Small Lake and Pond Management

BLAKE RUEBUSH
DISTRICT FISHERIES BIOLOGIST
ILLINOIS DEPARTMENT OF NATURAL RESOURCES

District Fisheries Biologist Duties

- Manage fish and aquatic plant populations in public lakes
  - District Counties: Pike, Calhoun, Scott, Morgan, Sangamon, Christian, Macoupin, Jersey, & Greene
  - ~40 public waters
  - Fish Surveys
  - Vegetation Treatments
  - Rearing and/or Stocking Fish
  - Habitat Improvements

District Fisheries Biologist Duties

- Provide fish and aquatic plant management recommendations to private pond owners
- Present outreach programs on fish biology, pond management, and fishing
- Provide fish samples for IL EPA contaminant testing
- Assist with rivers and streams surveys

The Pond Itself

- Needs to provide suitable habitat for fish and other aquatic life
- Not all ponds can support game fish
- Management is needed for positive results
- Pond shape, depth, and water quality are all important
- Ideally 1 acre or greater when full
- Smaller ponds difficult to manage
  - Fish population out of balance
  - Excessive aquatic plants
  - Summer Kill / Winter Kill
  - More susceptible to the adverse effects of a drought

Pond Construction

- Natural Resource Conservation Service
- Watershed acreage vs. Pond acreage
  - 10-20 acres of watershed per one acre of water
- Soil Type
  - Soil type and fertility will affect fish production
- Brush Removal
- Slope along edges of pond
  - 3 feet – reduces sunlight on substrate and discourages excessive plant growth
- Minimum Maximum Depth
  - 10 feet, 15 feet or greater desired
- Clay Core in dam
- Water control valve to allow draw-downs or complete draining

Watershed Management

- Sources of Sediment and Nutrients
  - Agricultural runoff
  - Septic
  - Lawn fertilizer
  - Livestock feed lots or livestock entering pond
- Preventative Action
  - Dry dams
  - Grass buffer strips
  - Lawn fertilizer with less or no ‘P’ (phosphorus)
  - Keep livestock from entering pond

The Water

- Surface waters of IL, except Lake Michigan, considered ‘warm water’
- Midsummer surface temperatures of 70°F or greater
- Temperature influences:
  - Dissolved Oxygen available to fish
  - Fish feeding, growth, and spawning
- Spring turnover
  - Surface water temperature = 32°F
  - Bottom water temperature = 39°F – At 39°F water is at its greatest density
  - Warm spring breezes warm surface water, it sinks, and mixing occurs
  - The pond breathes
  - Gases are released and new Oxygen enters the pond

The Water

- Thermal Stratification
  - 3 zones of differing temperature and density
  - Upper lake, transition zone, lower lake
  - Thermocline is the transition zone where temperature begins dropping at a rate of 0.5°F or greater per foot of increasing depth.
  - It's the cold spot you feel when you jump in a pond!
- Fall turnover
  - Surface water cools, it sinks, displacing lighter, warmer water below
  - Breaks up thermal stratification
  - The pond breathes again
  - Process is complete when all water in the pond reaches 39°F

The Food Chain

- Organic matter and minerals + sunlight = Plankton and Plant Growth
- Plankton Growth = Food for all fish during early stages of life
- Plant Growth = Food for Crustaceans and Aquatic Insects
- Crustaceans and Aquatic Insects = Bluegill, Redear, & young Largemouth Bass growth
- Small Fish = Food for Larger Fish
- Larger Fish = Happy Fishermen

Fish Stocking

- What are your objectives?
- Important considerations:
  - Pond type
  - Size
  - Depth
  - Water chemistry
  - Fertility
  - Existing fish population
  - Fishing pressure and harvest
  - What do YOU want? It's your pond.

Bluegill

Wayne Herndon with a Bluegill, the IL State Fish – Bluegill primarily feed on aquatic insects

Photo Credit: Rob Hilsabeck, IDNR

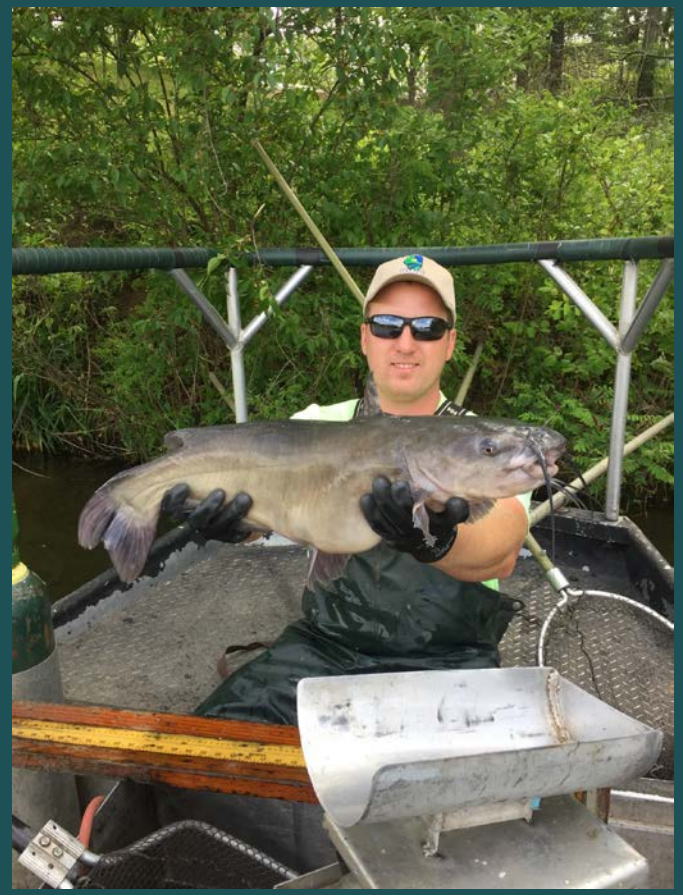
Redear Sunfish

Redear Sunfish, also known as ‘Shellcracker’, prefer to feed on snails

Largemouth Bass

Largemouth Bass usually serve as the top-predator in small lakes and ponds

Channel Catfish



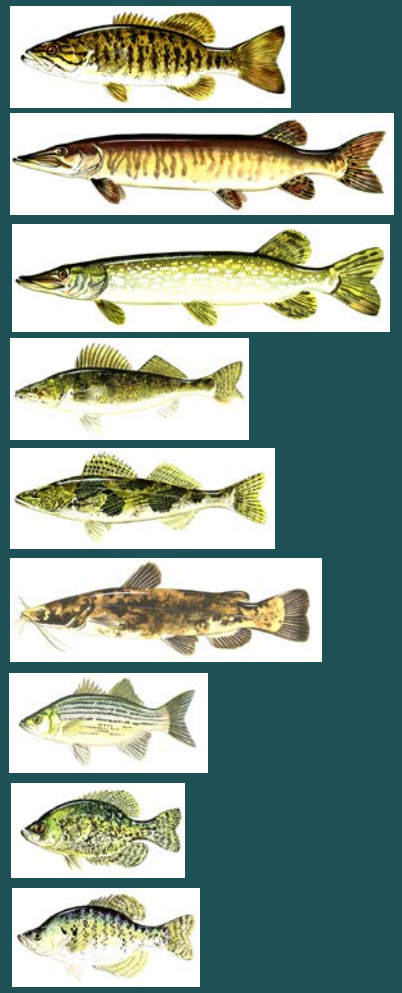
Channel Catfish forage on many food types

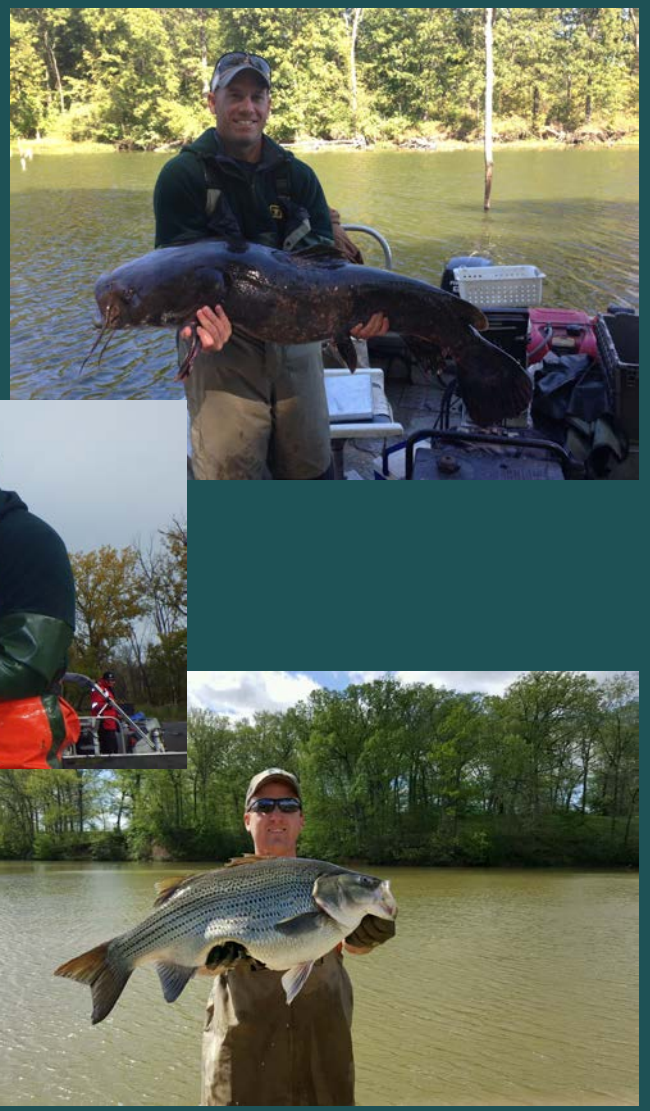
Fathead Minnow

Fathead Minnows can be stocked in a new pond to give Largemouth Bass a jump start on growth

Sportfish not recommended in small ponds

- Smallmouth Bass
- Muskellunge
- Northern Pike
- Walleye
- Sauger
- Flathead Catfish
- Hybrid Striped Bass
- Black Crappie
- White Crappie





Concerns with stocking Crappie

Crappies are highly prolific, can compete with Largemouth Bass and Bluegill, and can stunt out in small lakes and ponds

Undesirable Species

- Common Carp
- Bullheads (Brown, Black, and Yellow)
- Yellow Bass
- Gizzard Shad
- Green Sunfish

Central IL Recipe

- The most widely used and most successful stocking combination in Illinois is Largemouth Bass, Channel Catfish, Bluegill and Redear Sunfish.
- These species are:
  - Popular among fishermen
  - Biologically adapted to various conditions
  - Effectively use natural and artificial foods
  - Compatible with most species that could be stocked later
- Concept: Bluegill eat aquatic insects, Largemouth Bass eat Bluegill, Largemouth Bass reduce Bluegill numbers resulting in better Bluegill growth rates




Central IL Stocking Recommendations

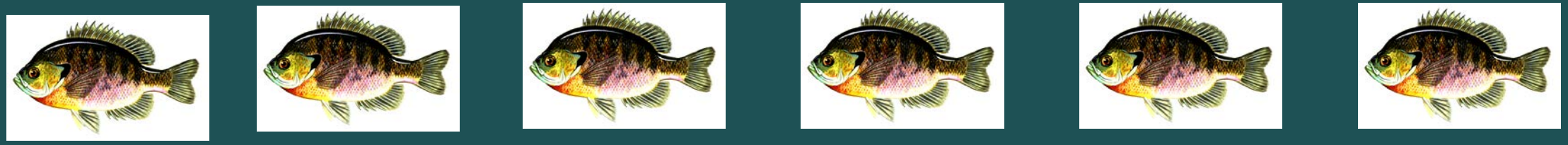
- New or Rehabilitated Pond: 1-3” Fingerling fish
- Season 1:
  - 50-100 4-6” Channel Catfish / Acre
  - Option 1: 750-1000 1-2” Bluegill / Acre
  - Option 2: 500-750 1-2” Bluegil and 250 1-2” Redear Sunfish / Acre
  - 2lbs of Fathead Minnows / Acre (optional)
- Season 2:
  - 50-100 2-3” Largemouth Bass / Acre

Corrective and Supplemental Stockings

- 5-8” Largemouth Bass after a fish kill
- 8” Channel Catfish every 2-3 years
  - 15-25 / Acre

Controlling Overabundance of Bluegill

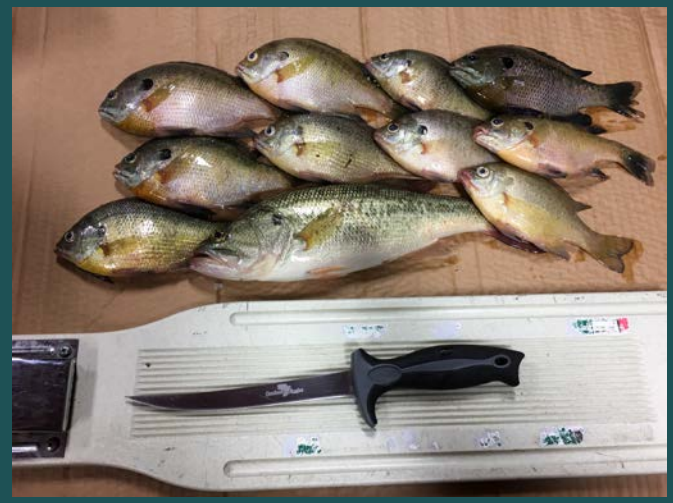
- Harvest more Bluegill while angling!
- Stock Largemouth Bass to prey on Bluegill
- Conduct a drawdown to consolidate small fish
- Reduces places for small fish to hide by treating aquatic plants



Fish Harvest is Important

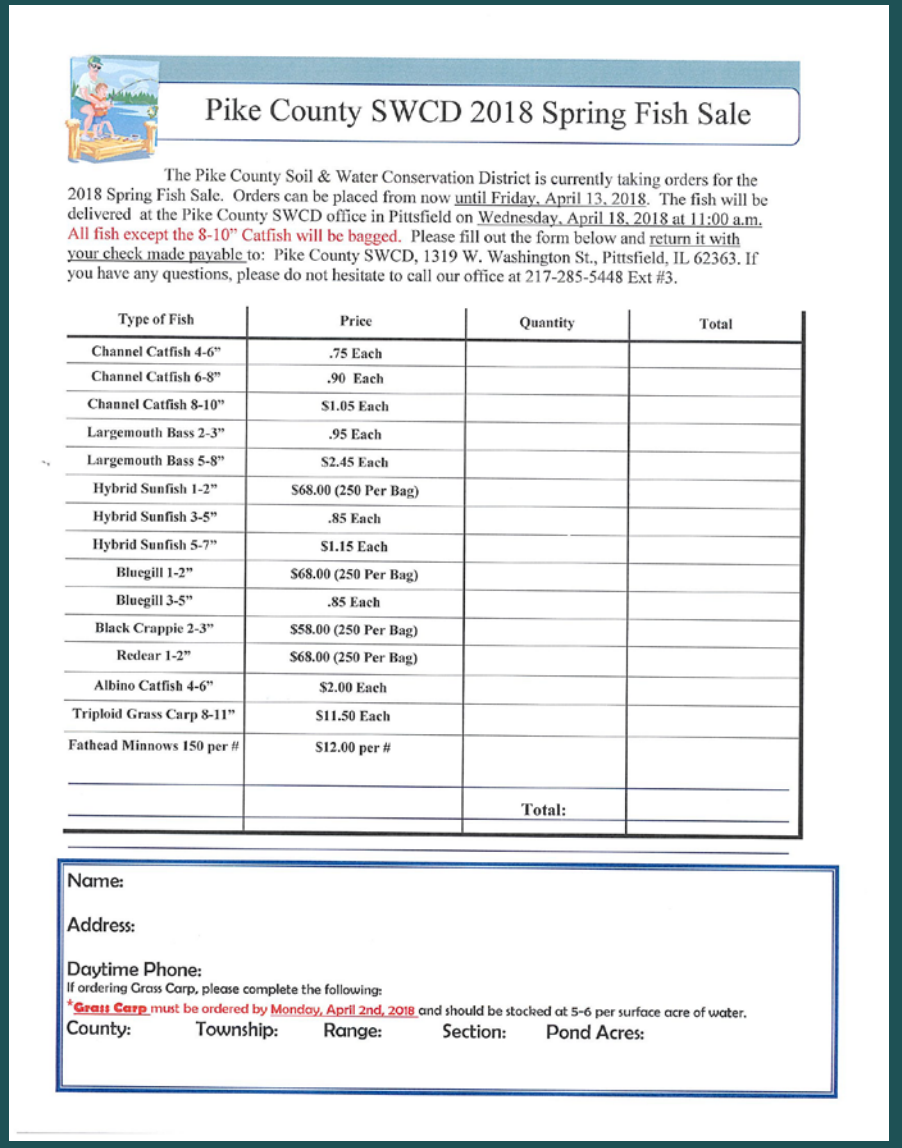
- Many private ponds are underutilized
- Harvest is a management tool
- New Pond Harvest
  - Bluegill – year 2
  - Largemouth Bass – year 3
  - Channel Catfish – as desired,

  assuming future supplemental stockings will occur
- Established Pond Harvest
  - Consult with your District Fisheries Biologist



Sources of Fish

- IDNR Private Fish Dealer List
  - www.ifishillinois.org
- Soil and Water Conservation District
- Local Farm or Feed Store



Pike County SWCD 2018 Spring Fish Sale

The Pike County Soil & Water Conservation District is currently taking orders for the 2018 Spring Fish Sale. Orders can be placed from now until Friday, April 13, 2018. The fish will be delivered at the Pike County SWCD office in Pittsfield on Wednesday, April 18, 2018 at 11:00 a.m. All fish except the 8-10" Catfish will be bagged. Please fill out the form below and return it with your check made payable to: Pike County SWCD, 1319 W. Washington St., Pittsfield, IL 62363. If you have any questions, please do not hesitate to call our office at 217-285-5448 Ext #3.

Type of Fish	Price	Quantity	Total
Channel Catfish 4-6"	.75 Each		
Channel Catfish 6-8"	.90 Each		
Channel Catfish 8-10"	$1.05 Each		
Largemouth Bass 2-3"	.95 Each		
Largemouth Bass 5-8"	$2.45 Each		
Hybrid Sunfish 1-2"	$68.00 (250 Per Bag)		
Hybrid Sunfish 3-5"	.85 Each		
Hybrid Sunfish 5-7"	$1.15 Each		
Bluegill 1-2"	$68.00 (250 Per Bag)		
Bluegill 3-5"	.85 Each		
Black Crappie 2-3"	$58.00 (250 Per Bag)		
Redear 1-2"	$68.00 (250 Per Bag)		
Albino Catfish 4-6"	$2.00 Each		
Triploid Grass Carp 8-11"	$11.50 Each		
Fathead Minnows 150 per #	$12.00 per #		
		Total:	

Name:

Address:

Daytime Phone:

If ordering Grass Carp, please complete the following:

*Grass Carp must be ordered by Monday, April 2nd, 2018 and should be stocked at 5-6 per surface acre of water.

County: Township: Range: Section: Pond Acres:

IDNR Aquaculture Program

- Aquaculture, Fish Importation, & Restricted Species Permits

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Aquaculture Program Specialist

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Cell: (630) 360-4182

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Winter Kill

- Oxygen supply under the ice depends upon the passage of light
- Snow covered ice = No Photosynthesis
- Oxygen is gradually used up
- Most likely to occur in fertile, shallow, weed-filled ponds
- Solutions
  - Deepen pond
  - Clear snow off of ice
  - Artificial aeration
- ***Making holes in the ice will not help.

Summer Kill

- (Aquatic Plant Die-Off)
  - Abundance of submersed aquatic plants or algae
  - Plants die suddenly from natural causes or from herbicides
- (Temperature)
  - Summer water temperatures can reach 90 to 95 degrees

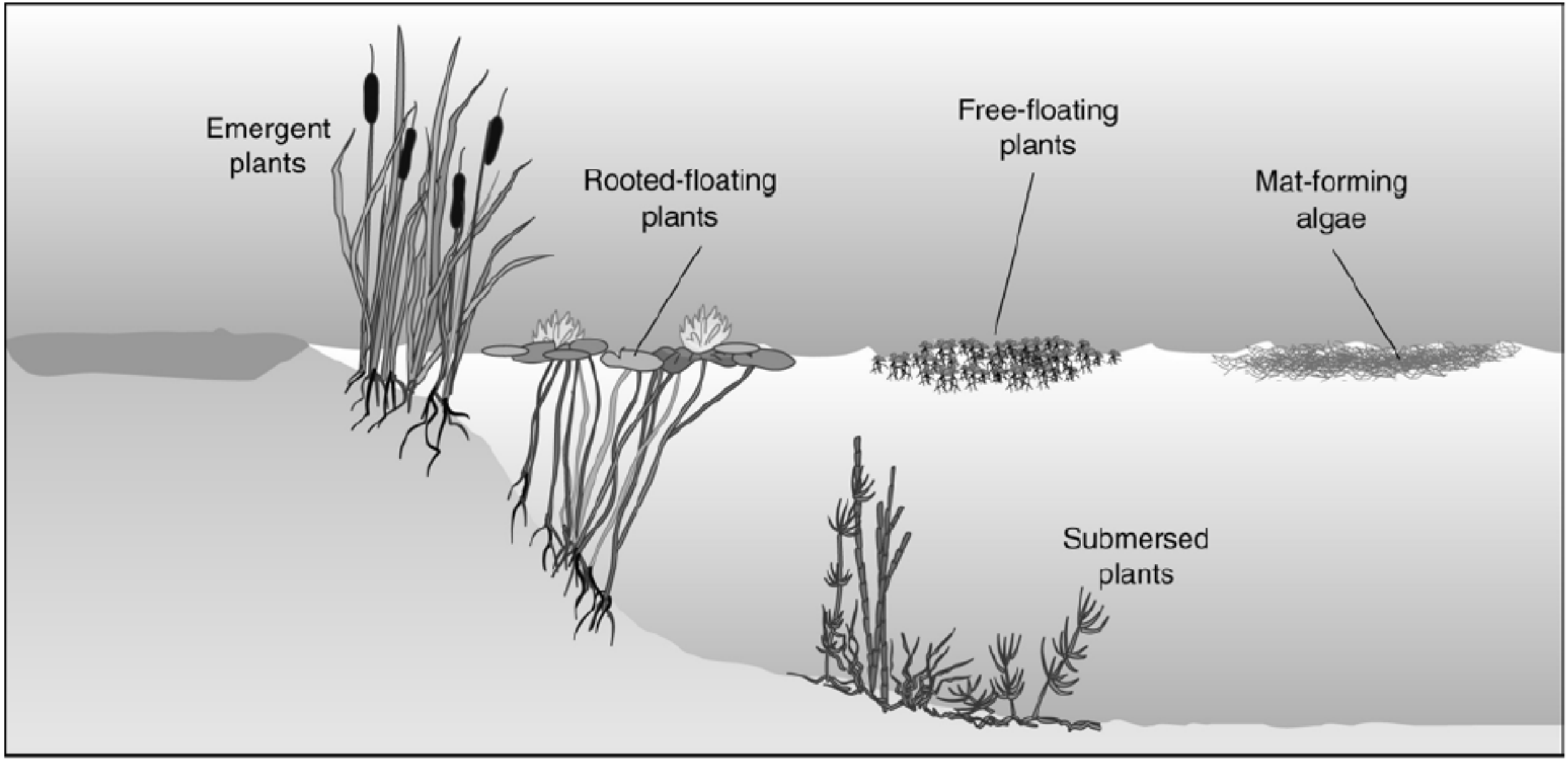
- Solutions
  - Deepen pond
  - 25% of pond should be 7-10 feet deep
  - Control aquatic vegetation and algae with herbicides
  - Artificial aeration

Other causes of mortality

- Organic Pollution
  - Build up of organic material over time
- Pesticides
  - Agricultural or residential runoff or drift
- Natural Mortality
  - Winter stress – not uncommon to see dead fish after ice out
  - Hot summer temperaturs
- Industrial and Mining Wastes
  - Runoff
  - Spills

Aquatic Vegetation

- Sunlight + Nutrients = Aquatic Plant Growth
- Importance
  - Produces dissolved oxygen
  - Provides food to a diversity of aquatic life
  - Provides cover to young fish
  - Can reduce erosion and be aesthetically pleasing
- Negative affects
  - If in high densities summer die-offs of aquatic plants can cause fish kills
  - Hinders fishing/boating/swimming activities
  - Unsightly depending on species and density
  - Too much aquatic vegetation can affect fish population and fish growth


Emergent plants
Rooted-floating plants
Free-floating plants
Mat-forming algae
Submersed plants

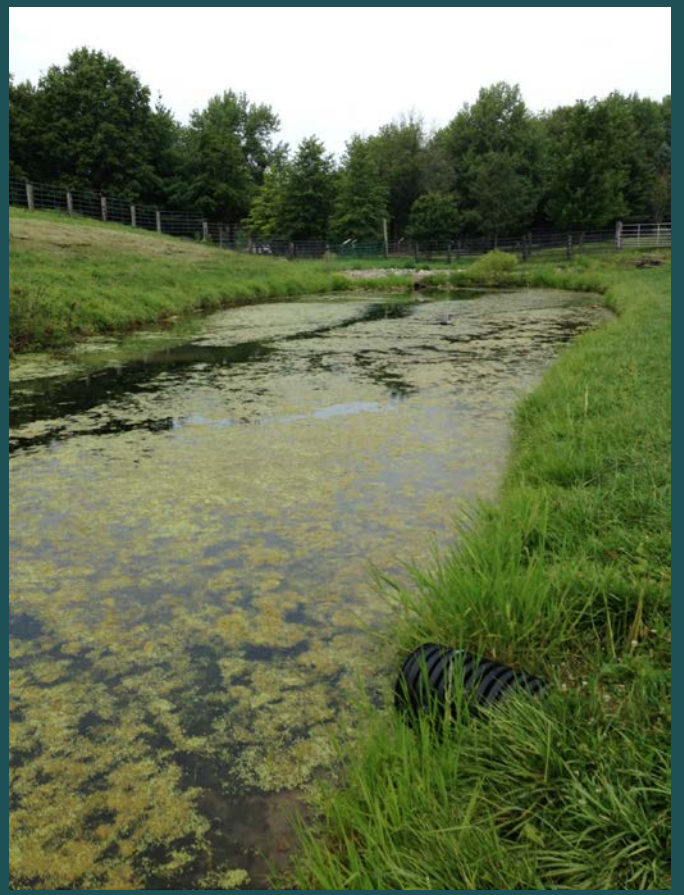
Aquatic Life Approved Species List

Updated March 11, 2015

For the purposes of Section 20-90 of the Fish and Aquatic Life Code [515 ILCS 5/20-90], the Aquatic Life Approved Species List is established. The following aquatic life categories will be considered approved for aquaculture, transportation, stocking, importation and/or possession in the State of Illinois. Those species having special requirements are indicated by an asterisk (*).

Aquatic life categories:	***Applies to:***	***Regulated through:***
Crustaceans	Illinois Aquaculturists	Licenses
Mussels and Clams	Bait Shops	Facility Permits
Gastropods	Fish Importers	Importation Permits
Fish	Fish Markets	Health Certifications
Plants	Grocery Stores	Facility Inspections
	Nursery Dealers	Transportation Permits
	Pet Shops	

Algae



Filamentous algae

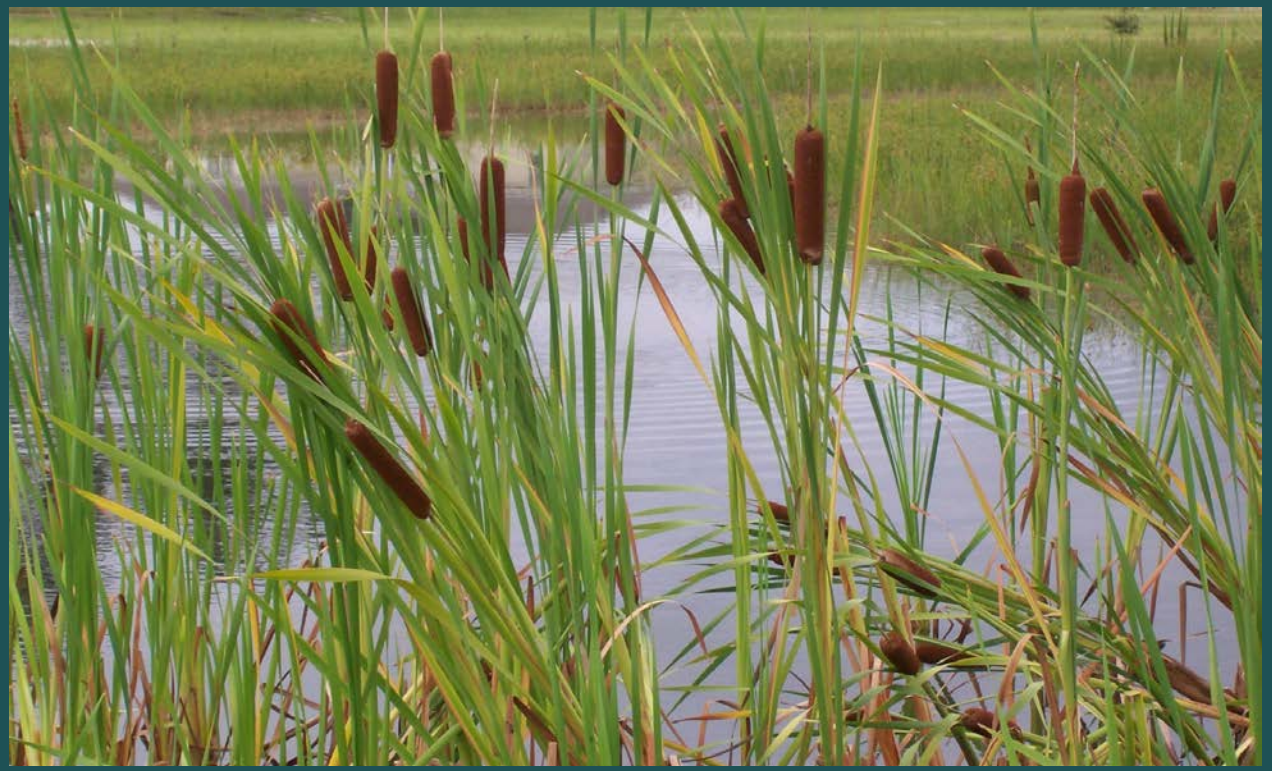
Blue-green algae

Blue-green algae often looks like spilled paint.

Floating Plants

Duckweed and Watermeal

Emergent Plants



Cattails

Arrowhead

Photo Credits: David Wyffels

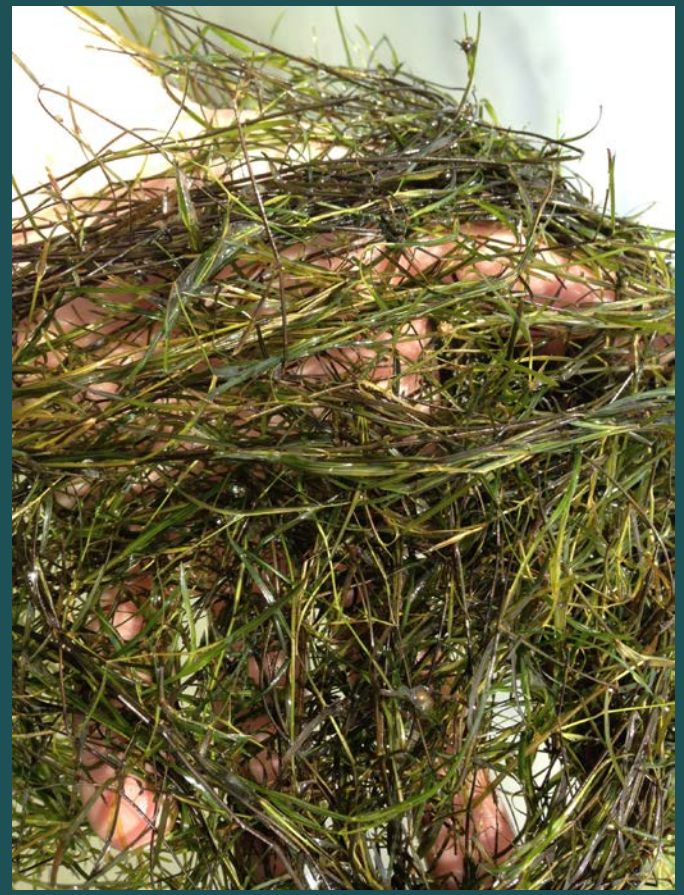
Submersed Plants

Coontail

Coontail

Submersed Plants

American Pondweed



Pondweed *spp*.

Habitat

Georgia Cube design

Stick Up design

Mechanical Control

Photo Credit: David Wyffels

Photo Credit: Farm and Home Supply

Biological Control

- Triploid Grass Carp (sterile)
  - Pros
    - Cheap, Natural, can be effective for the right vegetation
  - Cons
    - If overstocked, they can destroy all aquatic vegetation in the pond.
    - They have food preferences.
    - Depending on the productivity of your pond, you may see an increase in one kind of vegetation as you see a decrease in another.
  - Aquatic Vegetation that is not controlled by Grass Carp:
    - Filamentous Algae, Cattails, Duckweed, Watermeal, American Lotus

Triploid Grass Carp Stocking

Triploid Grass Carp Stocking Rate			
	Illinois		
% Plant Coverage	South	Central	North
10-20	0	0	0
20-40	3	4	5
40-60	5	7	10
Over 60	7	10	15

Chemical Control – Water Dyes

- Aquashade, PondShade, Blue Pond Dye, etc.
- Apply early in season
- Reapply as needed during growing season

- Do not apply for the first time in mid-summer! May trigger a fish kill.

Chemical Control - Herbicides

- For specific recommendations on aquatic herbicide selection please contact your county IDNR District Fisheries Biologist.
- Photos can be sent via email to aid in identification
- Please take photos of the plants in the water and close up pictures of the vegetation on a white towel
- Treatments need to be done before July 1.
  - Cool water holds more Oxygen than warm water.
  - Decomposing aquatic vegetation uses oxygen as it breaks down, depleting available oxygen for fish, which can trigger a fish kill

Copper Products

- Copper Sulfate, Cutrine Plus, Clearigate, etc.
- Primarily used to treat algaes
- Some products are effective at treating submersed plants
- Contact herbicides
- Citric acid can increase effectiveness
- Multiple treatments may be required throughout the season
- Spray, drag, scatter application methods

Diquat Dibromide Products

- Reward, Tribune, Weedtrine D, etc.
- Primarily used for submersed aquatic plants
- Some control of duckweed and watermeal
- Contact herbicide
- Spray or apply by boat

2,4-D Products

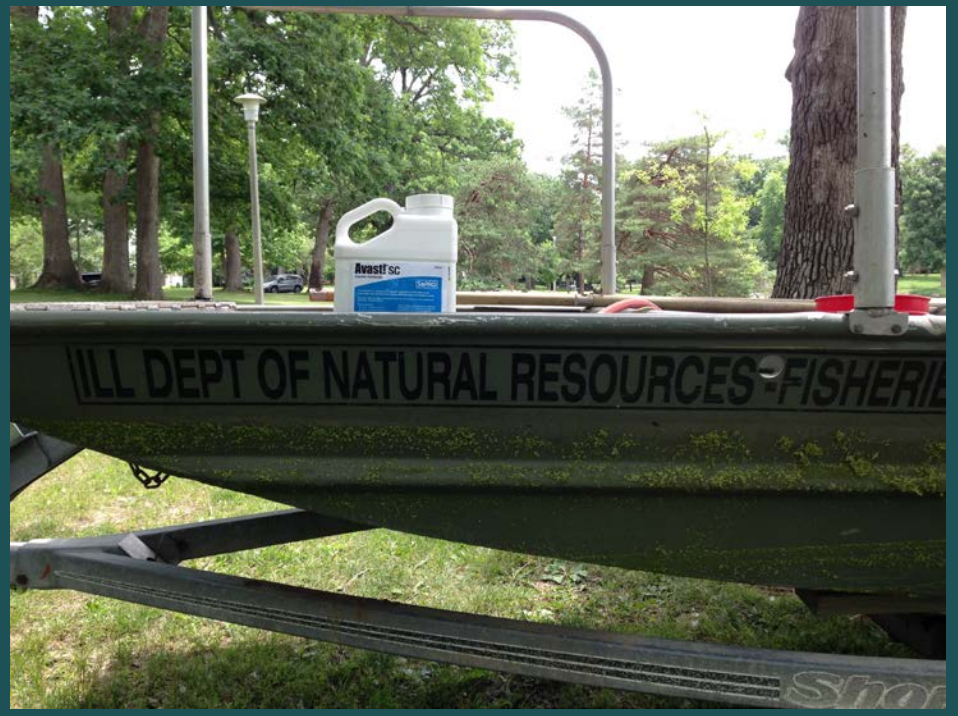
- Aquacide, Navigate, DMA4*IVM, etc.
- Most effective on emergent and some submersed aquatic plants
- Contact herbicide
- Spray or apply by boat

Glyphosate Products

- Rodeo, Aquapro, Aquaneat, etc.
- Primarily used on emergent and some submersed aquatic plants
- Contact herbicide
- Add surfactant
- Spray application

Fluridone Products

- Sonar, Avast, Sprit-Flo, Wipeout, etc.
- Effective for most all aquatic plants except algaes
- Effective for duckweed and watermeal
- Systemic herbicide
- Works slowly
- $$$ Costly
- Apply by boat



Washington Park Pond 6/6/2018

Washington Park Pond 6/20/2018

NPDES Requirements for Pesticide Applications to Lakes and Ponds

- NPDES permit is required when pesticides are applied to, over or near waters of the US.
- Notice of Intent (NOI) must be submitted to the IEPA at least 14 days prior to the pesticide application.
- Forms and Information at: http://www.epa.state.il.us/water/permits/pesticide/general-permit.pdf

Muddy Water

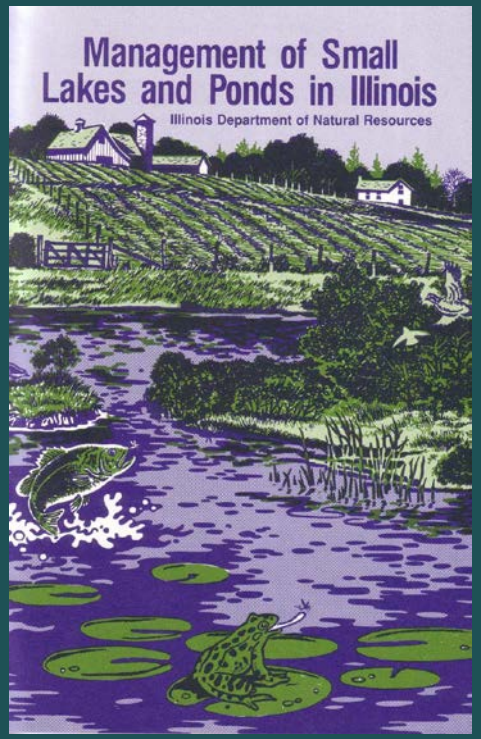
- Presence of Common Carp or Bullheads
- Watershed too large
- Soil erosion
- Clay suspensions
  - Simple test using a glass jar
  - Gypsum (hydrated calcium sulfate)
  - 525lbs / acre-foot of water

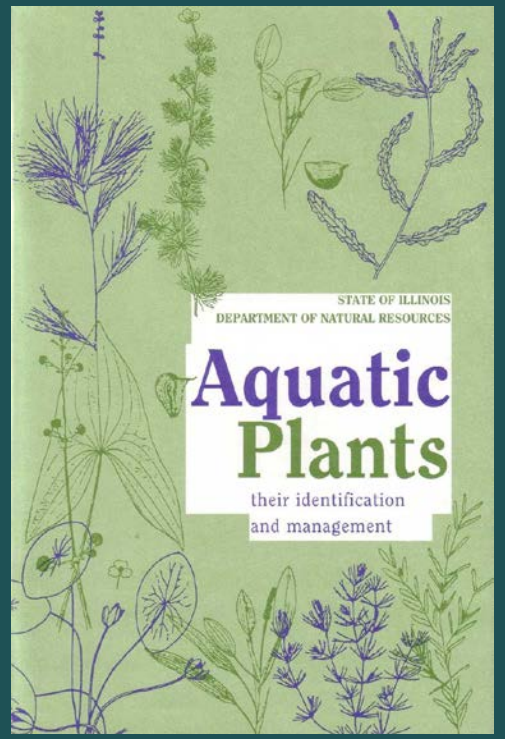
Aeration

- Fountains, Surface Diffusers, Bottom Diffusers
- Diffusers more effective than fountains
- Bottom mounted diffusers should be mounted on a stand and not dropped into organic matter
- Turn aeration on in April or May and run until October
- DO NOT turn on an aeration system mid-summer, recipe for a fish kill

IFISHILLINOIS.ORG
Pond Management Resources

https://www.ifishillinois.org/programs/aquatic_mgmt.html





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