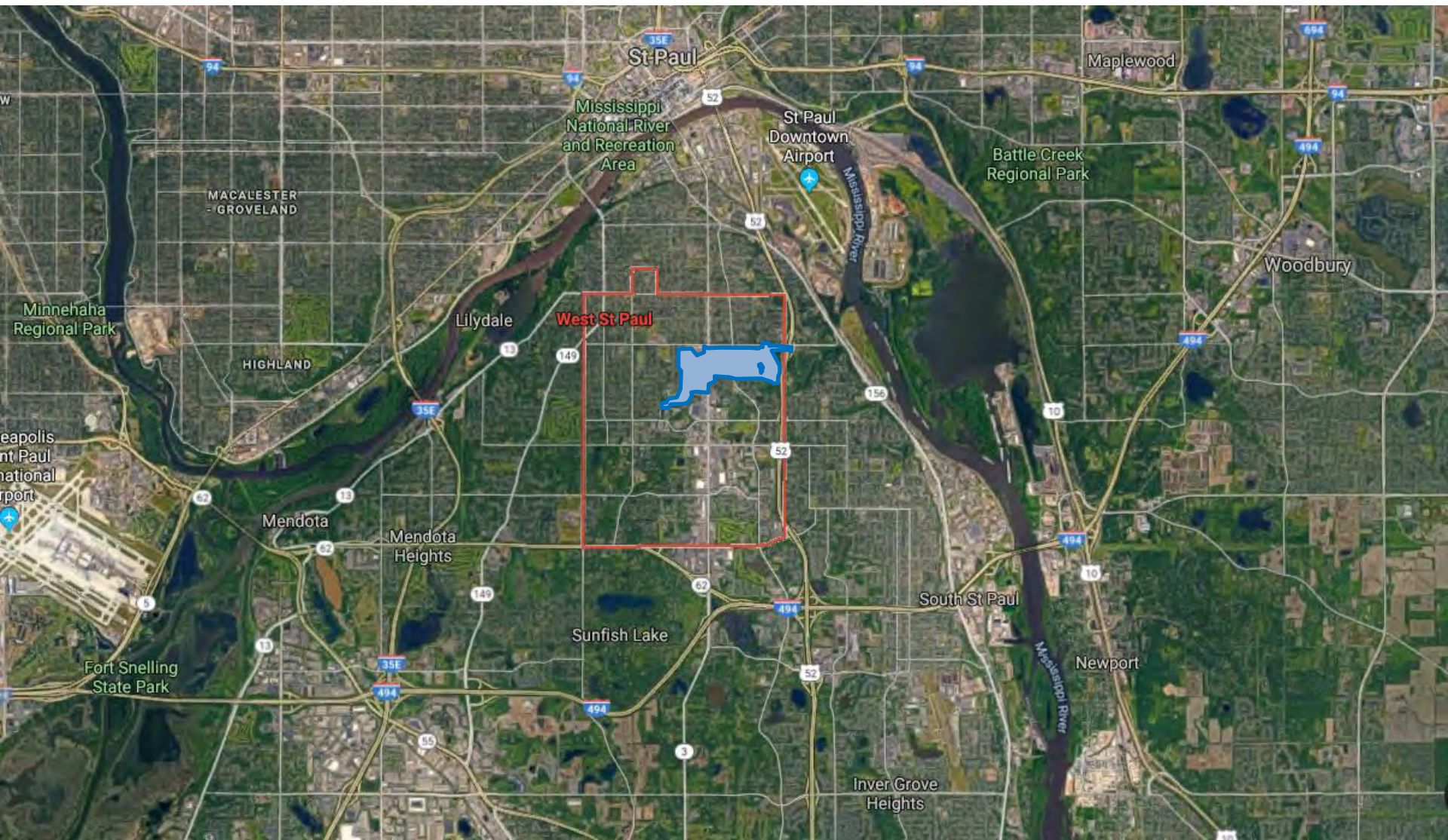
Joe Barten  
LMRWMO Administrator  
& Dakota County SWCD  
Senior Resource Conservationist

# ORIENTATION – 7 COUNTY METRO



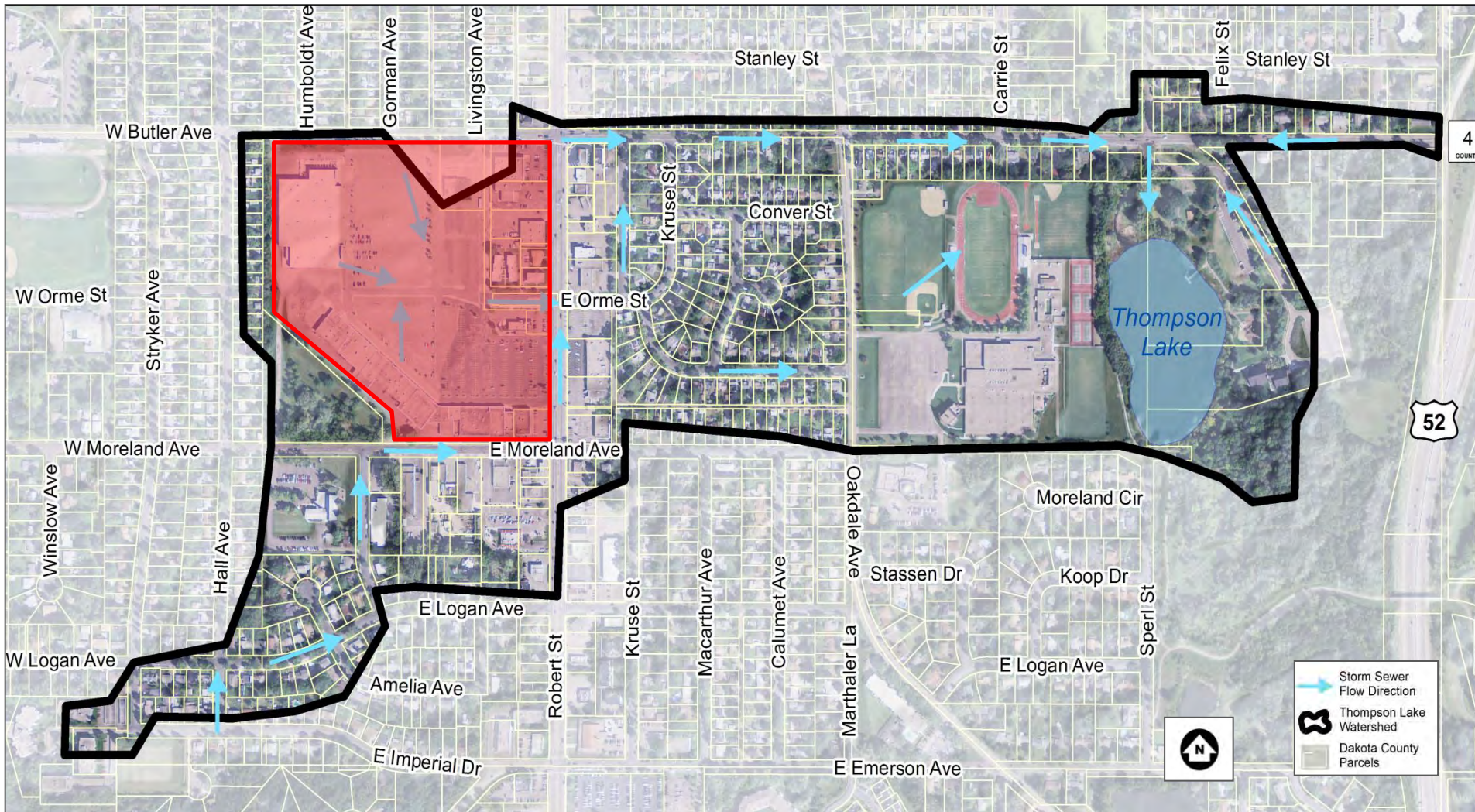


# ORIENTATION – WEST ST. PAUL





# ORIENTATION – THOMPSON LAKE WATERSHED





# VITAL STATISTICS

- **Thompson Lake – DNR Waterbody**
  - Designated for fishing and recreation
  - 8 Acres, 8 feet deep
  - 180 acre watershed
  - Fish stocking program
- **Dakota County**
  - Major feature of 57 acre Thompson County Park
  - Owns 2/3 of lake property
- **Lower Mississippi River WMO**
  - Responsible for monitoring and management
  - WRAPS Study focus on Thompson Lake
- **City of West St Paul**
  - Owns inlet and outlet
  - Uses for stormwater management
- **St Croix Lutheran High School**
  - Owns 1/3 of lake property
  - Lake is used for outside laboratory





1937

School Outline





1951



Swimming Beach





1964

Sediment plume  
forming



Swimming Beach  
Area Filled





1997





2000



2005





2014

[No Title]





2017





2017

Approximate 1951  
Lake Boundary &  
Wetland Boundary

Sediment  
Deposition from  
1950's - 2017

Sediment now  
below vegetation  
and in **underwater  
sediment delta**





# THE PROBLEM

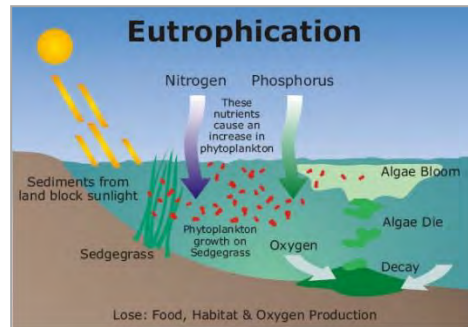




# POLLUTANTS OF CONCERN

## Excess Nutrients (Phosphorus)

- Impaired for nutrients
- 2012 WRAPs study
- 2014 - avg. 78 mg/L of P (110 mg/L at highest), regulatory limit of 60 mg/L.



## Polycyclic Aromatic Hydrocarbons (PAHs)

- Potential carcinogen
- Coal-tar based sealants for pavement, legacy, since banned.
- driveways, streets, paths, etc. and are found in the sediment in Thompson Lake.



## Chloride (Deicer Salt)



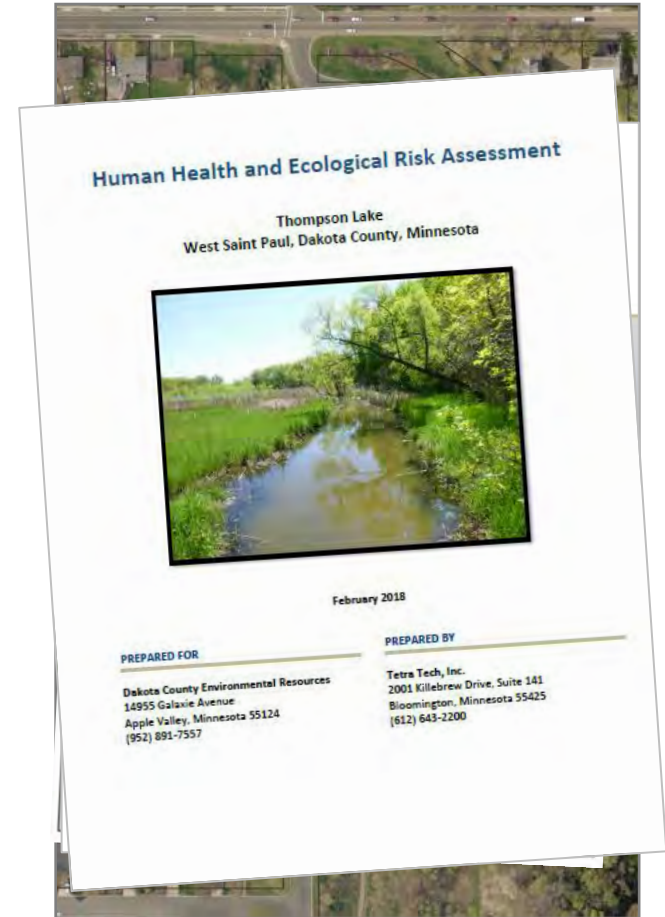
- Chloride impairment from winter maint. activities.
- Highly urbanized watershed.

# PROJECT HISTORY

2007

- Stassen Lane Reconstruction
- Permanent Stormwater Improvement Project
- Permitting hurdles
- Site Contamination Assessment and Water Monitoring Plan
- LMRWMO WRAPS and TMDL Study
- Feasibility Study for PAH Contamination
- PAH Field Investigation Report Part 1
- Lake Bottom Assessment
- Human Health and Ecological Risk Assessment

2019





# THE SOLUTION – A CATALYST & PARTNERS



**LMRWMO - 2016 BWSR - CWF Grant \$576,000**

Clean Water Land & Legacy Amendment

**Dakota County Environmental Legacy Fund (ELF)  
\$1,300,000**

Host fees from Dakota County landfills for environmental cleanup

**City of West St. Paul CIP \$144,000**

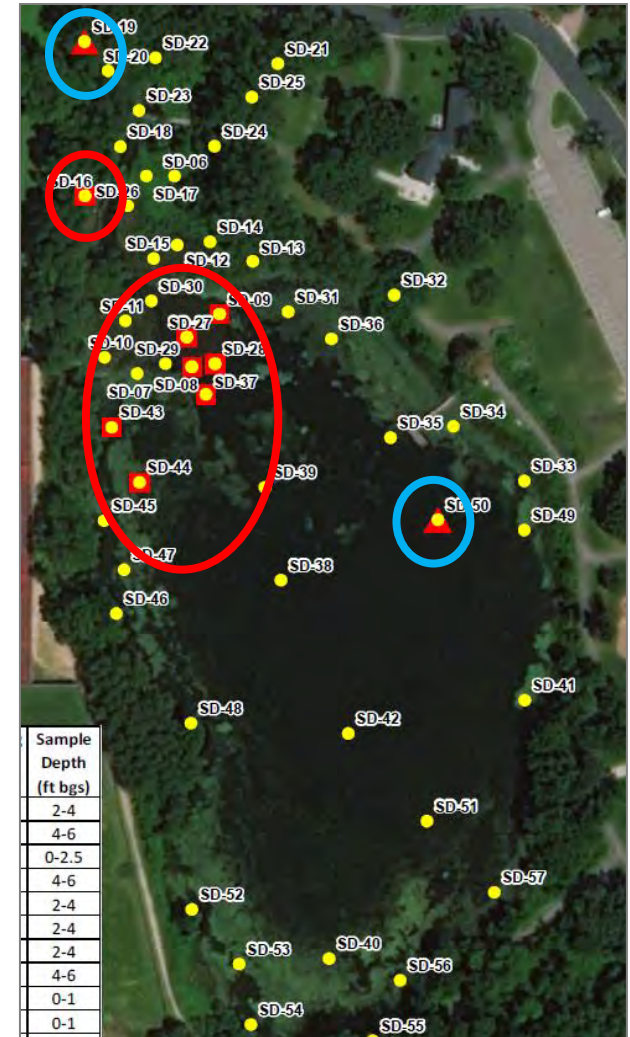
City funds to meet waste load allocations from WRAPS study/TMDL

**Total Budget - \$2,020,000**



# PAH - IN-LAKE INVESTIGATION

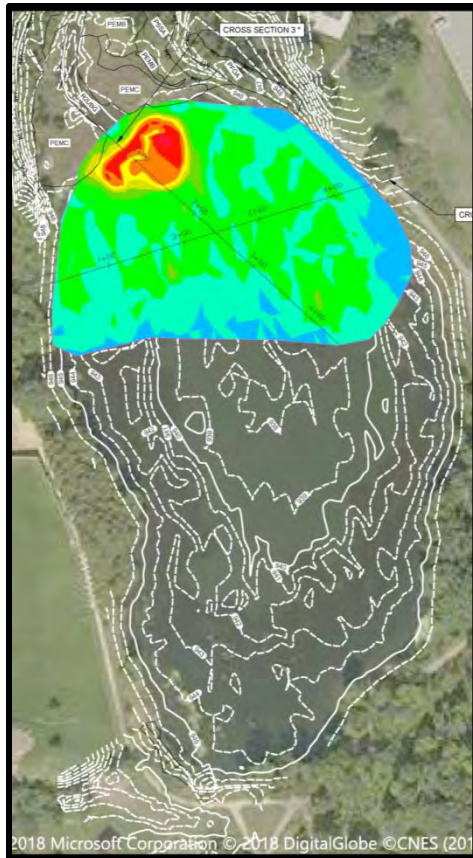
- Completed updated Lake Bathymetry
- Sampling from 2009 to 2018
- Sediment had oily sheen and strong petroleum odor
- 65 sediment samples collected in 22 locations
  - Inlet/Channel ~ 1' to 3' of sediment
  - Delta ~ 8' to 13' of sediment
  - Main Lake Area ~ 1' to 2' of sediment
- Eight locations exceeded PAH limits for human health exposure (MDH)
- Two locations exceeded limits for arsenic



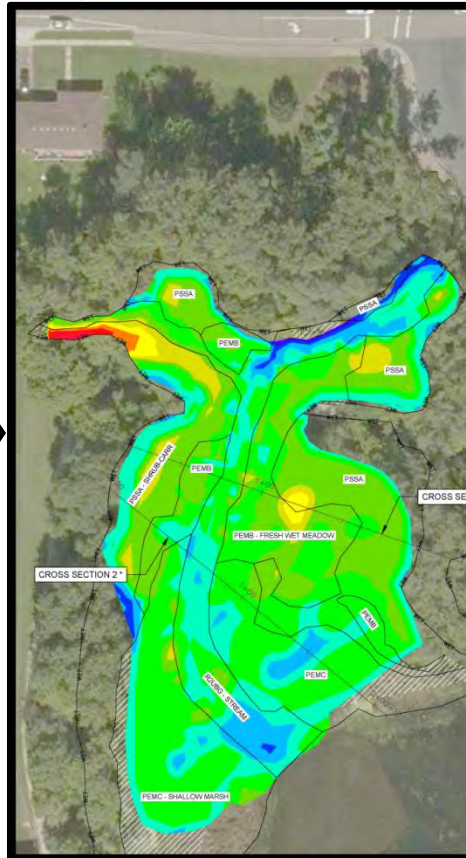


# TWO PROJECTS, IN THREE PHASES

Phase 1 –  
Removed PAH's  
Lake Dredging



Phase 2 –  
Remove PAH's  
Upland Removals

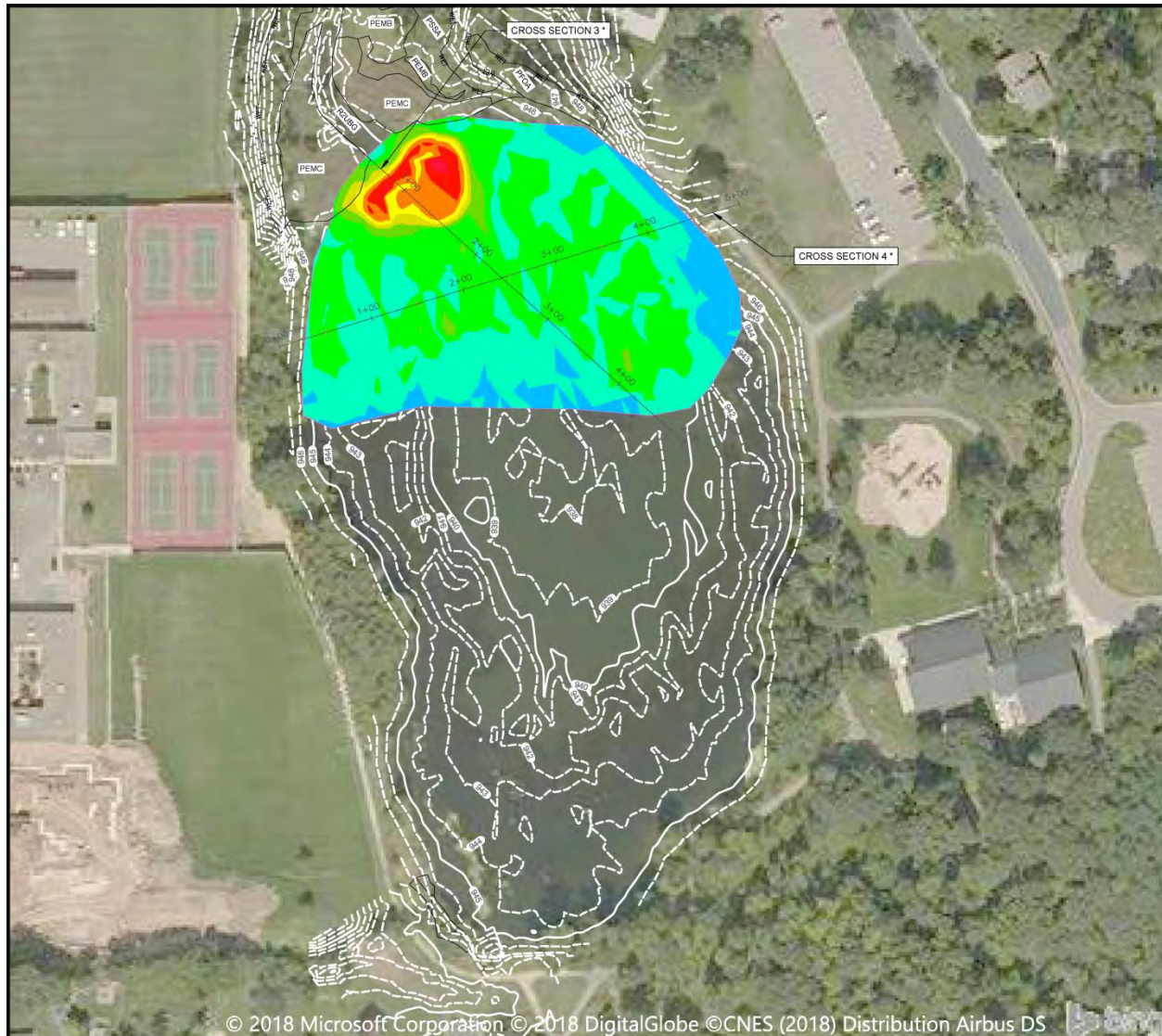


Phase 3 –  
Meet TMDL Stormwater  
Improvements





# PHASE 1 – LAKE BED SEDIMENT REMOVALS



KEY: EXCAVATION CUT/FILL DEPTHS





# PHASE 2 – UPLAND SEDIMENT REMOVAL



KEY: EXCAVATION CUT/FILL DEPTHS





# PHASE 3 – STORMWATER IMPROVEMENTS

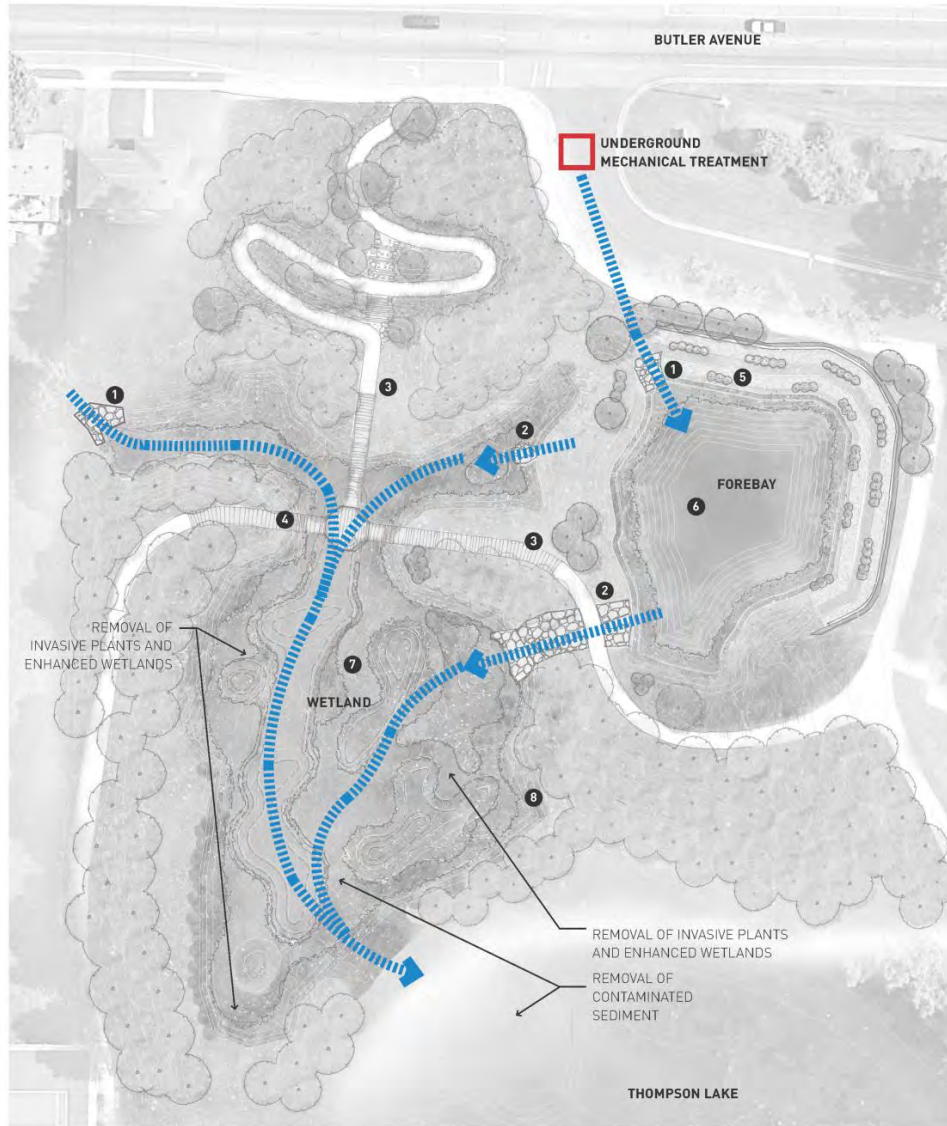


## LEGEND:

- ① Existing trees
- ② Asphalt trail
- ③ Stone stairs
- ④ Boardwalk
- ⑤ Riprap stone
- ⑥ Retaining wall
- ⑦ Forebay
- ⑧ Existing trail
- ⑨ Proposed wetlands



# PHASE 3 – STORMWATER IMPROVEMENTS



1 OUTFALL STRUCTURE



5 OUTCROPPING STONE RETAINING WALL



2 OVERFLOW AREA



6 DETENTION BASIN



3 INTERPRETIVE SIGNAGE



7 WETLAND



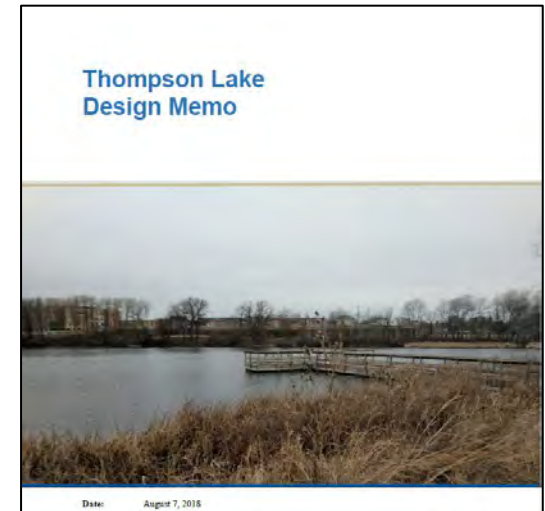
4 BOARDWALK



8 WETLAND PLANTING

# ENGINEERING AND CONSTRUCTION

- Design documents - TetraTech
- Construction Management - Wenck Associates
- Construction - Max Steininger, Inc.









































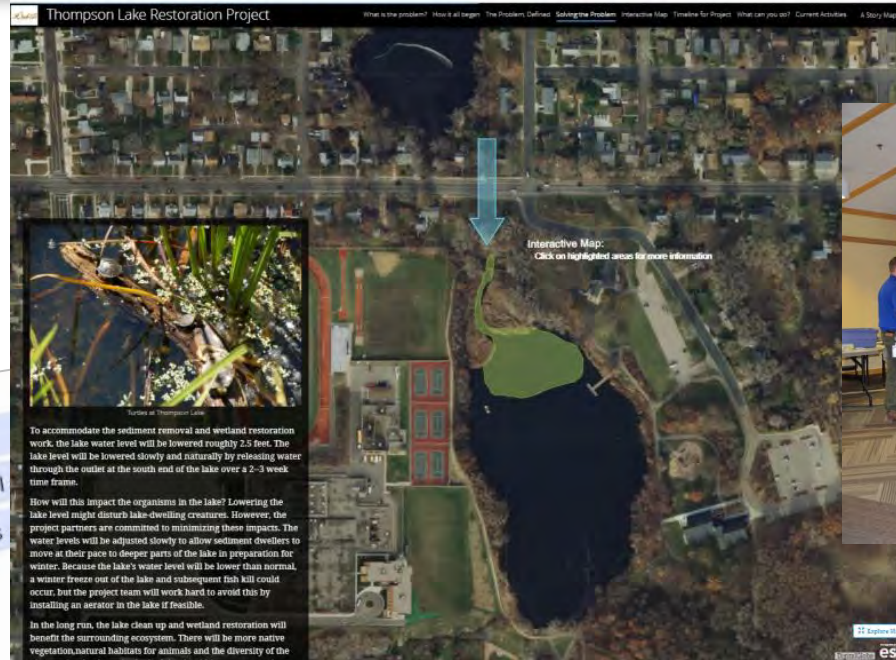
# PUBLIC ENGAGEMENT

## Public Engagement and Communication

- April 2018 Project Open House and Master Plan Introduction at Thompson County Park
- Summer – Fall 2018
  - Park disturbance signs throughout Park
  - Construction project signage at entrance
- October 2018 Project Story Map went live
  - [Thompson Lake Restoration](#)
- November 2018 Project Camera went live
  - [Project Camera](#)
- 2019 Resident Rain Barrel Program
- June 9, 2019 Take a Kid Fishing and Lake Restoration Celebration



# OUTREACH & ENGAGEMENT – PRE PROJECT



- Community meetings
- Park master plan meetings
- Stakeholder meetings
- Agency/Regulatory meetings





# PROJECT WEBSITE STORY MAP

Usage details for the period:

April 7, 2019 - May 7, 2019

Past 30 Days

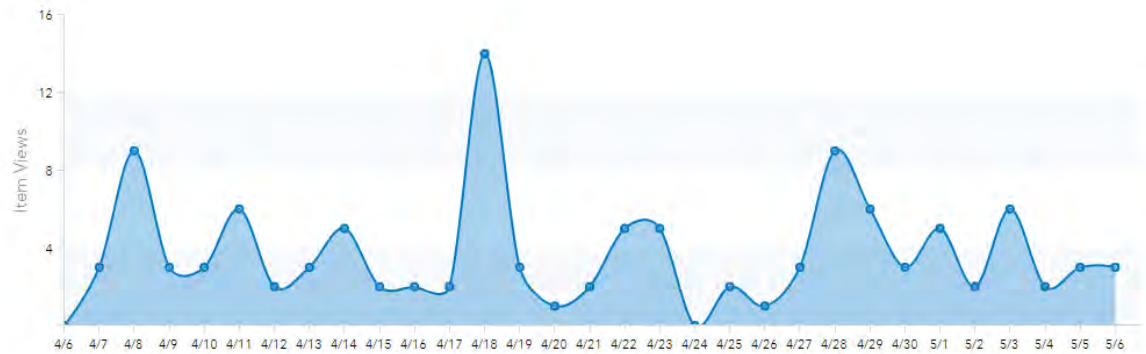
Item Views this Period

115

Avg Item Views Per Day

3.83

Usage Time Series



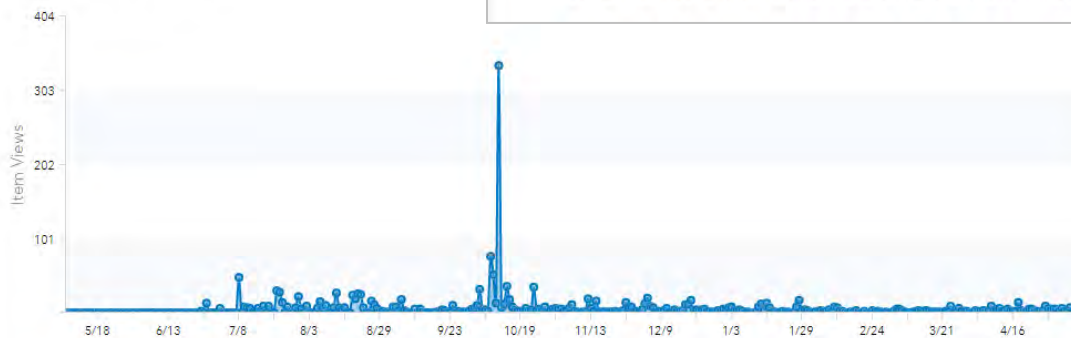
Usage details for the period:

May 7, 2018 - May 7, 2019

Item Views this Period

1,884

Usage Time Series





# OUTREACH & ENGAGEMENT – DURING PROJECT

## THOMPSON LAKE RESTORATION - CONTAMINATED SEDIMENT REMOVAL & STORMWATER IMPROVEMENT PROJECT

### ADDITIONAL INFORMATION:

Visit [www.chicagocounty.org](http://www.chicagocounty.org) and search for Thompson Lake Restoration.

### FUNDING

- Dakota County, the Lower Mississippi River Watershed Management Organization, and the City of West St. Paul are partnering to clean up Thompson Lake, both will be a better place to fish and explore other recreational activities like swimming.
- The \$2 million total project is funded by a Dakota County investment of \$1.2 million for removing contaminated sediments, \$575,000 from the Lower Mississippi River Watershed Management Organization (LMRWMO) as a State of MN Clean Water Fund grant for stormwater improvements, and \$204,000 in matching funds from the City of West St. Paul.

### PROJECT PARTNERS:



## LAKE RESTORATION IN PROGRESS

CONSTRUCTION TIMELINE: OCTOBER 2018 - JUNE 2019

### THOMPSON LAKE & THOMPSON COUNTY PARK

- Thompson County Park is a regionally significant 57-acre park located in West Saint Paul. Thompson Lake is the central focus point of the park.
- Thompson Lake is currently categorized as a Group 2 Resource Water Body, meaning it is managed for fishing, boating, and aesthetic purposes, but not for swimming.
- Thompson Lake is impaired for recreational use due to excessive nutrients, primarily phosphorus, and is on the MN Pollution Control Agency's (MPCA) 2014 Impaired Waters list. Too much phosphorus causes algae growth in lakes and reduces water clarity. A watershed restoration and protection strategies (WIRAPS) study and total maximum daily load (TMDL) developed from 2012 to 2014 identified watershed runoff as the primary source of phosphorus to the lake; the TMDL identified a phosphorus waste load reduction of 30% necessary to achieve MPCA water quality standards.



- Studies of the sediment in Thompson Lake identified contamination from polycyclic aromatic hydrocarbons (PAHs) chemicals within now-banned coal-tar based driveway sealer products. The sediments exceed state requirements for some contaminants that have the potential to cause acute and chronic impacts to humans.
- The lake has been degraded by decades of untreated stormwater discharged directly into the lake, depositing contaminated sediment and phosphorus throughout the lake. These have caused degradation of water quality, diminished habitat, and reduced diversity in the ecology of the lake. The goal of the lake restoration project is to fix these issues by removing already contaminated sediment and installing stormwater practices in Thompson Lake in the future.



### PROJECT COMPONENTS

- The project has two main phases: cleanup of contaminated sediment and installation of stormwater treatment practices.

#### PHASE 1 - REMOVAL OF CONTAMINATED SEDIMENT

- Removal of contaminated sediment will happen through dredging in the north end of Thompson Lake. The lake level will be maintained during the fall and winter months to reduce the impact on wildlife in the lake.
- Dredging is dirty business and the contaminated sediment must be diked out prior to being hauled to a landfill. Stockpiles of construction area during the dredging phase.

#### PHASE 2 - STORMWATER IMPROVEMENTS

- Phase 2 of the proposed project will treat stormwater runoff prior to entering Thompson Lake. A "treatment train" of stormwater practices will be installed as part of the project. These include underground treatment devices to pull out sediment, floatable stormwater, a stormwater pond forebay to allow sediment to drop out of the water column, a wetland restoration, and a tree system that draws water from the pond and irrigates the nearby park.
- These projects in combination will limit runoff from 43% of the Thompson Lake watershed (145 acres), thereby reducing nutrient concentrations in the water entering the lake and improving lake clarity, with the goal of removing Thompson Lake from the project will prevent about 160 lbs of phosphorus and 23,000 lbs of suspended solids (sediment) from entering the lake annually.

### PROJECT BENEFITS

- REMOVAL OF CONTAMINATED SEDIMENT
- RESTORING WETLANDS FOR WATER QUALITY AND HABITAT
- REMOVING INVASIVE VEGETATION
- INSTALLING BANK STABILIZATION AND PROTECTION MATERIALS
- RESTORATION AND PLANTING OF NATIVE VEGETATION
- INSTALLATION OF STORMWATER TREATMENT STRUCTURES
- TREE PLANTING FOR HABITAT AND PARK ENHANCEMENT
- INSTALLATION OF STORMWATER REUSE IRRIGATION SYSTEM
- REDUCTION OF PHOSPHORUS AND SEDIMENT INTO THE LAKE
- IMPROVED TRAIL, EDUCATIONAL OPPORTUNITIES, AESTHETIC





# OUTREACH & ENGAGEMENT – DURING PROJECT





# OUTREACH & ENGAGEMENT – DURING PROJECT



Dear Thompson Lake Watershed Neighbors,

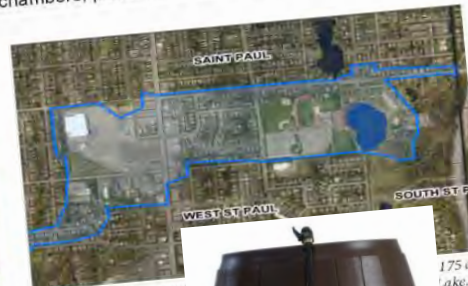
Your property has been identified by the Lower Mississippi River Watershed Management Organization (LMRWMO) as being within the direct drainage watershed of the wonderful amenity that is Thompson Lake, in Dakota County's Thompson County Park.

As part of efforts to reduce the amount of stormwater runoff reaching the lake, the LMRWMO has partnered with the Friends of the Mississippi River to offer rain barrels to you, a watershed resident, at a cost of just \$30, a savings of \$50! Rain barrels catch stormwater from your roof via the downspout. Installing a rain barrel on your property is an easy way to decrease runoff while creating a source of reusable water for your property.

This rain barrel program is part of a larger Thompson Lake Restoration Project undertaken by the LMRWMO, Dakota County, and West. St. Paul using a State Clean Water Fund grant, County Environmental Funds, and City funding. The restoration will remove contaminated sediment from the lake area and install stormwater treatment chambers, ponds, and wetlands to stop pollutants and nutrients from entering Thompson Lake.



The 72 inch storm sewer pipe brings stormwater to the lake (left). The Thompson Lake watershed is outlined in blue on the map (right). The more rain barrels installed in the Thompson Lake watershed, the less water will reach the lake.



**Do your part to reduce the flow of stormwater**

Enter code: 'watershed' to access the Eventbrite page to purchase your rain barrel today

Please indicate your pickup preference during checkout via email

**Saturday, June 8th from 10 a.m. - noon** at the N  
located on St. Paul's West  
-or-

**Sunday, June 9th from 10 a.m. - noon** at Thompson County Park

(If these times don't work for you, special arrangements may be made)



175 acres.  
Lake.

irrel

mes are:

ance

il





# OUTREACH & ENGAGEMENT – POST PROJECT

## JOIN US TO CELEBRATE COMPLETION OF THE THOMPSON LAKE RESTORATION

Come early and enjoy the  
annual Take a Kid Fishing event  
from noon–3 p.m. at Thompson Park.



**SUNDAY, JUNE 9  
2:30–3 P.M.**

THOMPSON COUNTY PARK, 360  
BUTLER AVE. E., WEST ST. PAUL

*Dakota*  
COUNTY  
forever wild  
PARKS

A new stormwater treatment and reuse system was installed and a native plant wetland was restored to treat stormwater before it enters the lake. The project also includes a new and improved boardwalk through the restored wetland connecting a paved lake loop trail.

This \$2 million, comprehensive lake restoration project was funded by Dakota County, the Lower Mississippi River Watershed Management Organization and the City of West St Paul with the purpose of improving the water quality of Thompson Lake. The County invested \$1.3 million to remove invasive species and contaminated sediment from the lake and restore shoreline areas to protect the lake now and into the future.

**LMR WMO**  
LOWER MISSISSIPPI RIVER  
WATERSHED MANAGEMENT ORGANIZATION



**CITY OF  
WEST ST. PAUL**

*Dakota*  
COUNTY

**LMR WMO**  
LOWER MISSISSIPPI RIVER  
WATERSHED MANAGEMENT ORGANIZATION



# OUTREACH & ENGAGEMENT – POST PROJECT

## Take A Kid Fishing: Event Map

You're at: 360 Butler Avenue East, West St. Paul, MN



# TAKE A KID FISHING

Dakota COUNTY forever wild PARKS

**Free event**

## THANK YOU to our event partners!

Logos of event partners: TIPS OUTDOORS, DAKOTA COUNTY LIBRARY, MNR, CITY OF WEST ST. PAUL, DODGE, DAKOTA COUNTY VOLUNTEERS, Be, SCHOOL DISTRICT 197.

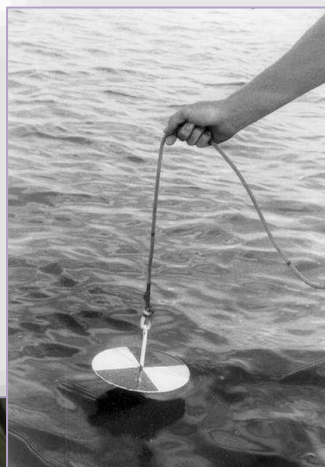


# OUTREACH & ENGAGEMENT – POST PROJECT





# NEXT STEPS – MONITORING & MAINTENANCE





# PROJECT BENEFITS

## Goals

- Remove all contaminated sediment
- 30% reduction in total phosphorus (TP) loading (WRAPS)
- 50% reduction in total suspended solids (TSS) loading
- Park functionality improvements

## Outcomes

- 6,000 cubic yards of PAH contaminated sediment removed
- **41% decrease in TP (48.4 lbs annually)** P-8, MIDS
- **70% decrease in TSS (12.9 tons annually)** P-8, MIDS
- Incorporation of two underground hydrodynamic separators, irrigation reuse system, stormwater forebay, stormwater treatment wetland
- Invasive species removal, native habitat, improved water quality
- Trail improvements



# LESSONS LEARNED

- Projects do not follow a linear path
- Impact of outside forces , economy, PAH awareness, politics, funding
- Having an impairment helps
- Catalyst needed for motivation and funding
- Planning good, follow-up is better, being on-site is best
- Information to public early
- Restoration ongoing
- Handling floatable trash in pond and lake





# THOMPSON LAKE RESTORATION

## A Tale of Two Projects: Contaminated Sediment Removal and Stormwater Improvement Project

Joe Barten

Dakota County SWCD  
Senior Resource Conservationist &  
LMRWMO Administrator