

# Fish and Weed Management in Kansas Ponds

Joe Gerken, PhD  
Fisheries & Aquatic Extension Specialist  
785-532-1418  
785-477-4150  
[gerkenje@ksu.edu](mailto:gerkenje@ksu.edu)

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# Welcome

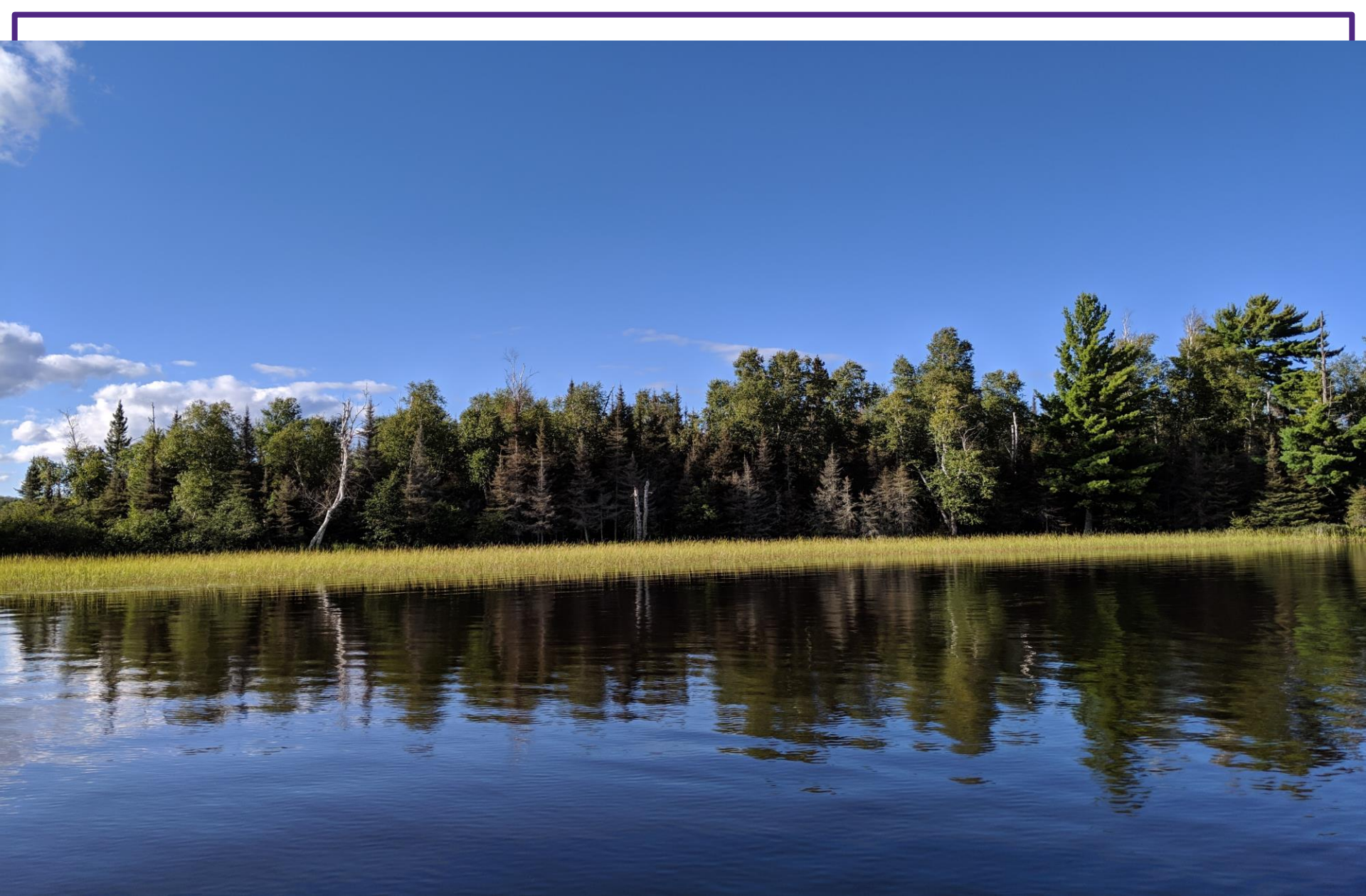
- Let's Chat!
- What are some questions you are hoping to get answered today?

# Overview

- Plants in Ponds
- Nutrient and Light Balance
- Aeration
- Fish in Kansas Ponds
- Fisheries Management
- Questions

# Plants are Good!

- Primary Producers
  - Food for small fish
- Shelter for fish
- Oxygen producers
- Improved Water Quality
  - Buffer for Pollutants
- Aesthetics



# Plants are Usually Good!

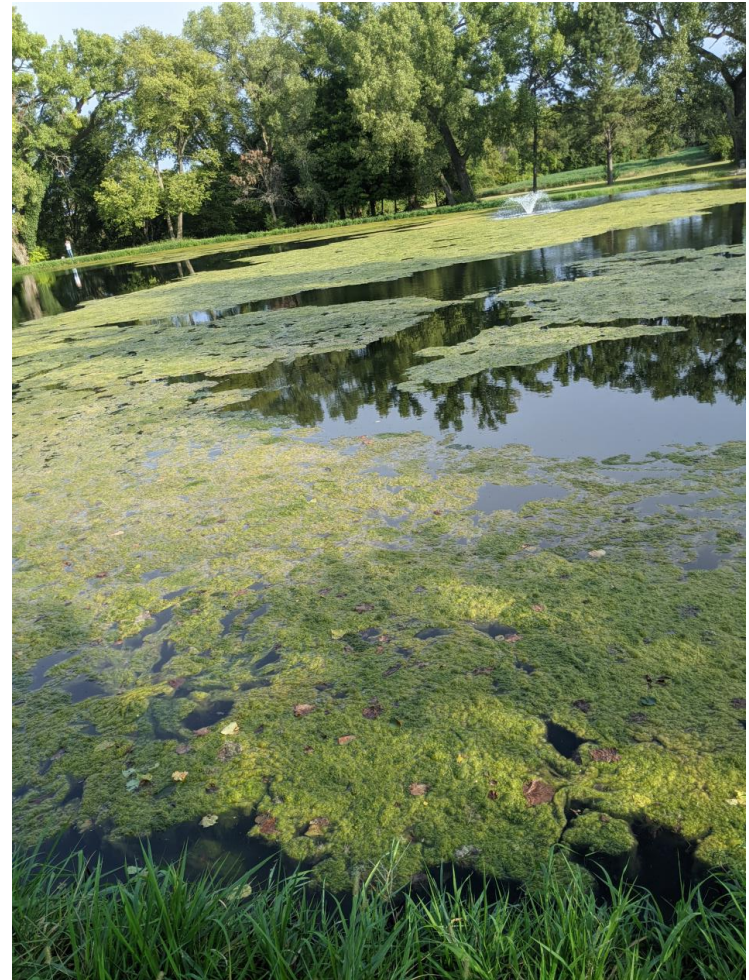
- Sedimentation
- Unsightly
- Reduced Forage for Large Fish
- Decreased Recreational Enjoyment

# Pond Management



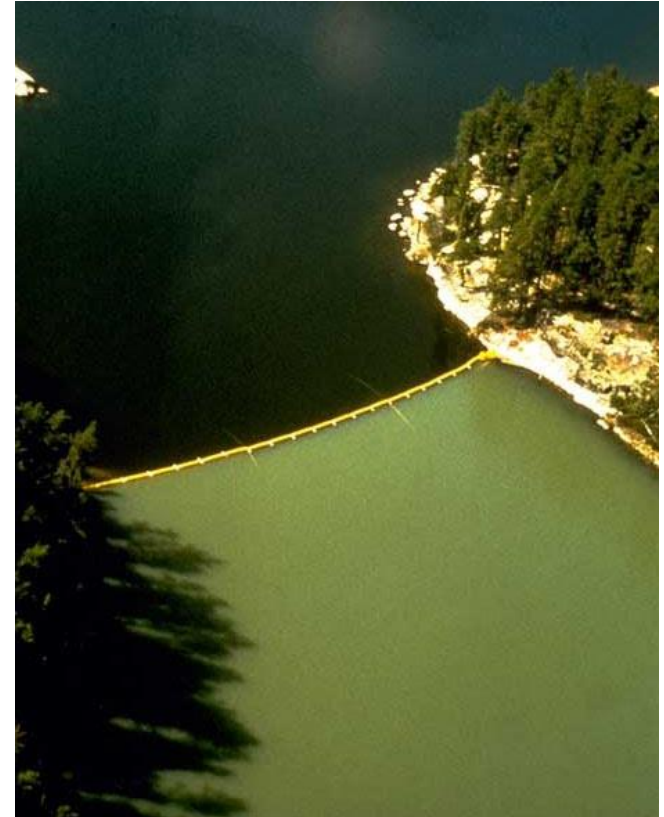
# Pond Management

- Excessive nutrients
  - Fertilizer
  - Livestock
- Shallow
- Stagnant water
- Eutrophication: Excessive nutrients in a pond leading to increased plant growth





# Eutrophication – Why We Care



Images From: <https://sites.google.com/site/experimentallakearea/3/a-eutrophication-lake-227-and-226>

# Eutrophication – Why We Care

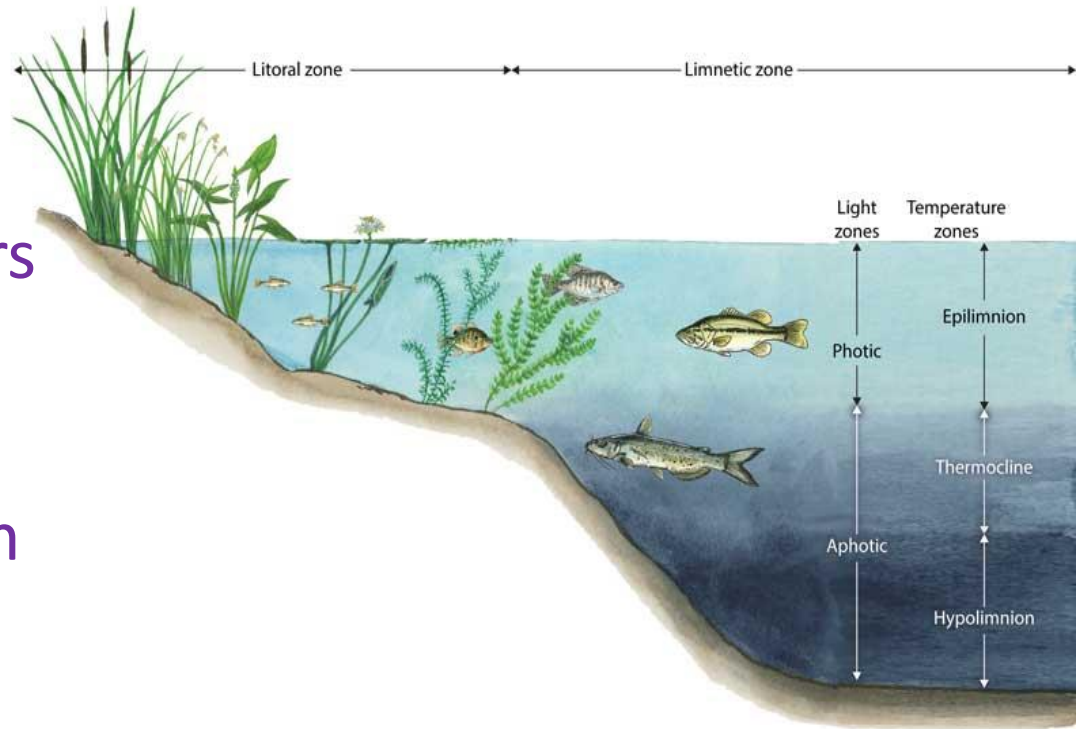
Unbalanced Nutrients – Too much N & P

Unbalanced Sunlight – Too much sunlight reaching bottom



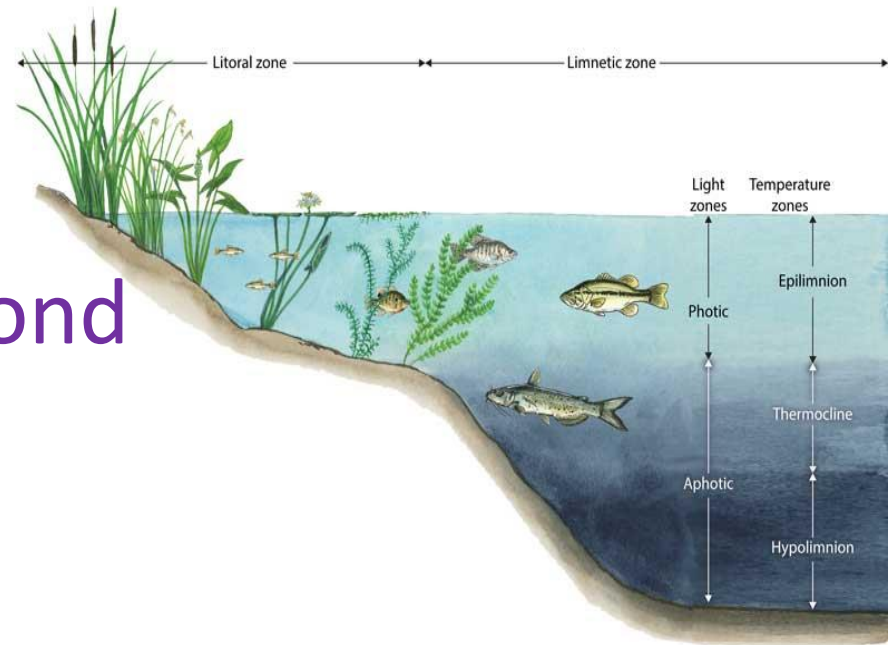
# Sunlight Balance

- Littoral Zone
  - Sunlight reaches pond bottom
  - Plant growth occurs
- Limnetic Zone
  - Sunlight does not reach pond bottom
  - No plant growth
  - Low Oxygen



# Proper Pond Construction

- Shallow Margins  
Deeper Middle
- Sloped Margins
  - 3:1 or 4:1
- Deepest portion of Pond
  - 10 – 12 feet deep
- Sedimentation
  - Increase Littoral Zone
  - Limnetic Zone Shallows
  - Excessive Vegetation



# Pond Management

Proper Vegetation requires Proper Construction and Management

## Light Balance:

- Turbidity (how much light is available)
- Depth: Usually deeper = less light

## Nutrient Balance:

- Nitrogen and Phosphorous

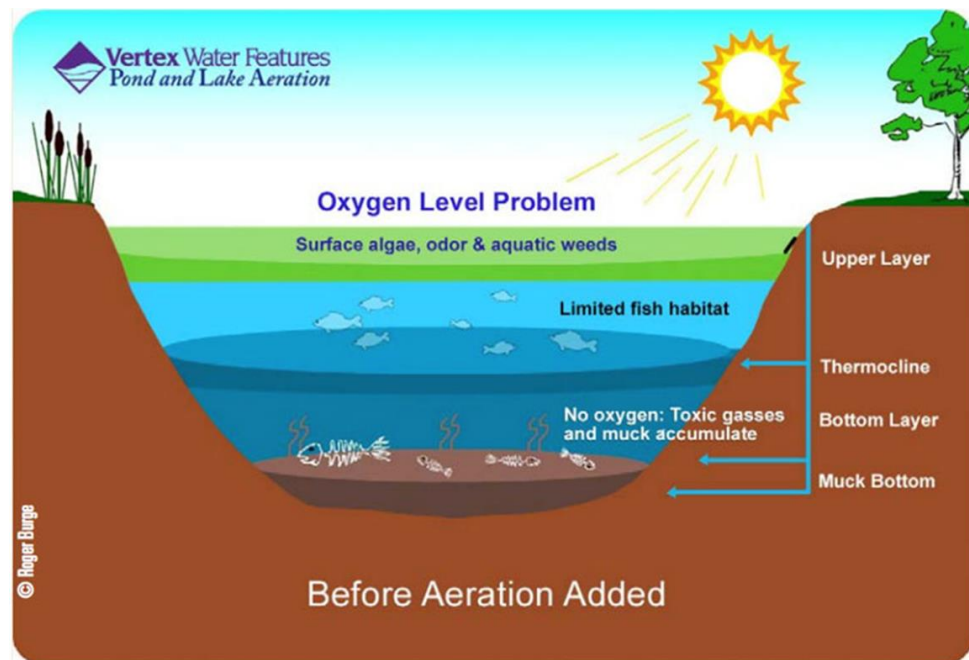
## Unbalanced Pond - Aeration

# Aeration

Water has different densities at different temperatures

## Thermocline

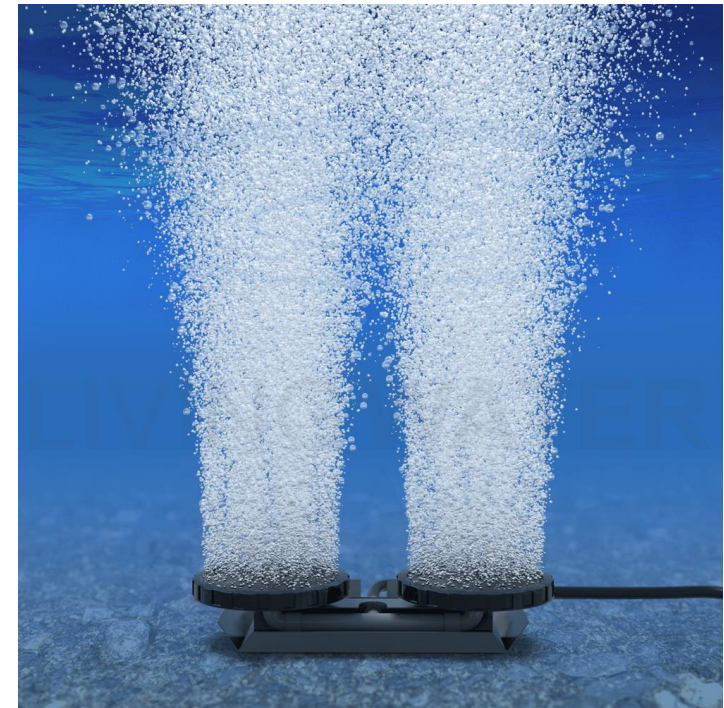
- Warmer oxygenated water above
- Cooler unoxygenated water below
- Stagnant water



# Aeration

## Adding air to the pond

- Increase (or maintain) oxygen levels
- Mix pond water
- Promote beneficial bacterial growth
  - Reduce nutrients
  - OFTEN leads to reduced vegetation



[www.livingwateraeration.com](http://www.livingwateraeration.com)

# Types of Aeration

## *Types of aerators*

- Surface agitation
- Benthic diffusion



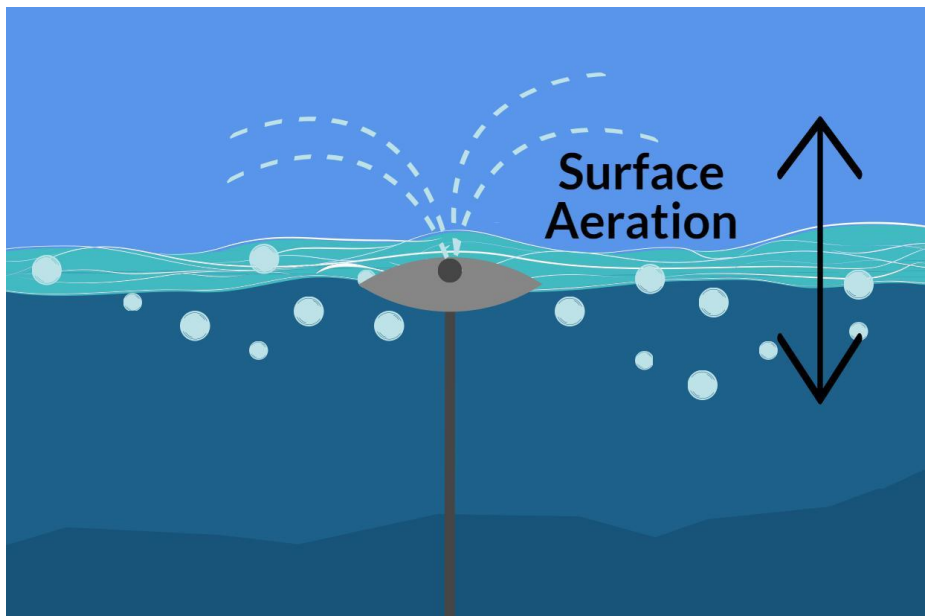
[www.lakeandwetland.com](http://www.lakeandwetland.com)





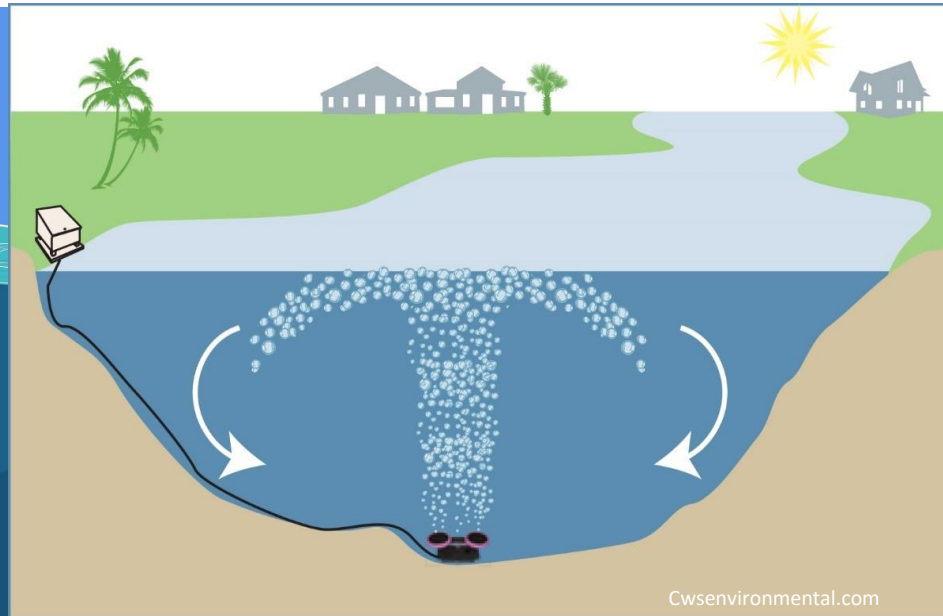
# Types of Aeration

## SURFACE AERATION



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## BENTHIC DIFFUSION

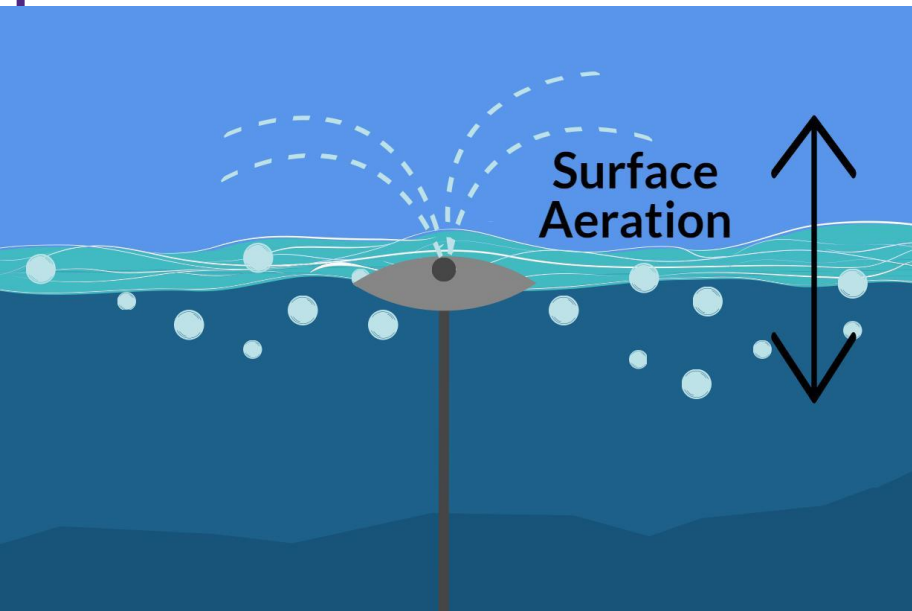


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# Types of Aeration

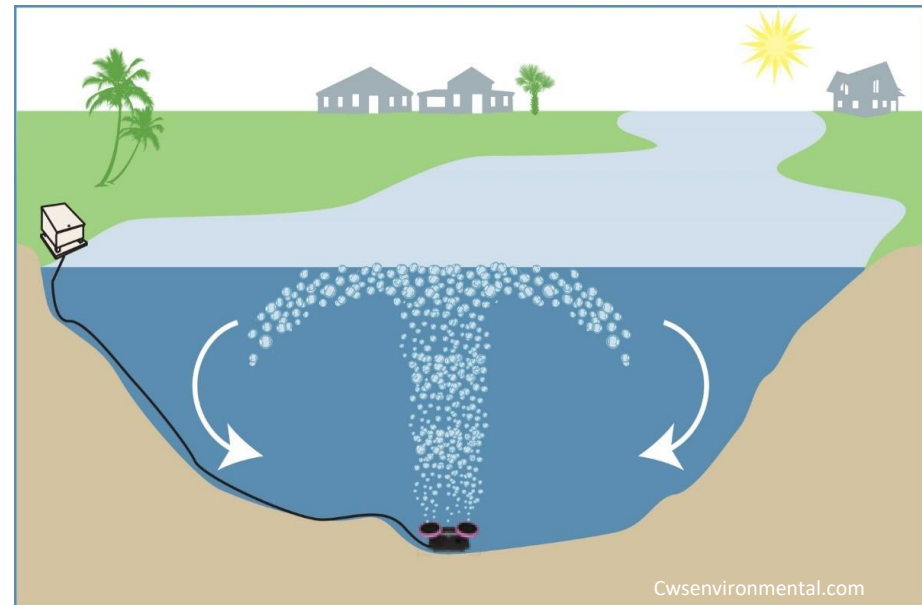
## SURFACE AERATION

- ▶ Pretty
- ▶ Usually less effective
- ▶ Shallow ponds



## BENTHIC DIFFUSION

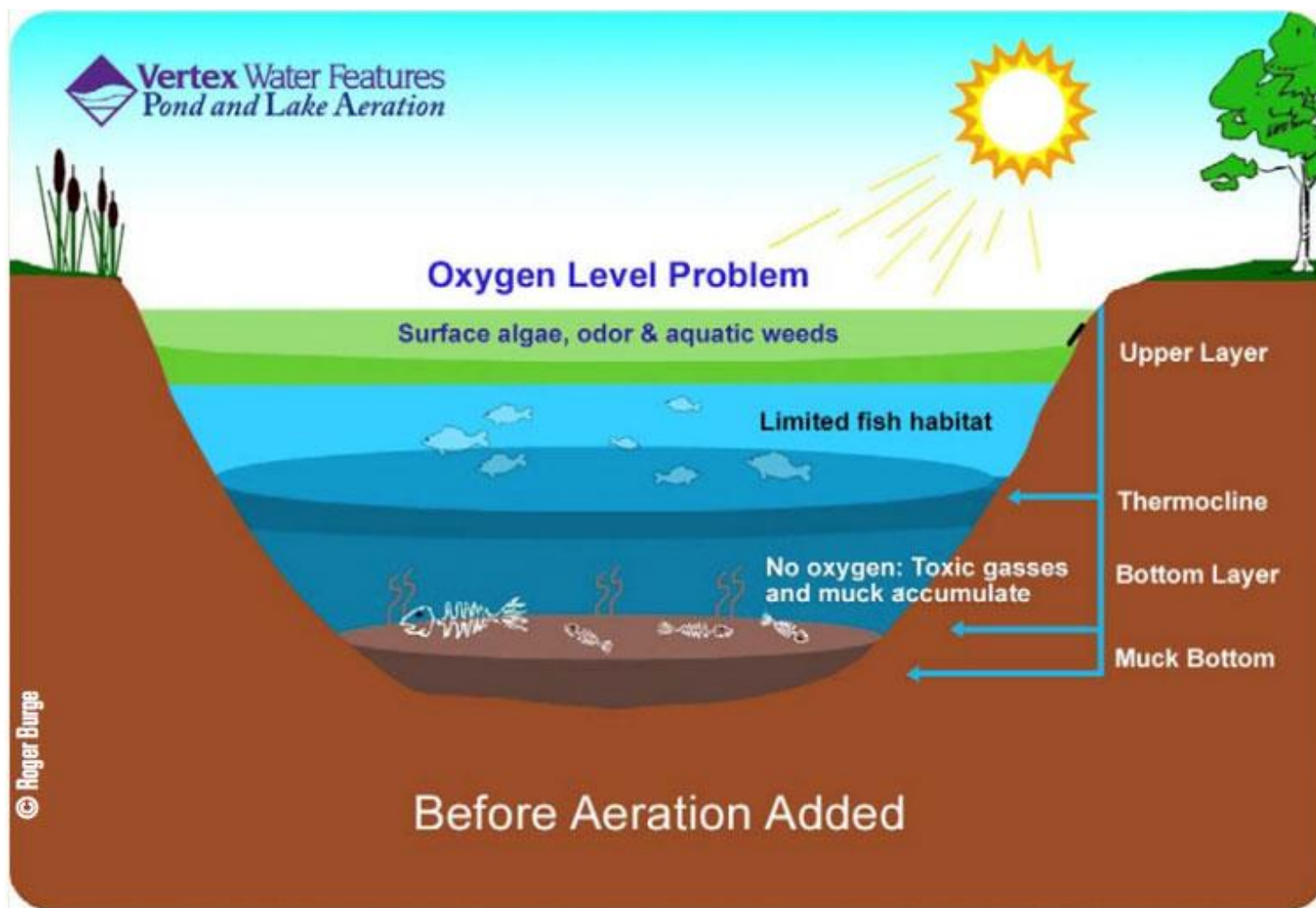
- ▶ Keeps pond mixed
- ▶ More bacterial growth
- ▶ Generally more beneficial



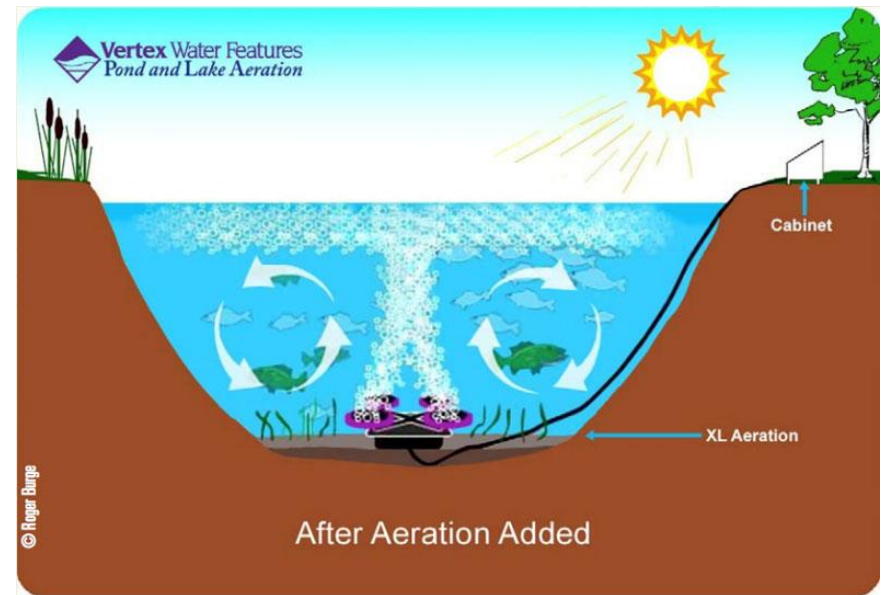
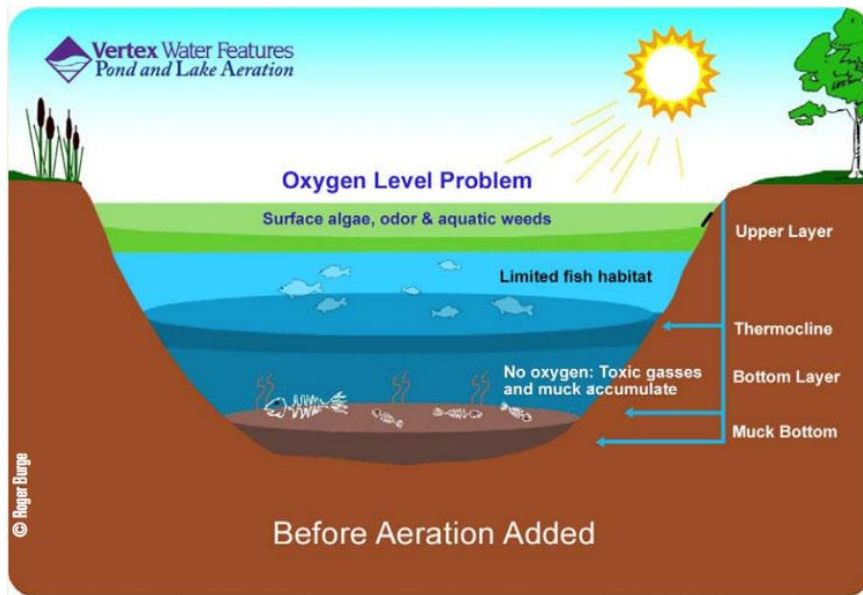
Cwsenvironmental.com

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# How Does it Work?



# How Does it Work



# Nutrients in Sediment

Unbalanced ponds are often eutrophic

Nutrients accumulate in sediment

- Decomposed organic matter
- Fertilizer Runoff

Low oxygen = low bacterial activity

- Long-term nutrient availability

Bacteria/Enzyme control

# Pond Muck / Pond Sludge

Accumulated organic matter on pond bottom

- Decayed Plants
- Decayed Fish
- Fish waste
- Inorganic materials (e.g. fertilizer, herbicides)



# Pond Muck Control

- Aeration
  - Encourages natural bacteria
- Dredging
  - Dig it out – move to another location
- Bacteria/Enzyme Pellets
  - “Muck eaters”

# Bacteria/Enzyme Pellets

- Temperature and pH sensitive
- Bacteria consume nutrients in muck
- Usually 10lbs/acre – applied monthly during growing season
  - Up to 20 lbs/acre in smaller ponds or heavily affected ponds



# Reducing Nutrient Input

- Maintain vegetation!
  - Roots give soil stability
  - Added benefit of reducing nutrients in pond!



# Plants, Nutrients, and Aeration

- Any Questions?

# Healthy Pond for Fish

- Healthy pond = Healthy Fish
  - Water Quality
    - Nutrient Balance
    - Oxygen Balance
    - Proper Vegetation
      - Habitat for large and small fish
- *Everything we have talked about is important for fish!*

# Stocking Best Practices

- Proper stocking is crucial to establishing a healthy fish population
- Stocking should match pond goals, pond design, and pond size
- Stock fish of similar sizes
- Stock at recommended rates
  - More is not always better

# Fish

*What are some common fish in Kansas ponds?*



# Common Kansas Fish

Most commonly stocked fish:

- Largemouth bass
- Bluegill
- Redear Sunfish
- Channel Catfish



# Common Kansas Fish

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## Other common fish:

- White amur (grass carp)
- Hybrid Sunfish
- Fathead Minnows



# Bluegill

- Usually the first fish stocked
- Reproduce and provide food for largemouth bass
- Frequent spawner
  - May - October
- 3 years to harvestable size





# Redear Sunfish

- Can be stocked with bluegill
- Reproduce and provide food for largemouth bass
- Spawn 1x/ year
- Usually grow bigger
  - Harder to catch
- Help control parasites
  - Shellcracker



# Largemouth Bass

- Eat mostly fish
- Harvestable size in 2-3 years
- Spawn 1x/year
- Usually apex predator in ponds



IMAGE HOSTED BY  
GALLERY/NANFA.ORG

# Channel Catfish

- “Bonus Fish”
- Doesn't really alter fish population
- Usually don't reproduce well in ponds
- Add 2-3x harvest/year



# Fathead Minnow

- Forage fish in new ponds
- Help “jump start” pond
- Not needed in healthy pond
- 10 lbs per predator lb
  - EXPENSIVE!
  - \$50 Bass Fillet Or \$50 Fillet Mignon?!?



# Fish to Avoid

- **White Crappie**
  - Prolific spawners
  - Outcompete other fish
- **Bullhead Catfish**
  - Muddy water
  - Overabundant; Compete with other fish
- **Shad**
  - Overabundant
  - Compete with small sportfish

# Fish Habitat

Brushpiles

Rockpiles

Christmas Trees

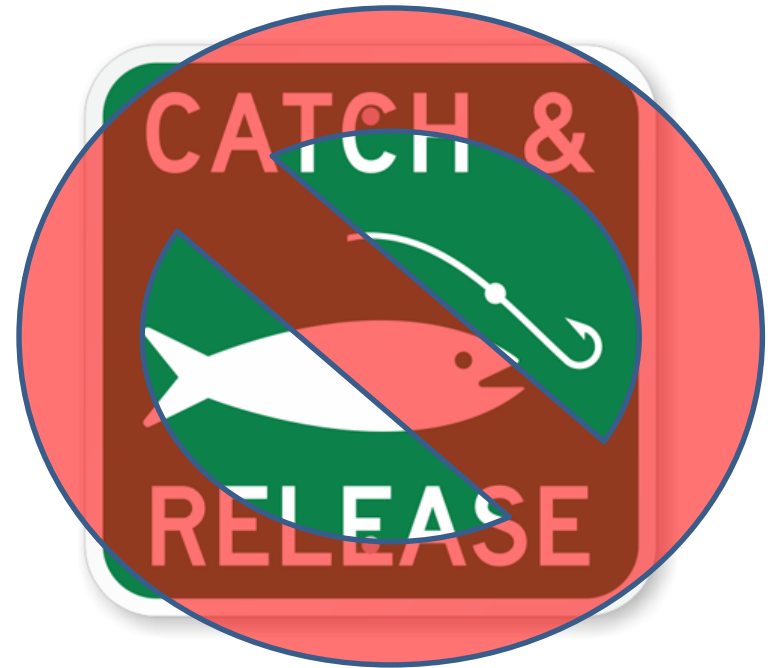
Artificial Structures

- Purchased
- Man made



# Controlling Fish Populations

In General, should fish in your pond be kept or released?



# Controlling Fish Populations

It depends on your goal... But fishing, and keeping fish, is usually necessary to maintain a balanced fish population



# Fish Harvest

- Overpopulation
- Stunted growth
- Population crash
- Management Program with Harvest Goals



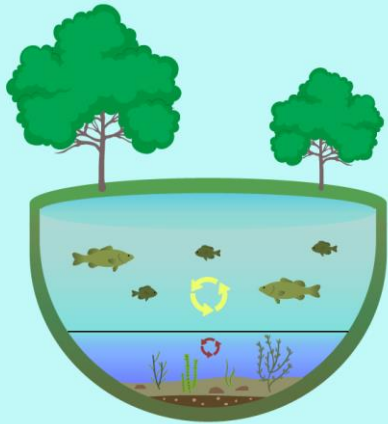
# Other Concerns - Fish Kills

- Some dead fish is common
- Summer Fish Kills
  - Oxygen depletion
  - Algal bloom, die off, decay
- Winter Fish Kills
  - Snow/Ice block sunlight
  - Plants can't make oxygen
  - Oxygen depleted

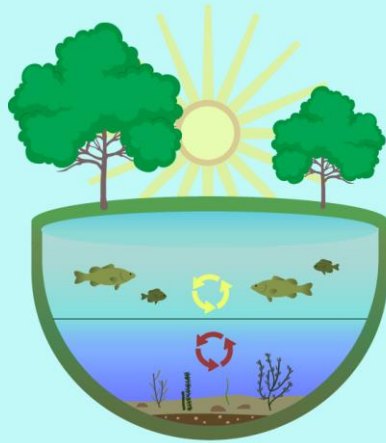


# Fish Kills

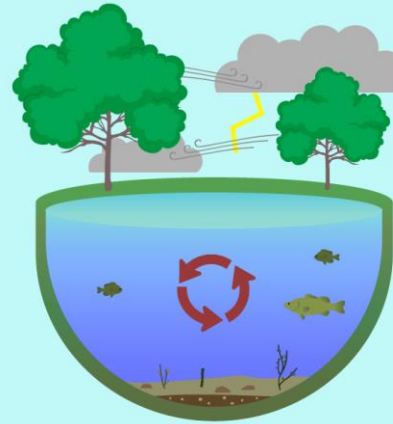
In summer, ponds can stratify into layers that do not mix together. While the top layer has sufficient oxygen, the bottom layer can become hypoxic due to bacterial decomposition.



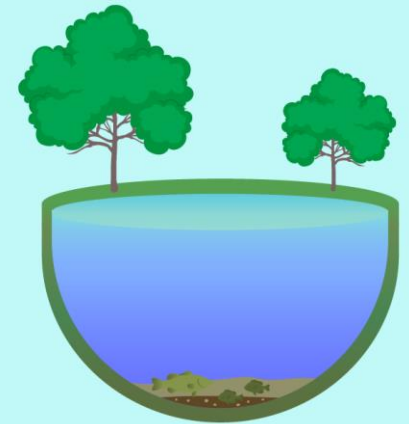
As the hot, still days of summer progress, the bottom hypoxic layer increases in size.



Summer storms, strong winds or changing seasons cause pond layers to mix together, decreasing oxygen throughout the pond.



If the hypoxic layer is large, this mixing can decrease oxygen below critical levels, resulting in a summer fish kill.



## Aeration!

# Fish - Summary

- Make sure your pond is ready for fish
- Stock fish at recommended rates and ratios
  - Largemouth bass, bluegill, fathead minnows, channel catfish
- Create a management plan & follow through!
  - Harvest is often necessary
- If you have a problem – call your extension agent or me
- **HAVE FUN!!!**

# Nuisance Animals

- Beavers
  - Muskrats
  - Snakes
  - Turtles
  - Birds
- 
- K-State Extension can help!



# THANK YOU!

<https://www.wildlife.k-state.edu/contact.html>

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