



Lake Recirculation Equipment

City Council Meeting
February 1, 2022

Taste & Odor Events

Is the water safe to drink during events?

- * Yes
- * Although the water may have an off taste to some, it is safe to drink.
- * All laboratory tests show the water meets all water quality guidelines for health standards.

What makes my water taste bad?

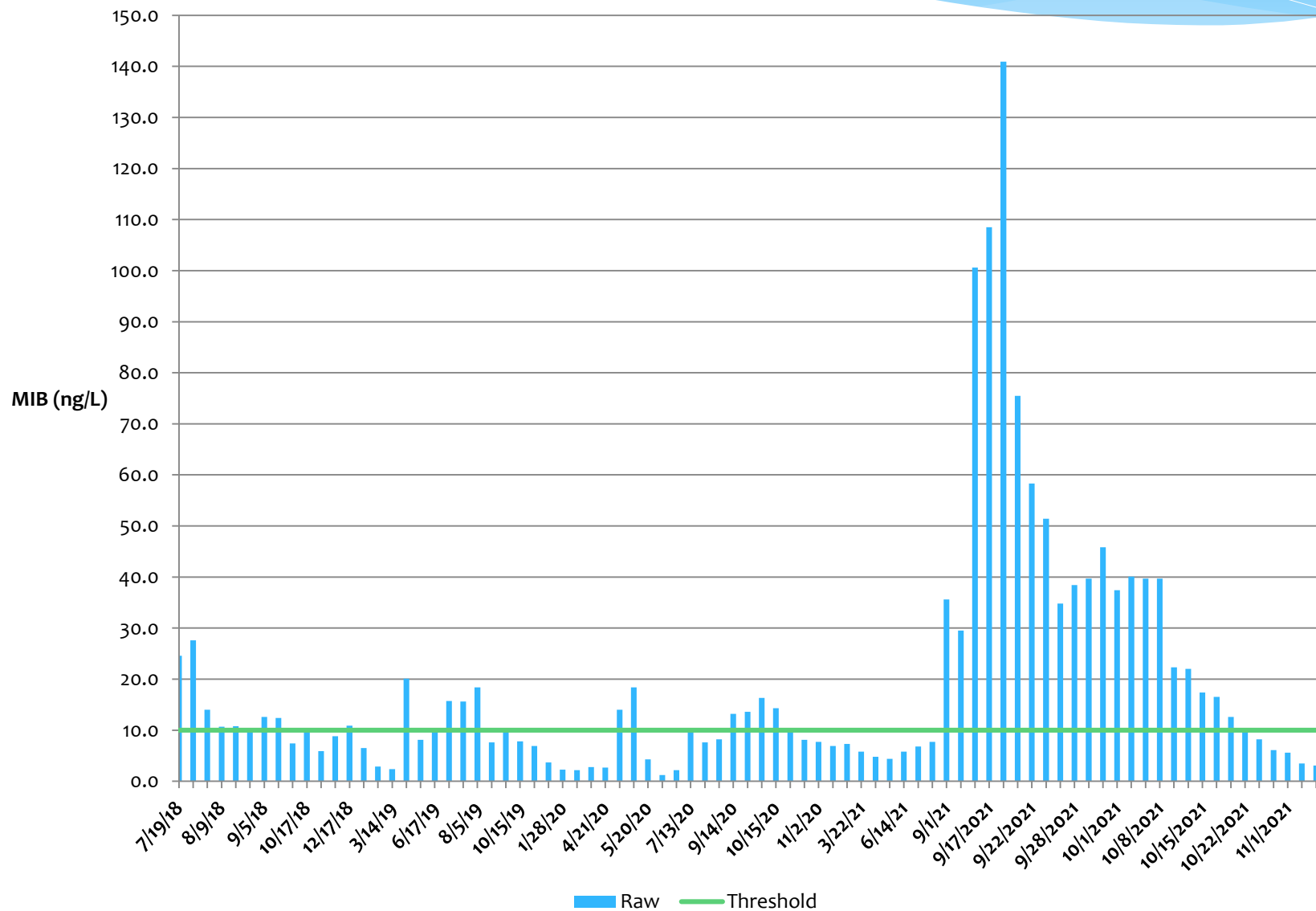
With lake turnover, algal compounds from naturally occurring blue green algae result, and some will notice a change in the taste and odor of drinking water.

- Musty, Dirty, Earthy
- Qualitatively Identified by Taste & Odor Tests at Plant (Human Threshold – 10 to 30 ng/l)
- Quantified by Geosmin and MIB (Methylisoborneol)

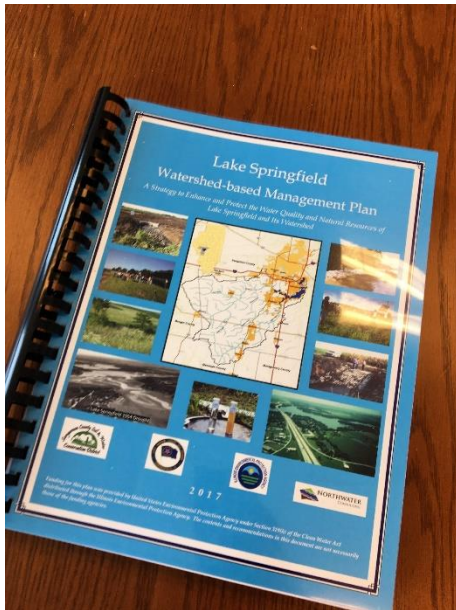
Why hasn't this happened before?

- * Lake turnover has happened before and is normal occurrence for surface water supplies
- * Fall of 2021 Lake Springfield had abnormally high algal compound levels, not typical, and for a prolonged period taste and odor issues resulted
- * The water treatment plant normally has the capability to remove most taste and odor causing compounds from the water
- * Lack of water movement and less thermal load including with nonoperation of Units 31, 32 and 33 in recent months appears to correlate

Lake Springfield MIB Levels July 2018-November 2021

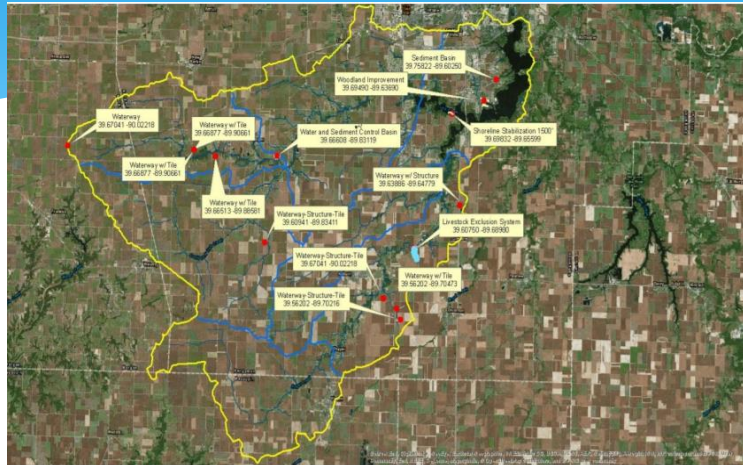


Mitigations



- * Lake Springfield Best Management Practices (BMPs)
- * Intake Level Adjustment
- * Powder Activated Carbon Feed
- * Plant Washouts
- * Distribution System Flushing

Lake Springfield BMPs



LAKE SPRINGFIELD WATERSHED BASED MANAGEMENT PLAN 2017



LAKE SPRINGFIELD SHORELINE STABILIZATION USING ROCK RIP RAP



GRASSED WATERWAY IN LAKE SPRINGFIELD WATERSHED

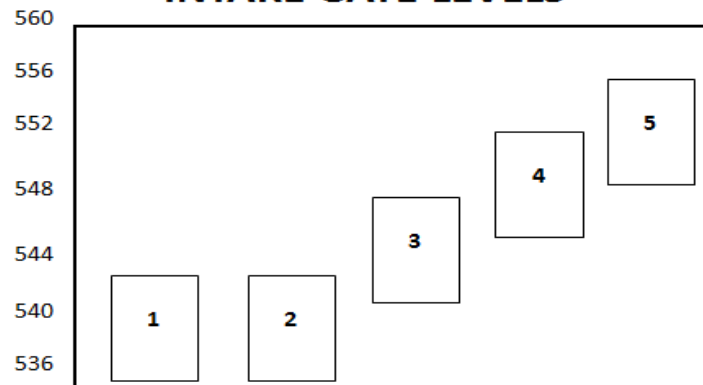


FILTER STRIP IN LAKE SPRINGFIELD WATERSHED

Intake

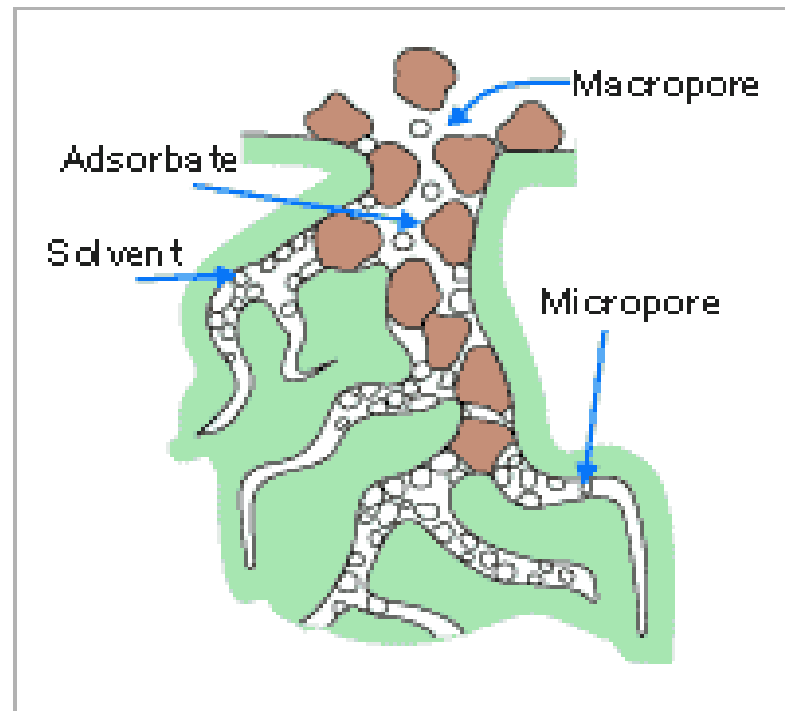


INTAKE GATE LEVELS



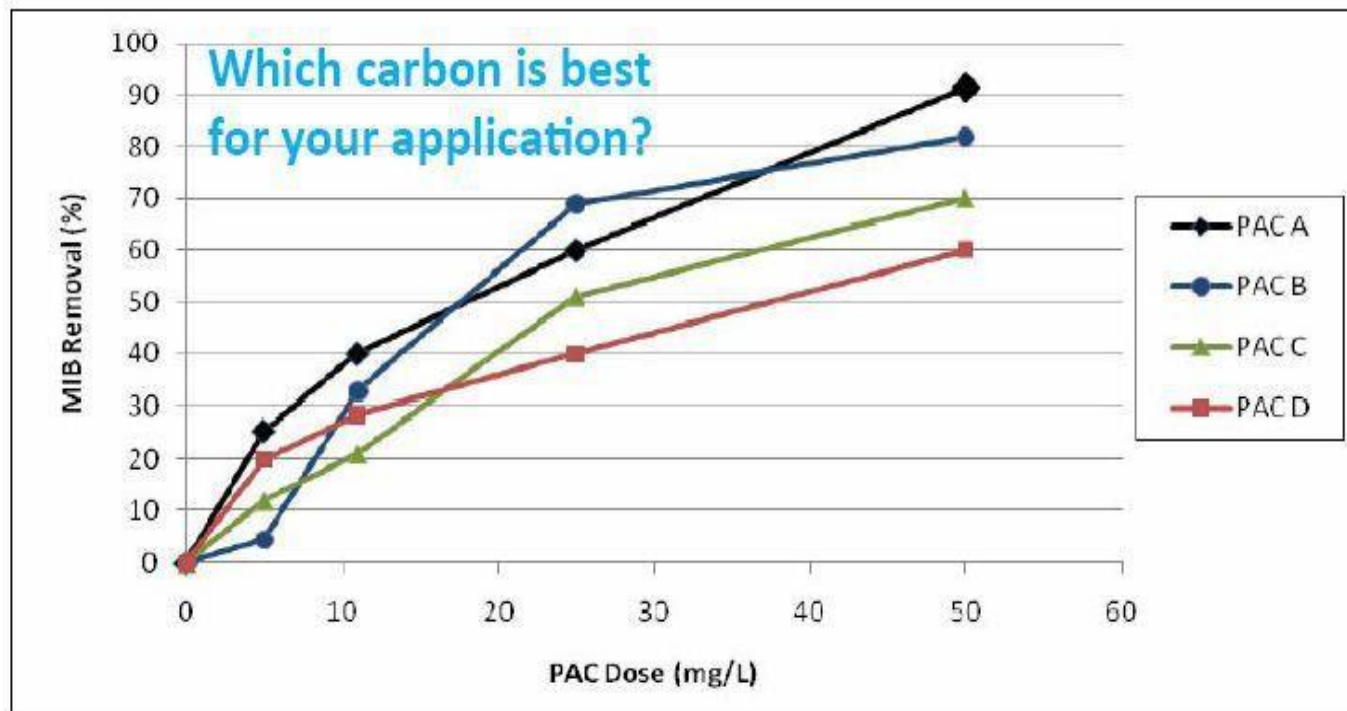
Powdered Activated Carbon

- * Macroporosity
- * Microporosity



Performance Testing on Carbon EPS Labs in Jacksonville, FL

PAC Dose Removal Curve



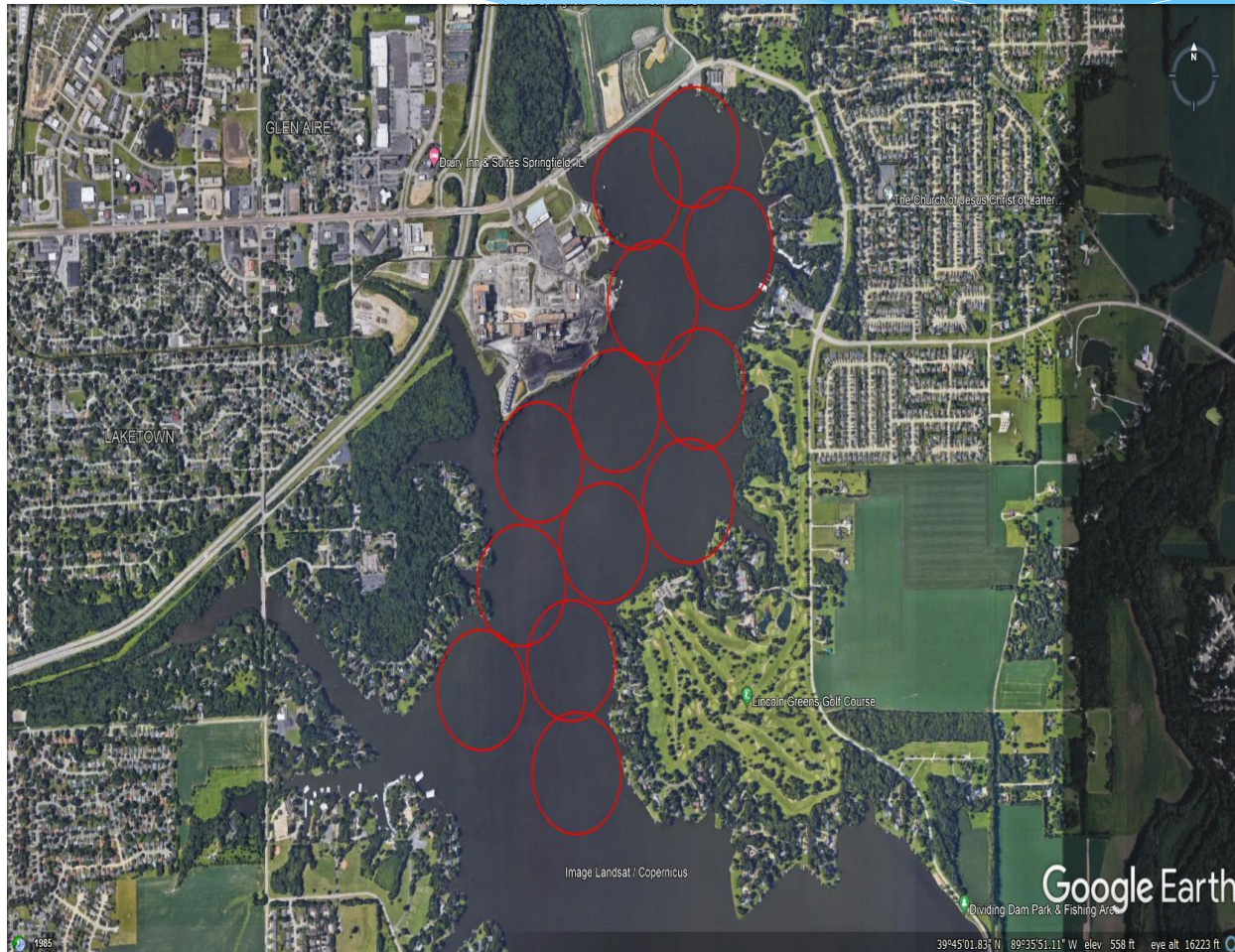
Plant Washouts and Distribution System Flushing



Additional Potential Tools to Combat Taste & Odor

- * Construct a Pretreatment Storage Basin to Increase Carbon Contact Time
- * Implement a Pretreatment Oxidant
- * Alter Treatment Process (Ozone, UV/Peroxide, GAC Biologically Active Filters, Resin Based Technology Etc...)
- * Lake Circulation – Improve Ecology of the Lake

Lake Aeration and Mixing



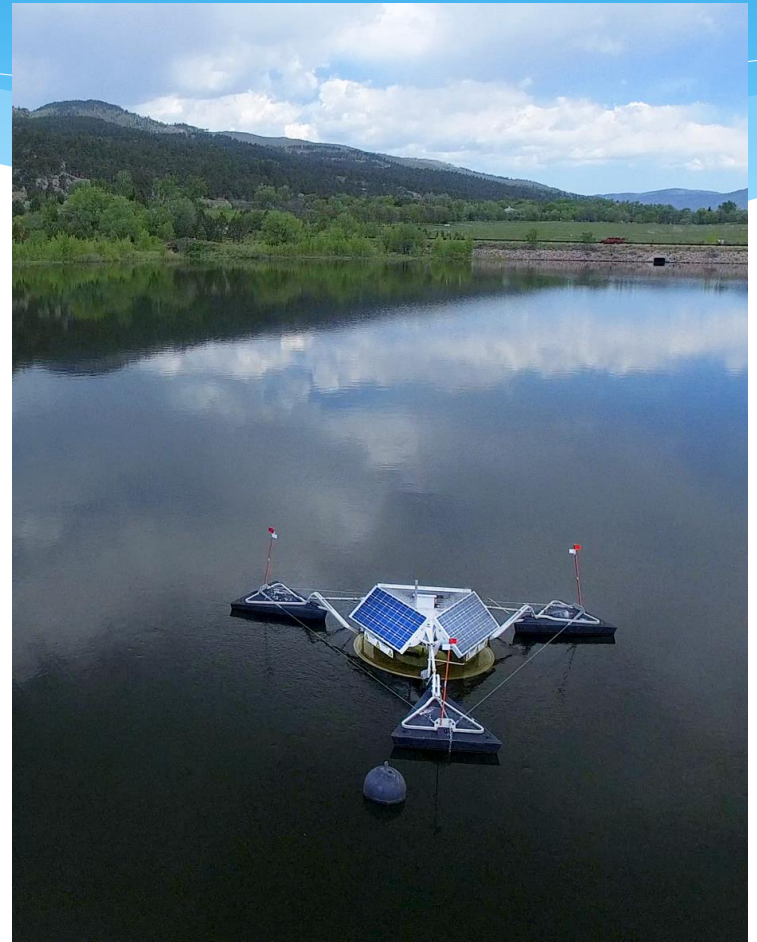
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Water Quality Solutions

Michael Christensen

Regional Manager
Ixom Watercare



Problems in Lakes & Reservoirs

Cyanobacteria (Blue-Green Algae)

- Cyanotoxins
- Taste & odor in drinking water.
- Loss of property value.
- Loss of recreational use.



Lake circulation is not new.

Lake *managers* have been promoting lake circulation for 30 plus years.

In 2001 the SolarBee was invented. It has proven to be consistent and reliable circulation equipment.

It's unique features (solar powered and ability to adjust circulation depth) is a desired tool to lake management.



SolarBee® Lake Circulators, 450 lakes Over 200 water treatment plants



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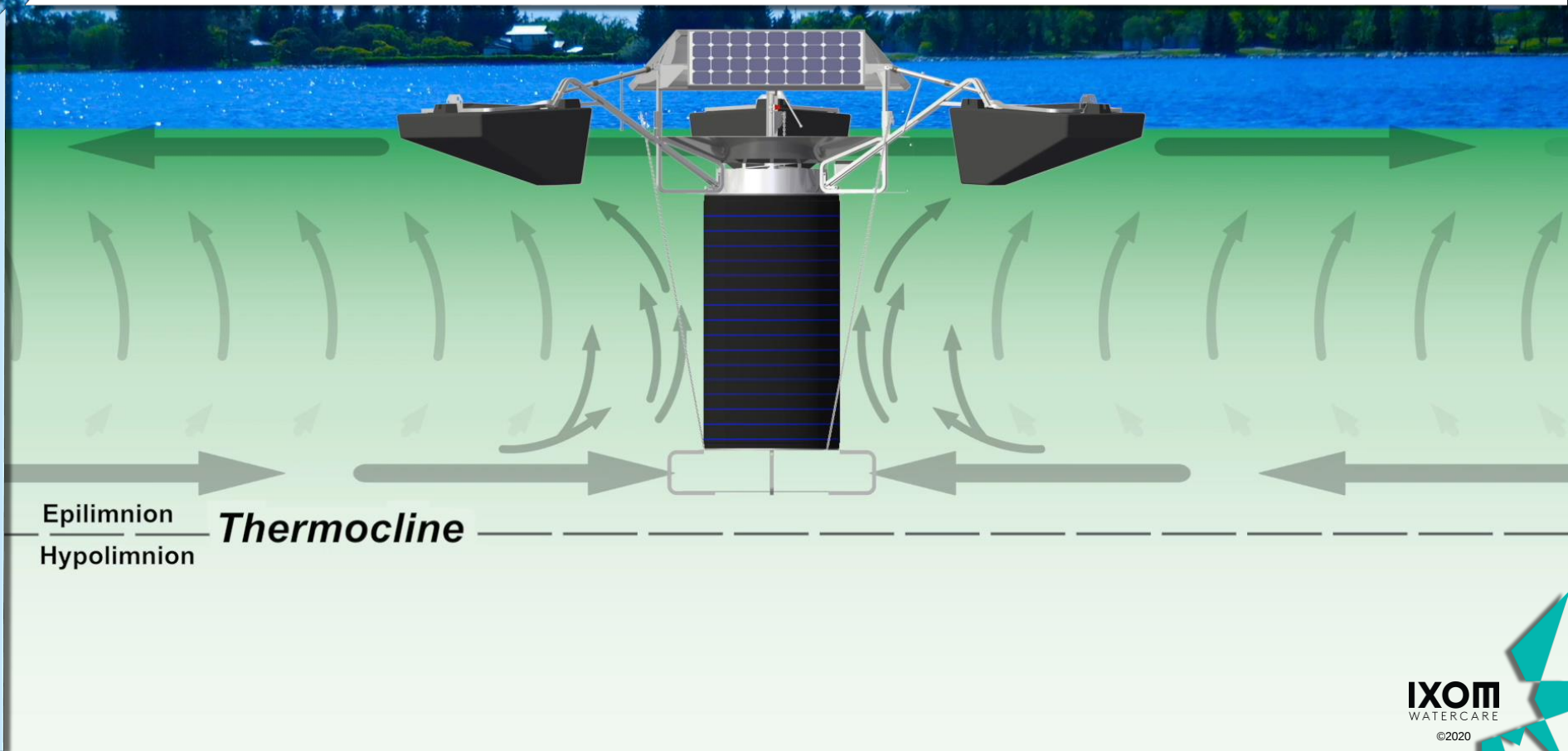
SolarBee® Lake Circulators

Updraft, low head, high volume axial pump, designed to circulate large volumes of water in reservoirs.

- Solar-powered.
- On-board battery system for day/night operation.
- Circulates up to 10,000 gpm.
- 2 year warranty

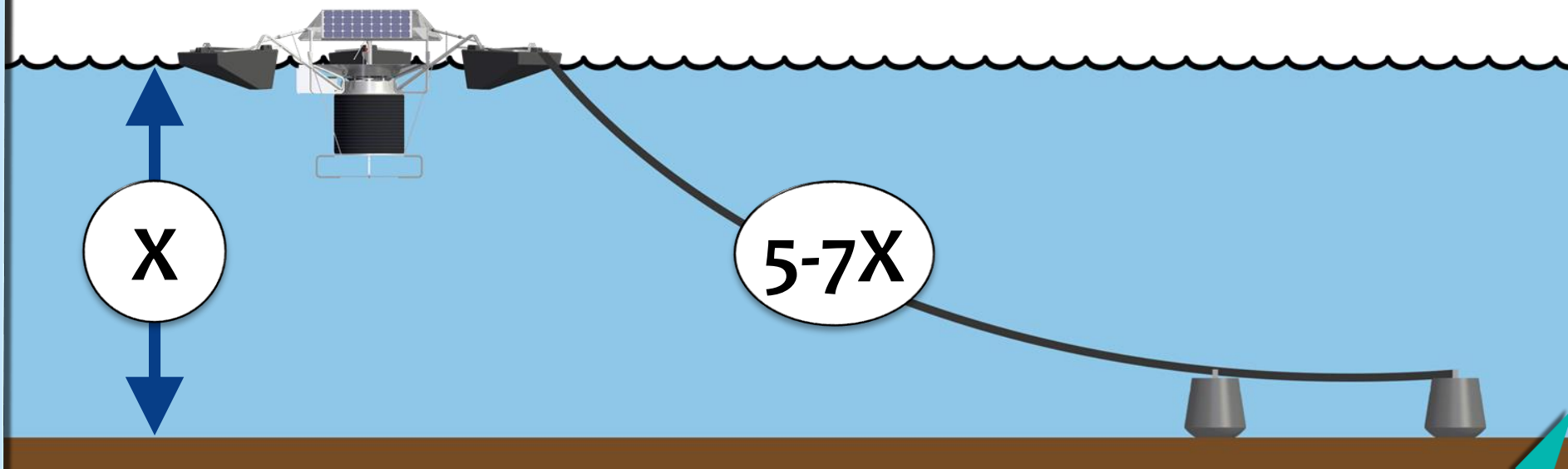


SolarBee® Epilimnetic Circulation



Mixer Designs- Mooring Block Anchoring

Anchor Chain Scope 5-7:1
Based on depth at the machine.



Floating Lake Circulators- Spacing

~0.25 mile spacing



Four BGA control methods using SolarBee circulation.

- 1. Increases Good Algae and bacteria growth to out compete BGA for nutrients.**
- 2. Promotes growth of Zooplankton. They harvest BGA.**
- 3. Disrupts BGA buoyancy. BGA competitive advantage.**
- 4. Promotes Cyanophage (virus), a predator of Cyanobacteria.**

Case Study: Otter Lake Water Commission, Virden IL

2006- Installed 4 SolarBees to cover around 120 acres in front of 2.5 mg/day drinking water plant.

Goal- reduce taste and odor events.

Owner remarks-

Improved water quality to plant.

MIB and Geosmin were drastically reduced.

BGA blooms were less frequent and intense.

Robust equipment with low maintenance.

**Case Study: Newton County Board of Commissioners,
Covington GA**

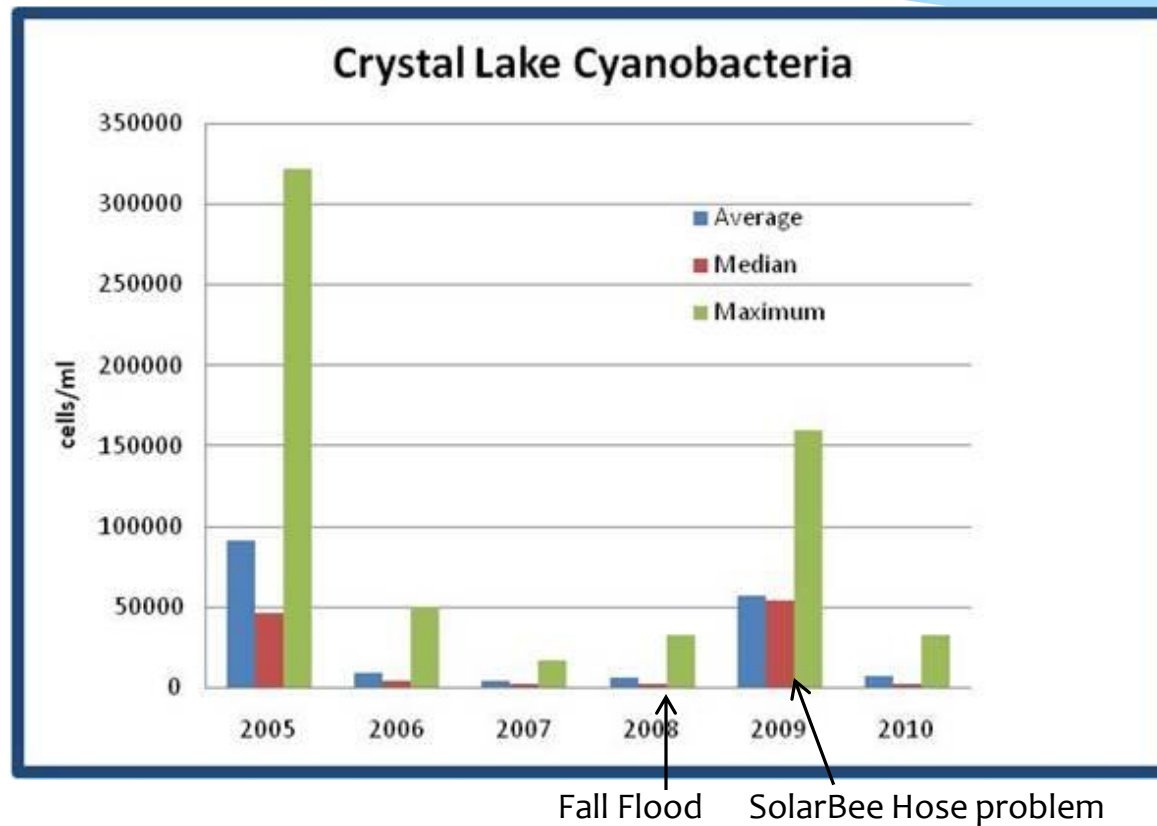
2013- Installed 12 SolarBees to cover around 360 acres in front of 12 mg/day (future 25mg/d) drinking water plant. Goal- reduce taste and odor events.

Owner remarks-

**Huge reduction in taste and odor complaints.
County saved \$250K chemical use.
Lowered activated carbon use by 75%.
2019 was voted “Best Water in GA”.**

Case Study: Des Moines IA, Crystal Lake Reservoir

SolarBees installed in 2006



Fall Flood

SolarBee Hose problem

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Questions?

Michael Christensen

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Ixom Watercare

