

LakeTech



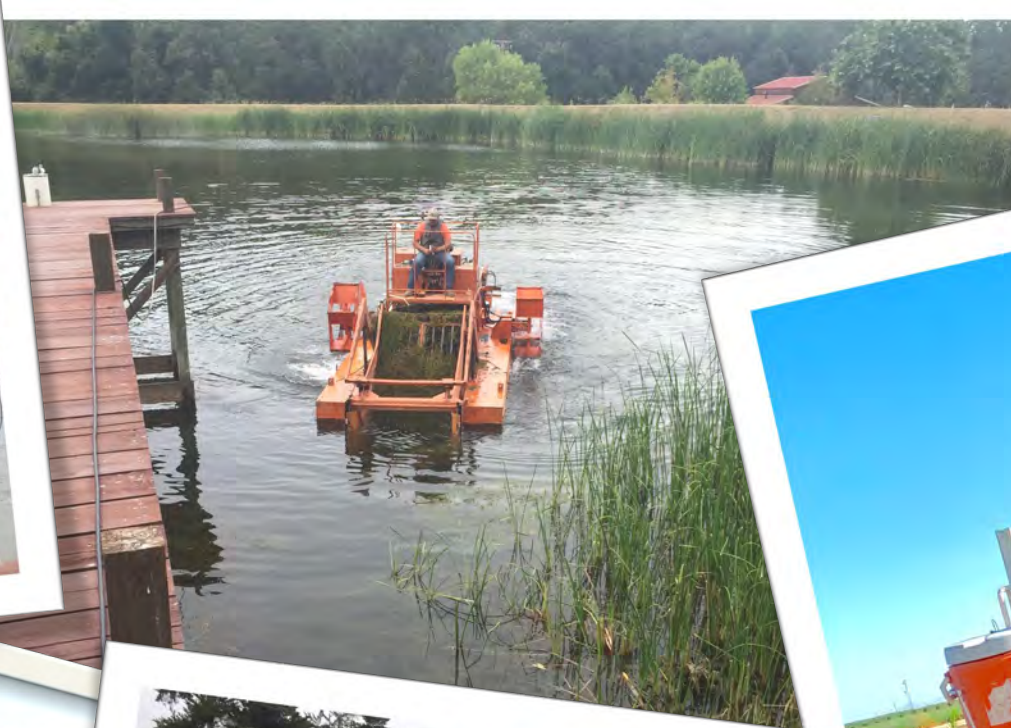
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Aquatic pest management

like all land management requires vigilance, patience and persistence.



IF YOU SEE THIS AD, “DON’T BUY IT”

Is this even the same lake in the photos?!

Eutrophication: eu·troph·i·ca·tion

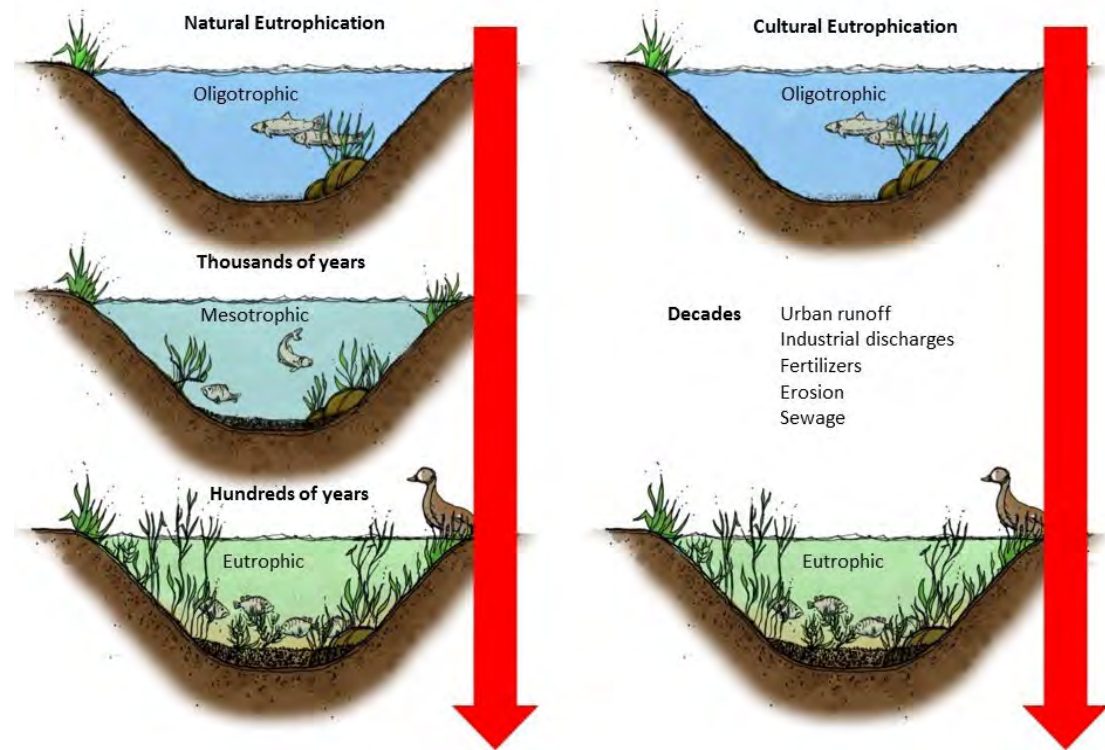
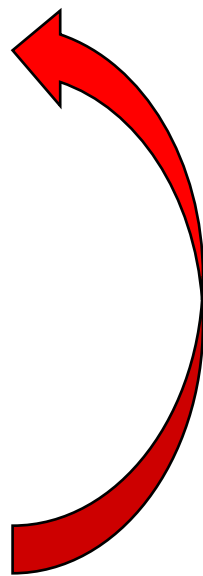
Eutrophication, which comes from the Greek *eutrophos*, "**well-nourished**"

Natural vs. Human-Induced Eutrophication

The process of eutrophication is natural. For many lakes, as they age over centuries, there is a buildup of nutrients, sediment, and plant material, which slowly fill the lake basin. Eventually, the process ends and the basin becomes colonized by terrestrial vegetation. The timing of natural eutrophication is highly variable and depends on the characteristics of the basin, watershed, and climate. However, humans, by altering nutrient inputs, have greatly increased the pace at which eutrophication can occur.

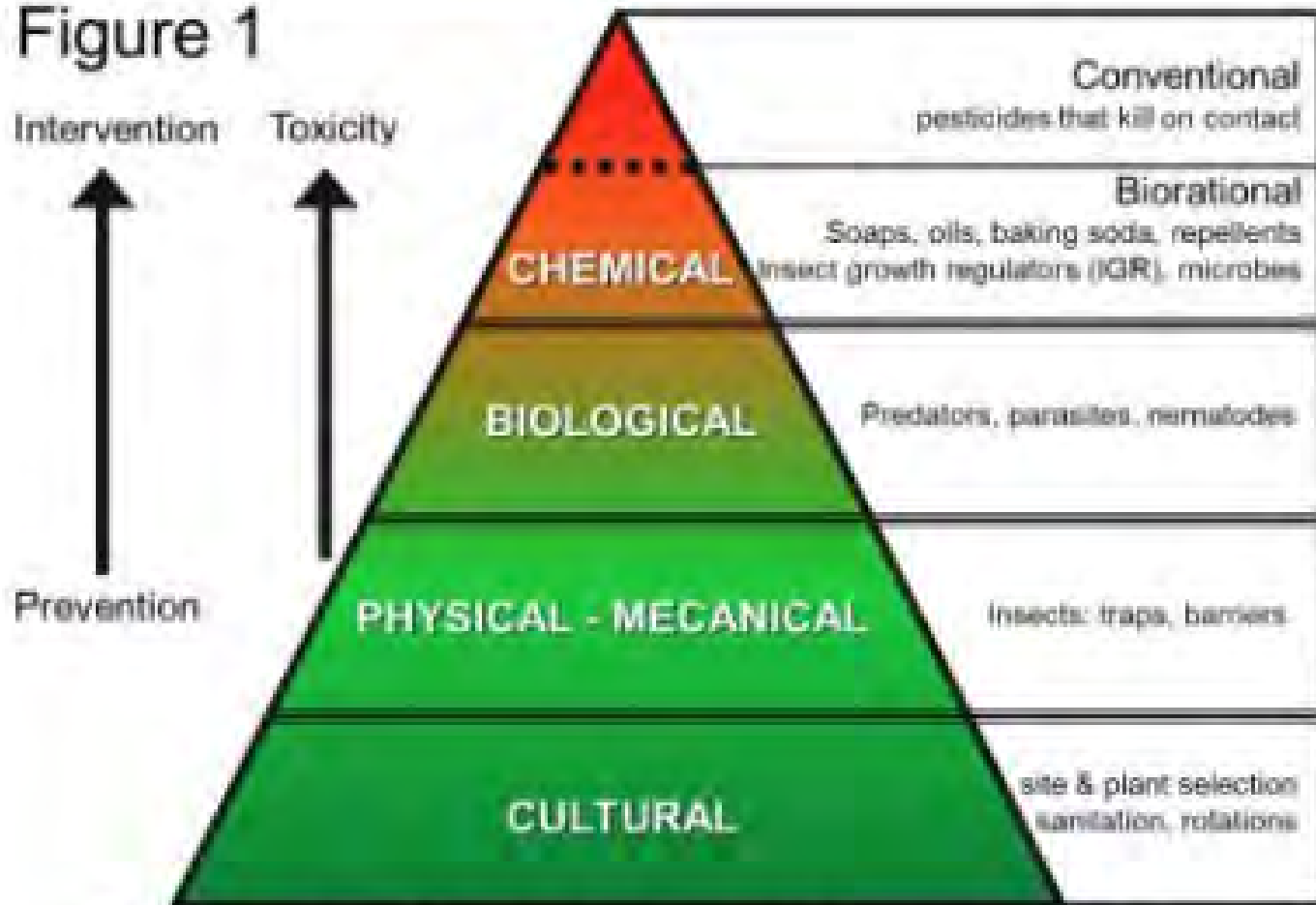
- Driven by excess nutrients which
- Fuel algae and plant growth beyond what can be consumed by zooplankton.
- Resulting in accumulation of organic matter and decomposition, which
- Increases Dissolved Oxygen (DO) demand
- DO depletion (hypoxia/anoxia) results in the release of nutrients from the sediment (Internal loading), which intern further drive more algae and plant growth

“positive feedback loop”



What is Integrated Pest management?

Figure 1



Pyramid of IPM Tactics for Pests of Crops, Lawn & Garden

Source: Penn State Extension: PA Integrated Pest Management

Step 1

• **IDENTIFY**

- Mistaken identity may lead to ineffective actions. Make sure you identify your pest correctly so that you may take proper action to eliminate it.

Step 2

• **MONITORING**

- Now that you know what type of pest you have, you must decide if you need to take action. This step also helps you learn where the pests are and if they are increasing/decreasing in number.

Step 3

• **ASSESSMENT**

- For each pest species at each site, set an action threshold—the pest population level at which control actions must be employed. Begin to develop an action plan to rid your home of the problem pests. Remember to think holistically.

Step 4

• **IMPLEMENTATION**

- It's time to take action. Move swiftly and thoroughly to ensure the best results. Employ nonpesticidal tactics first. Consider the use of chemicals only as a last resort.

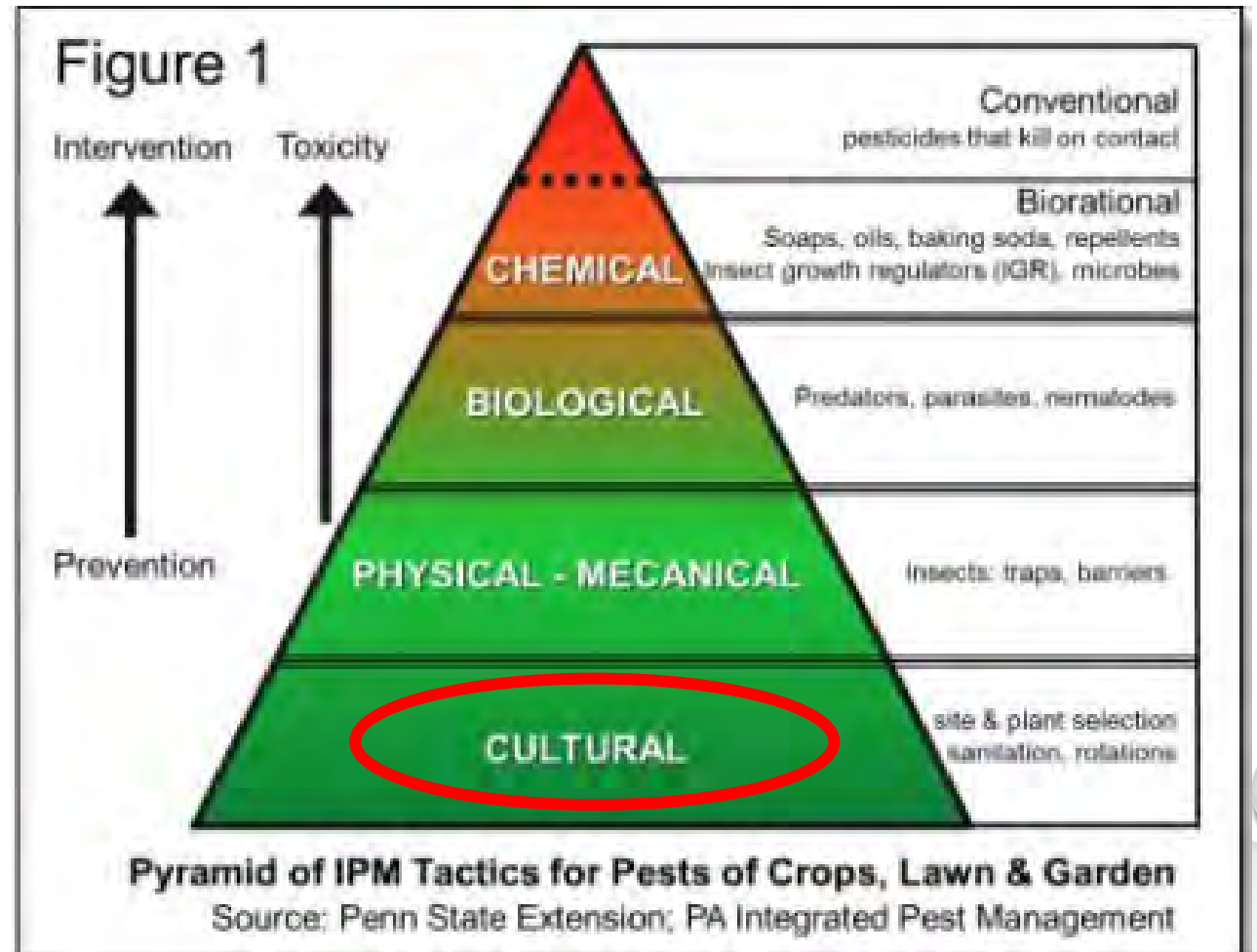
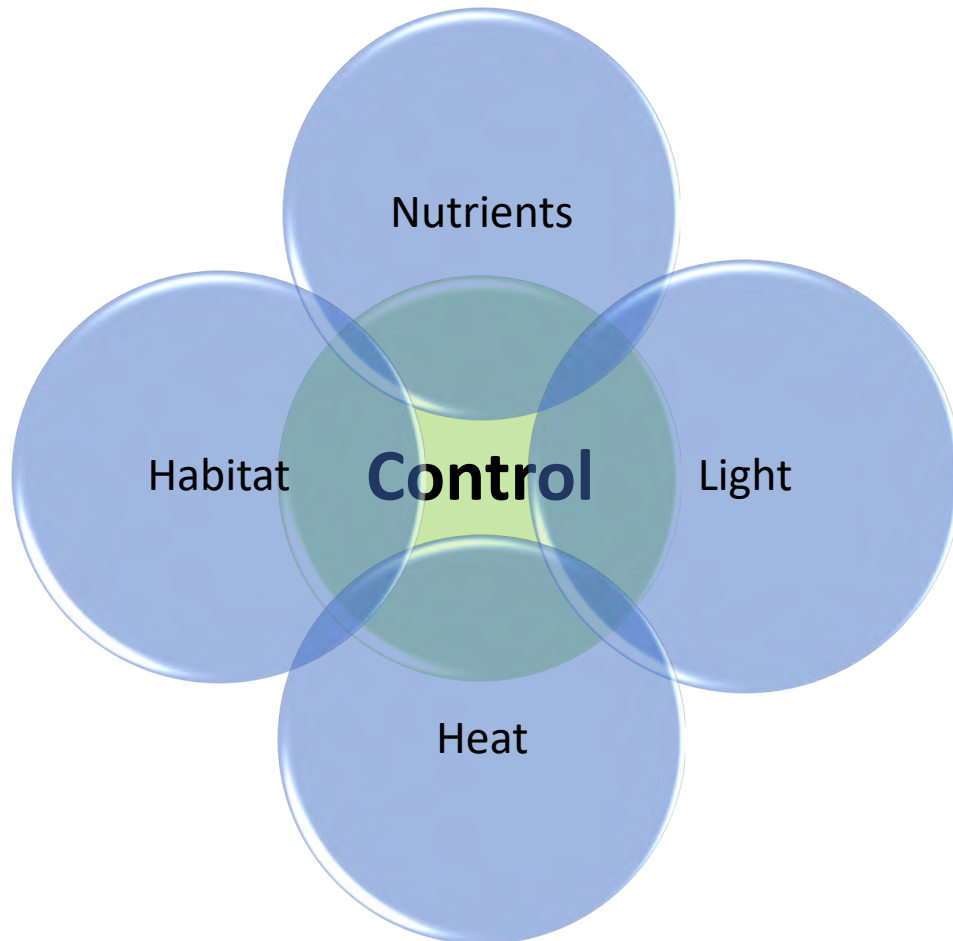
Step 5

• **EVALUATE RESULTS**

- Did it work? If it did, then remember to keep up with the IPM strategies in order to prevent the pest from returning. If it was less successful, evaluate what went wrong and create a new action plan.

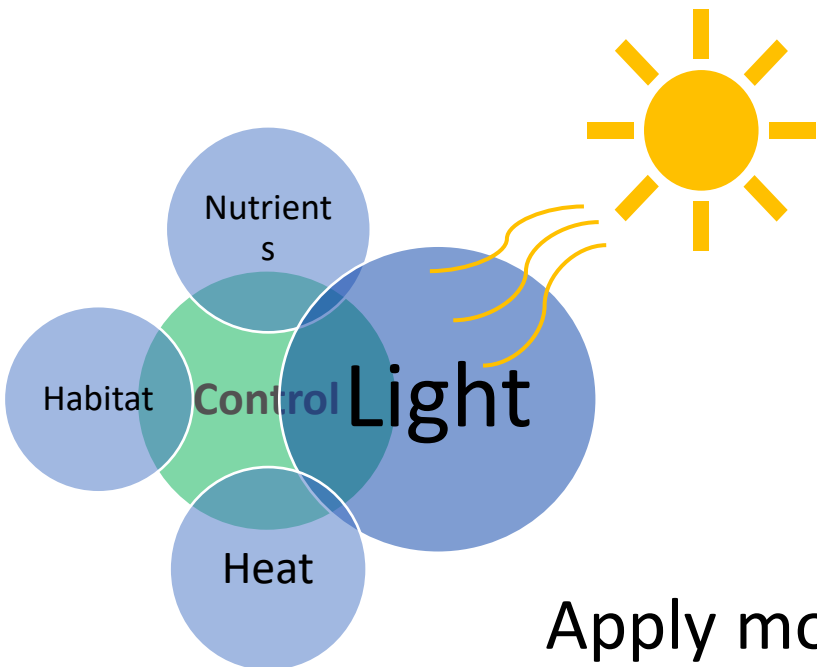
SO, WHAT DO WE DO?

IPM Tactic #1: Cultural controls - practices that reduce pest establishment, reproduction, dispersal, and survival.

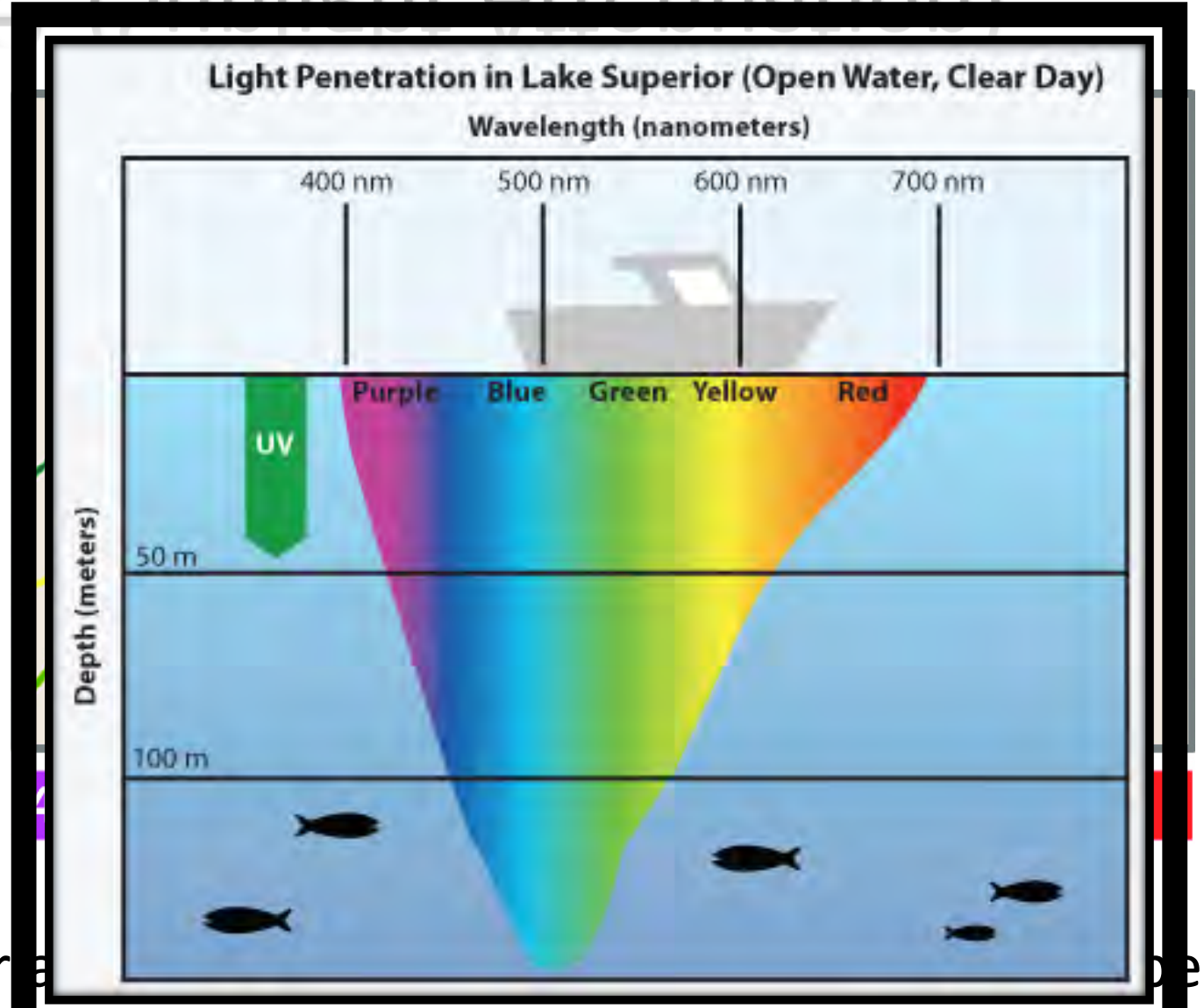


Pond Dye (Sunlight Attenuation)

Reducing sunlight slows the speed of growth of algae and plants.

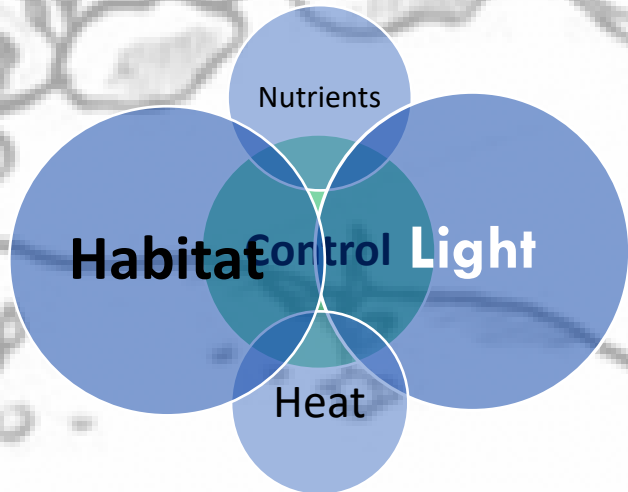
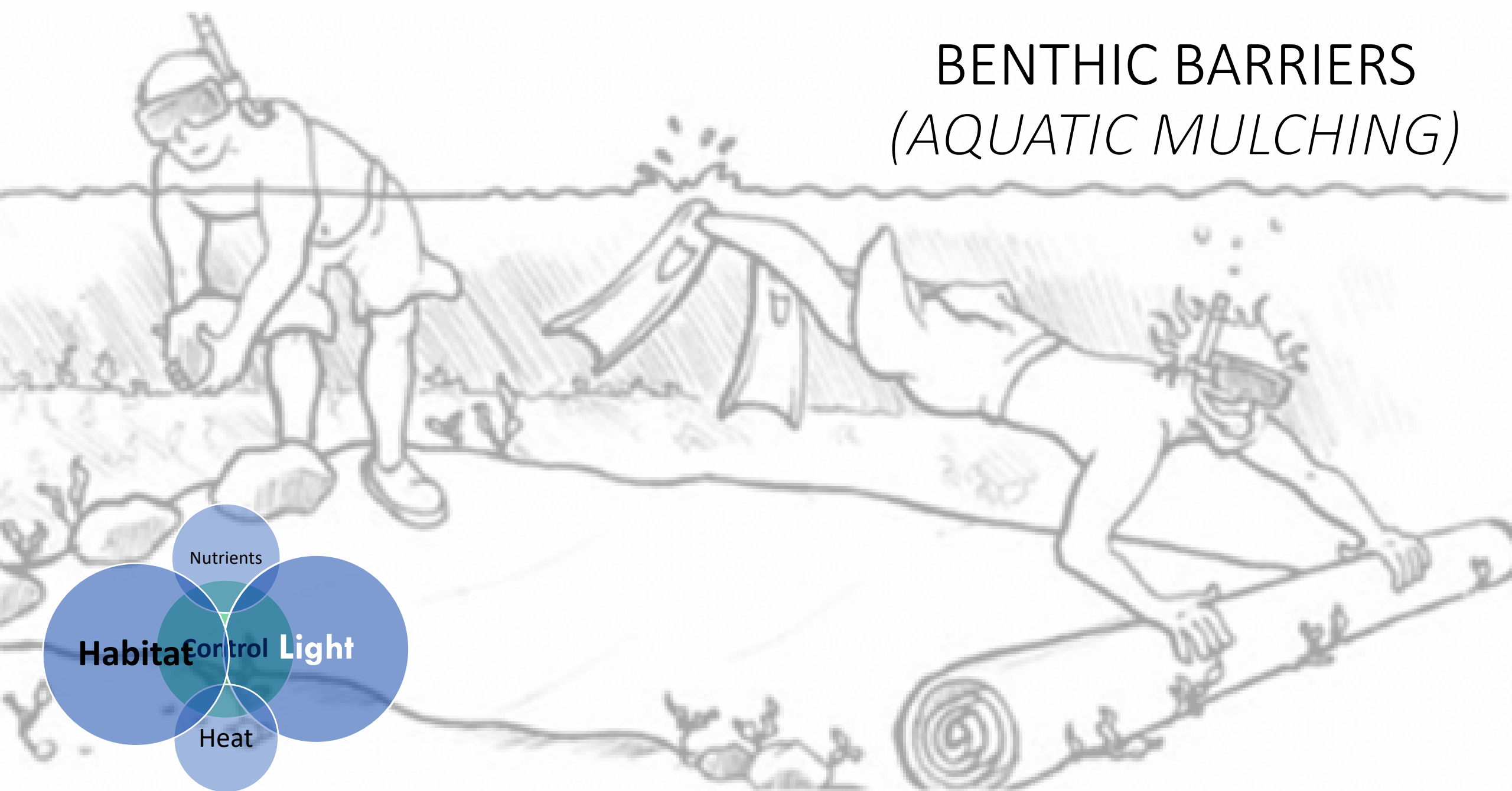


Apply monthly or



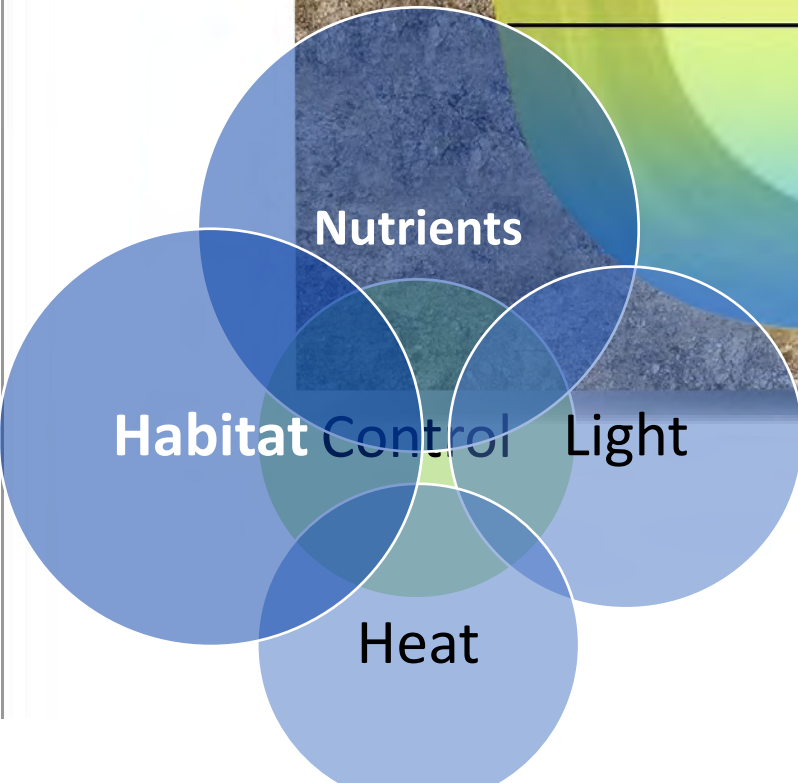
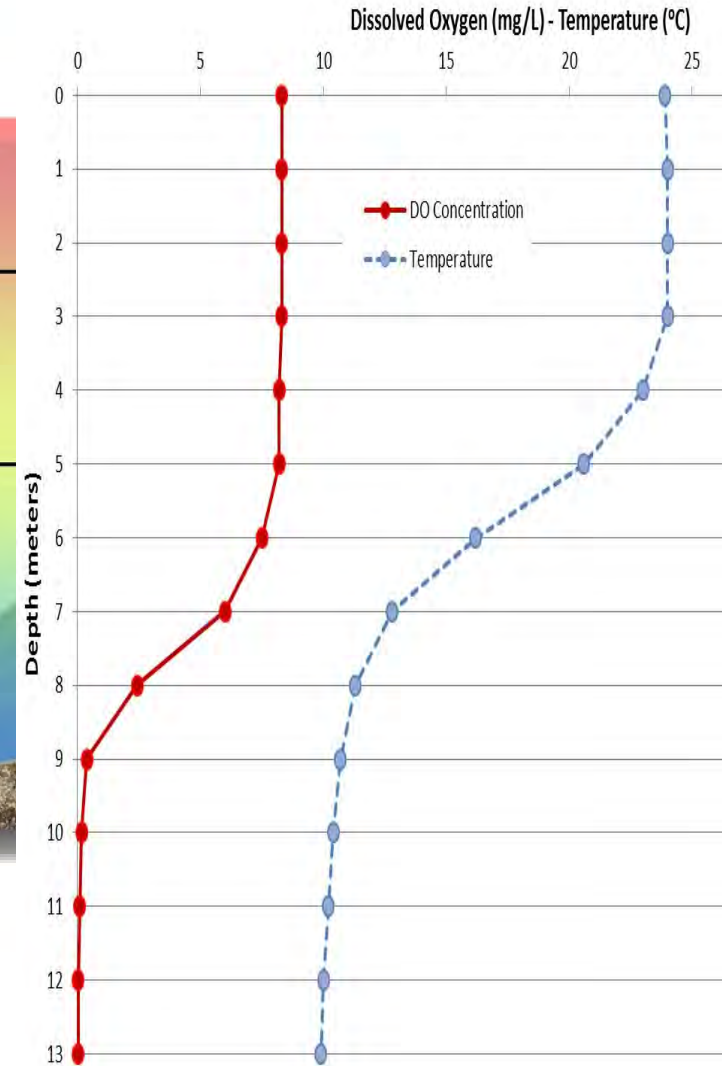
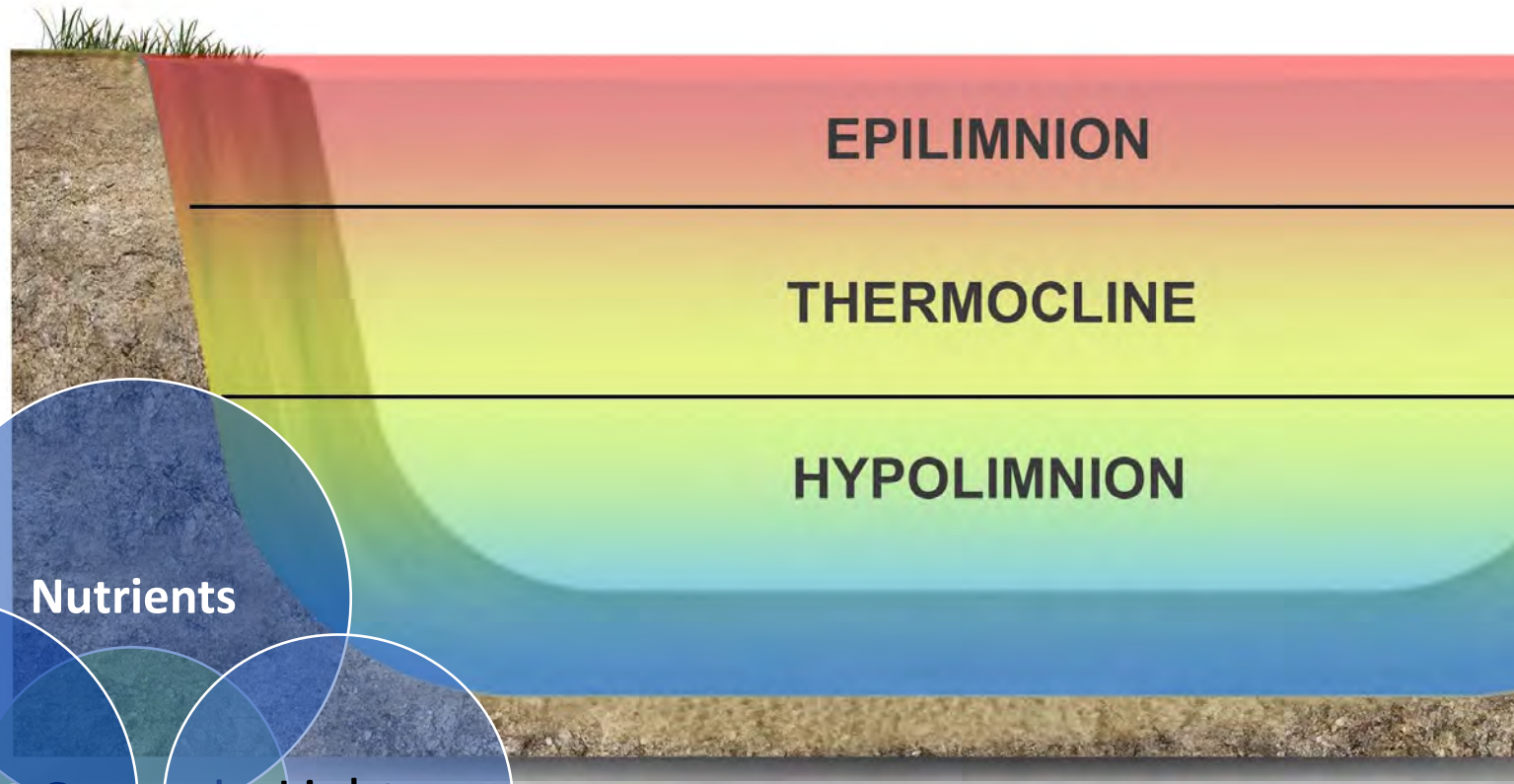
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BENTHIC BARRIERS (AQUATIC MULCHING)

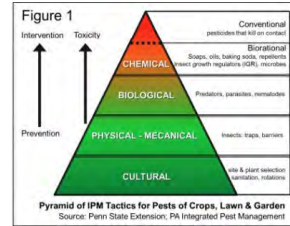


Labor intensive, typically small scale, installed early in the season and removed after a month or two.

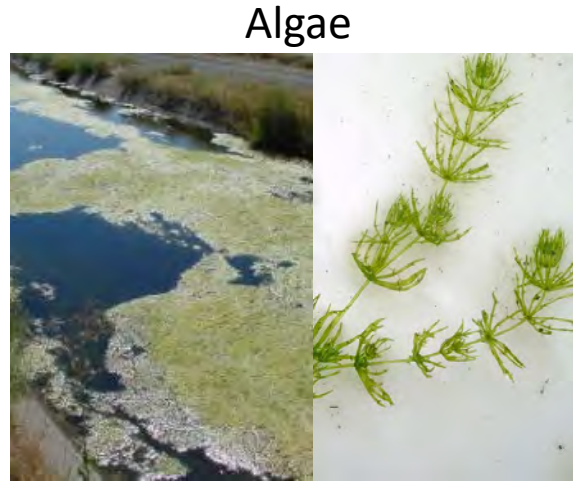
THERMAL STRATIFICATION



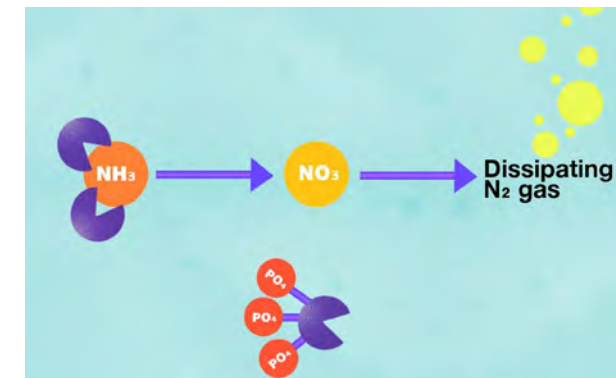
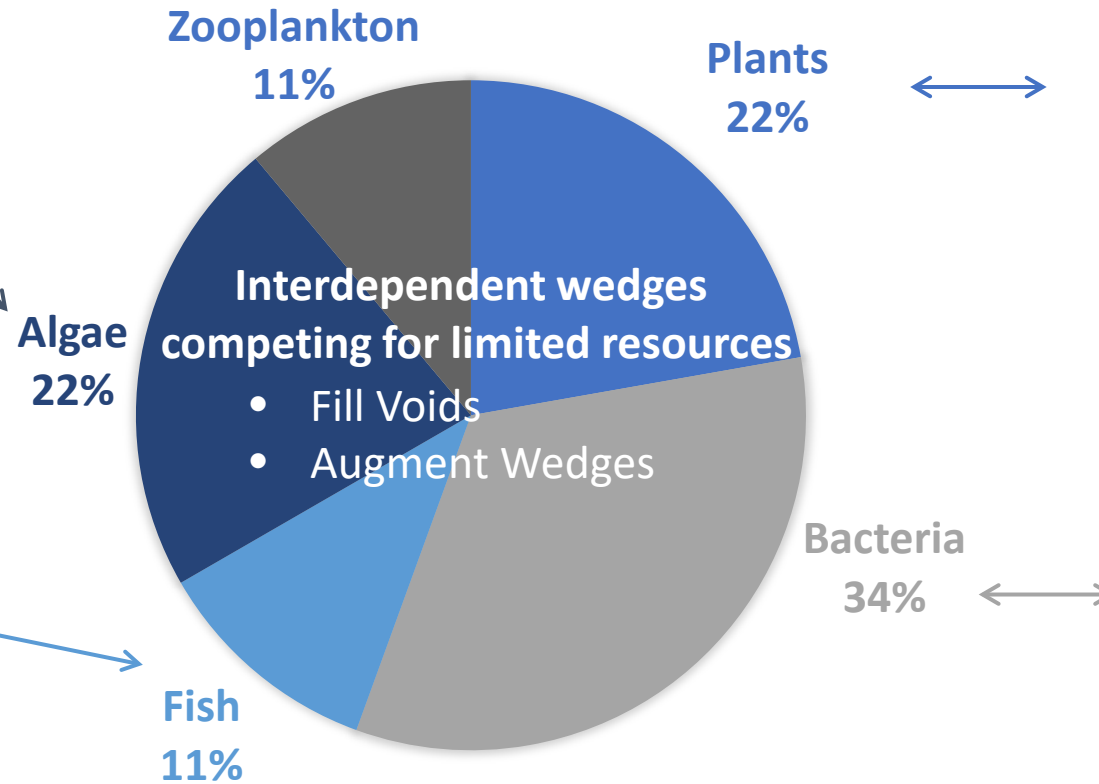
Biological "Control"



Biological control is the use of *natural enemies*—predators, parasites, pathogens, and **competitors**



HYPOTHETICAL CHART



Herbivores, insect control, scavengers, other benefits.

Current Site
My Pond

Dashboard

Sites

Tasks

Field Logs

Photos

Chemicals

Account Tools

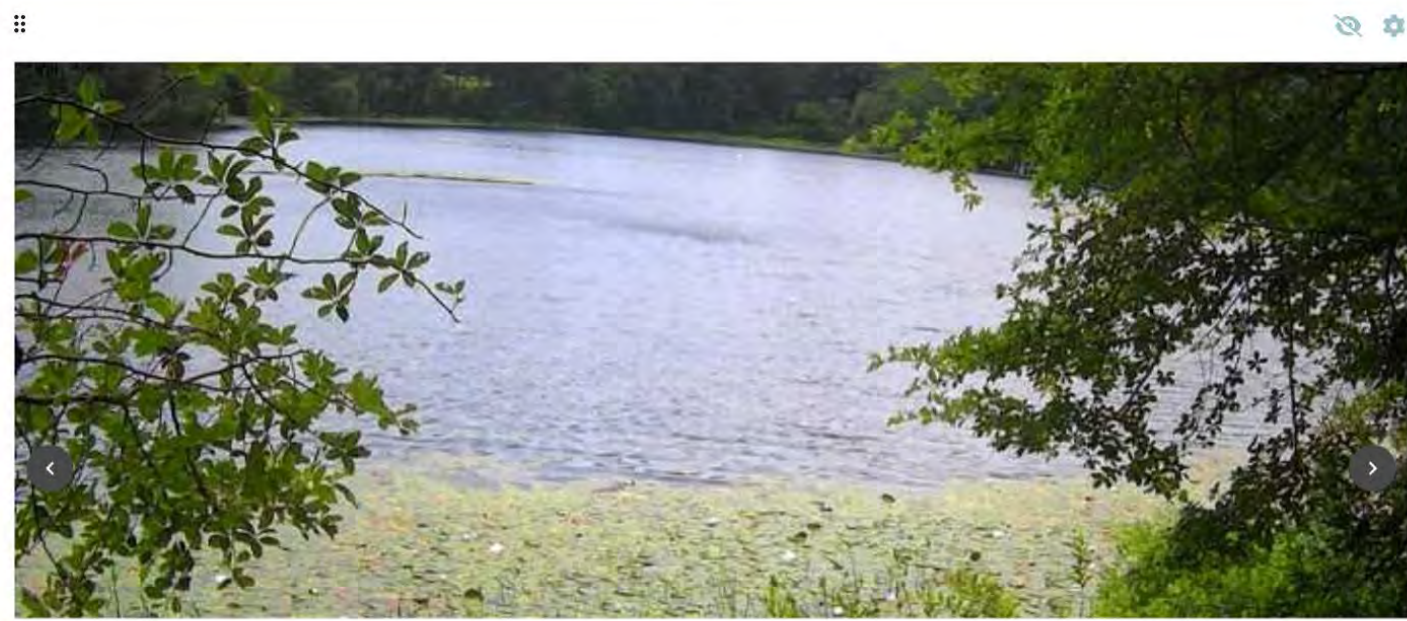
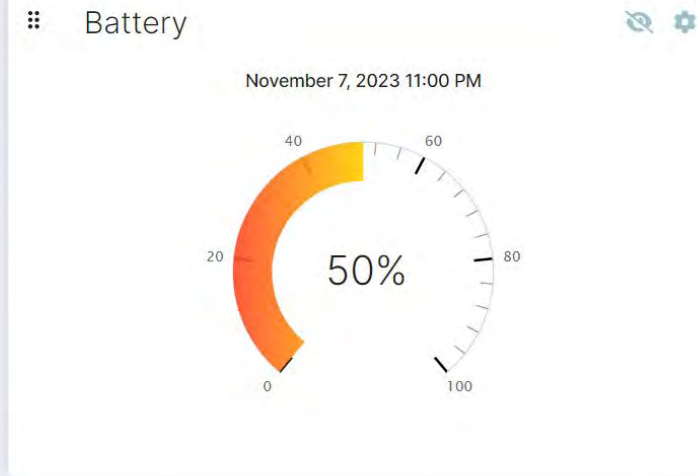
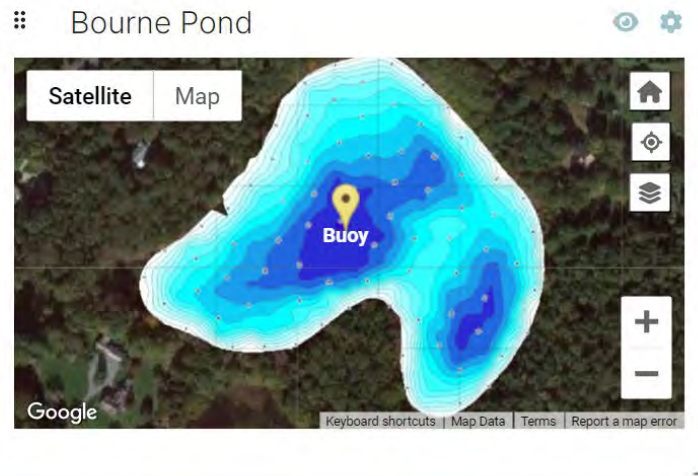
Account Info

Account Staff

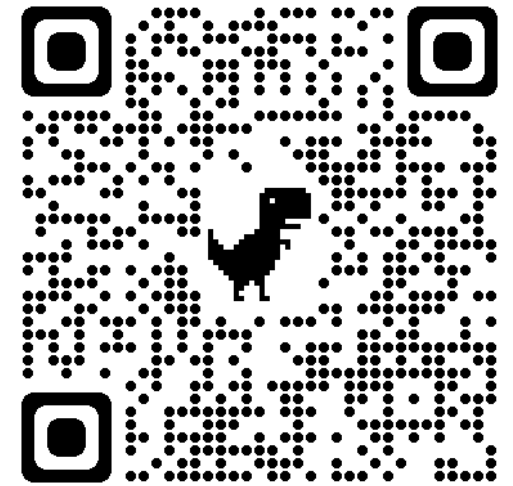
Products & Services

Inventory

Welcome back Dashboard



Bourne Pond



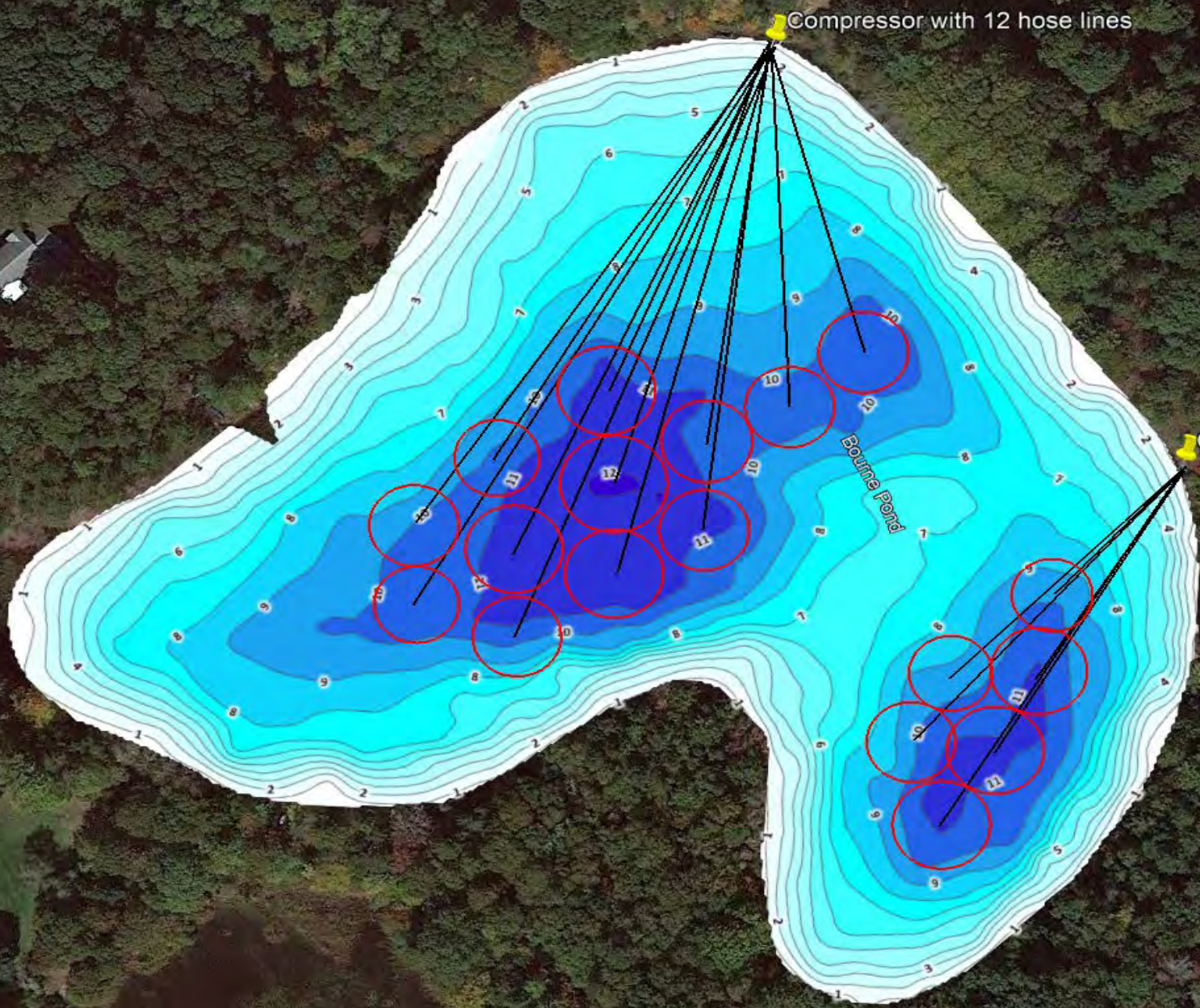
www.my.LakeTech.com/public-portal/Bourne/
Password: FOBP2022

Bourne Pond

Diffused aeration concept

Legend

- Diffuser zone of influence
- Weighted hose line



Bourne Pond

Diffused aeration & Updraft Circulator Concept

Legend

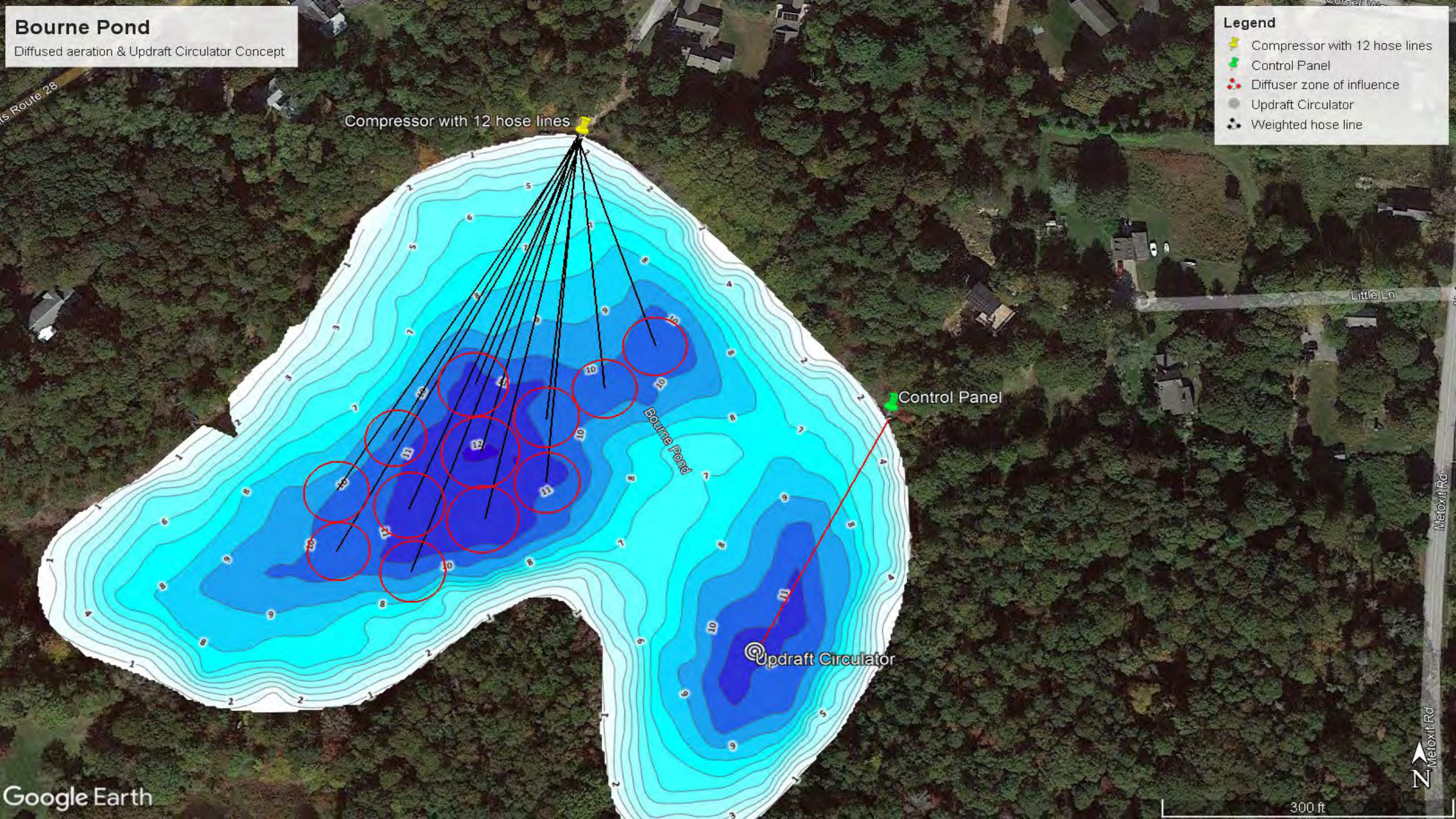
- Compressor with 12 hose lines
- Control Panel
- Diffuser zone of influence
- Updraft Circulator
- Weighted hose line

Compressor with 12 hose lines

Control Panel

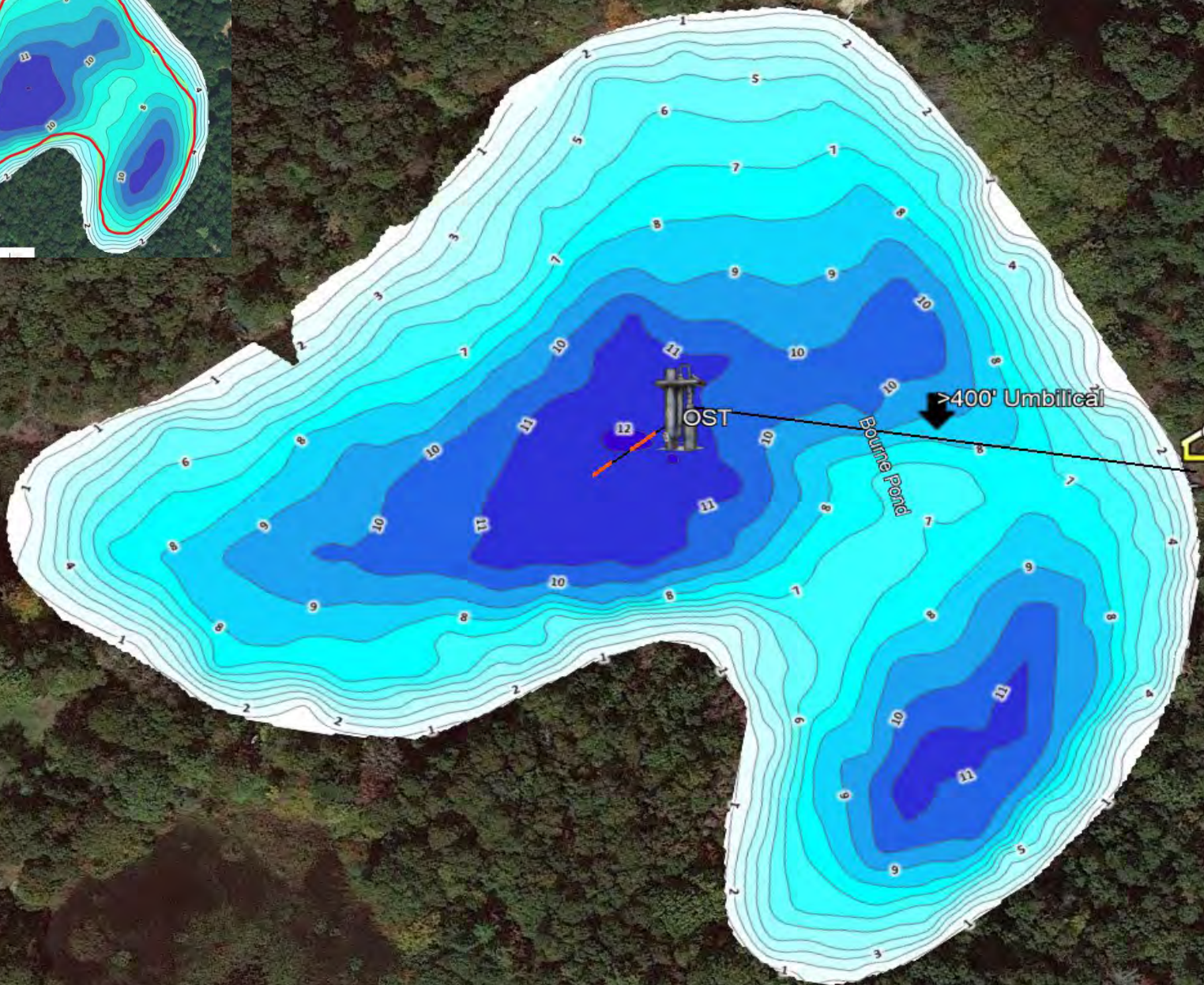
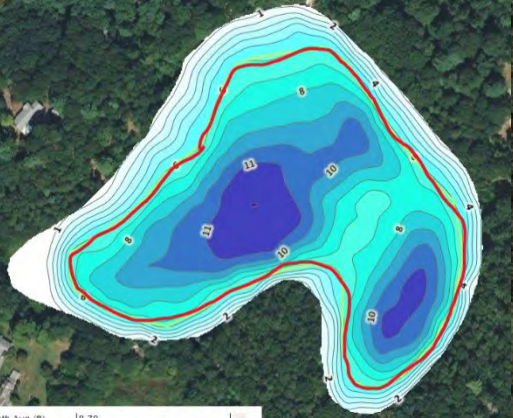
Updraft Circulator

Bourne Pond



Legend

- Air and Power Line
- Headers (Intake & Discharge)
- O2 Generator in TuffShed -240V, 30 amp
- OST



OST

Bourne Pond

>400' Umbilical

O2 Generator in TuffShed -240V, 30 amp



Little



OBJECTIVES OF HYPOLIMNETIC AERATION/OXYGENATION

- Raise dissolved oxygen levels without destratification
- Provide additional habitat for cold water fish
- Reduce internal phosphorus loading
- Increase decomposition of OM

Sizing of Hypolimnetic Aeration Systems is Complicated

- Determine oxygen deficit rate (mg/m²/day)
- Estimate stratification period
- Calculate volume of hypolimnion
- Calculate oxygen requirement
- Oxygen requirements easy to underestimate
 - Increased circulation, respiration and decomposition rates
 - These factors can increase oxygen demand by 3-4 times the calculated requirement

