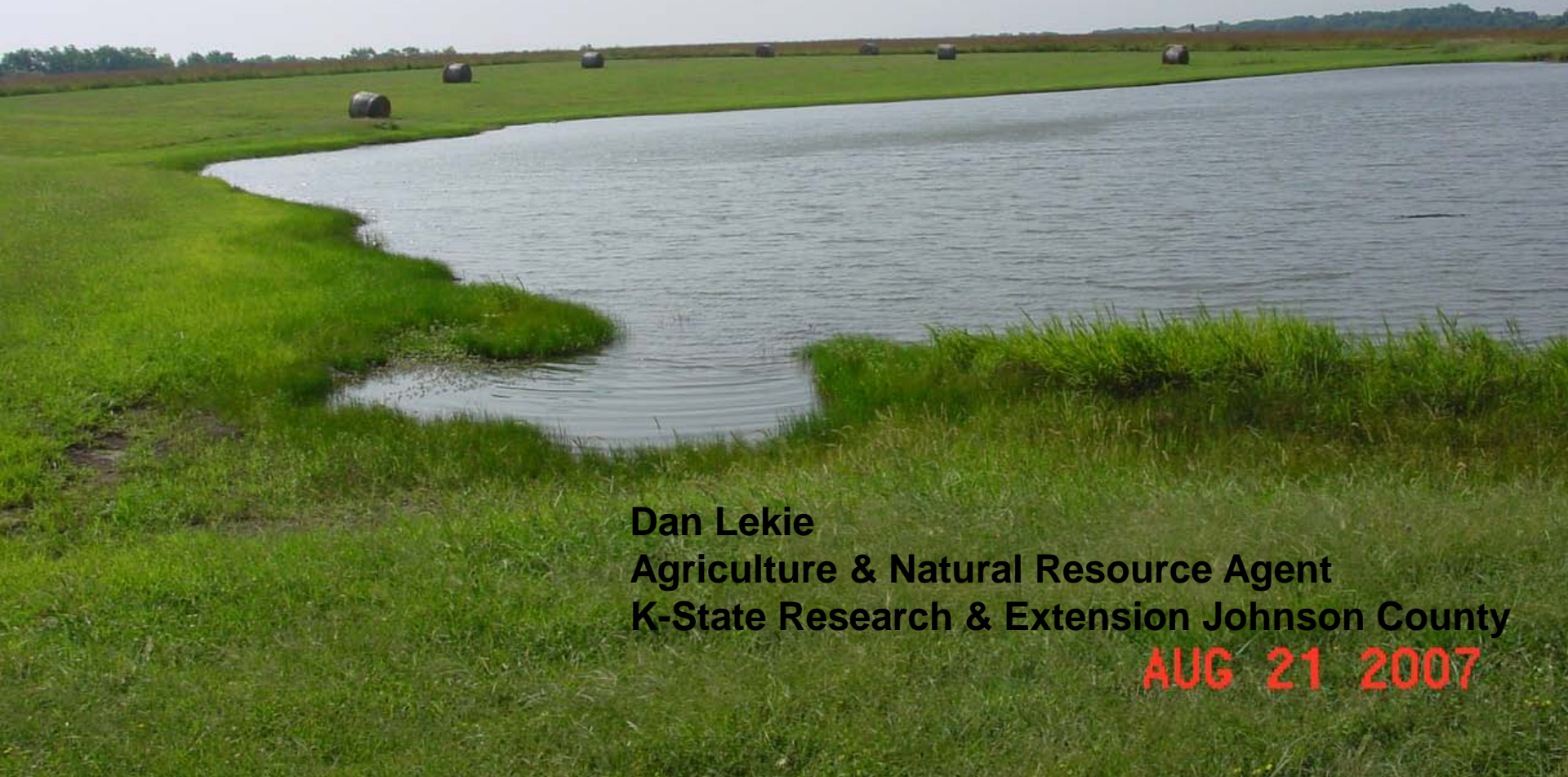


Pond Management



Dan Lekie
Agriculture & Natural Resource Agent
K-State Research & Extension Johnson County

AUG 21 2007

Pond Management Basics

Plant ID and Control

Fish Management

Wildlife Concerns

Management Options



Types of Aquatic Plants

- Algae
- Floating
- Submersed
- Emergent

Algae

- Filamentous
- Chara
- Phytoplankton/planktonic

Filamentous Algae











Chara Algae





COONTAIL
(Plant)

CHARA
(Algae)





Planktonic









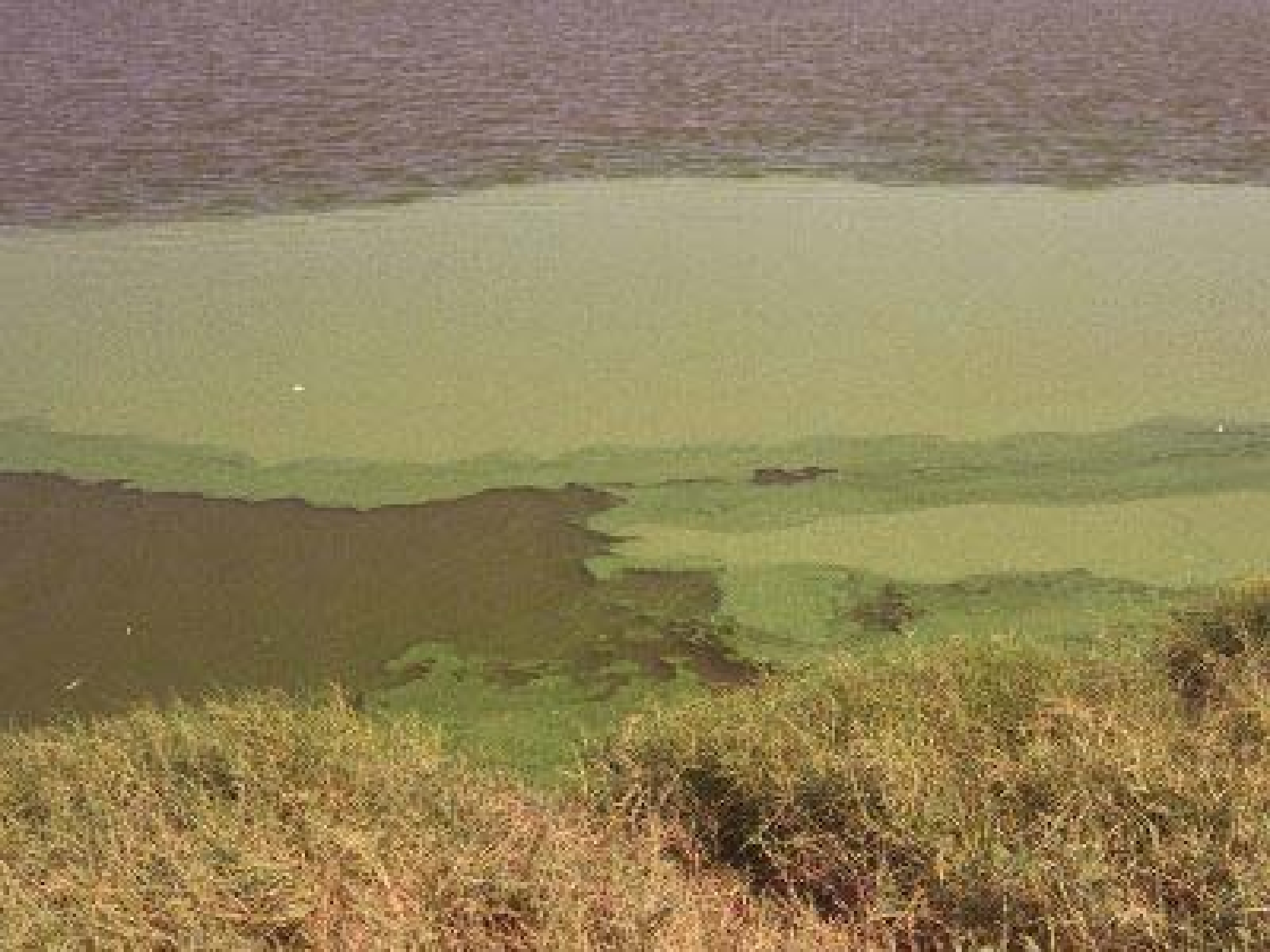






Table 1. Response of aquatic weeds to selected herbicides¹ and approximate treatment costs.

Aquatic Weed Classification	Aquatic Weed	Aquatic Herbicide (Trade name)							
		Copper Algaecides (Severol)	2,4-D (Severol)	Diquat (Reward & WeedtrineD)	Endothall (Aquathol & Hydrothol)	Fluridone (Sonar & Avast)	Glyphosate (Rodeo & Others)	Imazapyr (Habitat)	Tridopyr (Renovate)
Algae	Chara	E	P	G	G ²	P	P	P	P
	Filamentous	E	P	G	G ²	P	P	P	P
	Planktonic	E	P	P	P	P	P	P	P
Floating Plants	Duckweed	P	G	G	P	E ³	F	G	P
	Watermeal	P	P	F	P	G ²	F		P
Rooted Floating Plants	Waterlilies	P	E	P	P	E	E	E	E
Submersed Plants	Bladderwort	P	F	E	P	E	P	P	P
	Cootail	P	G	E	E	E	P	P	P
	Elodea	P		E	F ²	E	P	P	P
	Najas	P	F	E	E	E	P	P	P
	Pondweeds	P	P	G	E	E	P	P	P
	Watermilfoil	P	G	G	G	E	P	P	E
Emerged Plants	Arrowhead	P	E	G	P	P	E	E	
	Water Primrose	P	E	F	P	F	E	G	E
Marginal Plants	Cattails	P	F	G	P	F	E	E	F
	Smartweeds	P	F	P	P	P	E	E	E
	Purple Loosestrife	P	F	P	P	P	E	E	G
	Willow	P	E	P	P	P	E	E	E
	Cottonwood	P	G	P	P	P	G	G	E
Approximate Cost ⁴		\$2.50-20/ Acre-ft	\$7-65/Acre-ft	\$250-700/ Surface acre	\$50-220/Acre-ft	\$60-150/Acre-ft	\$15-30/ Surface acre	\$33-133/ Surface acre	\$80-320/ Surface acre

¹ E = Excellent, G = Good, F = Fair, and P = Poor or none. Refer to product labels for specific recommendations.² Hydrothol formulation only.³ AS formulation only.⁴ Herbicide cost varies with application rate, water depth, formulation, geography, and market fluctuations. Contact local supplier for current retail prices.

Floating Plants

- Duckweed
- Watermeal

Duckweed





NOV 26 2007

Watermeal





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Floating Plants	Duckweed	P	G	G	P	E ³	F	G	P
	Watermeal	P	P	F	P	G ²	F		P
Rooted Floating Plants	Waterlilies	P	E	P	P	E	E	E	E
Submersed Plants	Bladderwort	P	F	E	P	E	P	P	P
	Coottail	P	G	E	E	E	P	P	P
	Elodea	P		E	F ²	E	P	P	P
	Najas	P	F	E	E	E	P	P	P
	Pondweeds	P	P	G	E	E	P	P	P
	Watermilfoil	P	G	G	G	E	P	P	E
Emerald Plants	Arrowhead	P	E	G	P	P	E	E	
	Water Primrose	P	E	F	P	F	E	G	E
Marginal Plants	Cattails	P	F	G	P	F	E	E	F
	Smartweeds	P	F	P	P	P	E	E	E
	Purple Loosestrife	P	F	P	P	P	E	E	G
	Willow	P	E	P	P	P	E	E	E
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Submersed Plants

- Pondweed(s)
- Coontail
- Naiads

American Pondweed







Coontail





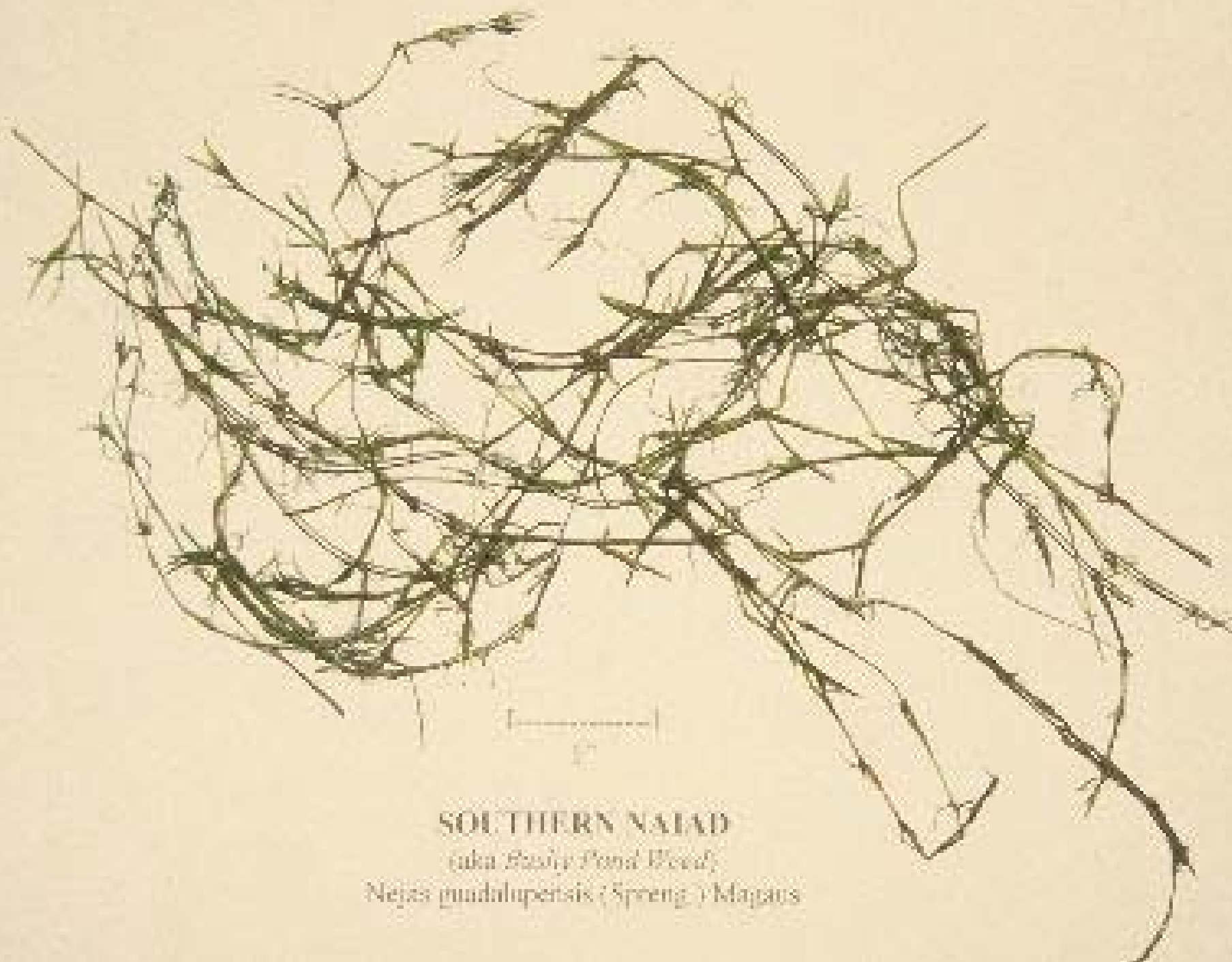
STAPLES





Southern Naiads





SOUTHERN NAIAD

(aka *Basin Pond Weed*)

Najas guadalupensis (Spreng.) Magaas



Table 1. Response of aquatic weeds to selected herbicides¹ and approximate treatment costs.

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	Planktonic	E	P	P	P	P	P	P	P
Floating Plants	Duckweed	P	G	G	P	E ³	F	G	P
	Watermeal	P	P	F	P	G ²	F		P
Rooted Floating Plants	Waterlilies	P	E	P	P	E	E	E	E
Submersed Plants	Bladderwort	P	F	E	P	E	P	P	P
	Cootail	P	G	E	E	E	P	P	P
	Elodea	P		E	F ²	E	P	P	P
	Najas	P	F	E	E	E	P	P	P
	Pondweeds	P	P	G	E	E	P	P	P
	Watermilfoil	P	G	G	G	E	P	P	E
Emerged Plants	Arrowhead	P	E	G	P	P	E	E	
	Water Primrose	P	E	F	P	F	E	G	E
Marginal Plants	Cattails	P	F	G	P	F	E	E	F
	Smartweeds	P	F	P	P	P	E	E	E
	Purple Loosestrife	P	F	P	P	P	E	E	G
	Willow	P	E	P	P	P	E	E	E
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Emergent Plants

- Arrowhead
- Cattails
- Smartweed(s)
- Water primrose

Arrowhead







Cattail



Smartweed







Water Primrose







Table 1. Response of aquatic weeds to selected herbicides¹ and approximate treatment costs.

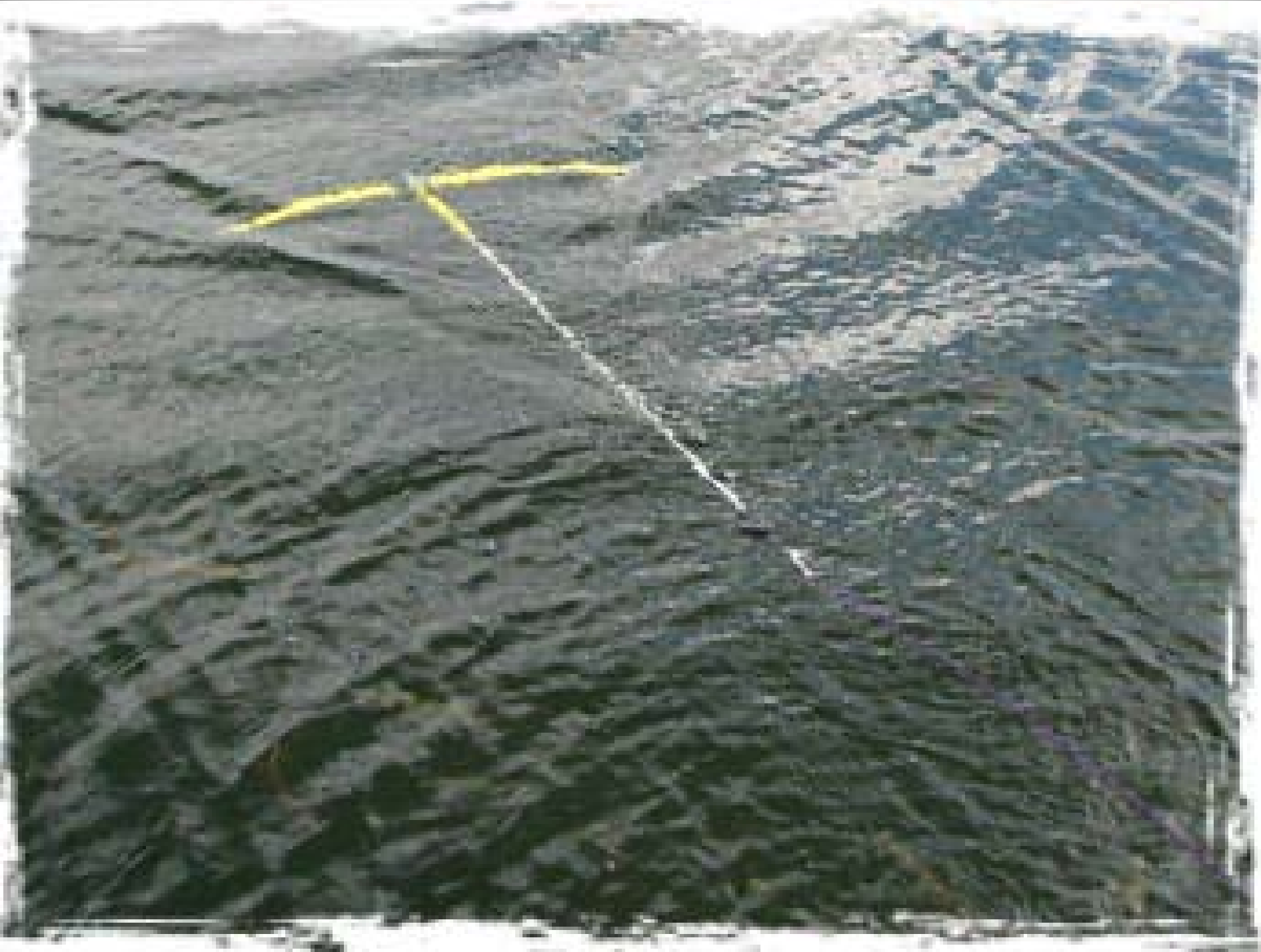
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	Watermeal	P	P	F	P	G ²	F		P
Rooted Floating Plants	Waterlilies	P	E	P	P	E	E	E	E
Submersed Plants	Bladderwort	P	F	E	P	E	P	P	P
	Cootail	P	G	E	E	E	P	P	P
	Elodea	P		E	F ²	E	P	P	P
	Najas	P	F	E	E	E	P	P	P
	Pondweeds	P	P	G	E	E	P	P	P
	Watermilfoil	P	G	G	G	E	P	P	E
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Mechanical Removal

- Weed Cutters
- Machines
- Weed Rakes
- Hand







22 10 2002





Biological Weed Removal

- Herbivorous Fish







<http://aquaplant.tamu.edu/>



A POND MANAGER DIAGNOSTICS TOOL

Pond Management for Fishing

- Stocking Strategy
- Environmental Conditions
- Fish Harvest and Growth
- Successful Fish Reproduction
- Elimination of Unwanted Fish Species
- Vegetation Control




Three Reasons for Poor Fishing Quality

- Wrong Kinds of Fish
- Wrong Size of Fish
- Wrong Number of Fish



Pattern of Fishing in an Unmanaged Pond

- The pond is built and stocked with fish
 - Fishing begins one or two years later
 - Three to five years after construction, fishing is excellent
 - Fishing declines after six or seven years and remains poor
- 
- A photograph of a calm pond surrounded by trees and grass, reflecting the sky and surrounding vegetation. The pond is the central focus, with its surface acting as a mirror for the overcast sky and the bare branches of trees in the background. The foreground is filled with lush green grass, while the background shows a line of trees and a distant horizon under a grey, overcast sky.

Why Does Fishing Decline?

- Natural progression: increased plant growth is detrimental for large predatory bass because:
 - Makes capturing prey more difficult
 - Increases the chance of fish kills due to plant die-offs
 - Selective fishing

What to Stock?

All-purpose Fish Combination

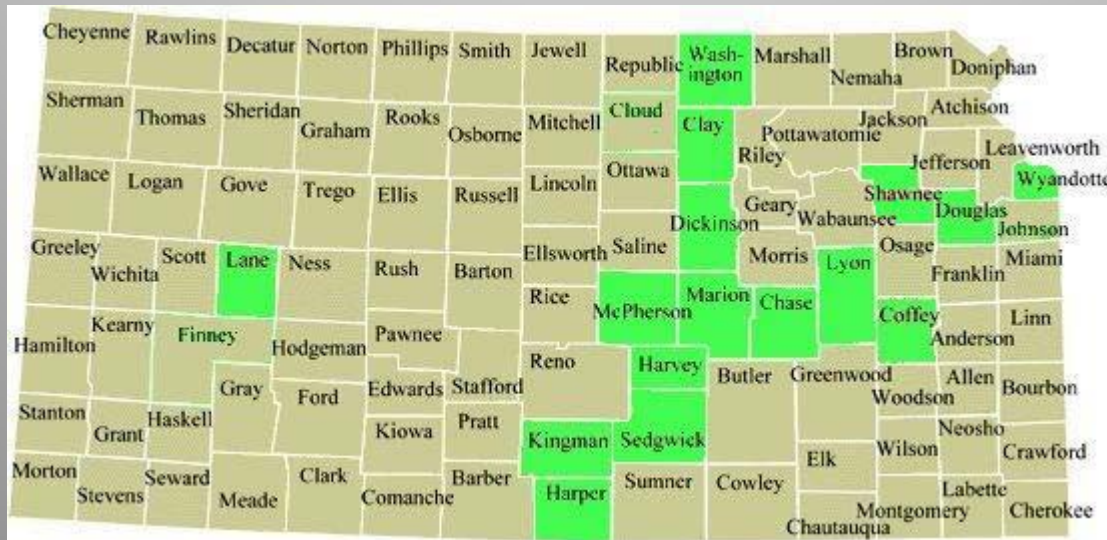
- Largemouth Bass – 100 fingerlings/acre
- Bluegill – 500 fingerlings/acre
- Channel Catfish – 100 fingerlings/acre
- Fathead Minnows – 3 pounds/acre

When to Stock

- Stock minnows in spring
- Catfish in fall
- Largemouth bass next spring

Where to Get Fish

- Kansasaquaculture.com



Bass Harvest Critical

- Do not remove bass ≤ 15 " for 3 years
- After that have a 12"-15" protected range
- Harvest no more than 20lbs. bass/acre/year



Bluegill

- Usually not harvested adequately
- Try to remove 30 lbs/acre/year



Channel Catfish

- Harvest as many as desired
- Replace with $> 8''$ to avoid bass predation



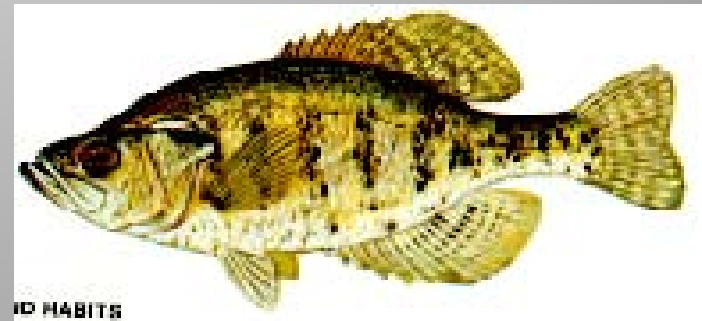
Typical Stocking Strategy for Small Ponds

- Bluegill
- Largemouth Bass
- Channel Catfish



Problem Fish for Ponds

nows also have scaleless heads.



ID HABITS

Pond Fishery Out of Balance

- A few large bluegill
- Many small largemouth bass

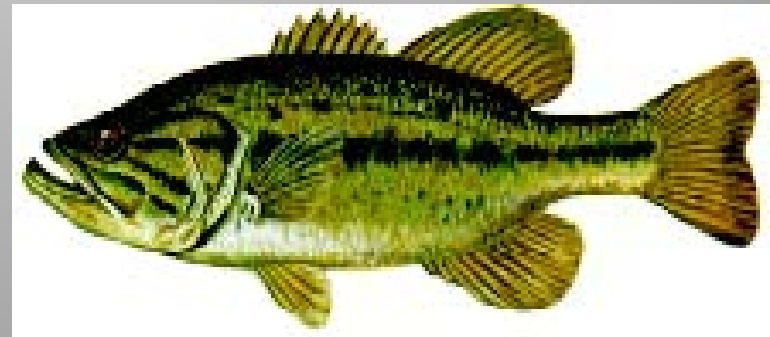


Pond Fishery Out of Balance

- Many small bluegill

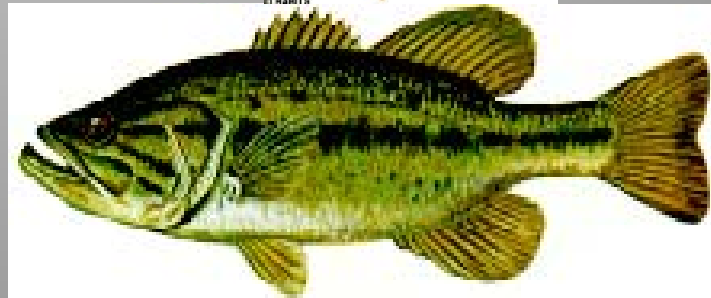
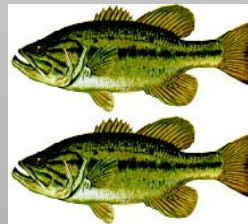
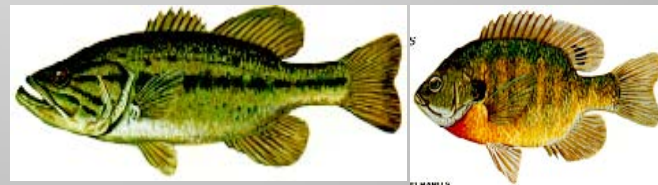


- Few large largemouth bass



Balanced Pond

- Bluegill
- Largemouth Bass



The Best Monitoring Method Is Fishing



Questions to Ask Yourself

- Is the average size of bluegill declining?
- Is the largest size bluegill you catch getting smaller?
- Do you catch fewer big fish?
- Are bass being caught less frequently?
- Are crappie, carp, or other non-stocked fish being caught?

Record Fish Harvest

- Species
- Size
- Number
- Date
- Water conditions



Pond Management Is A Balancing Act

A balanced pond fishery can be established with the initial stocking.

Maintaining balance requires the pond owner to manage the harvest.

Managing the Harvest

- Bag Limits
- Size Limits
- Catch and Release
- Education



Correcting Poor Fishing

Eradication of all fish species is recommended if your pond contains a poor mix of fish species or is dominated by over-crowded slow growing bluegill.

Choices:

- Drain Pond
- Chemically Treat

Fish Attractors

- May be used if pond has limited cover
- Will not significantly increase pond productivity, simply concentrate fish
- Recommended materials include brush, Christmas trees or any wood
- Anchor to the bottom
- Place on the ice



Feeding Fish

- Not recommended for most pond owners – not needed in a balanced system
- Not a solution for undersized fish



Panfish Option

**Release all bass < 15 inches,
this overpopulates the bass
and then larger Bluegills will
be produced (> 8")**





Big Bass Option

- Release all bass under 15" for 4 years after stocking
- Harvest no bass $> 15"$ during that time
- Then overharvest the 8" – 15" bass (30-50/acre)
- Release bass $> 15"$



Common Causes of Muddy Ponds and Their Solutions

- 
- A photograph of a pond with a heron standing in the water. In the foreground, there are tall, dry grasses. The water is slightly murky, and the background shows a line of trees.
- Soil erosion
 - Abundance of common carp and bullheads
 - Wave Action
 - Livestock
 - Suspended clay particles
 - Buffer zone
 - Eradication: chemical or drain pond
 - Riprap or vegetation
 - Fencing
 - Hay bales

Fish Kills Due to Suffocation

- Excessive snow and ice
- Rapid plant die-off resulting from:
 - Cold rain
 - Several cloudy days
 - Excessive use of herbicides



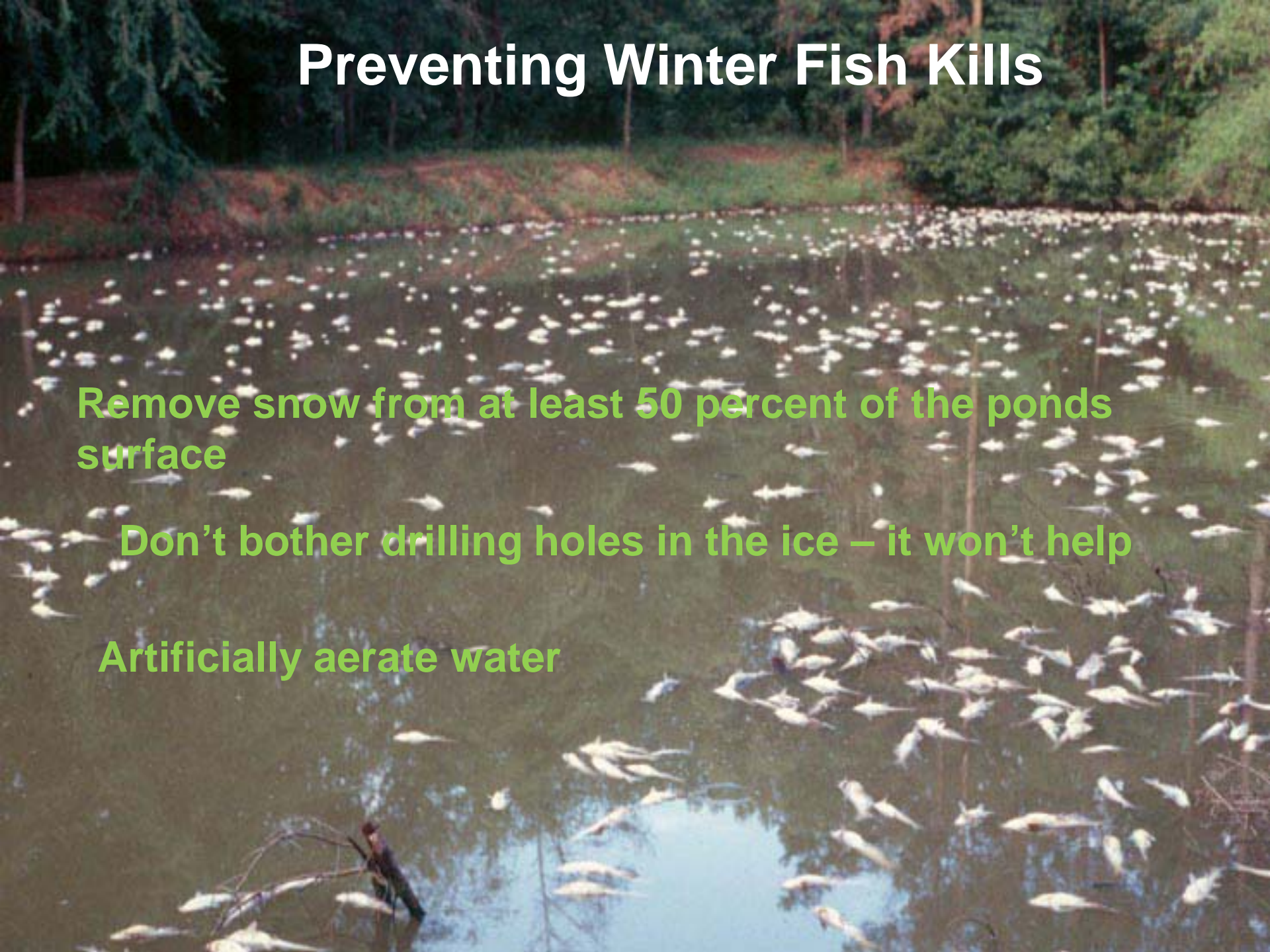


Preventing Winter Fish Kills

Remove snow from at least 50 percent of the ponds surface

Don't bother drilling holes in the ice – it won't help

Artificially aerate water



Preventing Summer Fish Kills

Prevent fertilizer, herbicides, insecticides or organic run-off (silage, manure) from entering the pond

Chemically treat aquatic weeds early in the growing season

Avoid treating large areas at the same time



Nuisance Wildlife





Muskrats





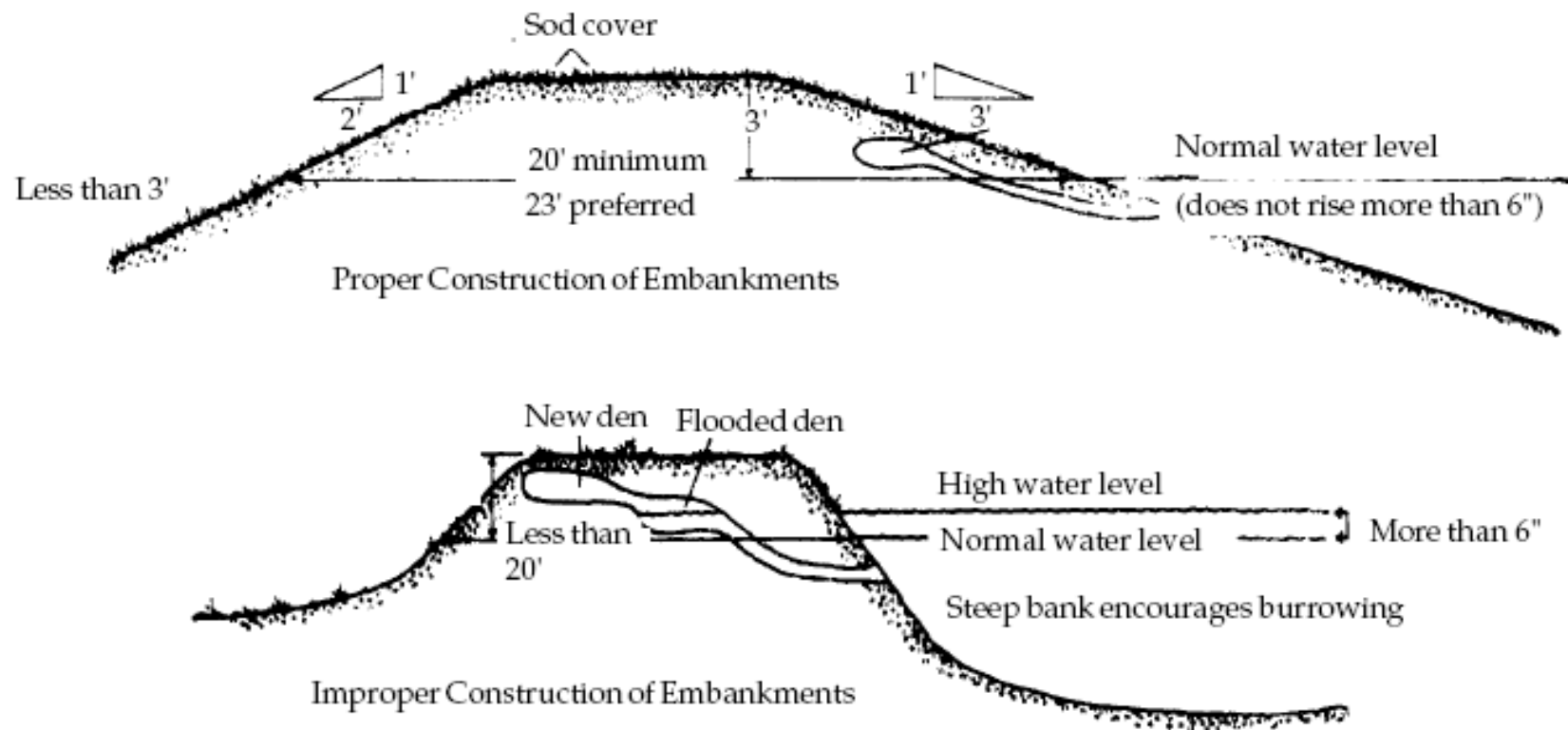
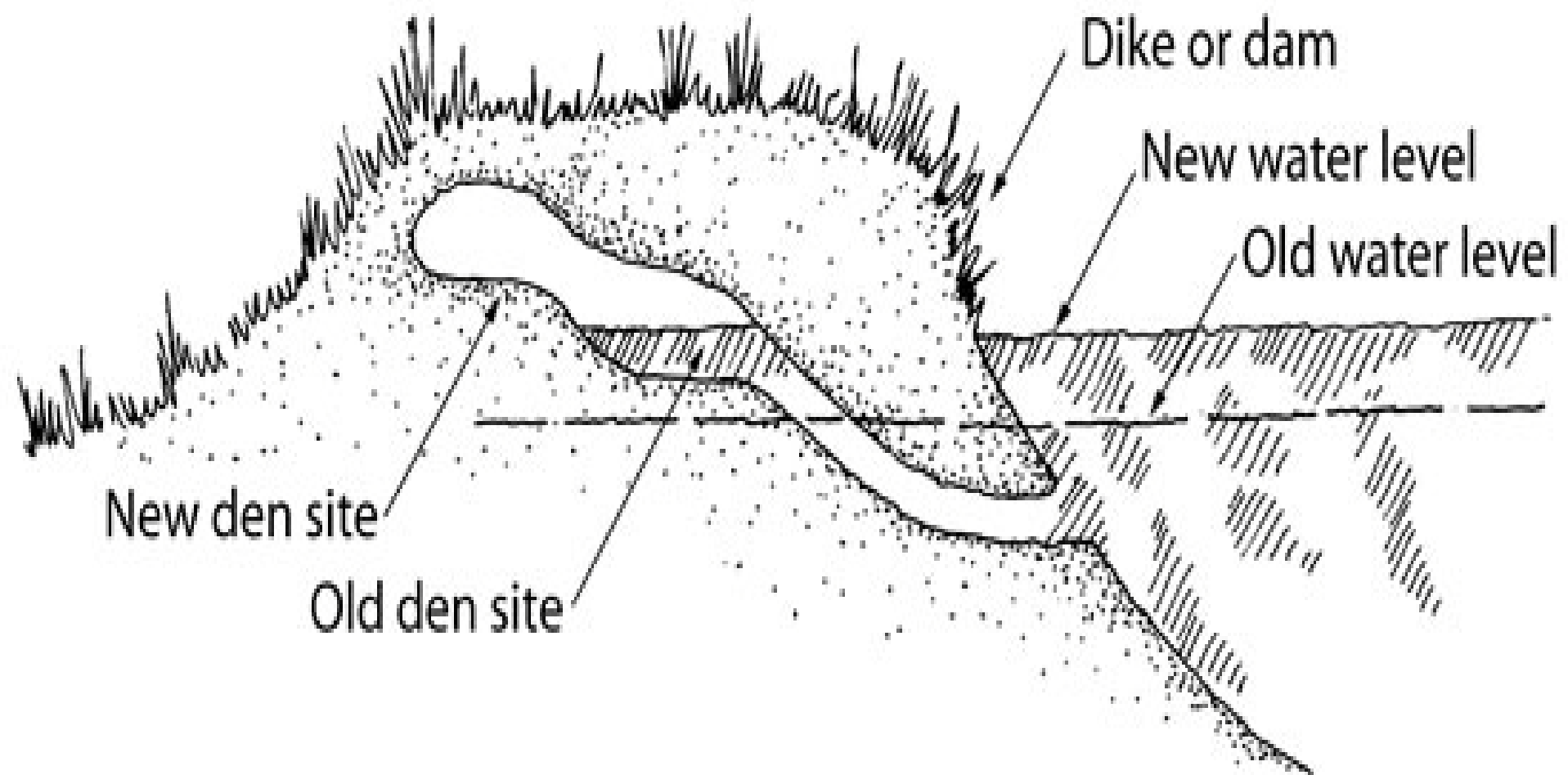


Fig. 5. Proper dam construction can reduce muskrat damage to the structure.









Beaver















Management Options

What do you want?







THE END