Lake Springfield, Lake Circulation Equipment & Other Solutions

Public Meeting March 9, 2022



The Water Department's Job

We work to not only ensure drinking water is safe to drink and meeting or exceeding all regulatory standards, but also to meet our customer's expectations for CWLP's water aesthetics –its taste, odor and appearance.

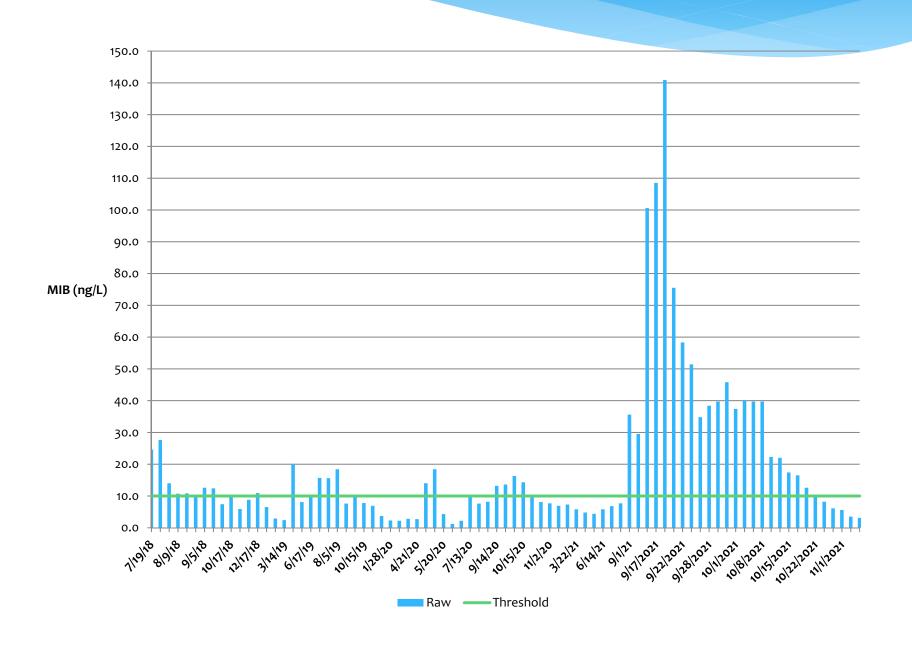
Lake Turnover & Algae Blooms

- * With seasonal temperature changes, the water from the top of the lake changes places with the water on the bottom of the lake.
- * Algal compounds increase in raw lake water and can impact taste and odor in finished drinking water
- * Algal compounds, Geosmin and Methylisoborneol (MIB) found in naturally occurring blue green algae

2021 Taste & Odor Event

- * Abnormally high algal compound levels for a prolonged period mid-August-October 7
- * Lack of water movement and less thermal load (heat) including with nonoperation of Units 31, 32 and 33 in recent months appears to correlate
- * Normal treatment mechanism of powder activated carbon couldn't overcome taste and odor as normal for Geosmin & MIB

Lake Springfield MIB Levels July 2018-November 2021



Algae Impacts On Water Taste & Odor

- Safe to drink but some describe taste and odor that is musty, dirty, earthy
- Qualitatively Identified by Taste
 & Odor Tests at Plant (Human
 Threshold 10 to 30 ng/l)
- 1 ng/L = One grain of sand in Olympic Sized Pool
- Quantified by Geosmin and MIB (Methylisoborneol)



Water Dispatch Complaint Log

Over 100 formal complaints/inquiries from August 31 to October 7

Andover Dr Austin Dr

Back Bay Dr Sherman

Bates

Beaver Creek Ln

Bennington Drive Block Edwards

Brandonshire Dr

Camden

Cantrell Ct

Carl Prairie Dr

Clearwater Lane

Country Place

Dartmouth Dr.

Deming Dr

Dial Court

S Douglas

Dryden Dr

Dunwich

E Black

E Black Ave

E Carpenter

L carpenter

E Converse

E Enos Ave

E Griffiths Ave E Hazel Dell Rd

E Lenox

E Leliox

Elderberry Ln

Engineering Drive

Fairfield Dr Fairmont Dr

- u

Findley

Greggory Ct

Harriet Ln

Haverford

Hedley Rd

Horace Mann Plaza

Larchmont Dr

Lorrie Ln

Midland Ct

N 1st St

N 4th St

N Franklin Ave

N Grand Ave W

N Lincoln Ave

Ninebark Drive

N 11th Street

Ramsey Road

Redbird Ln

Redhawk

Redlands Dr

Ridgely Lot 34

S 1st St

S 5th St

S 6th

S Dirksen Pkwy

S Durkin

S Grand Ave W

S Macarthur Blvd

S Noble

S Park

S Spring

S Walnut St

S. 10th St

S. 12th St.

S. 2nd St

S. Hoover

S. State St

S. Walnut

Saxony Rd

Shadowfax Dr

Sheffield

Sherborn

Summerton

Sussex

Tennyson Dr

Turnberry Place

W Allen

w Calhoun

W Camp Sangamo Rd

W Hay St

W Jackson

W Jefferson

W Jerrer John

W Maple Ave

W Monroe

W Vernon

W Woodland Ave

Westchester Blvd

Wexford Dr

Wildcat Run

Williams Blvd.

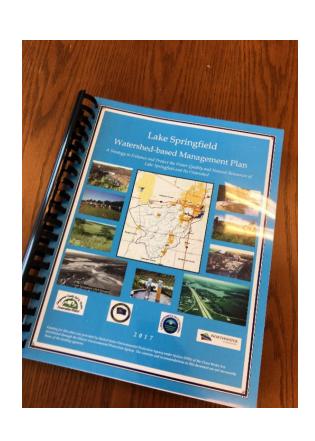
Williamsville

Windsor Rd

Winners Circle Dr

Winterberry

Mitigations



- * Lake SpringfieldBest 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



GRASSED WATERWAY IN LAKE SPRINGFIELD WATERSHED



LAKE SPRINGFIELD SHORELINE STABILIZATION USING ROCK RIP RAP

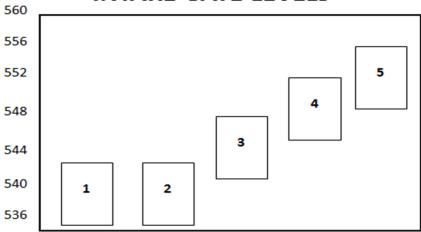


FILTER STRIP IN LAKE SPRINGFIELD WATERSHED

Intake

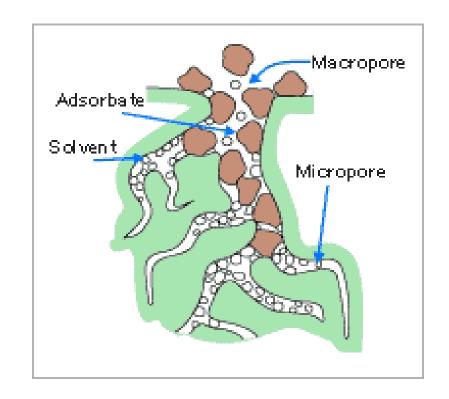


INTAKE GATE LEVELS



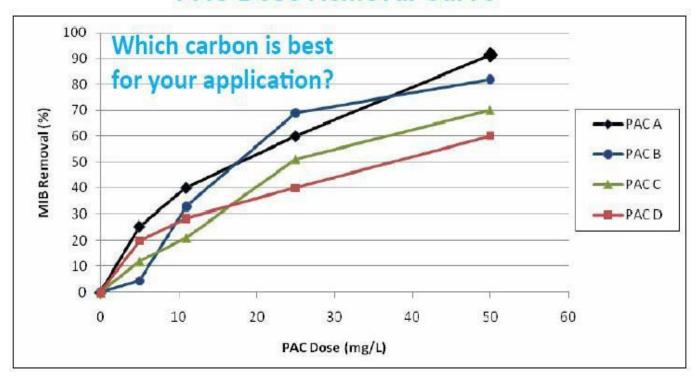
Powdered Activated Carbon

- * Macroporosity
- * Microporosity



Performance Testing on Carbon EPS Labs in Jacksonville, FL

PAC Dose Removal Curve



Plant Washouts and Distribution System Flushing



Lake Circulators - Solar Bees

- * Improves Lake Circulation
 - * Ecology of the Lake
- * Reduces MIB & Geosmin
- Reduces Blue Green Algae& Green Sheen
- * Lowers treatment costs

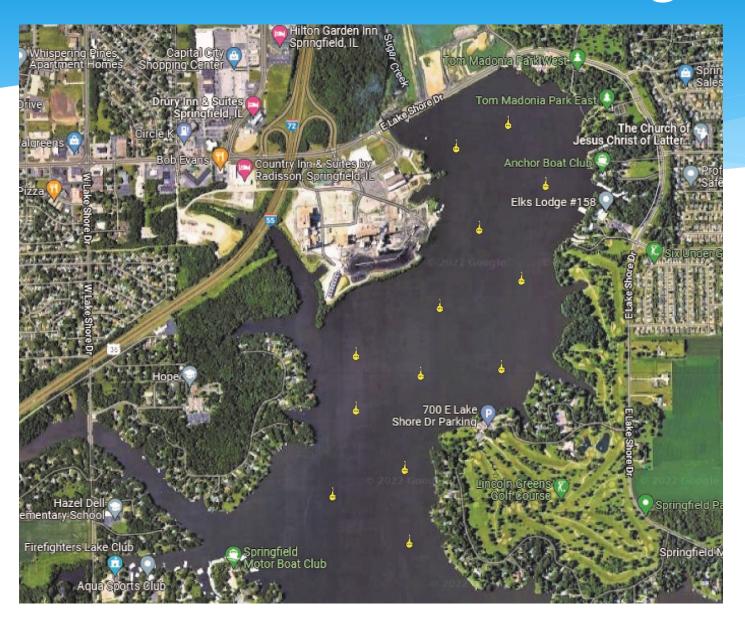


Lake Circulators - Solar Bees

- * In use on 450 water reservoirs, 200 of those for water treatment plants, & 70% w recreation
- * Environmentally Friendly, solar-powered
- * Quick Implementation
- * Easy to move
- * ARPA funding



Lake Aeration and Mixing



Additional Options To Be Studied

Higher Capital Cost-Long Term Projects \$10M-\$30M

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

Dallman Pumps

- * Annual Electric cost \$1 million
- * Permitting
- * Maintenance of facilities to be retired
- * Running pumps alone doesn't add thermal load to the lake, stabilizing the lake temperature through seasons

XOIIWATERCARE

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.

Solor Bee Lake Circulators, 450 lakes Over 200 water treatment plants











How does





Solor Bee 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



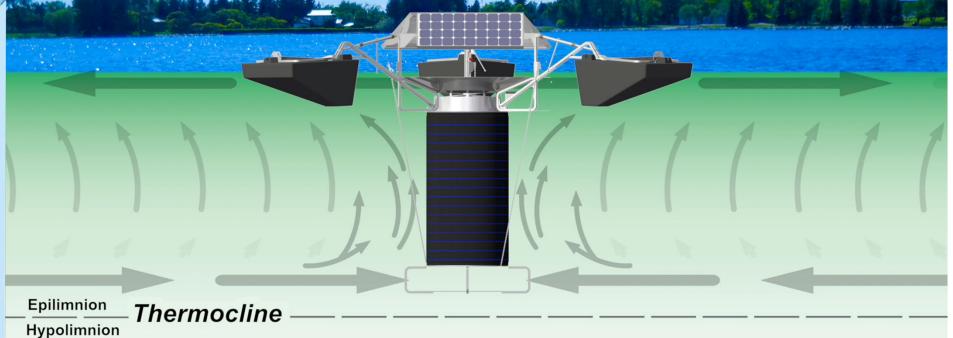
Medora Corporation

[GridBee SolorBee]

White Board Series
"Everything Lake"



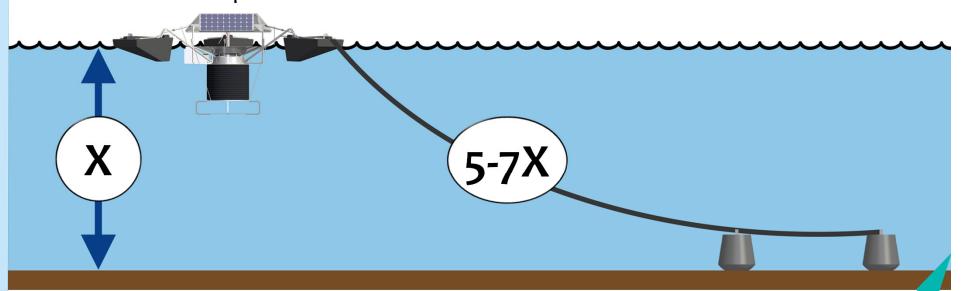
SolarBee® Epilimnetic Circulation





Mixer Designs- Mooring Block Anchoring

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





Floating Lake Circulators- **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

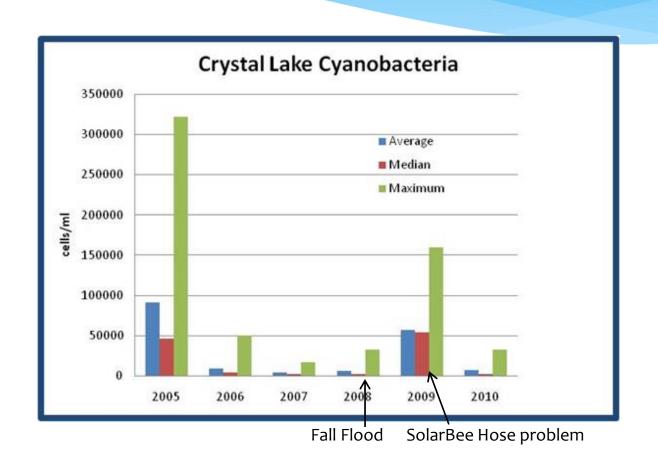
2013- Installed 12 SolarBees to cover around 360 acres in front of 12 mg/day (future 25mg/d) drinking water plant. Goal-reduce taste and odor events.

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





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Questions?

Michael Christensen

Regional Manager Ixom Watercare



