



Birch Island Lake Water Quality Study Summary



January 8, 2024

Our Team



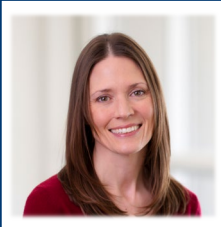
Katie Turpin-Nagel, PE
Water Resources Engineer



Keith Pilgrim, PhD
Limnologist & Senior Water Resources Scientist



Joe Bischoff
Senior Aquatic Ecologist



Janna Kieffer, PE
District Engineer

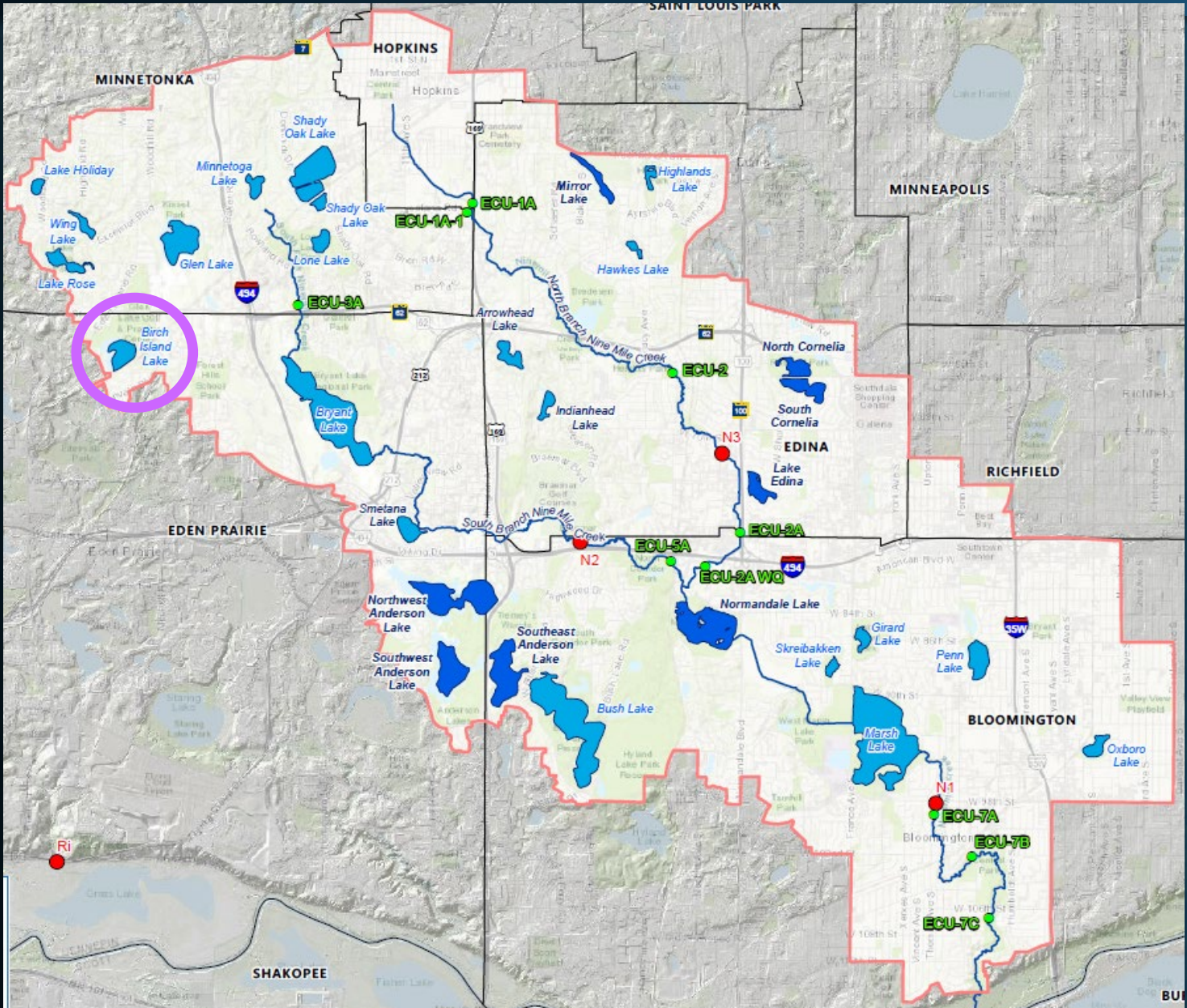


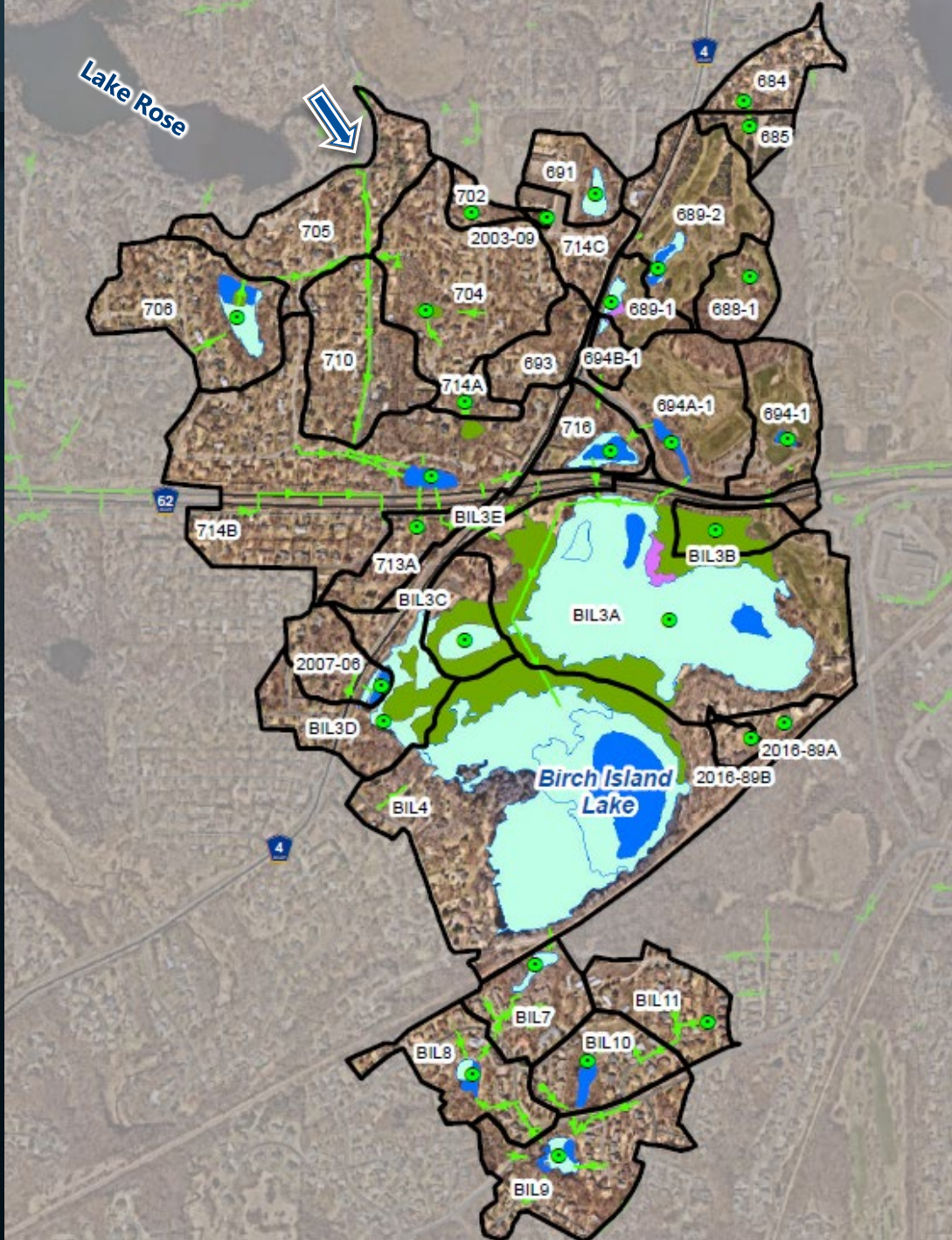
Photo: Birch Island Lake, 2023

Meeting Agenda

1. Birch Island Lake Background
2. NMCWD Management Objectives
3. Existing Lake Stressors (Threats)
4. Potential Management Activities
5. Next Steps and Estimated Timeline

Birch Island Lake





- Subwatersheds
- Storm Sewer
- P8 Model Treatment Devices

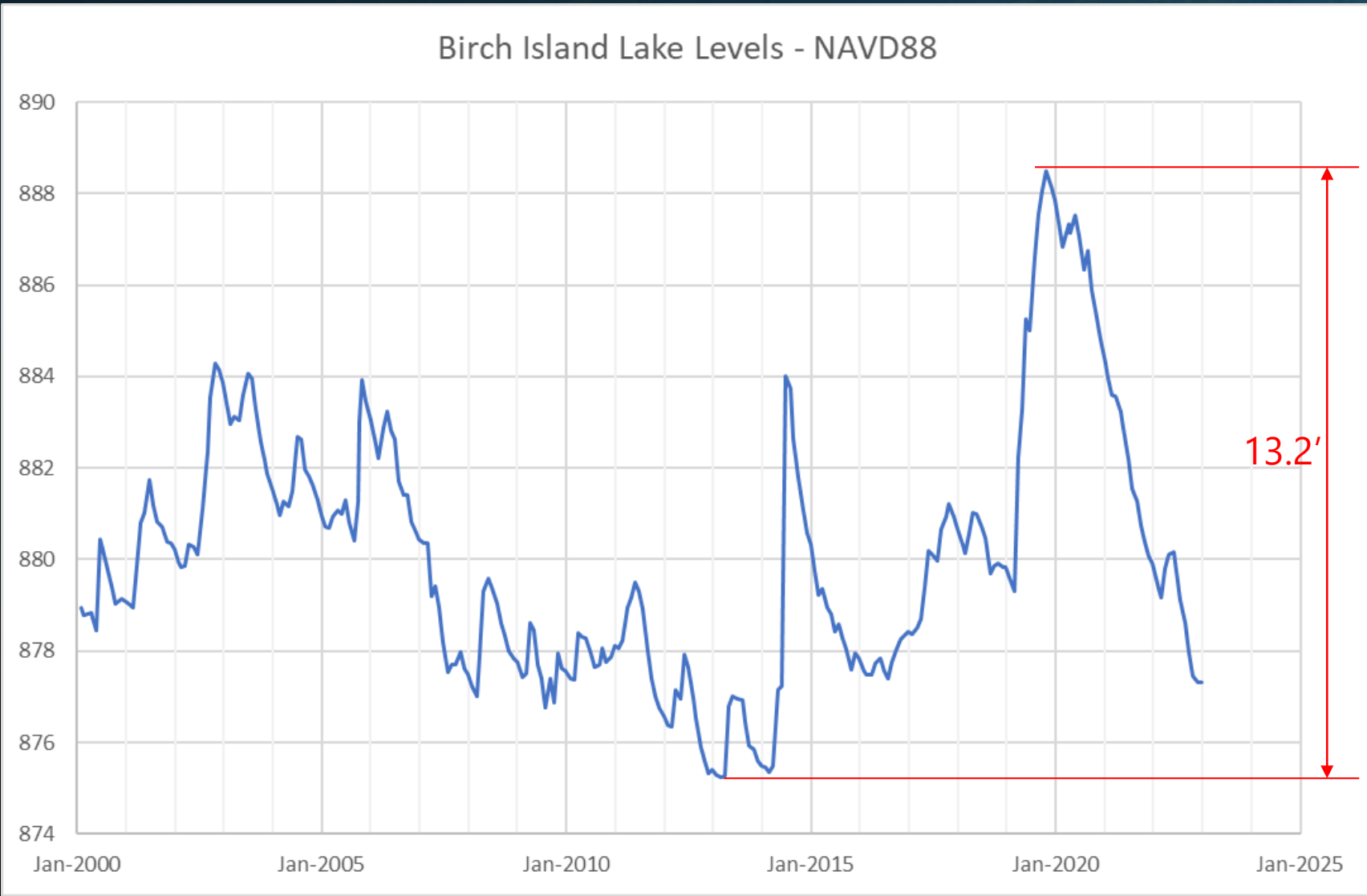
National Wetland Inventory (NWI) Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested Wetland
- Freshwater Pond
- Freshwater Shrub Wetland

Birch Island Lake- significant fluctuation in water levels

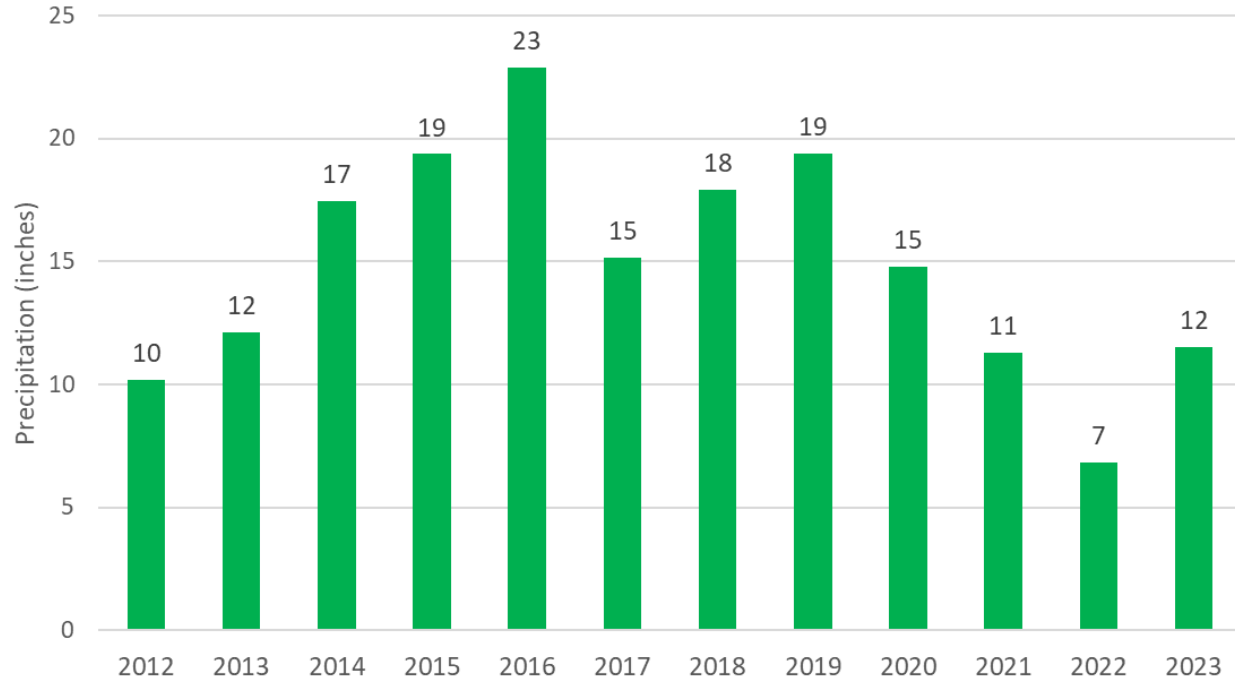


Birch Island Lake- significant fluctuation in water levels

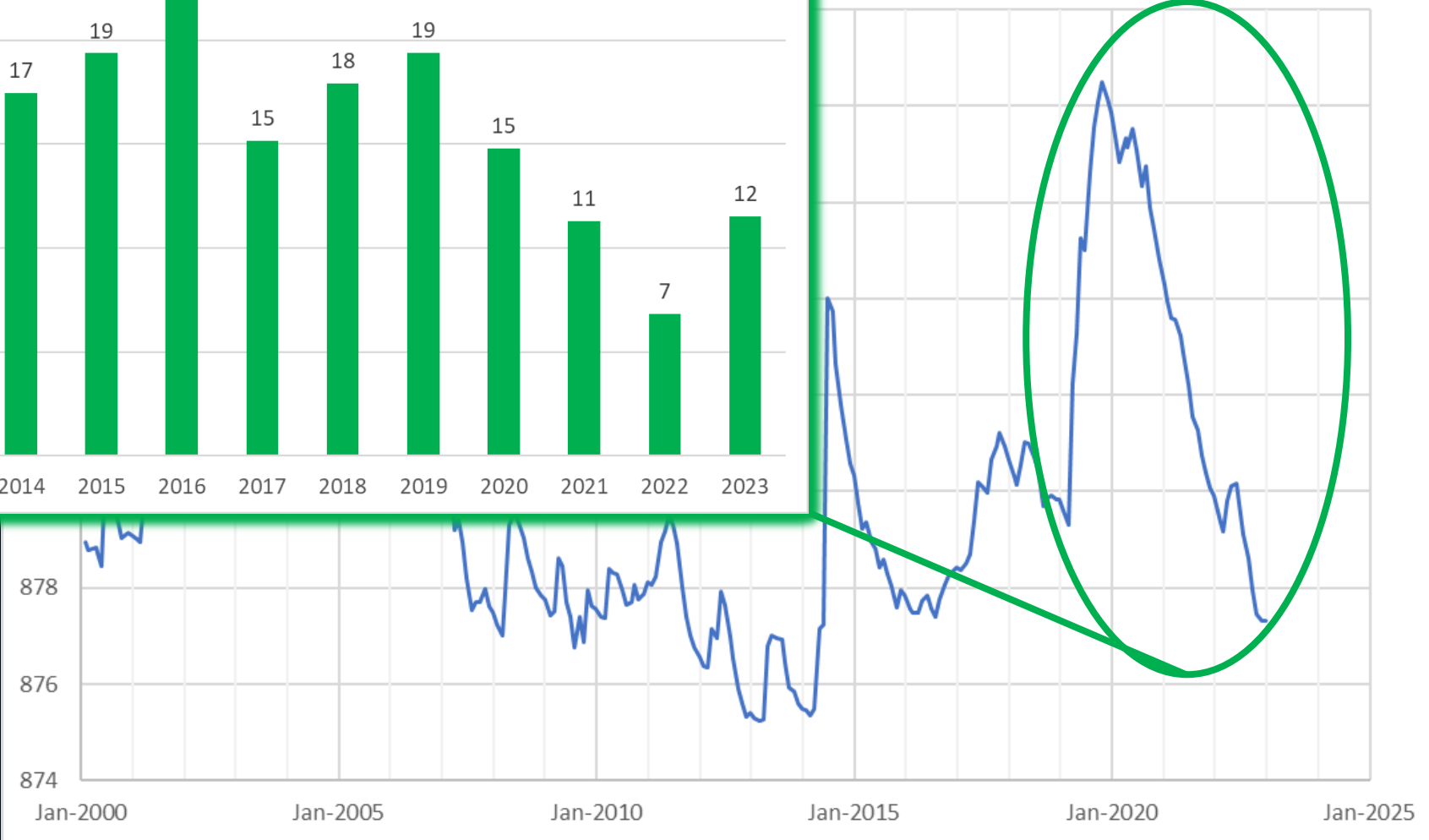


Birch Island Lake- significant fluctuation in water levels

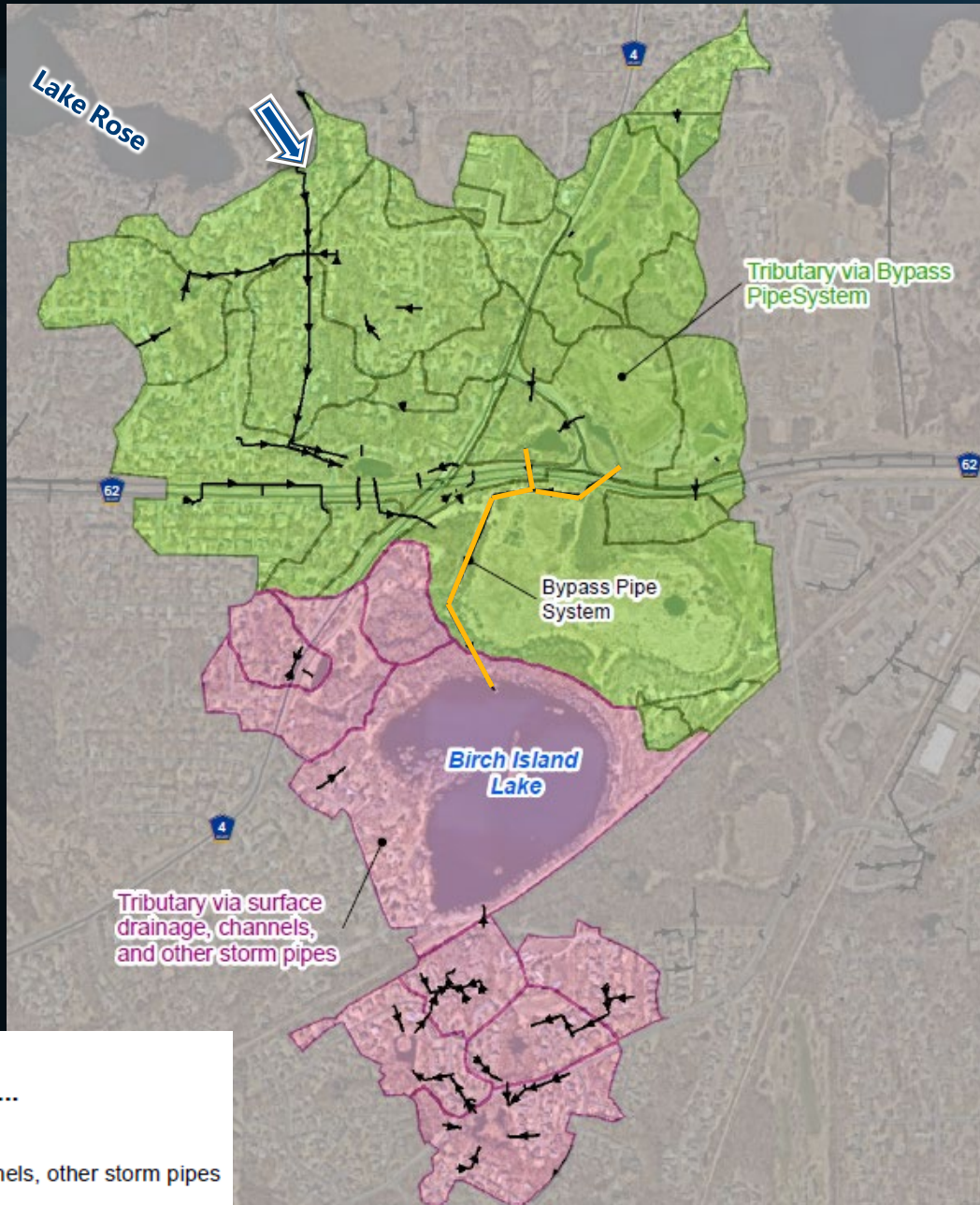
Minneapolis Airport - Growing Season Precipitation (June - Sept)



Water Level - NAVD88



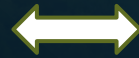
Birch Island Lake: Why Low Water Levels?



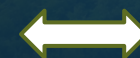
- Construction of County Road 62 in 1980's seems to have resulted in less water volume reaching the lake
- **Bypass pipe** installed in 2007 by NMCWD to promote conveyance of water to the lake
- Bypass pipe has historic clogging issues, so benefit is inconsistent

NMCWD Management Goals

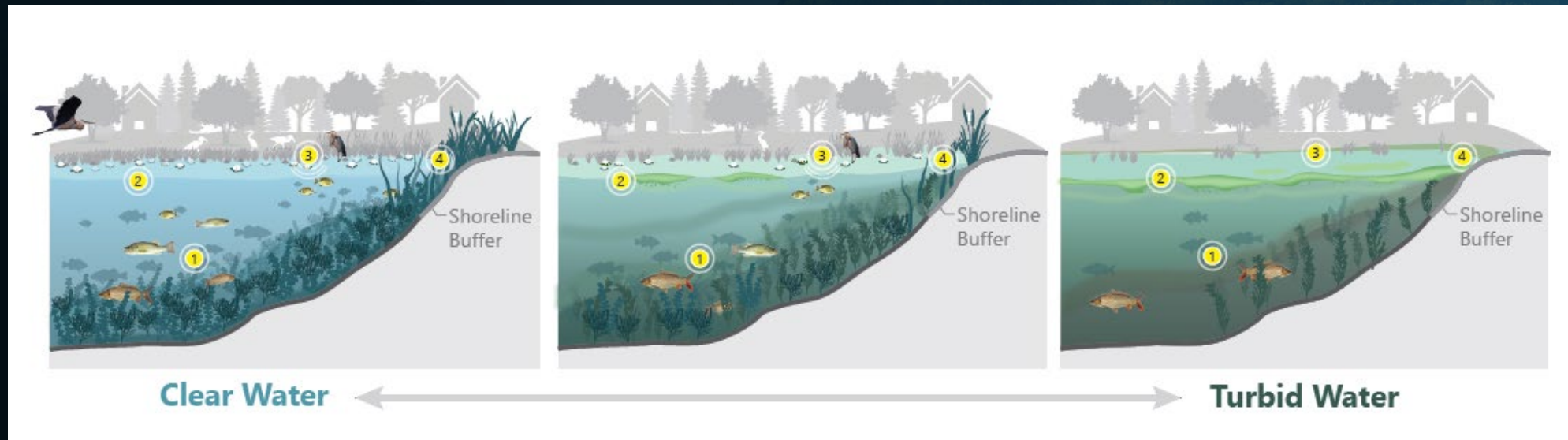
Work Towards Meeting
State Water Quality
Standards



Promote a Diverse,
Native Aquatic Plant
Population

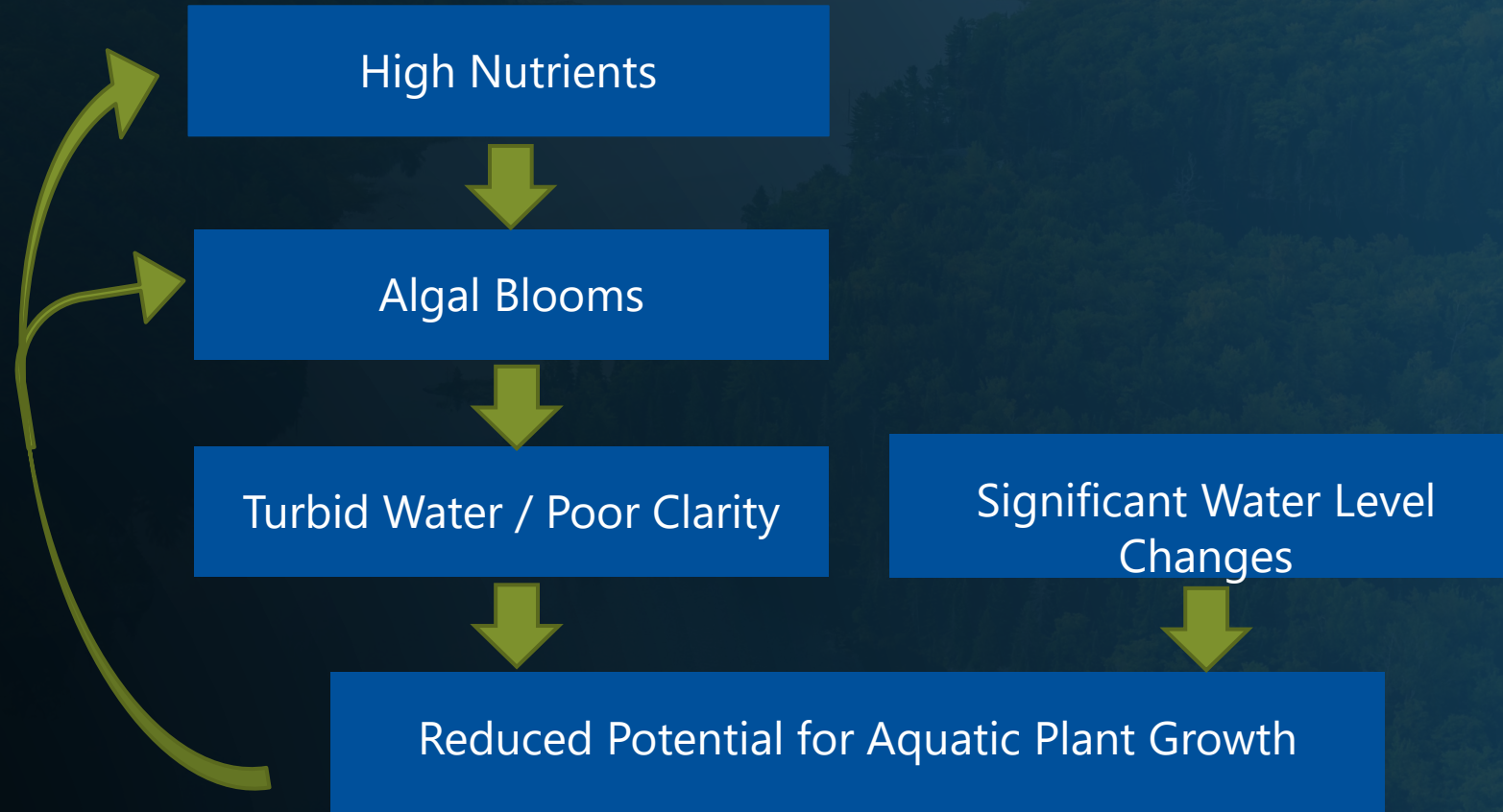


Support a Healthy,
Balanced Aquatic
Ecosystem



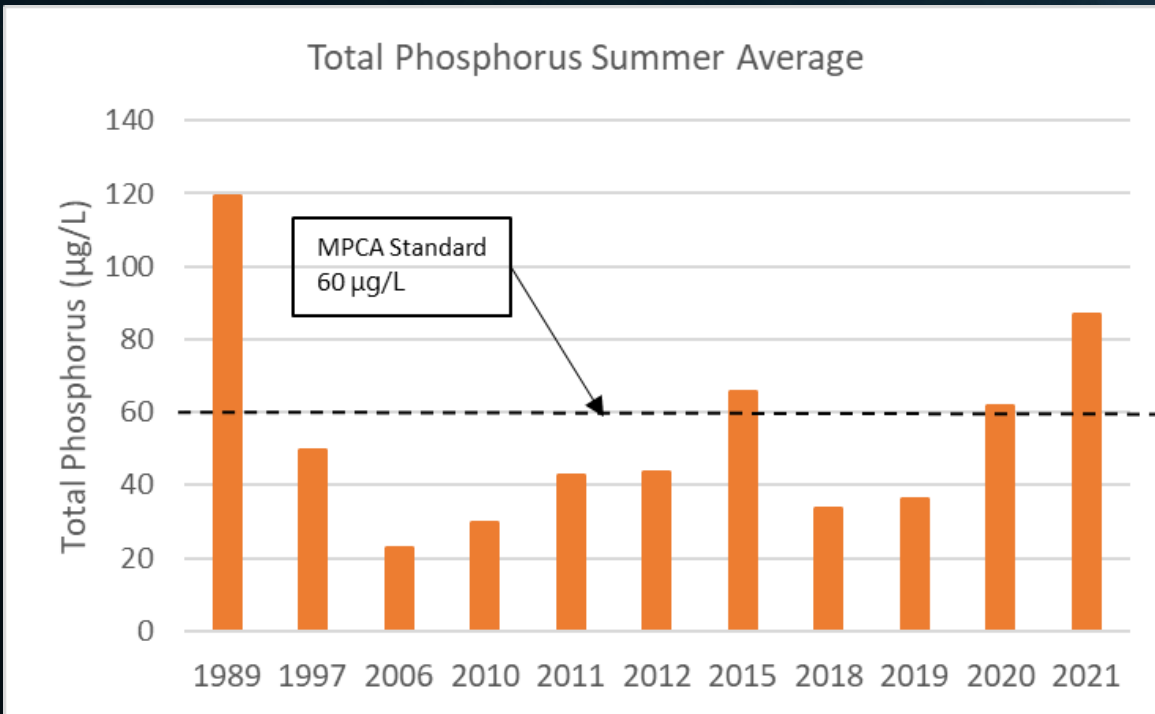
Stressors/Threats for Birch Island Lake

Stressors/Threats to Healthy Lake Conditions



Stressors/Threats for Birch Island Lake

High Nutrients – Above state standards in recent years ✓



Upland Erosion

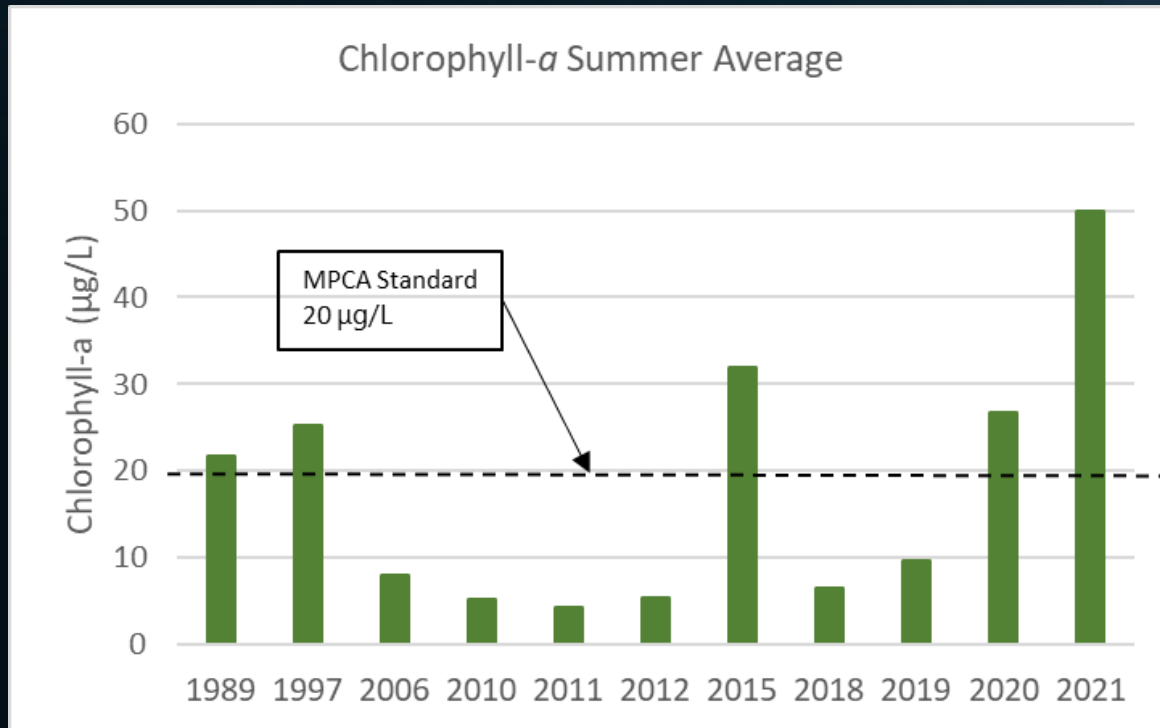
Internal loading from sediment

Leaves, grass clippings, & fertilizer from storm pipes and yards



Stressors/Threats for Birch Island Lake

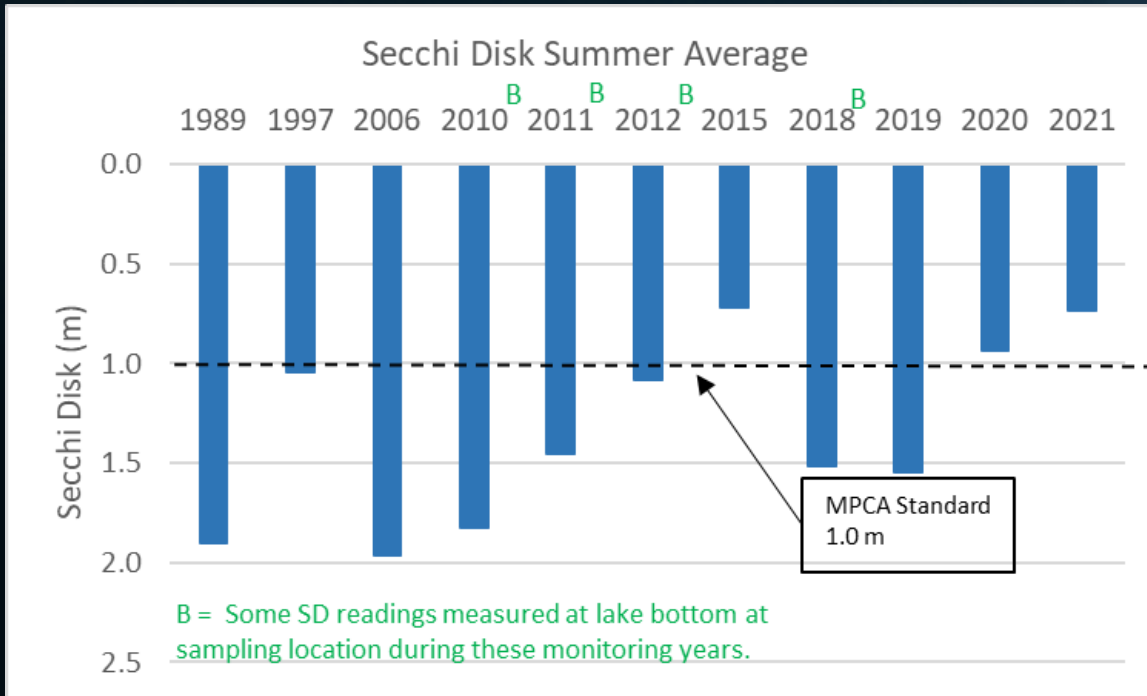
Algal Blooms – Above state standard in recent years



Example blue-green algae bloom

Stressors/Threats for Birch Island Lake

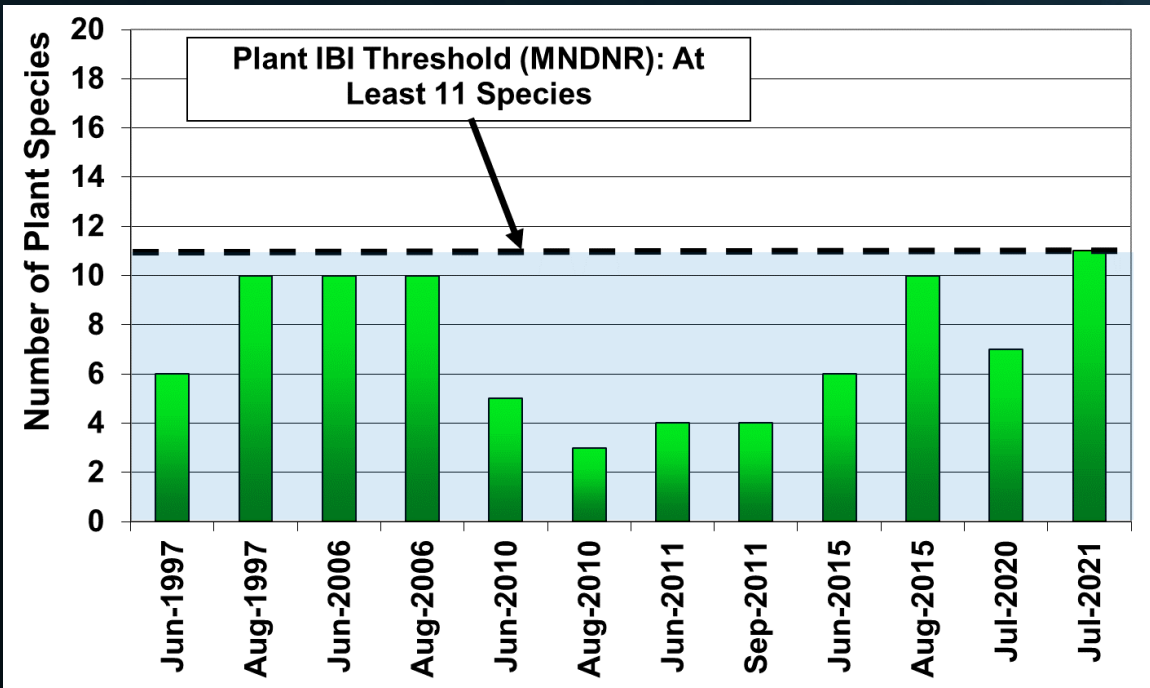
Turbid/Poor Clarity – Below state standard in recent years ✓



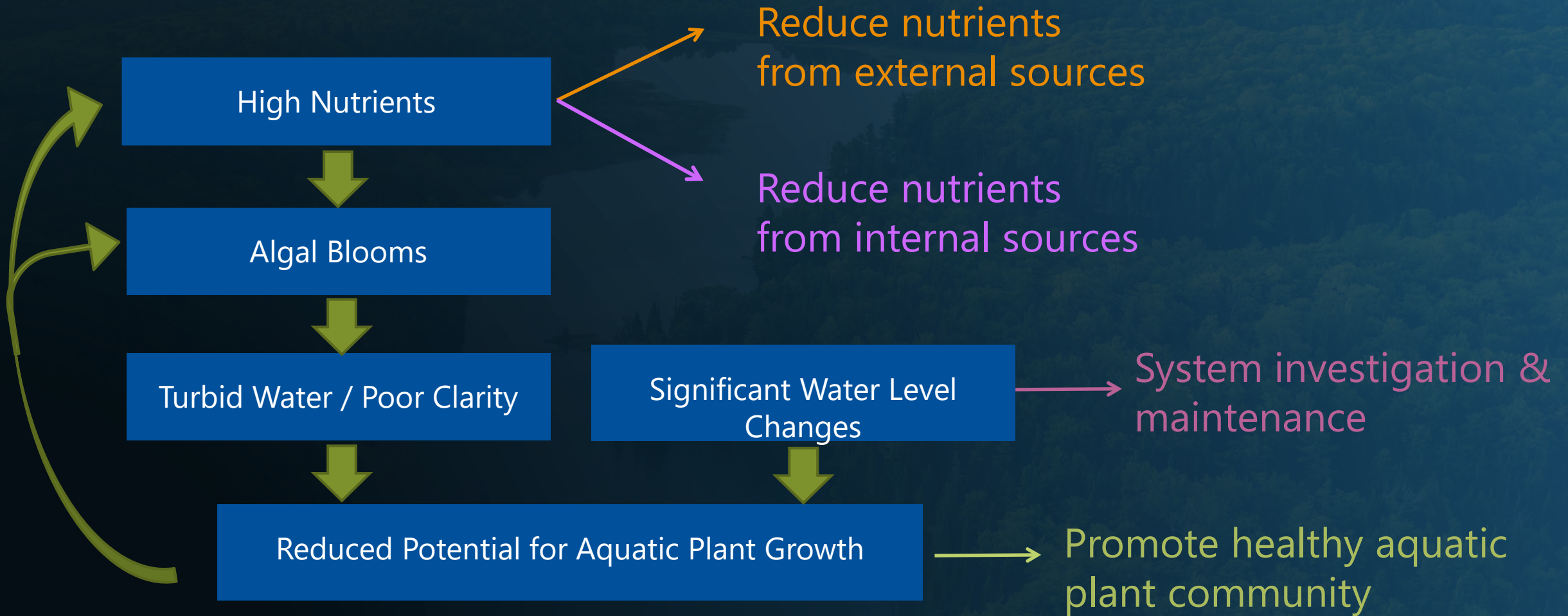
Poor lake clarity visible in aerial imagery from July 2022

Stressors/Threats for Birch Island Lake

Reduced Potential for Aquatic Plant Growth –
diversity and extent variable ✓



How do we address these stressors?



Water Quality Model – Phosphorus Sources

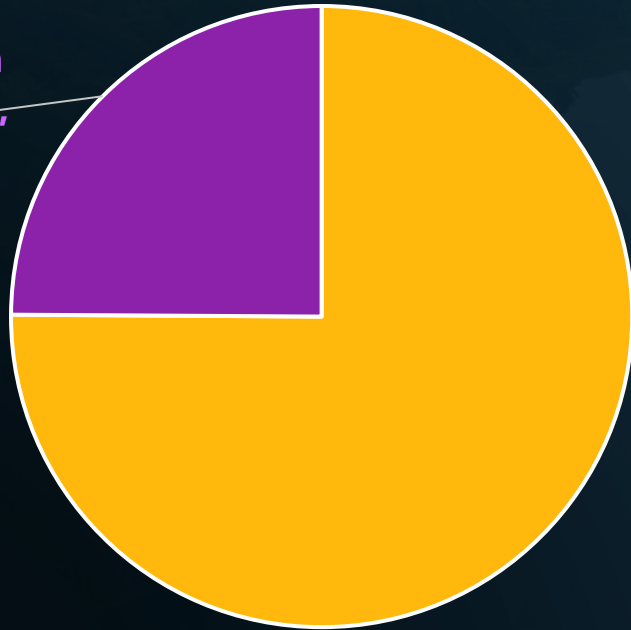
Wet Year

Dry Year

2019 Birch Island Lake Total Phosphorus Sources (pounds)

2020 Birch Island Lake Total Phosphorus Sources (pounds)

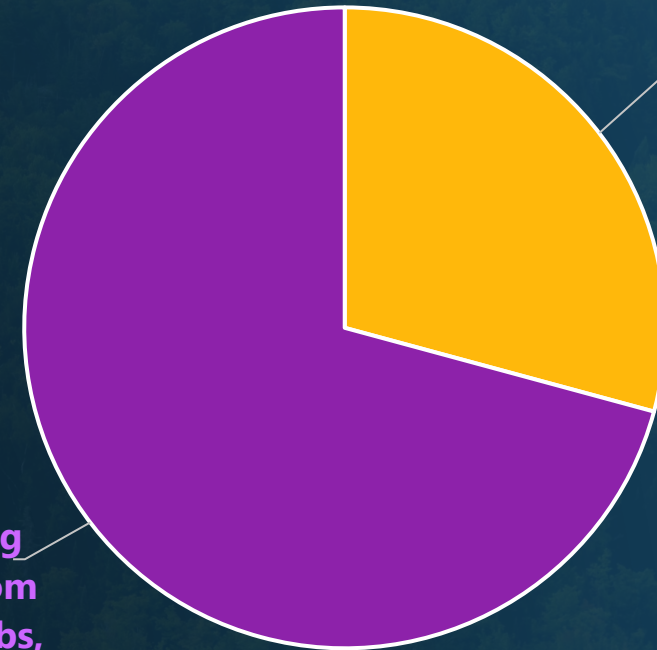
Internal Loading
from Lake Bottom
Sediment, 22.9 lbs,
25%



Watershed Inflow,
69.1 lbs, 75%

Internal Loading
from Lake Bottom
Sediment, 62.0 lbs,
71%

Watershed Inflow,
25.6 lbs, 29%



*No inflow from Lake Rose in 2019/2020 model

Management Options for Birch Island Lake

Work Towards Meeting
State Water Quality
Standards

Promote a Diverse,
Native Aquatic Plant
Population

Support a Healthy,
Balanced Aquatic
Ecosystem

- Internal Phosphorus Control
 - Sediment Treatment

Sediment Alum Treatment



- Aluminum Sulfate
 - Dissolves in water to form aluminum hydroxide and sulfate
 - Aluminum hydroxide is a white solid that settles to the lake bottom
- Permanently binds phosphorus in the sediments
 - Stable in the environment
 - Not sensitive to environmental changes



Sediment Alum Treatment



Water Level as
of May 2023

Access

Management Options for Birch Island Lake

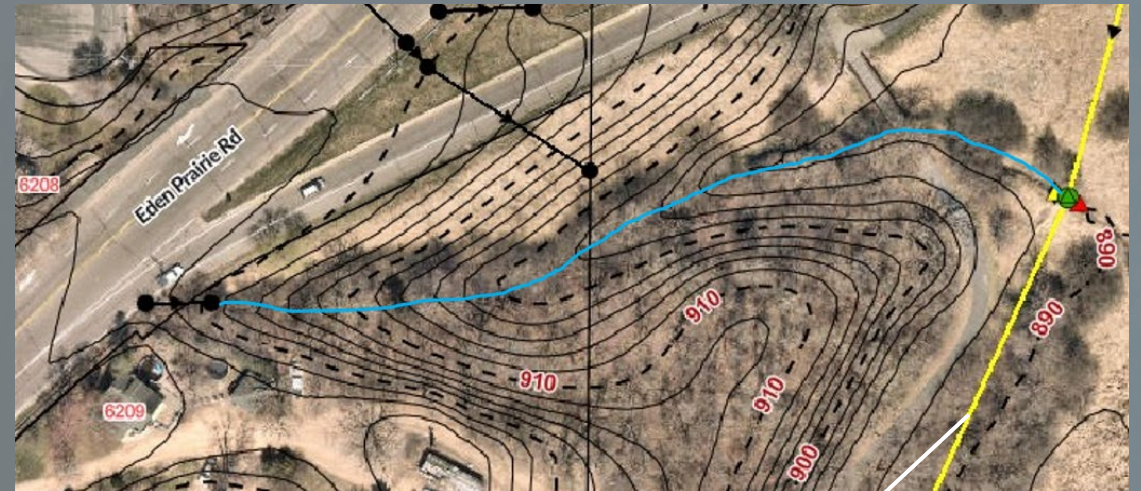
Work Towards Meeting
State Water Quality
Standards

Promote a Diverse,
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Population

Support a Healthy,
Balanced Aquatic
Ecosystem

- Internal Phosphorus Control
 - Sediment Treatment
- External Nutrient Control
 - Stormwater Retrofit BMPs
 - Street Sweeping
 - Upland/Channel Stabilization
 - Fertilizer Management
 - Cost Share Programs

Watershed Management – Upland Stabilization



Bypass
pipe

Watershed Management – Upland Stabilization

1. Notable sand accumulation and deposition in channel



2. Significant bank erosion and undercutting (over 50% of bank length); bank failure



Watershed Management – Upland Stabilization



3. Limited undergrowth and open soil within the forested areas adjacent to Birch Island Lake; Noticeable buckthorn growth



Watershed Management – Resident Fertilizer Reduction Program



Soil Testing Pilot Program – Expand to Birch Island Lake Watershed

- Pilot tested in Minnetonka in 2023
- QR code sign-up to request free soil testing kit with sample drop-off at District office
- 46 signed up; 38 soil samples turned in and analyzed

FREE SOIL TESTING



Save money on fertilizer by testing your soil nutrients and protect lakes from pollution.



SIGN UP

Scan the QR code to visit our website for more information and to sign up.



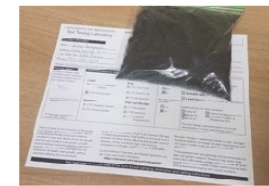
DIG

Use the instructions and equipment in the kit to dig a sample of soil from your lawn areas.



DROP OFF

Drop off your pre-labeled soil sample at Discovery Point in Eden Prairie.



GET ANALYSIS

We will take your samples to the UMN Soil Lab and send back your results and recommendations.

Watershed Management – Cost Share Grant Programs

NMCWD has existing cost share grants available for application

- Rain gardens
- Shoreline Buffers
- Habitat Restorations
- Permeable Pavement

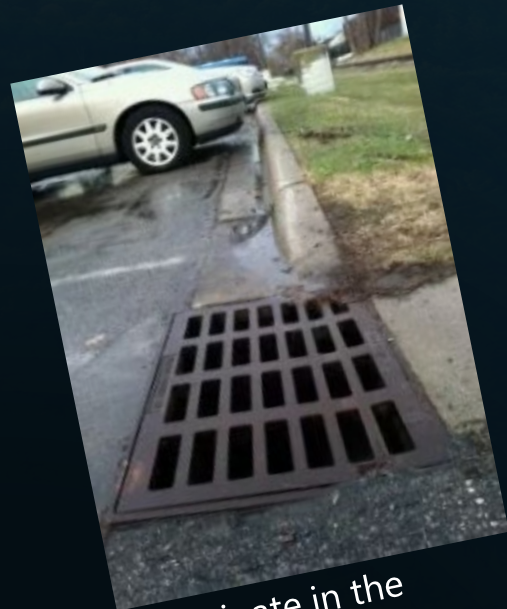


ninemilecreek.org/grants



What role can residents play in protecting Birch Island Lake?

How Can I Help? - Nine Mile Creek Watershed District



Participate in the adopt-a-drain program (mn.adoptadrain.org)



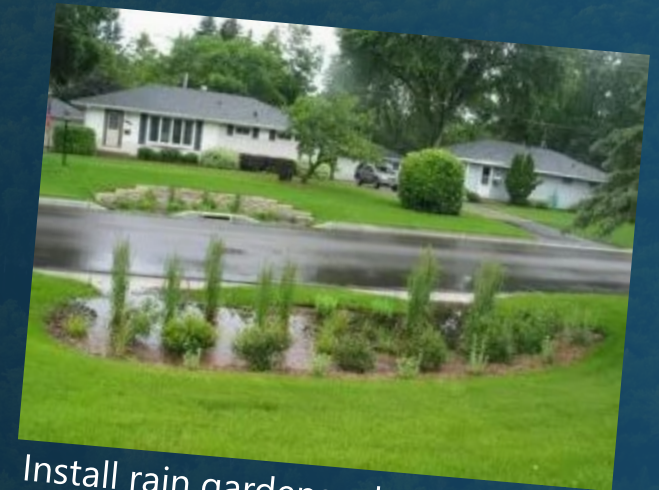
Clean up grass clippings and leaves



Good salt application: space between granules

Poor salt application: no space between granules

Reduce salt application



Install rain gardens, plant shoreline buffers, replace lawn areas with native plants



Reduce fertilizer use and mow high

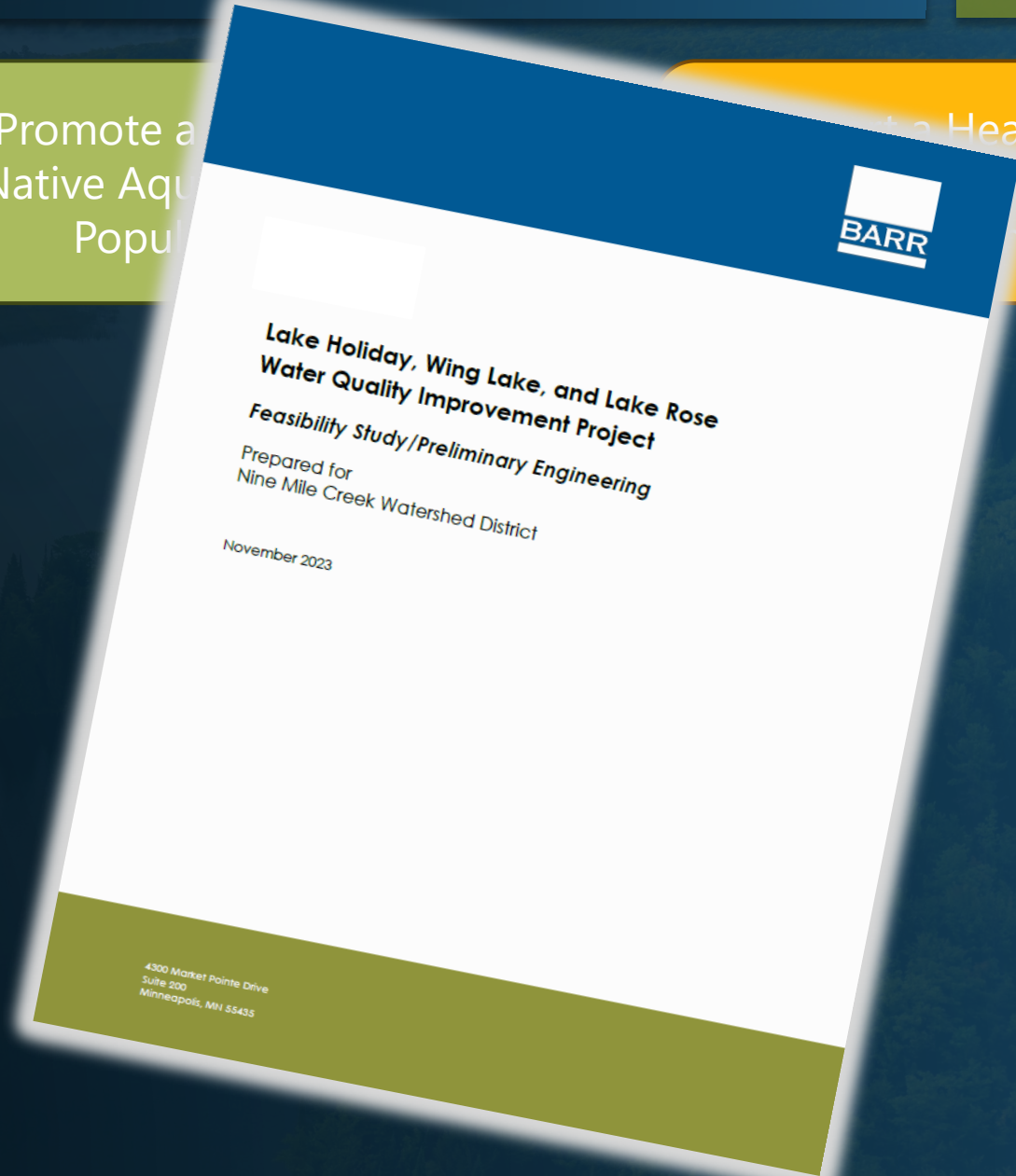
Management Options for Birch Island Lake

Work Towards Meeting
State Water Quality
Standards

Promote a
Native Aquatic
Population

to a Healthy,
Aesthetic
Lake

- Internal Phosphorus Control
 - Sediment Treatment
- External Nutrient Control
 - Stormwater Retrofit BMPs
 - Street Sweeping
 - Upland/Channel Stabilization
 - Fertilizer Management
 - Cost Share Programs
- Upstream Lake Improvements



Management Options for Birch Island Lake

Work Towards Meeting State Water Quality Standards

- Internal Phosphorus Control
 - Sediment Treatment
- External Nutrient Control
 - Stormwater Retrofit BMPs
 - Street Sweeping
 - Upland/Channel Stabilization
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- Upstream Lake Improvements

Promote a Diverse, Native Aquatic Plant Population

- Invasive Species Tracking and Management
- Encourage Healthy Aquatic Plant Growth
- Encourage Healthy Shoreline Vegetation

Support a Healthy, Balanced Aquatic Ecosystem

Vegetation Management – Reduce Invasives, Promote Natives



Example photo of invasive curly-leaf pondweed



Example photo of native plant species and clear water conditions

Management Options for Birch Island Lake

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Promote a Diverse, Native Aquatic Plant Population

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Support a Healthy, Balanced Aquatic Ecosystem

- Fisheries Re-assessment in future
 - Fish Management?

Support a Healthy, Balanced Aquatic Ecosystem



	Total Catch	Fish per Net (n=8)
Black bullheads	4	0.5
Fathead minnow	21,162	2645
Goldfish	2	0.3
Stickleback minnow	3	0.4
TOTAL FISH	21,171	2646
Turtles - painted	21	2.6
Turtles - snapping	3	0.4
Crayfish	10	1.3
Tadpole	2	0.3

No predator fish → Minnow over predation of zooplankton → Less predation of algae

Management Options for Birch Island Lake

Work Towards Meeting State Water Quality Standards

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Support a Healthy, Balanced Aquatic Ecosystem

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Lake Level Stabilization



1. Recommend that NMCWD consider conducting a **Lake Level Stabilization and Flood Management Evaluation** of Birch Island Lake and associated impacts to water quality and ecosystem health.
2. In the meantime... Recommend that the flow capacity of the pipe bypass system be maintained as much as practicable
 - A. City of Eden Prairie **continue to inspect and maintain** the bypass pipes and structures multiple times per year, as needed.
 - B. **Address upstream sediment loads** (channel, upland stabilization) to reduce maintenance frequency

Management Options for Birch Island Lake

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Promote a Diverse,
Native Aquatic Plant
Population

Support a Healthy,
Balanced Aquatic
Ecosystem

- **Internal Phosphorus Control**

- **Sediment Treatment**

- External Nutrient Control

- Stormwater Retrofit BMPs

- Street Sweeping

- **Upland/Channel Stabilization**

- **Fertilizer Management**

- Cost Share Programs

- Upstream Lake Improvements

- Invasive Species Tracking and Management

- **Encourage Healthy Aquatic Plant Growth**

- Encourage Healthy Shoreline Vegetation

- Fisheries Re-assessment in future

- Fish Management?



Lake Level Stabilization

Next Steps and Estimated Timeline

Task	Approximate Timeline
Water Quality Study – Public Meeting	January 8, 2024 (TODAY!)
Water Quality Study – Final Report	January/February 2024
Feasibility Study	2024 - 2025
Lake Level Stabilization and Flood Management Evaluation	
Projects:	
Sediment Alum Treatment	2025 – 2029*
Fertilizer Management Program	Planning Begins 2024/2025
Address Channel and Slope Erosion (in coordination with Hennepin County)	Planning Begins 2024/2025
Bypass Pipe System Maintenance	Ongoing (2024+)

*Estimated timeline dependent on several factors, including lake water levels for access



BARR



Questions?