Fish and Weed Management in Kansas Ponds

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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
Types of Aeration

*Types of aerators*

- Surface agitation
- Benthic diffusion

[Images of aerators: one showing a fountain, another showing a body of water with a diffusion point.]
Types of Aeration

SURFACE AERATION

BENTHIC DIFFUSION

Surface Aeration

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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
How Does it Work?
How Does it Work

Before Aeration Added:
- Oxygen Level Problem
- Surface algae, odor & aquatic weeds
- Limited fish habitat
- No oxygen: Toxic gasses and muck accumulate

After Aeration Added:
- Upper Layer
- Thermocline
- Bottom Layer
- Muck Bottom
- XL Aeration
- Cabinet

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Research and Extension
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!**
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.
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

Most commonly stocked fish:
- Largemouth bass
- Bluegill
- Redear Sunfish
- Channel Catfish

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
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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