

Holiday, Wing, and Rose Lakes Water Quality Evaluation and Restoration Measures Using the Use Attainability Analysis (UAA) Process

Nine Mile Creek Watershed District and City of Minnetonka

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#### Our Barr Team



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## Why is the Nine Mile Creek Watershed District studying the lakes?

- NMCWD periodically studies all lakes in the District as part of the lake management program
- Previous studies
  - Evaluated lake water quality in comparison with lake management goals (2010 NMCWD)
  - Identified potential management activities to improve water quality (2010 NMCWD & 2016 City of Minnetonka)
  - What's happened since then:
    - Wing Lake and Lake Rose shoreline restoration projects
    - Education and outreach
    - Continued lake monitoring
    - NMCWD cost-share grant projects

### Why is the Nine Mile Creek Watershed District studying the lakes?

#### • 2021 water quality study

- Re-evaluate Holiday, Wing, and Rose to assess:
  - Changes to water quality over time (additional water quality monitoring)
  - Sources of nutrients to lakes (new model tool)
  - Need for management activities to improve water quality moving forward (new technology and research on management efforts)

## Lake Management Objectives



#### Holistic Lake Management as part of UAA



### Where do nutrients in the lake come from?

#### **External Source**

#### **Internal Sources**

Curly-leaf Pondweed (Invasive)



#### Where do nutrients in the lake come from? Stormwater Runoff



# Where do nutrients in the lake come from? Sediments





#### Where do nutrients in the lake come from? Curly-leaf pondweed (invasive)



## Where do nutrients in the lake come from? Curly-leaf pondweed (invasive)

#### Non-native, invasive plant; unusual growth cycle



Winter: Plants continue growing under ice Late-spring/earlysummer: Plants die back and form turions

**Summer:** Turions remain dormant **Fall:** Turions germinate

Winter: New plants sprout from turions



Curly-leaf turion Photos by Leslie Mehrhoff / CC BY 3.0

### Urban Shallow Lake Types



Algal dominant, no plants Turbid, low clarity



Plant Dominant, low algae Higher water clarity



# What can happen when we have too many nutrients?

- Harmful algal blooms (HABs) are overgrowths of algae in aquatic ecosystems that have the ability to produce toxins
  - Shifts in algal communities to ones more dominated by cyanobacteria



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#### Characteristics of a Well Functioning Shallow Lake

#### Diverse, Native Plants



Shoreline Buffer Zones



#### Balanced Fishery



# Balanced Zooplankton & Phytoplankton





#### How are Holiday, Wing, and Rose doing?

#### Lake Holiday





#### How are Holiday, Wing, and Rose doing?

#### Wing Lake





### How are Holiday, Wing, and Rose doing?

#### Lake Rose





## Blue-Green Algae in Lake Holiday



2020 Lake Holiday blue-green algae compared with World Health Organization (WHO) thresholds for adverse health effects



# How healthy are the aquatic plant communities?



#### Wing Lake

#### Lake Rose



# How healthy are the aquatic plant communities?



## Project status and next steps

- Completed
  - Water Quality Data Review
  - Water Quality Modeling of Current Conditions
- Next Steps
  - Water Quality Modeling of Future Conditions
  - Review Public Surveys and Comments
  - Evaluate Management Strategies



## Potential Management Activities: In-Lake

- In-lake Management
  - Reduce internal loading  $\rightarrow$  Alum treatment(s)
  - Promote Healthy Fishery  $\rightarrow$  Native Plants, Aeration
  - Promote Diverse, Native Plants



# Potential Management Activities: External

- External Management
  - Infiltration/Filtration Best Management Practices (BMPs)
    - Institutional/Residential land (re-development or retrofits)
    - Right-of-Way
    - Public land (e.g., parks)
    - Private/public partnerships



Optimizing treatment from existing BMPs/waterbodies



# Potential Management Scenarios: External

- External Management
  - Community Efforts
    - Increasing buffer zones
    - Shoreline restoration, rainwater gardens
    - Routine street sweeping (public and/or private)
    - Fall leaf clean-up, adopt-a-drain program
    - Reduction/optimization of fertilization
    - Mow high
    - Replace portions of conventional lawns with low-input turf or native wildflowers, grasses, shrubs, and trees



# NMCWD Cost Share Projects in the Watershed



### We need your help! - Survey

- To those of you who already took the survey, thank you!
- If you haven't yet, the survey is open until 10/1.
  - Tell us how you use/enjoy the lake(s)
  - Describe your current concerns regarding lake health
  - Express your interest in helping to improve water quality
  - Ask us questions
  - And more!
- <u>https://ninemilecreek.typeform.com/MtkaLakes</u>

#### We need your help! -Small group discussions





# What do you value most about your lake?



# What concerns you most about your lake?



# What is your vision for the future of your lake?

## Thank you!

- Next steps
- Questions, comments?
  - Contact Erica Sniegowski, Project Manager Nine Mile Creek Watershed District
    <u>esniegowski@ninemilecreek.org</u>

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Project page:

ninemilecreek.org/holiday-wing-rose-lakes-study