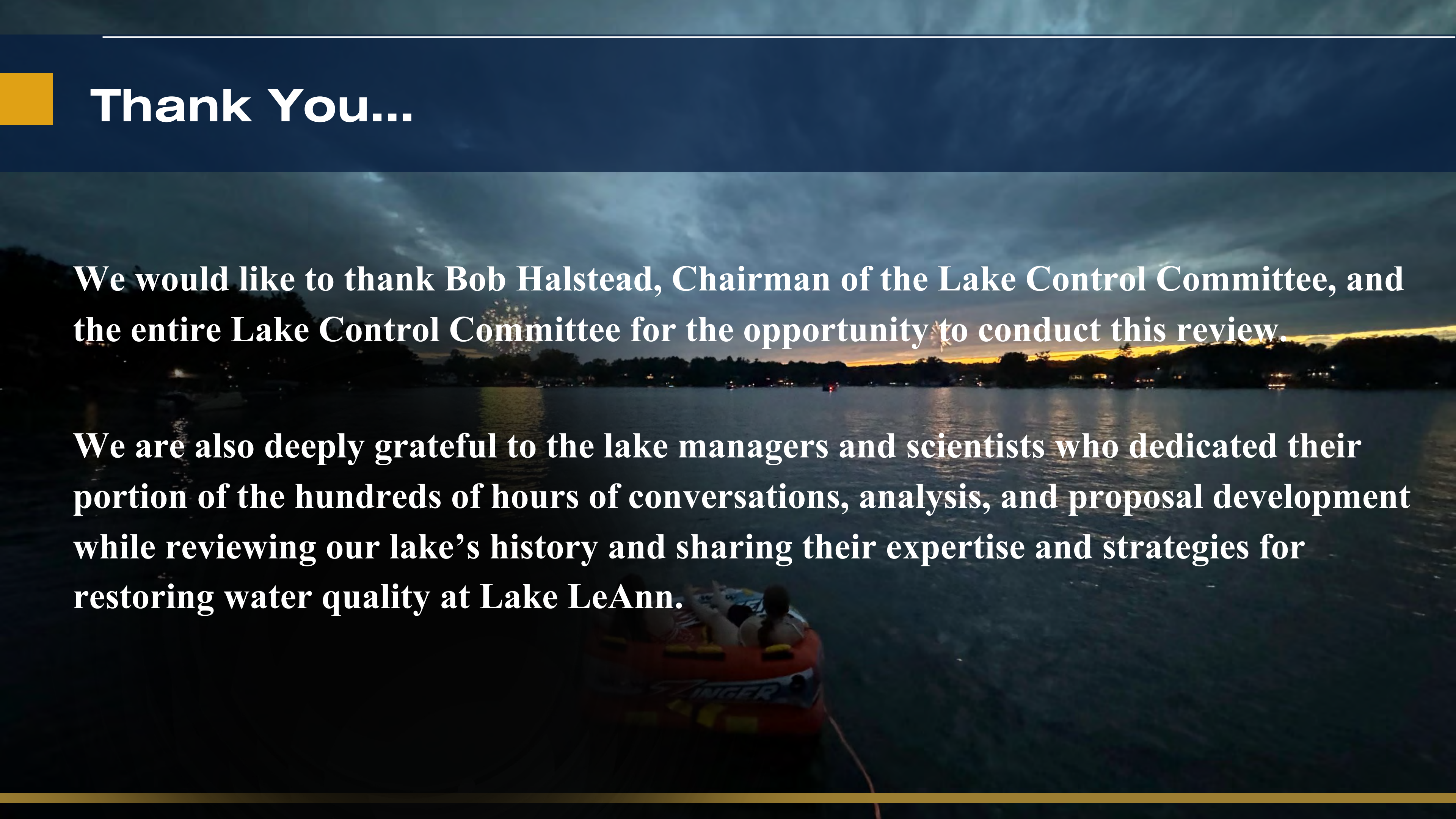




THINK DIFFERENT

A Community-Driven Approach
to Lake Water Quality

The background of the slide is a photograph of Lake LeAnn at dusk. The sky is dark with some clouds, and a line of trees and lights is visible on the far shore. In the foreground, a red inflatable boat with the word "ZINGER" on it is visible, with a person sitting in it. The water is calm, reflecting the lights from the shore and the boat.

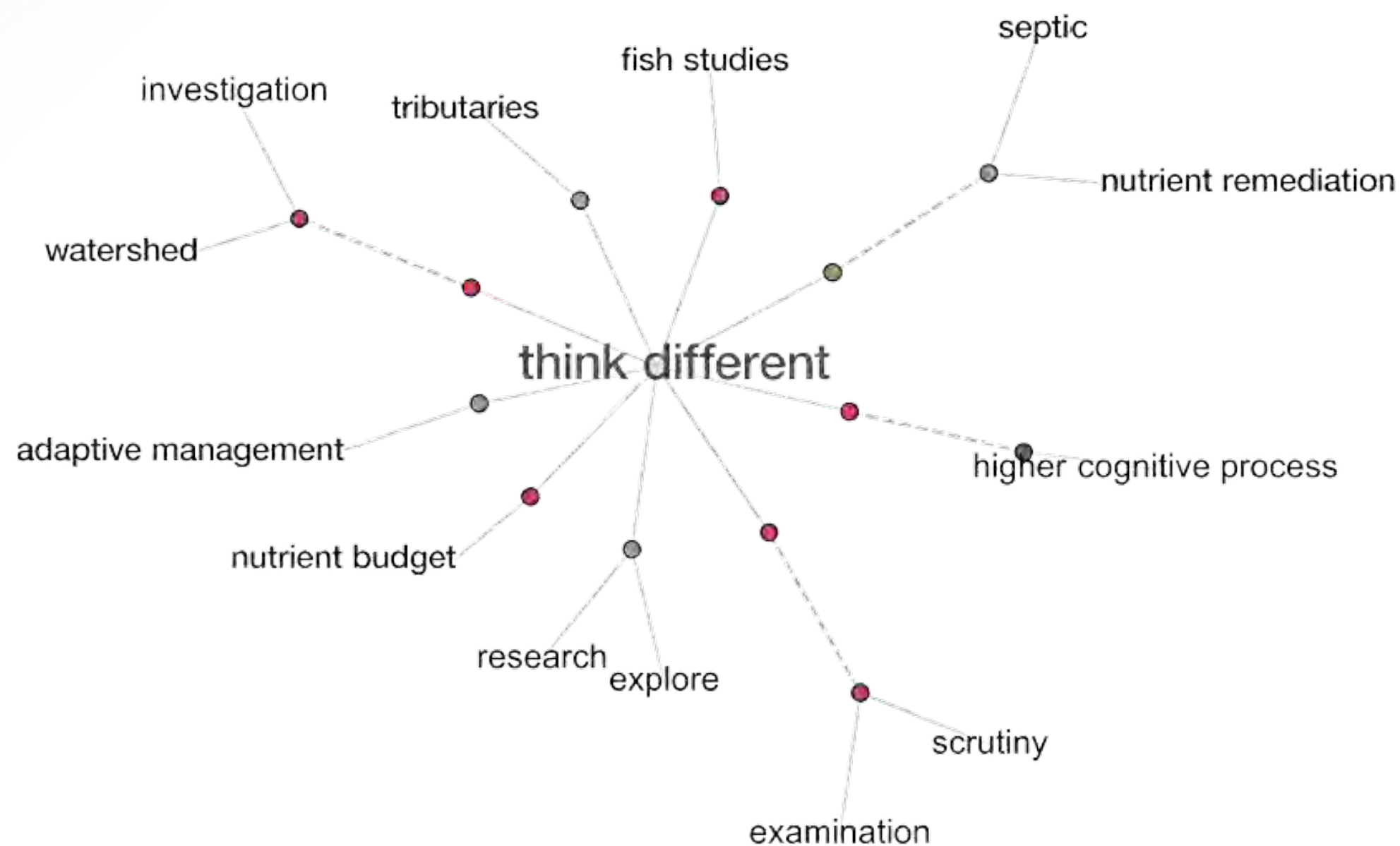
Thank You...

We would like to thank Bob Halstead, Chairman of the Lake Control Committee, and the entire Lake Control Committee for the opportunity to conduct this review.

We are also deeply grateful to the lake managers and scientists who dedicated their portion of the hundreds of hours of conversations, analysis, and proposal development while reviewing our lake's history and sharing their expertise and strategies for restoring water quality at Lake LeAnn.

“

One of the great challenges in this world is knowing enough about a subject to think you're right, but not enough about the subject to know you're wrong.



A Community-Driven Approach to Lake Water Quality

Our Story

From certainty  curiosity  data-driven decisions

Before

- We thought we knew the answers.
- A few calls to lake managers.
- Dredging. Harvesting.
- In Water Treatments.

... and we'd be done.

After

- Weekly deep dives with scientists.
- No two lakes behave the same.
- Controlling inflows beats chasing symptoms.
- Data before decisions.
- Research. Test. Verify.

The Watershed Mindset

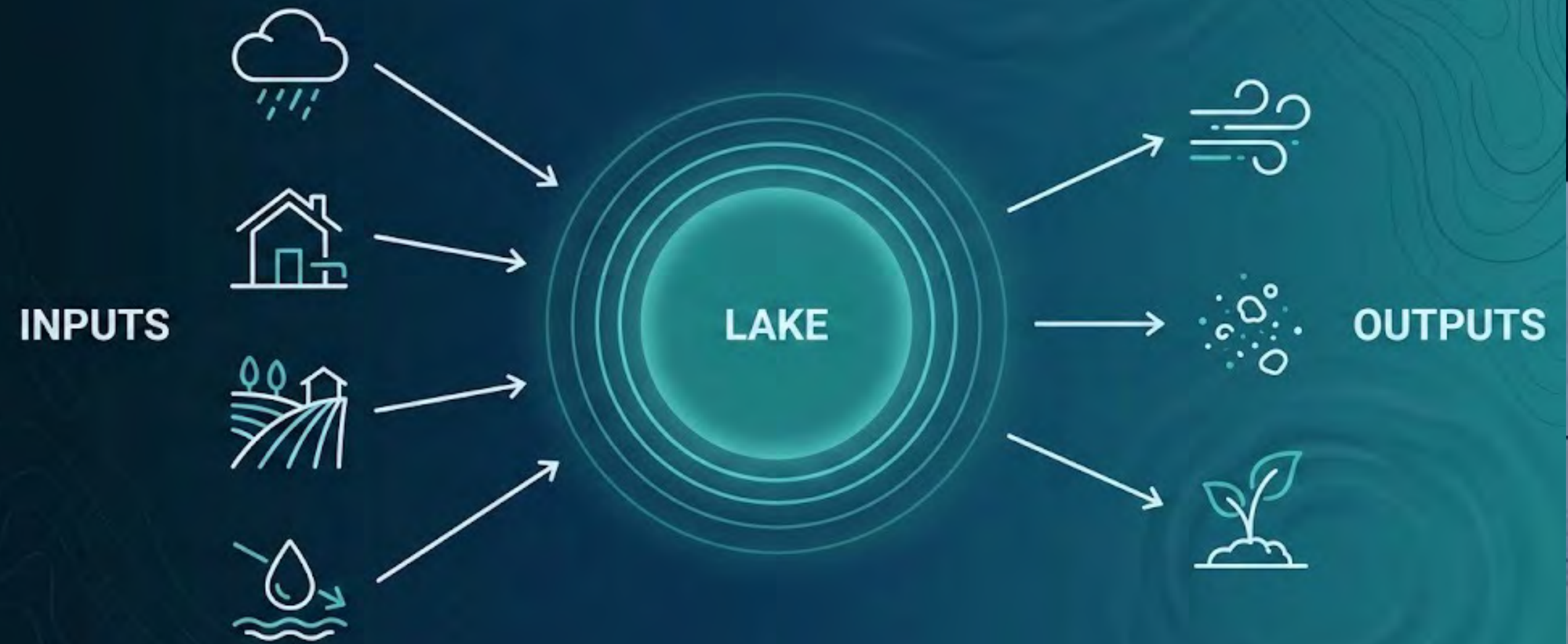
The lake reflects everything that flows into it



- Start at the Shoreline & work outward.
- Septic systems, drain pipes, culverts, tributaries & upland areas matter.
- Small actions upstream have big impacts downstream.
- Solutions extend beyond the lake itself.
- Precipitation events can contribute to immediate pulses of phosphorus.

How do we verify this?

**You need
to create a
Nutrient
Budget**



Lake LeAnn's Nutrient Budget

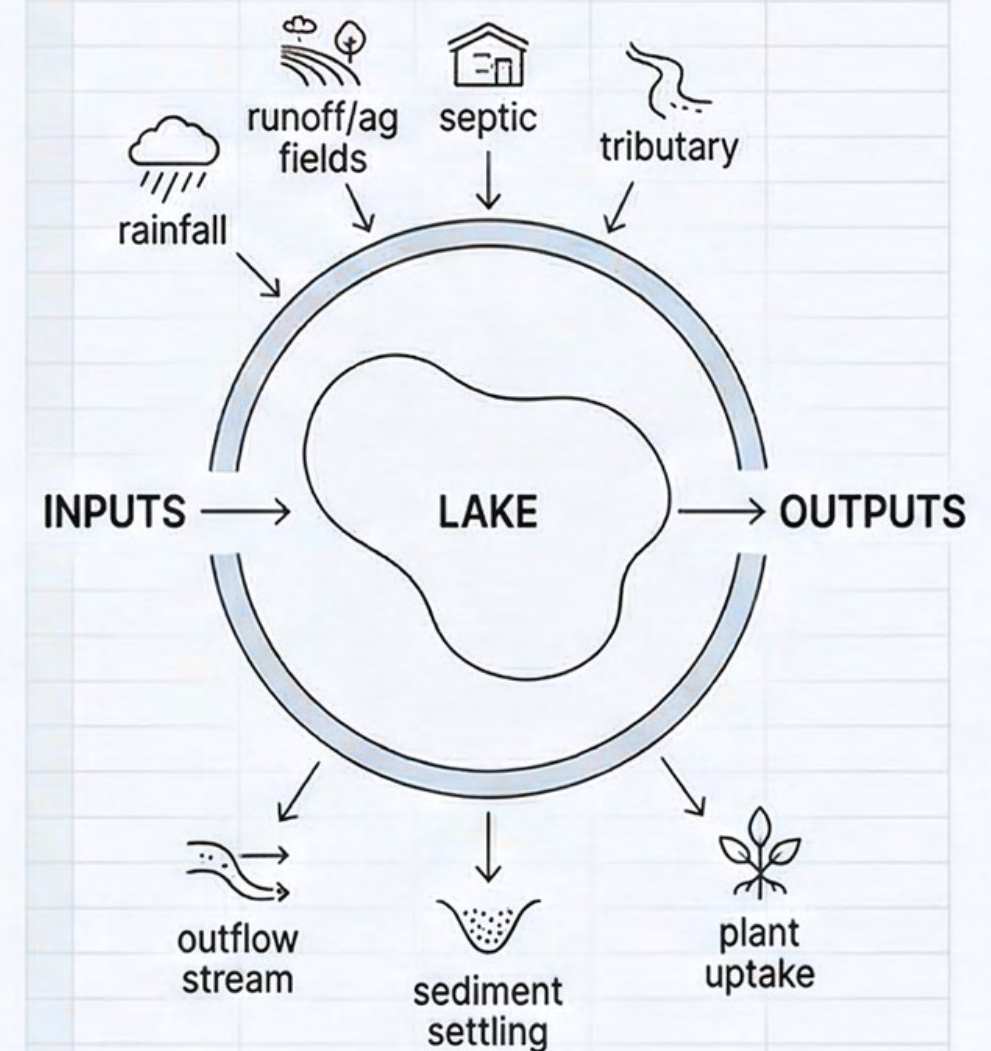
Understanding the nutrient sources that are affecting our lake water quality

Purpose

- The best first step for a lake experiencing algae issues is to make a Nutrient Budget.
- Allows for a better understanding of internal vs. external loading and each source's contribution.
- Creates a data driven framework for future lake management decisions.

Actions

- Develop a Nutrient Budget and Lake Response Model for Lake LeAnn.
- Start by modeling Lake LeAnn's watershed.
- Collect high level water quality data to input into the model.
- Collect sediment data and tributary data to input into the model.
- Look at additional inputs and outputs, septics, pipes, culverts, dams and evolve the model.
- Develop tools and monitor in flow and outflow.
- Completion of our Lake Response Model in August 2026.



Watershed Lake Manager

Joe Bischoff | Senior Aquatic Ecologist at Barr Engineering

Expertise:

- Joe has 28 years of experience in lake, reservoir & watershed management.
- Leads with a science-based, data-driven approach to Lake Management.
- Successfully treated over 30 lakes, 8 of which have been removed from the impaired waters list.
- Barr Engineering invests heavily in developing a knowledge base of the breadth of lake restoration techniques to provide cost-effective solutions.



Lake Water Quality Sampling

You need high level data to make the Lake Response Model accurate

Current Sampling

Three sampling events at ten locations for the LFA EGLE permit.

Proposed Sampling

- Five sampling events - May, June, July, August & September for a better data set.
- Two sampling site locations on each lake.
- Secchi depth will be measured at each site.
- Measurements of DO, temperature, pH, conductivity, and phycocyanin with depth per sampling site.
- Surface water samples will be collected for analysis of TP, TN, TKN, and chlorophyll a.
- Bottom water samples will be collected for analysis of TP and SRP.



May



May-Sep



Water Quality Lake Manager

*Ciera Baird | Aquatic Ecotoxicologist Specializing in
HAB Management at Aquatic Control*

Expertise:

- Designs full-scale algaecide applications using advanced application equipment to effectively target planktonic and benthic algal assemblages.
- Conducts internal and collaborative research regarding performance evaluations and best practices for various algaecides.
- Interprets laboratory exposure-response data for algaecides and site-specific algal assemblages to identify effective formulations and treatment concentrations for full-scale algaecide treatments.



Tributary Water Sampling

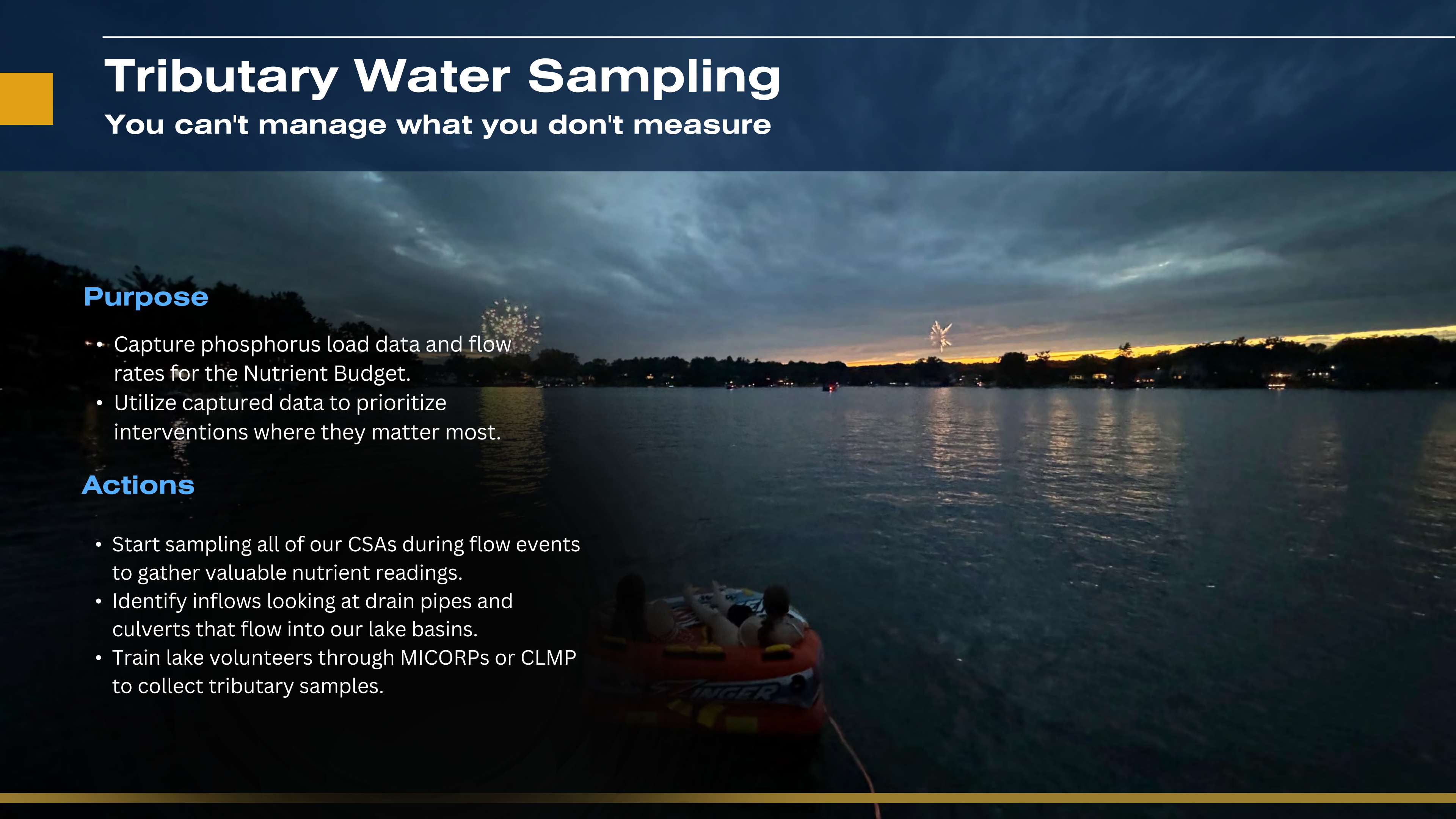
You can't manage what you don't measure

Purpose

- Capture phosphorus load data and flow rates for the Nutrient Budget.
- Utilize captured data to prioritize interventions where they matter most.

Actions

- Start sampling all of our CSAs during flow events to gather valuable nutrient readings.
- Identify inflows looking at drain pipes and culverts that flow into our lake basins.
- Train lake volunteers through MICORPs or CLMP to collect tributary samples.



Fish Studies

A clear picture of lake ecosystem health

Purpose

- Evaluate the impact that Common Carp may be having on water quality.
- Provide an accurate assessment of the fish community.

Actions

- Conduct an electrofishing survey to provide an accurate assesment of the fish community.
- Review species composition, status of forage and predator species and overall biodiversity.
- Make informed management decisions including stocking and habitat recommendations.



Fish Studies Manager

Wesley Goldsmith / Fish Management Specialist at Aquatic Control

Expertise:

- Aquatic Control's Fish Management Specialist for 6 years.
- Has worked in fisheries since graduating from Purdue University in 2015.
- Graduated with a Bachelor of Science degree in Fisheries and Aquatic Sciences.
- Oversees everything from endangered fish species in river systems to large private lakes managing trophy fish populations.



Aquatic Vegetation Management

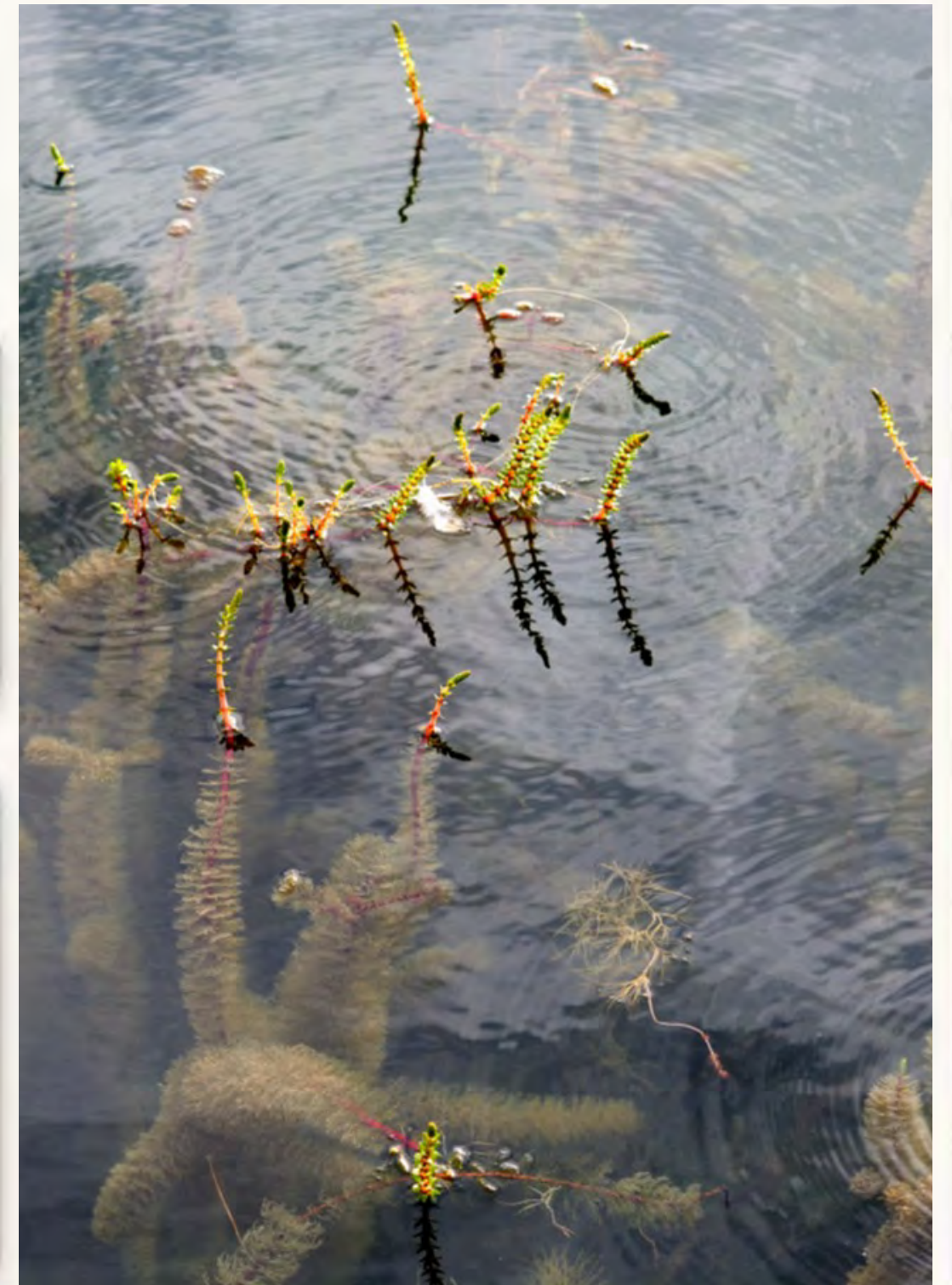
Balanced plant life for a balanced lake

Why it matters

- Aquatic vegetation acts as a filter, reduces algae and creates clearer water.
- Supports fish habitat and shoreline stability
- Reduces nutrient resuspension and erosion

Approach

- Conduct visual surveys that identify all of the plant species.
- Coordinate removal efforts with the LCC and Lake LeAnn's fishing community.
- Apply herbicides with a delicate touch, erring on the side of protecting native species.
- Monitor outcomes and adjust periodically.



Aquatic Vegetation Manager

Nick Pearce | Aquatic Biologist & Office Manager at Aquatic Control

Expertise:

- B.S. in Natural Resource Management, Grand Valley State University (Dec 2016)
- Joined Aquatic Control as Aquatic Biologist (Mar 2017, Valparaiso, IN) Managed aquatic vegetation and conducted vegetation surveys
- Fountain and aeration sales/service; assisted fish management surveys
- Performed equipment maintenance
- Six years as Aquatic Biologist; promoted to Office Manager (Jan 2023) Responsibilities: hiring & training, sales, overseeing field and office operations, large project management



Nutrient Remediation

Addressing the root cause of water quality decline

Why it matters

- Excess nutrients drive algae growth, HABs and reduced clarity.
- Long-term improvement requires reducing both internal and external loading.

Strategy

- Use mass loading lake response models to target the most impactful nutrient sources.
- Mitigate external nutrient loading from the watershed.
- Apply phosphorus inactivation where appropriate to limit internal recycling.

Lake Community Cooperation

People are our most powerful asset

Goals

- Build shared understanding of water quality issues.
- Encourage consistent best practices among residents.
- Foster a culture of stewardship.

Actions

- Community education and outreach.
- Clear guidance on shoreline care and runoff reduction.
- Regular communication and transparency.
- Harmful Algae Bloom reporting and response.

LLPOA MAY NATIVE PLANTING SESSION



Adaptive Management

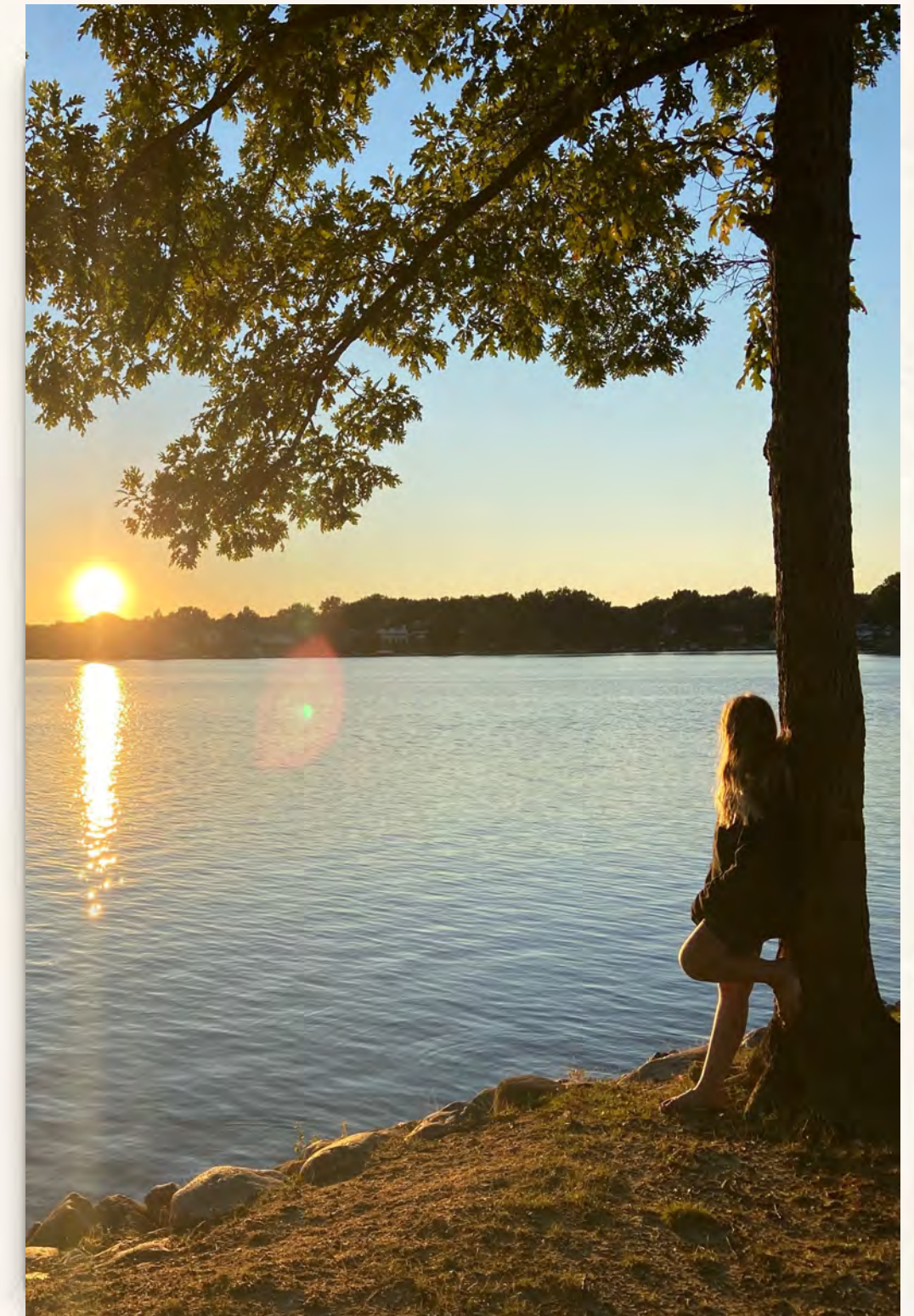
Letting the lake tell us what it needs.

Principle:

- Monitor conditions continuously with our Lake Management Team.
- Identify the right solution based on data.
- Test, measure, and refine over time
- Adaptive management ensures we are not locked into assumptions, responding to real conditions, not outdated plans.

Optional Adaptive Strategies:

- Treating North Lake & South Lake basins differently.
- Harmful Algal Bloom Monitoring & Management.
- Sediment core sample phosphorus release studies.



Referrals

Hear it from the people they've worked with

Angelo Ippilito- Indian Lake Association - Horrible experience with RLS, went through several interviews with lake managers, chose Barr, even though they were more expensive, and they have been everything they could possibly ask for and more. HIGHLY recommend us hiring Joe and Barr.

Terry Jeffery Riely- Purgatory Bluff Creek- Highly recommends Joe and Barr. Has worked with them for years and wouldn't consider working with anyone else. Did a treatment with Aluminum Sulfate that took the lake from murky with very little clarity to crystal clear in the fall and been clear ever since. They did two treatments that were \$200k each, but said well worth it. I believe that he said that their lake is about twice the size of ours.

Matt Kocian- Rice Creek Watershed District- Great recommendation. Has worked with Joe from before he was with Barr. Joe oversaw a 55 lake watershed and took several lakes off of the impaired list. Expert in sediment chemistry and they rely on him to keep their lakes healthy. High recommendation.

Gina Julien- Indiana, Lake Santee 250 acre private lake

-Dredged in 2022, 2024, 2025. McCullough Dredging Company (Mechanical) Saw incredible results, night and day difference. \$21 per sq yard. Roughly \$300k expense.

-Said AC has been a "lifesaver", act as an incredible support system, team is always available whenever members send pics with lake issues.

-AC does 6 algae treatments per year, implements shoreline vegetation etc.

Ron Milford-Koontz Lake Conservancy District (Koontz Lake); Walkerton, IN. 339 acres.

-AC does their weed and algae treatment, testing and vegetation management.

-Have seen a dramatic improvement in the lake and water clarity

-Have called several times to have them out to address algae blooms in between



Why the Aquatic/Barr Lake Management Team?

- Science-first: recommended a Nutrient Budget to identify pollutant sources driving algal blooms and poor clarity, completed by August.
- Integrated team: assembled specialists in watershed/nutrient management, water quality/HABs, fisheries, and vegetation for targeted remediation.
- Holistic ecosystem focus: addressed fisheries, biodiversity, and long-term resilience rather than isolated issues.
- External source control: prioritized stormwater, tributaries, drains, culverts, and septic systems, explaining why in-lake treatments alone are inadequate.
- Clear, accessible communication: translated complex science and clarified why prior treatments failed.
- Collaborative support: already providing training and reviewing our data to guide decisions.