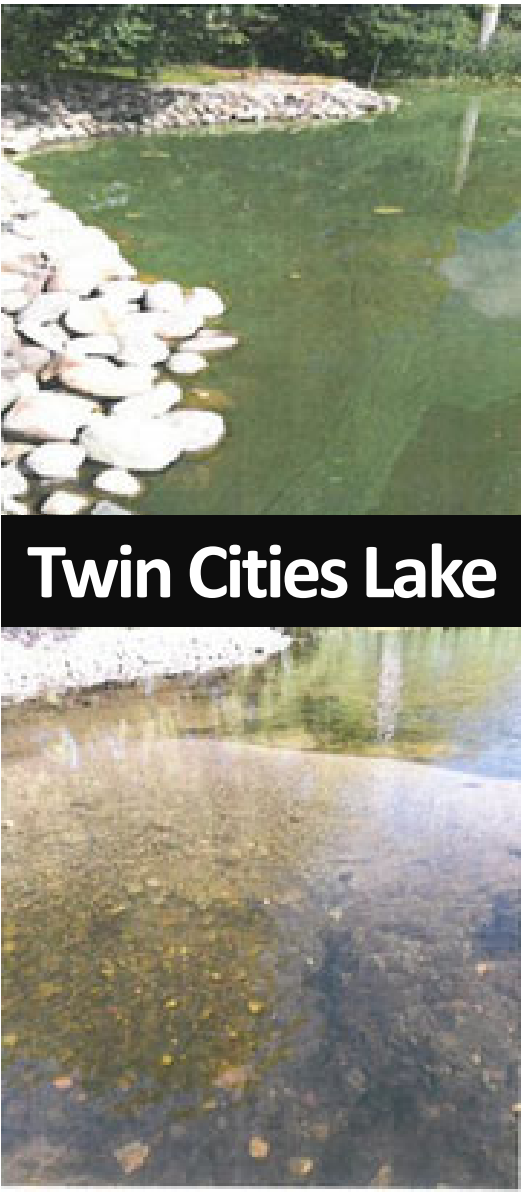


WaterQuality3D (WQ3D)

Patented, Non-Chemical Water Restoration Technology

Improving water quality in Lakes and Agriculture

LCC Subcommittee on Minnesota Water Policy

July 15, 2024

OVERVIEW

WQ3D Legislation Platform

2024 Introductions:

SF5219 – Utke: MDA-administered SWCD grant for a three-year on-farm irrigator pilot program to identify potential WQ3D water conservation benefits.

SF5265 – Weber: MDA-administered SWCD grant for a three-year conservation drainage pilot project to test phosphorus and nitrogen reduction in ag land runoff.

SF4277 – Jasinski: French Lake water quality availability extension.

SF5248 – Rasmussen: Lake Alice water quality grant extension and appropriation.

Laws 2024 – CH 160, ART 1, Sec. 2, Subd. 15 – Extends 2023 Appropriation Availability to June 30, 2025.

Laws 2023 – CH 60, ART 1, Sec. 2, Subd. 2, (l), (m), (n)$300,000 in MPCA Climate Resiliency and Water Infrastructure Grants for three, two-year pilot projects: Ramsey County – Round Lake, Rice County – French Lake & City of Fergus Falls – Lake Alice

OVERVIEW

Time to Value: *The Public/Policymakers may ask when will our Lake be Swimmable, Fishable or Restored?*

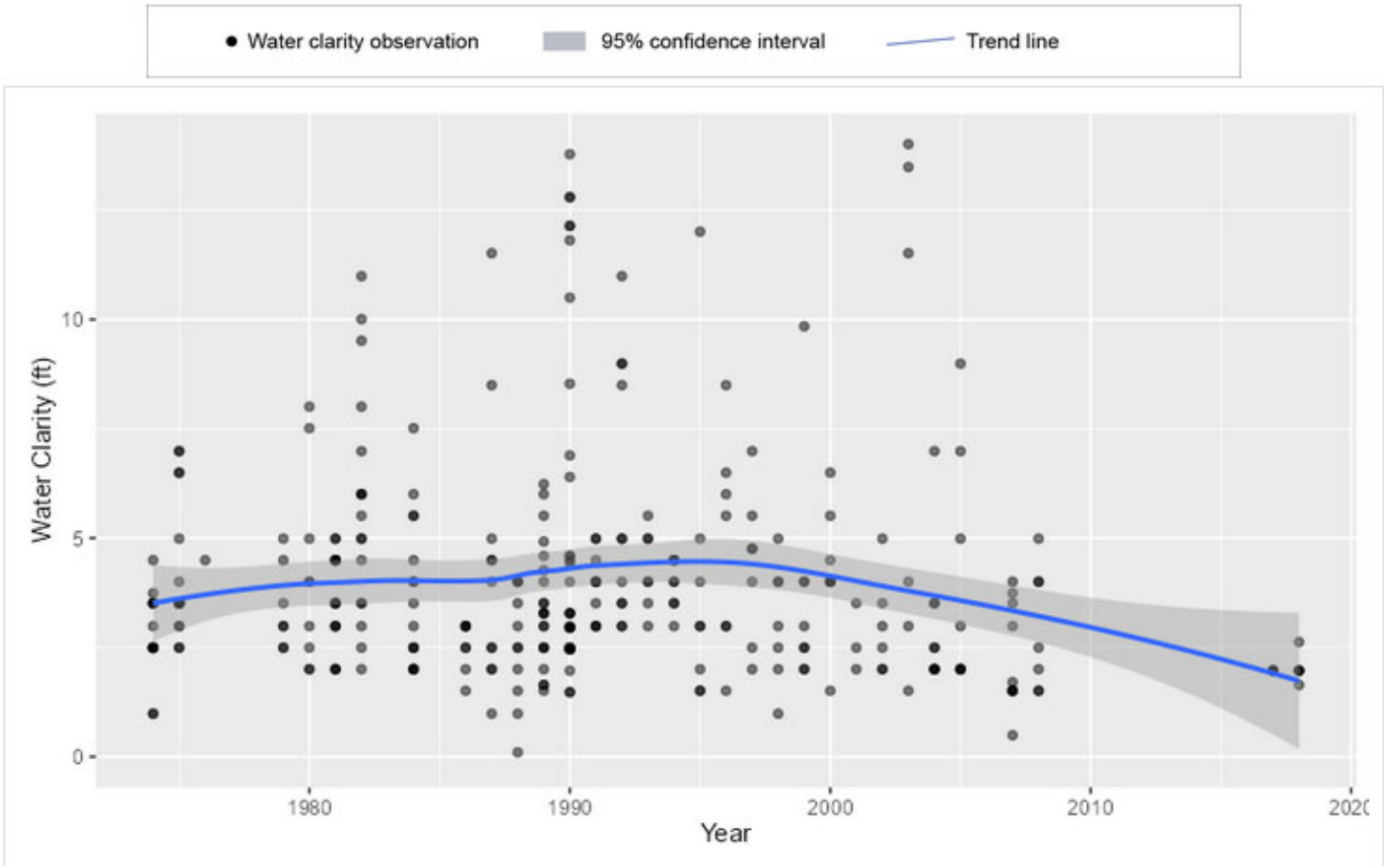
***"A successful lake restoration program should strive to manage both external and internal nutrient sources."* (MPCA)**

- **In-Lake:** WQ3D **integrates** science-based **(testing)** and **(restoration)** shortening time to value: swimming beach reopening etc.
  - WQ3D coordinates with MPCA for key water quality tests for the lake and adaptive management strategies. Restoration includes before, during and after testing using a patented non-chemical technology.
- Recreational usability time to value: Odor reduction, swimming, wading, fishing and other lake related aesthetic, biologic and economic values.

IMPAIRED
LAKES EXAMPLE

(MPCA) "Trend analysis result: For years **1974 to 2018** there is evidence of - ***no change in water clarity at this lake*.**"

French Lake
(MPCA) Dashboard Viewer

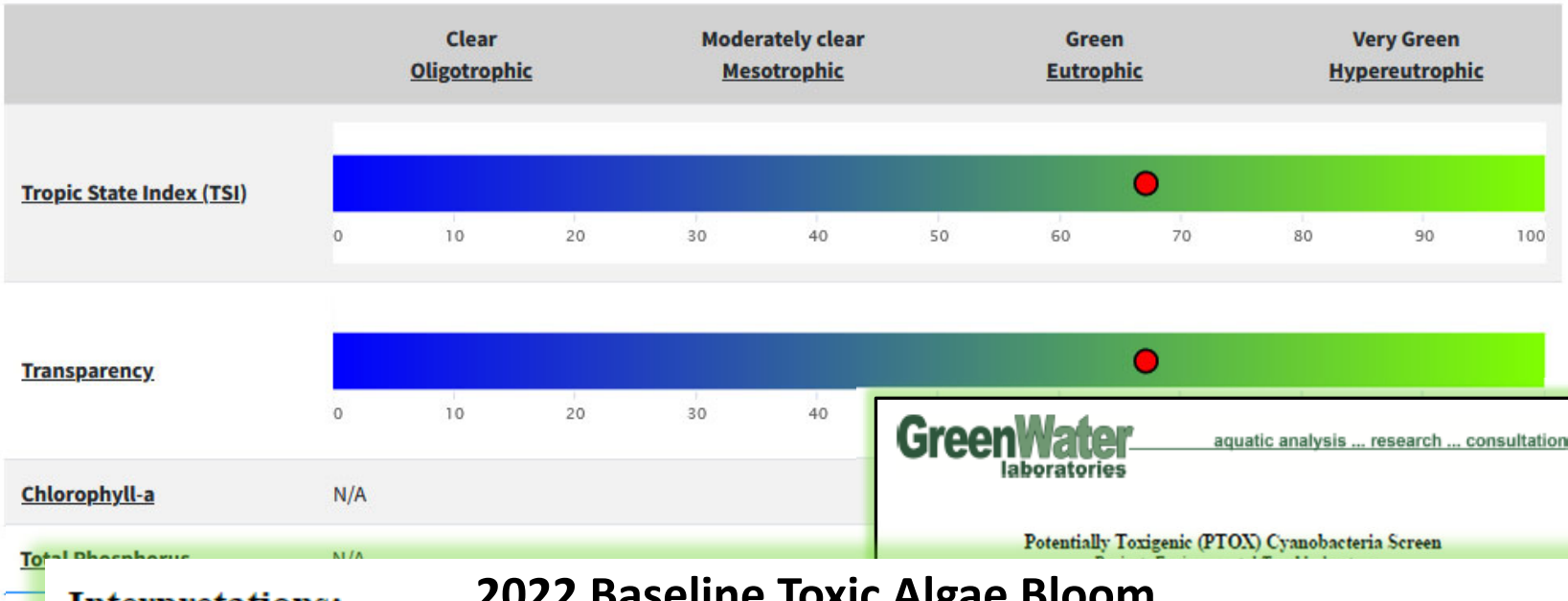


IMPAIRED
LAKES EXAMPLE

(MPCA) Recreational Use Summary

"Not always suitable for swimming and wading due to low clarity or excessive algae…"

French Lake
(MPCA) Dashboard Viewer



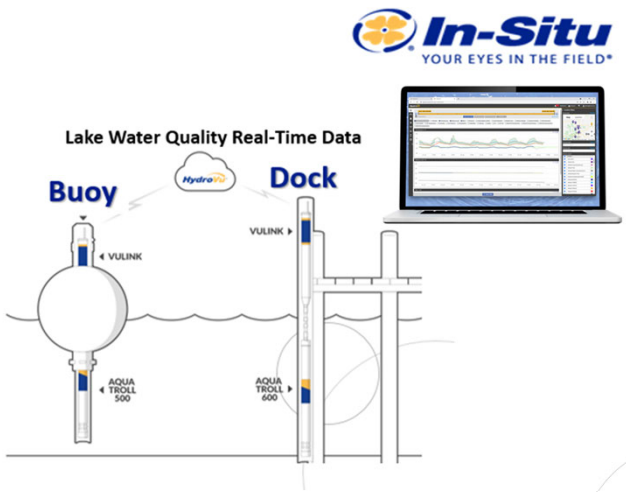
GreenWater laboratories — aquatic analysis … research … consultation

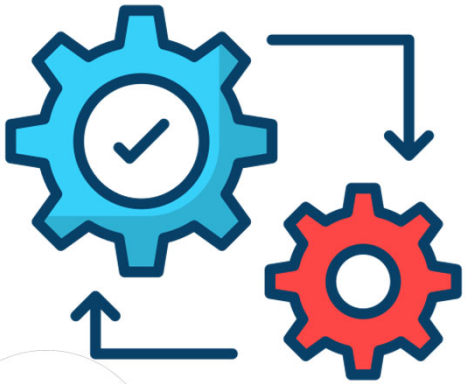
Potentially Toxigenic (PTOX) Cyanobacteria Screen

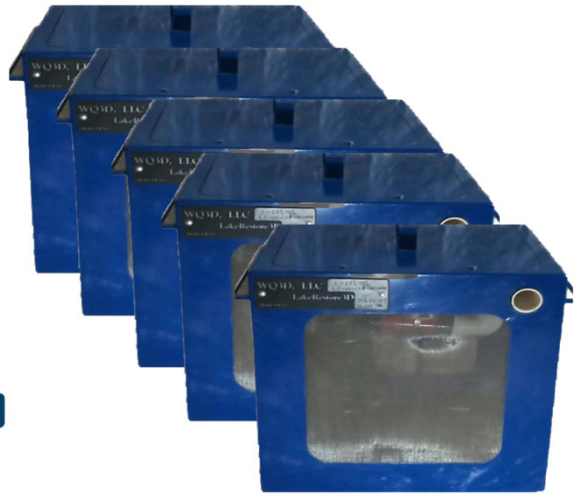
2022 Baseline Toxic Algae Bloom

Interpretations:
A significant level of microcystins/nodularins was determined to be present. The level of Adda MCs/NODs detected exceeds the current 'Draft EPA Recommended Value for Recreational Criteria and Swimming Advisory', which is currently 8.0 ng/mL (ppb) total microcystins. The WHO recreational guidance value for microcystin is currently 24 ng/mL (ppb) (World Health Organization (WHO), 2020a).

(WQ3D) IN-LAKE INTEGRATED SCIENCE-BASED TESTING AND RESTORATION







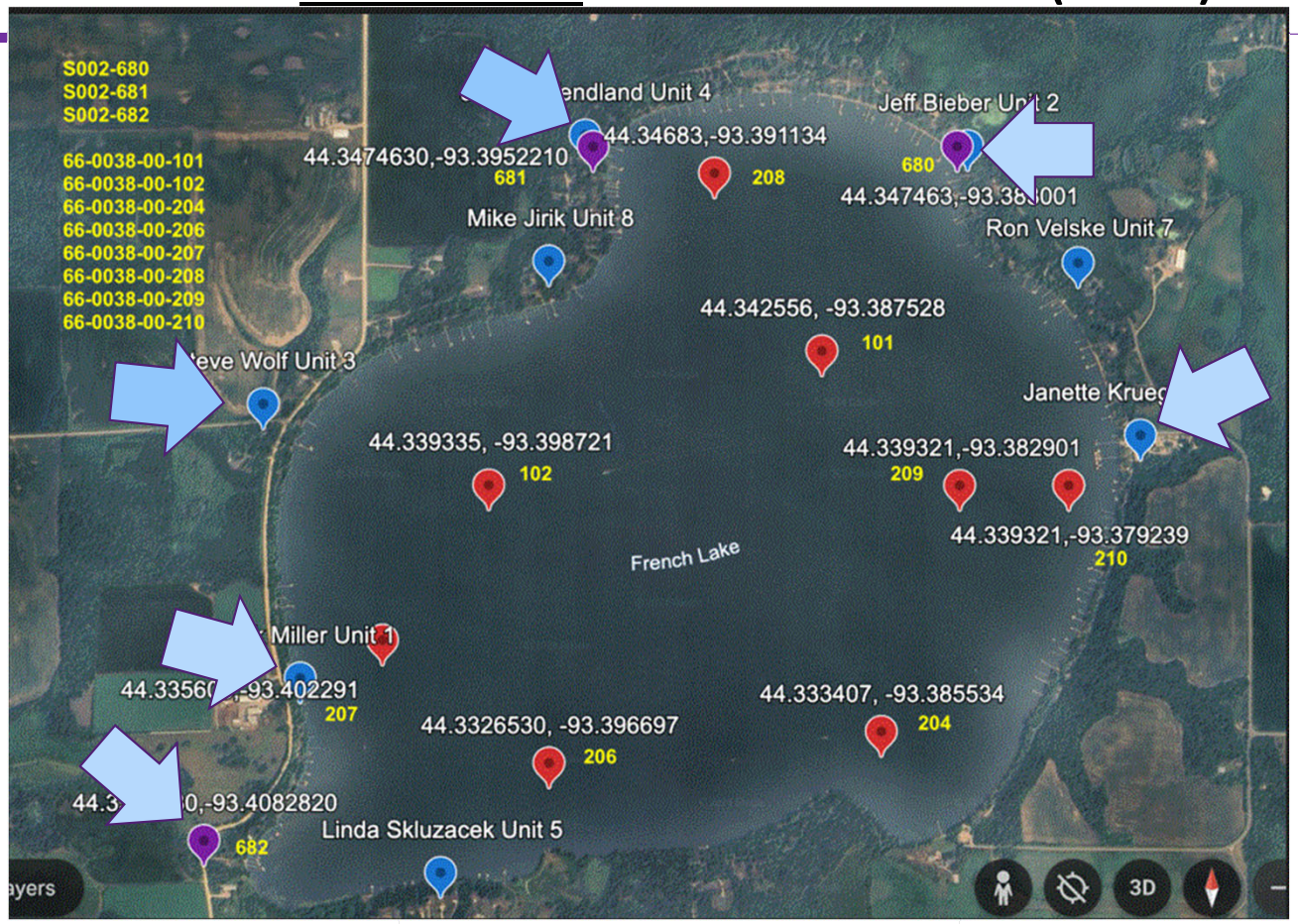
Science-Based Methods: Buoys, Hand-Held Sonde's, Environmental Labs, GreenWater Labs (Toxigenic Algae PTOX) & Citizen monitors.

Targeting Lake Stressors: Patented non-chemical technology balance's dissolved oxygen, pH, & oxidation-reduction potential.

French Lake

TARGETING WATERSHED LAKE STRESSORS

COMING INTO A LAKE COORDINATED WITH (MPCA)



Stressor Point/Testing (Influences)

Testing Locations

WQ3D Device Locations

Lake Alice
Impaired

Long-term persistence: Nuisance Odors, Bacteria & Algae
City of Fergus Falls

Valley News Live

News Watch Live Weather Video Photos Sports ND Today Valley News Now

Pilot projects aims to improve water quality, reduce odor on Lake Alice

LAKE ALICE

140 Years of toxic water conditions

Stakeholders described nuisance odor as "barnyard" like

C. TOTAL ESTIMATED COST

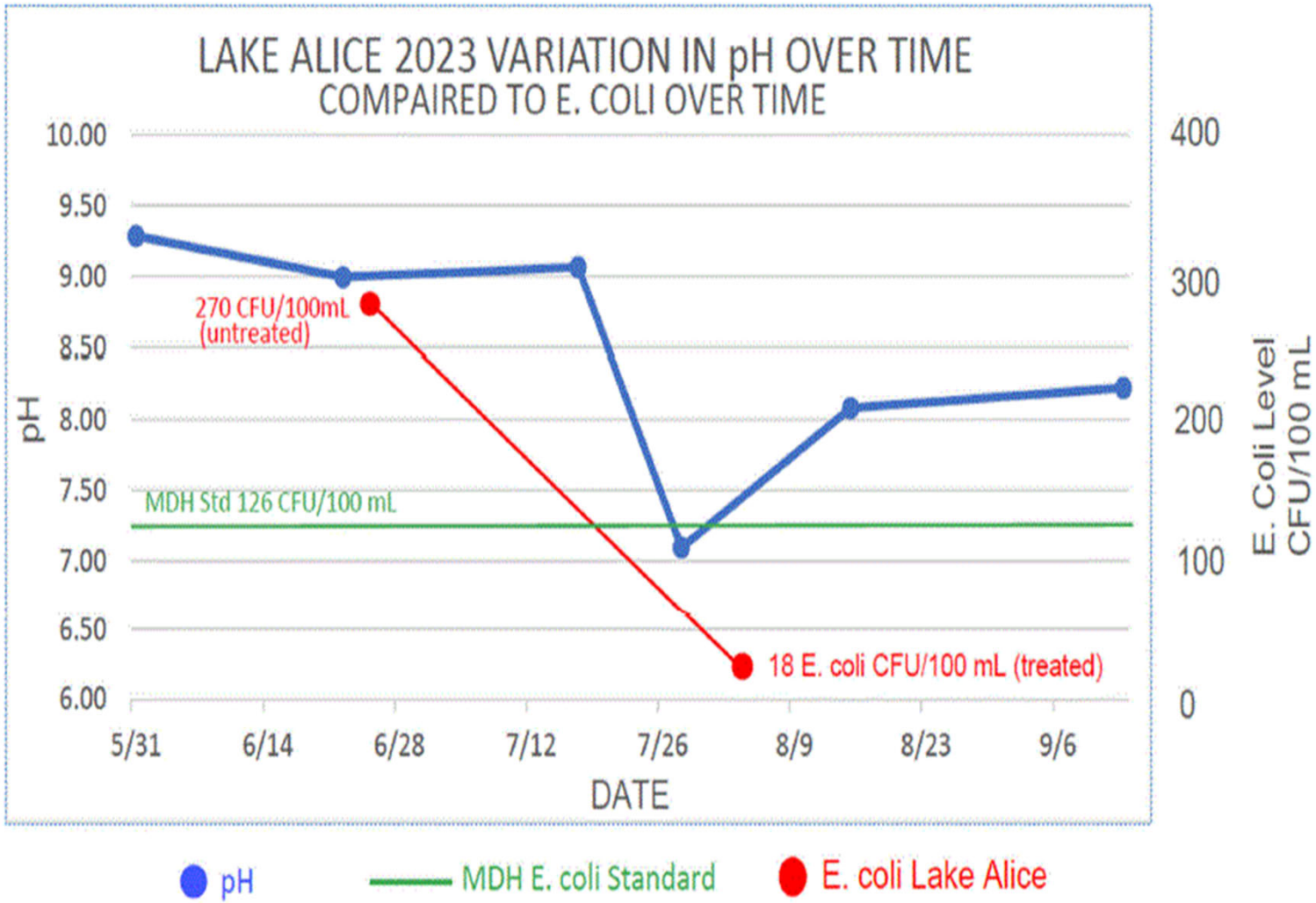
	GENERAL IMPROVEMENTS	WATER QUALITY IMPROVEMENTS
STAGE 1	Completed	
STAGES 2-4		
WATER MAIN, SANITARY SEWER, GRADING SURFACING, AND STORM SEWER (NON-DIVERSION) REPLACEMENT	$6,238,000	
REVISION TO LED LIGHTING	$20,000	
GRIT TRAPS		$200,000
STORM SEWER DIVERSION		$1,319,000
SUPPLEMENTAL WATER SYSTEM		$596,000
SUBTOTALS STAGE 2-4	**$6,258,000**	**$2,115,000**
STAGE 5		
DREDGING		$2,081,000
SUB-TOTALS	**$6,258,000**	**$4,196,000**
GRAND TOTAL	**$10,454,000**	

- **Dredging:** Proposals to dredge the lake were offered regularly (1886, 1925, 1929, 1939, 1945 and 2018 estimate up to $10.4m)
- **Land conservation**: Lake Alice is a Urban lake within a City. (Unrealistic)
- **Chemicals:** 1916 application of herbicide copper sulfate. (Unknown results)

LAKE ALICE

pH to E.Coli

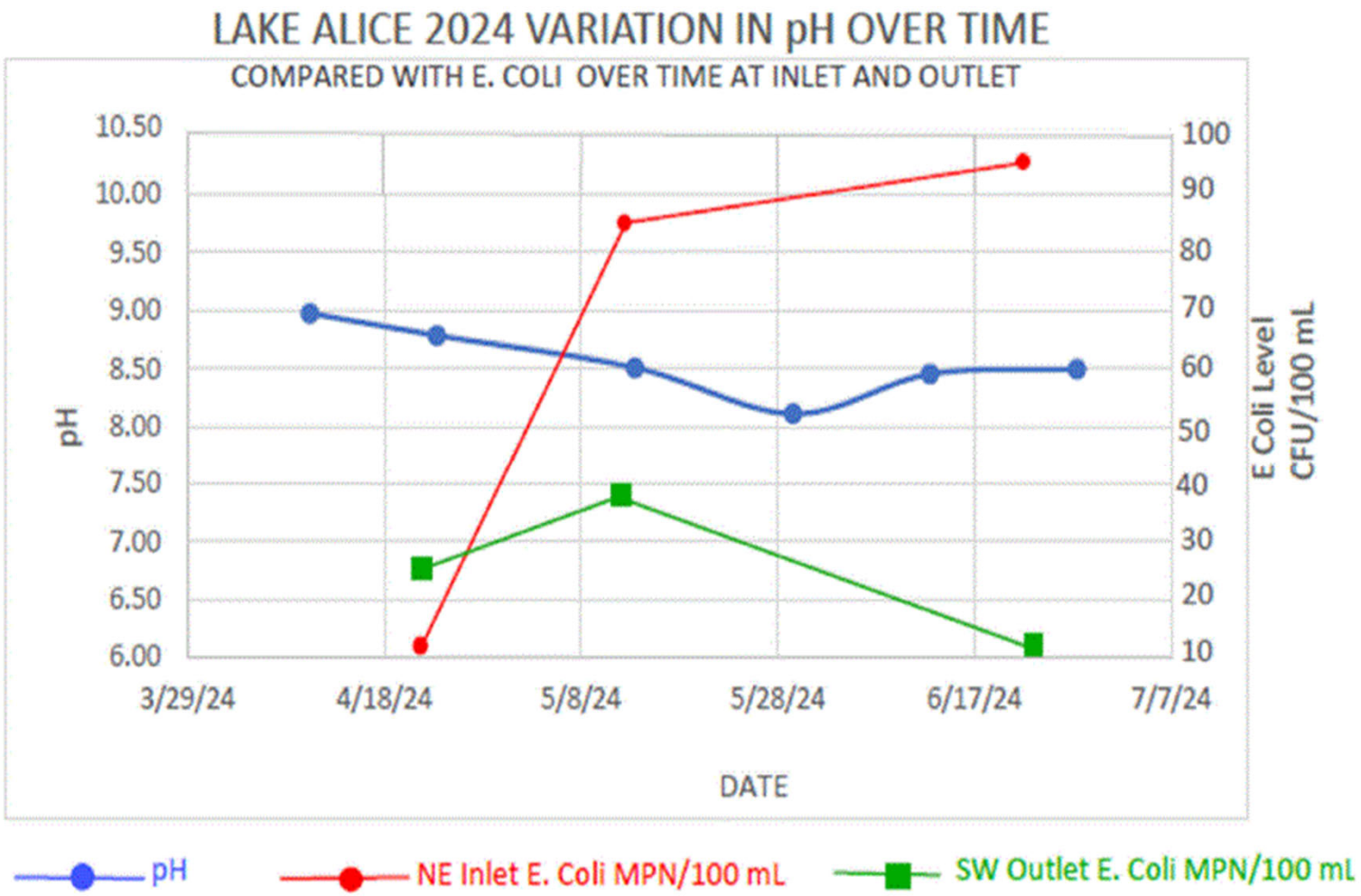
Interpretation:
Reduction in nuisance odor, bacteria and algae.



LAKE ALICE

INLET / OUTLET

Interpretation Lake Inlet & Outlet: Reduction in nuisance odor, bacteria and algae.



Thank You!
Questions?