
Nuisance Aquatic Plants in
Urban Lakes and Ponds

Urban Lakes / Retention Ponds

- Add value and curb appeal
- Flood and stormwater control
- Accept water from roads & yards
- Runoff water gathers oil, gas, pesticides, heavy metals, fertilizers, bacteria, and nutrients as it flows over roads, driveways and yards

These pollutants could cause serious harm if they flowed directly into water bodies without any filtration or decomposition

Urban Lakes / Retention Ponds

- Are easily invaded by non-native plants
- Algae feeds excess nutrients in the pond
- Excess nutrients come from lawn fertilizer, geese/pet waste, grass clippings, etc.

Pond Plan of Action

1. Treat symptoms
   - I have a pond weed problem now!
   - What are the treatment options?
   - What are the pros and cons for treatment options?
   - What is best for the overall pond health?
2. Prevention
   - What can we do to reduce nutrients going into the pond?

Treatment

Step 1: Identify the problem species

ID Your Weed

Websites

- http://aquaplant.tamu.edu/
- www.ppws.vt.edu/scott/weed_id/aquatics.htm
- www.outdooralabama.com/fishing/freshwater/where/ponds/p/ap/guide/
- http://aquat1.ifas.ufl.edu/

Book

Water plants for Missouri ponds

By James R. Whitley, Barbara Bassett, Joe G. Dillard, Rebecca A. Haefner

Bring in a sample of the weed to

the Extension Office

or

Email pictures to tonyab@ksu.edu

Filamentous Algae

Planktonic Algae

Common Pond Weeds

Duckweed

Watermeal

American Pond Weed

Eurasian Watermilfoil

Curly-Leafed Pond Weed

Coontail

Treatment

Step 2: Identify the options

Mechanical Removal

- No chemicals
- Minimal tools and know-how needed
- Not dependent upon water temperature or chemistry
- More cost effective
- Labor intensive
- Assess the level of effort needed

Mechanical Removal

- Hand harvesting
  - Pulling, raking, cutting or digging
  - Specialized rakes

    www.gemplers.com

    www.pondalgaesolutions.com

Benefits

- Doing it yourself = less cost
- Could be a shared community duty
- Get youth groups involved
- Borrow or rent a small boat
- Harvested algae and other weeds can be composted
- No potential exposure to hazardous chemicals, no need to worry about toxicity to fish
- Only treatment where nutrients are removed from waterbody

Chemical Weed Control

- Identify the plant pest
- Assess the acreage of infestation
- Know total pond acreage, average depth, flow rates
- Select labeled treatment
- Know the water chemistry
- Proper application and timing of applications is critical

Common Names & Active Ingredients

Bluestone	Copper Sulfate (Contact Herbicide)
Cutrine Plus, K-Tea, Captain, Algae Pro, Clearigate, Komeen, Nautique	Chelated Copper (Contact Herbicide)
Navigate (Granular), Weed Rhap Weedar 64 (Liquid),	2-4 D (Systemic Control)
Aquathol, Hydrothol	Endothol (Contact Herbicide)
Rodeo, Aquamaster, Aquaneat	Glyphosate (Systemic Control)
Reward	Diquat (Contact Herbicide)
Sonar, Avast	Floridone (Systemic Control)

Herbicides
Contact vs. Systemic

Contact herbicides

- act quickly and kill all plants cells that they contact

Systemic herbicides

- absorbed within the plant and moves to the site of action
- tend to act more slowly than contact herbicides

Chemical Weed Control

Understand:

- Application requirements
- Aquatic herbicide label & MSDS
- Active ingredients
- Immediate and latent Impacts
- Application rate
- # of applications
- Potential problems
- Weather
- Water-use restrictions

Aquatic Herbicides PowerPoint

The University of Georgia
Warnell School of Forestry and Natural Resources
College of Agricultural and Environmental Sciences

http://www.bugwood.org/PAT/powerpoint/14.%20Aquatic%20Herbicides.ppt#256,1,Aquatic Herbicides

http://www.lsuagcenter.com/NR/rdonlyres/0ED57178-7F9C-4E9A-A397-643295968168/56782/20Aquatics09.pdf

Sites provide detailed information about the characteristics of aquatic herbicides listed in the table, including mode of action, selectivity, toxicity to humans and wildlife, application rates & timing, weaknesses & limitations, etc.

Important notes about chemical treatment

- No restrictions on aquatic herbicide in KS, no license required if applicator is HOA employee

HOWEVER:

- The chemicals may be harmful to plants, invertebrates, or fish, *especially if applied improperly*
- Most insurance companies will not accept the liability
- Bottom line: proper application should be performed by an trained and licensed professional

- Oxygen in a pond decreases when plants die and decompose
- Nutrients are not removed but returned to the waterbody, algae will likely return
- Treat only ½ to ⅓ of the pond at a time
- Wait 1-2 weeks then treat the next ½ or ⅓
- Watch for fish stress
  - Gulping for air at the surface in early morning hours

Prices of Chemicals

Chemical	Cost Per	Application Rate	Cost Per Treatment*
Sonar (granular)	$38 / lb	30 lbs / acre-ft	$18,240
2, 4-D (granular) - Aqua-Kleen; Riverdale; Weedtrine II	$1.80 / lb	100 – 150 lbs / acre-ft	$4,320
Reward (Diquat)	$160 / gal	0.5 – 2 gal / acre-ft	$5,120
Rodeo	$72 / gal	1.5 gal / acre-ft	$1,728
Cutrine Plus (Chelated Copper)	$37 / gal	0.6-1.2 gal / acre-ft	$710
K-Tea (Chelated Copper	$33.20 / gal	0.7-2.9 gal / acre-ft	$1,541
Aquathol (endothal)	$24 / lb	2.2-13.2 lbs / acre-ft	$5,069

*A 2-acre pond with an average depth of 8 feet = about 16 acre-feet, assumes highest application rate where variable

Cost Analysis

- Cost of chemicals vary with application rate, water depth, formulation, geography, and water chemistry
- Price often determines which chemical treatment is best, but should not be the only consideration
- Consider costs for more than one treatment, labor hours to apply it, boat, spray equipment needed for liquid applications, wetting agents, etc.

Table 1. Response of aquatic weeds to selected herbicides[1] and approximate treatment costs.

		Aquatic Herbicide (Trade name)							
Aquatic Weed Classification	Aquatic Weed	Copper Algaecides (Several)	2,4-D (Several)	Diquat (Reward & WeedtrineD)	Endothall (Aquathol & Hydrothol)	Fluridone (Sonar & Avast)	Glyphosate (Rodeo & Others)	Imazapyr (Habitat)	Triclopyr (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[3]	F		P
Rooted Floating Plants	Waterlillies	P	E	P	P	E	E	E	E
Submersed Plants	Bladderwort	P	F	E	P	E	P	P	P
	Coontail	P	G	E	E	E	P	P	P
	Elodea	P		E	F[2]	E	P	P	P
	Naiad	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
Emersed 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.*

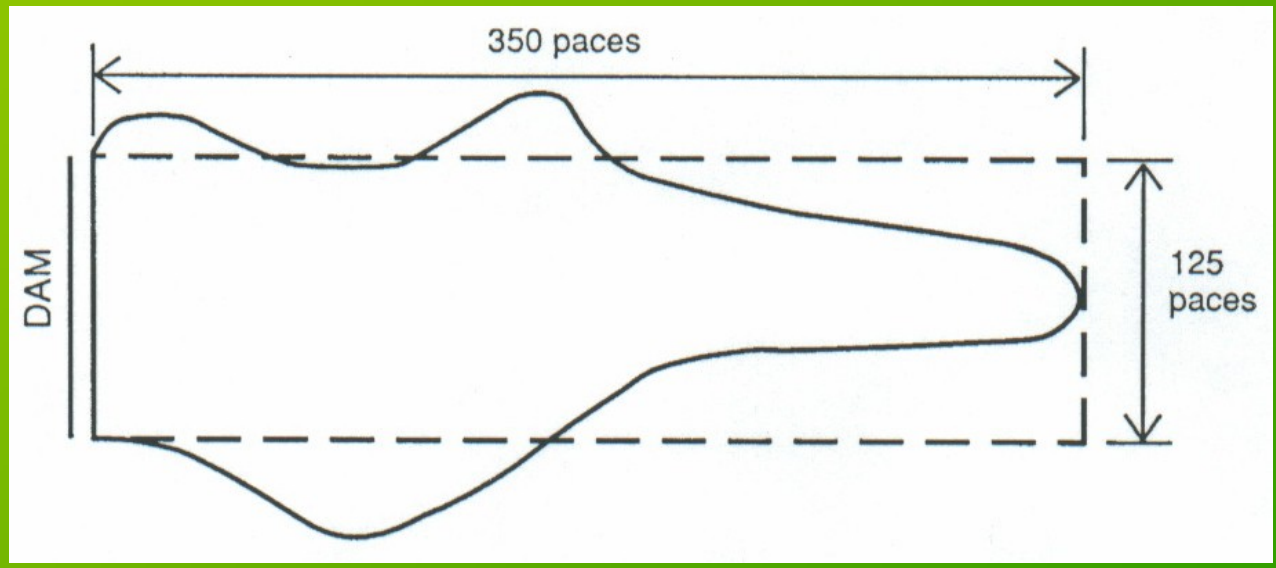
[3] *AS formulation only.*

[4] *Herbicide cost varies with application rate, water depth, formulation, geography, and market fluctuations. Contact local supplier for current retail prices.*

Calculating Pond Size

Area

Avg length x Avg width = total square feet



Graph paper method in (*Aquatic Plants* booklet)

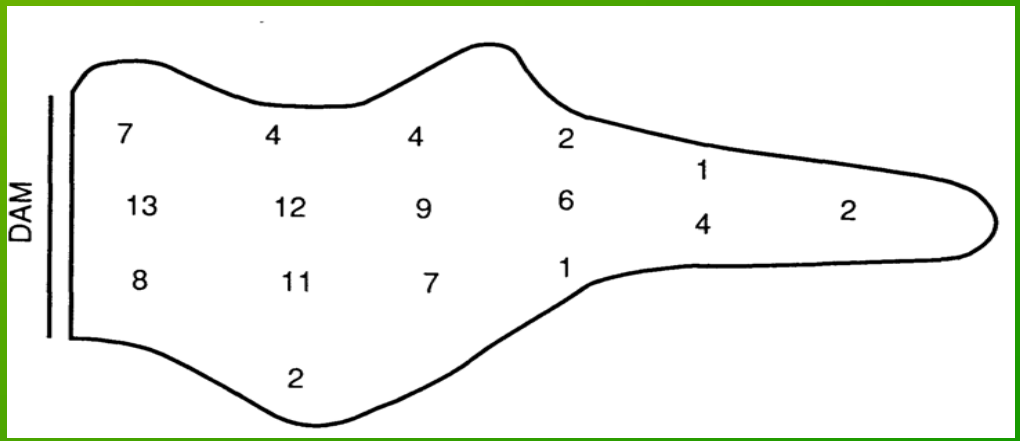
Calculating Pond Size

Volume

Pond area in sq ft x Avg depth in ft =
Total Volume in Cubic Feet

For **acre feet** divide cubic feet by 43,560

Find average depth by taking depth measurements, spaced evenly throughout pond



Biological Control

- Common Species - Grass Carp
- Stocked for Vegetation Control
- Greatest Impact at 12-24" in Length
- Metabolism Slows with Age

~ 7 Years of Productivity

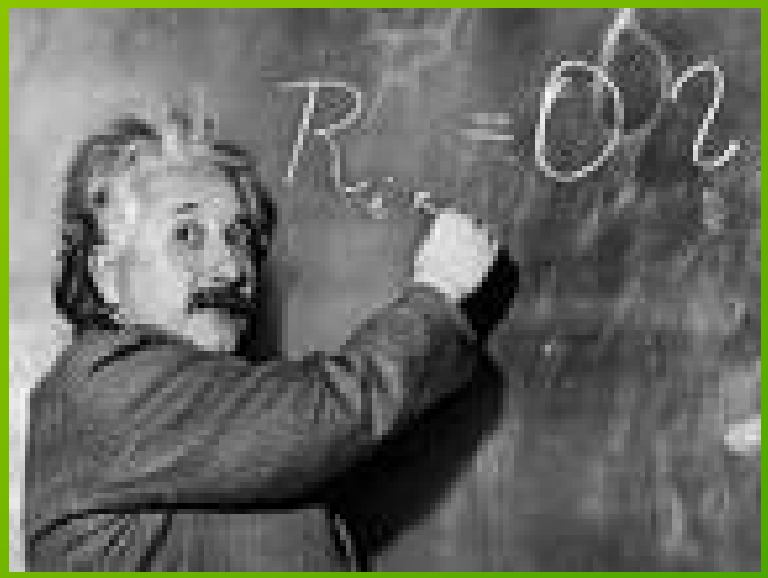
5 Per Acre - Preventative

0-20 Per Acre - Corrective

Grass Carp Drawbacks

- Consume all aquatic vegetation and overhanging terrestrial vegetation, thereby reducing food available to native invertebrates and other fishes
- Do not like planktonic or filamentous algae and will typically eat all the beneficial plants instead
- Often increase phytoplankton populations by enriching the system with their undigested and expelled plant material, promoting algal blooms
- May also carry several parasites and diseases known to be transmissible to native fishes

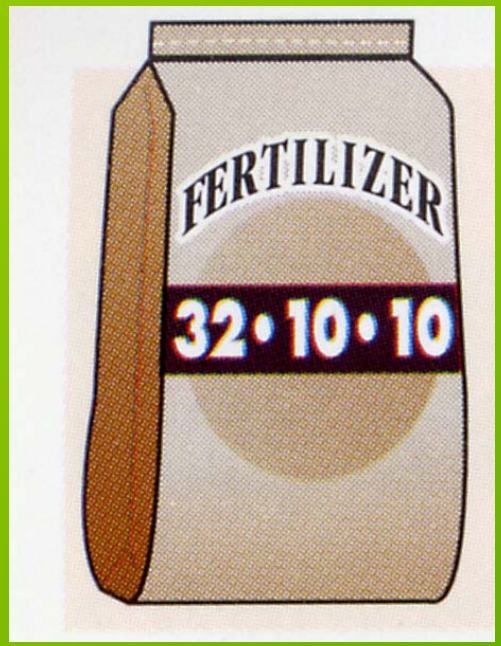
Prevention of Nuisance Aquatic Plants



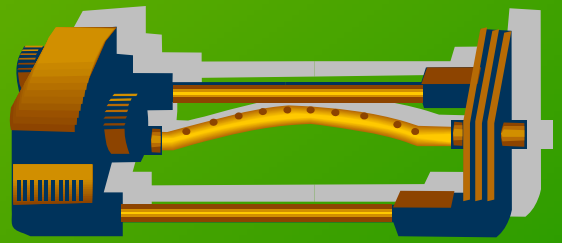
Intellectuals solve problems; geniuses prevent them.

- Albert Einstein

Common Lawn Care Mistakes that Impact Your Pond



- Mowing
- Watering
- Fertilizing



Mowing

- Set mower blade to cut off only the top 1/3 of the blade
- Leaving less than 2/3 of the grass blade causes
  - Weed growth
  - Potential heat stress
  - Harmful insects
  - Disease

Mowing

- Fescue's recommended height is 2 - 3 inches
- Follow the 1/3 rule and don't bag the clippings
- Keeping clippings on the lawn reduces fertilizer applications by 25%
- Don't allow clippings into pond either!

Cool Season Grasses

Grass	Mowing Height	Traffic Tolerance	Soil Type	Sun
Bentgrass	1/2 -1"	light	tolerates acidic	full
Bluegrass	2-2 1/2"	light	pH 6.5-7 neutral	full
Perennial Ryegrass	2-3"	high	most types	full
Fine Fescue	2-3"	light	most types	full/shade
Tall Fescue	2-3"	high	most types	full/partial

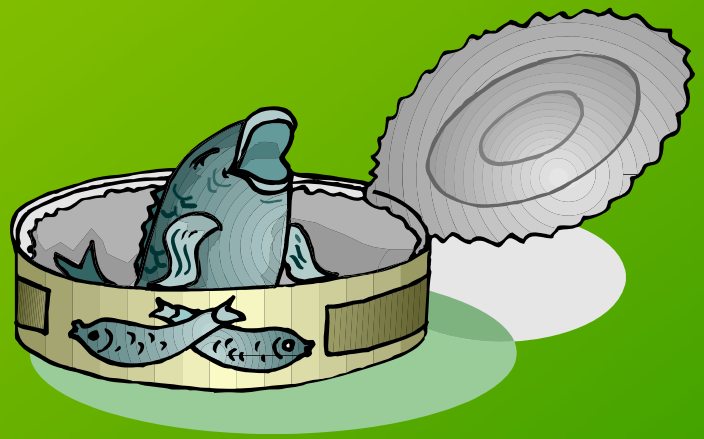
Warm Season Grasses

Bahia	2-2 1/2"	moderate	many types	full/moderate
Bermuda	1 1/2 -2"	high	light textured	full
Centipede	1 1/2 -2"	light	tolerates acidic	full/partial
St. Augustine	2-3"	high	prefers sandy	full/partial
Zoysia	1 - 2"	high	pH 5.5-6.5 slightly acidic	full/partial

Watering

No more than 1 inch per week:

- Includes rain
- Tuna can method



Grass needs water when:

- Grey-blue cast
- Footprints are visible after 30 min or more

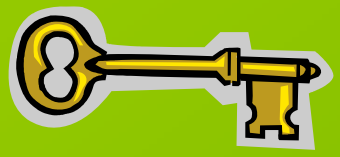
Watering

- In summer, water 1-2 times per week, 1 inch total
- Morning watering is best
- In fall, water every other week if weather is dry
- Don’t let water rush down the street gutters

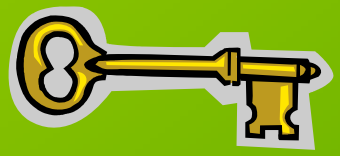
PLEASE NOTE

- Just because your lawn turns brown during extremely dry periods doesn't mean it's dying
- Grass will go dormant during such periods. Your lawn doesn't have to be green to be healthy.
- Most grasses can survive 30-60 days of drought without substantial losses.

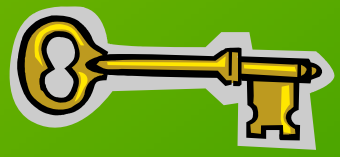
Keys to Fertilizing



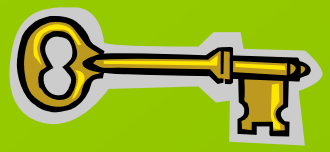
Right time



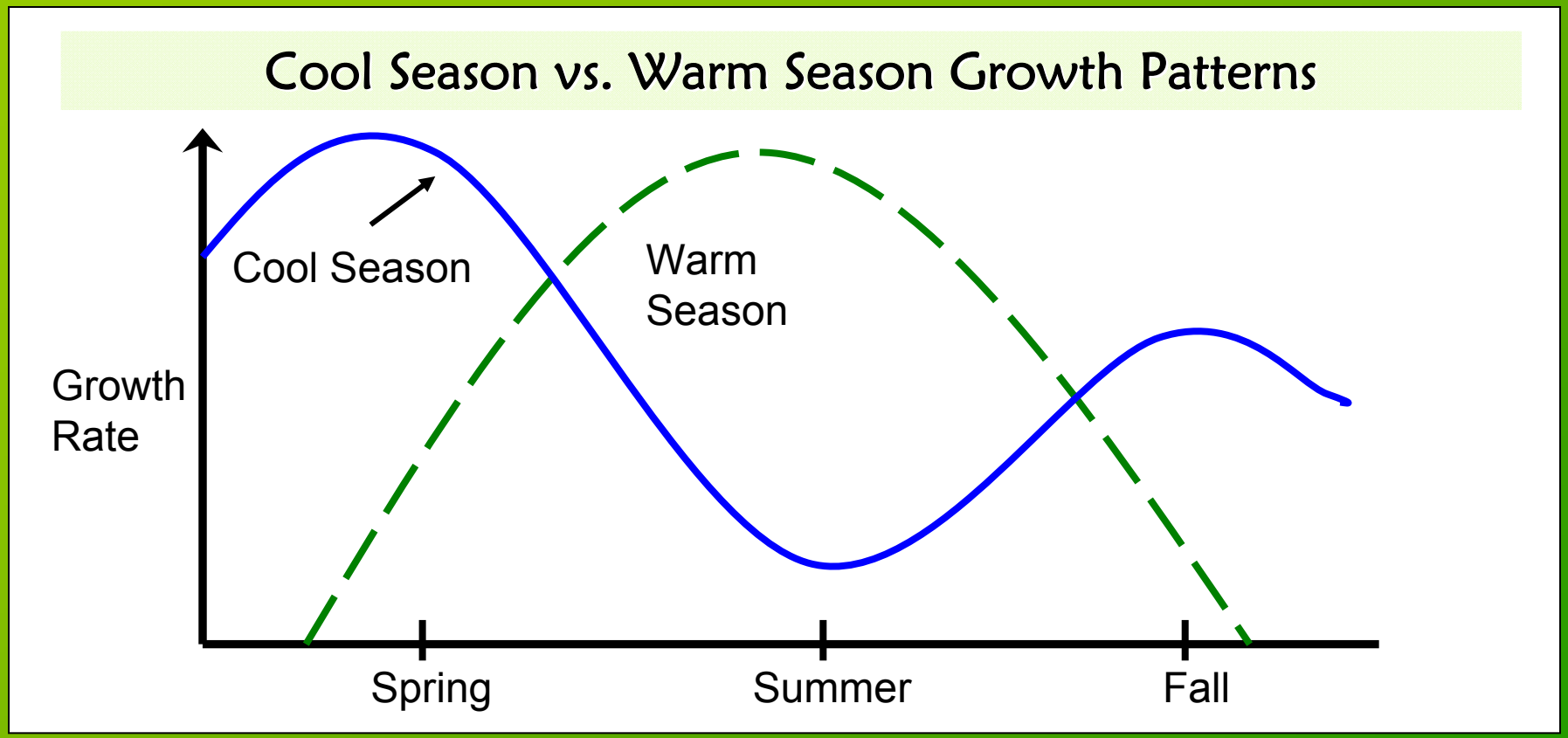
Right Quantity



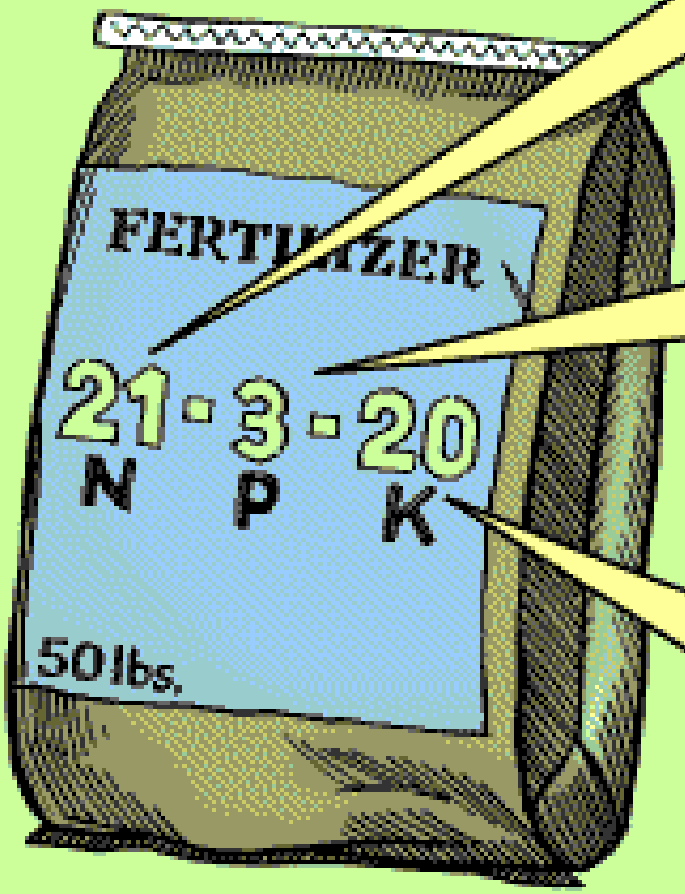
Right Mixture



Right Time


Cool Season vs. Warm Season Growth Patterns
Cool Season
Warm Season
Growth Rate
Spring
Summer
Fall

Right Mixture

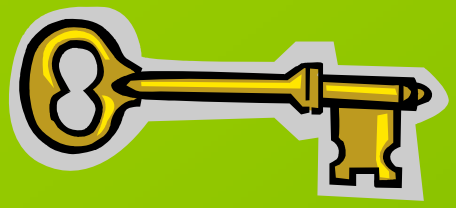


Nitrogen: key nutrient in plant growth.
21% N in a 50 lb. bag = 10.5 lbs. N

Phosphorus: important for establishment.
3% P in a 50 lb. bag = 1.5 lbs. P

Potassium: will increase stress tolerance.
20% K in a 50 lb. bag = 10 lbs. K

P & K needed only as soil test indicates



Right Quantity

More ≠ Better

Nitrogen	Rate
5 – 12	8 pounds/1,000 square feet
12 – 18	6 pounds/1,000 square feet
19+	4 pounds/1,000 square feet

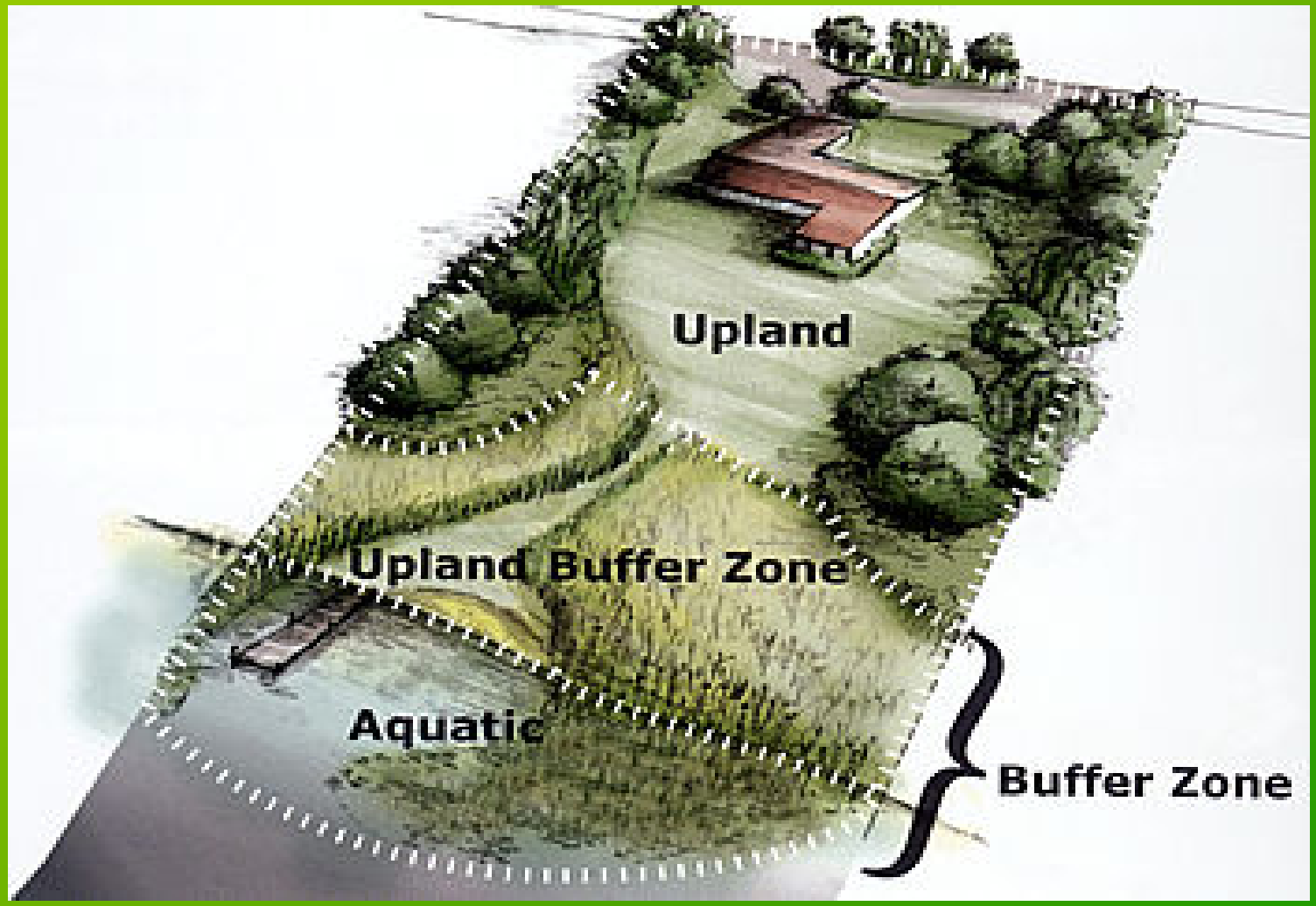
Soil Test

- Turf lawn test
  - Nitrogen
  - Phosphorus
  - Potassium
  - pH
  - Organic Matter
- Follow proper sampling methods
  - See *Procedure for Taking a Soil Test* handout
- Sedgwick County Extension Office
- Cost $18

Using a Lawn Service?

- Don’t assume your lawn care professional or maintenance company is following these practices
- Be sure to talk to your service provider about their methods to reduce nutrient overload

Buffers Can Help!



Vegetative Buffers

- Runoff filtering
  - Soluble pollutants, including plant nutrients, are taken up through plant roots or consumed by microbes
  - Slows the flow of runoff to reduce channel erosion and stabilize soil
- Shoreline stabilization
  - Natural buffers can protect against bank erosion
- Noise screen
  - Filters out noise associated with adjacent land use
- Aesthetic value
  - Natural vs. Artificial

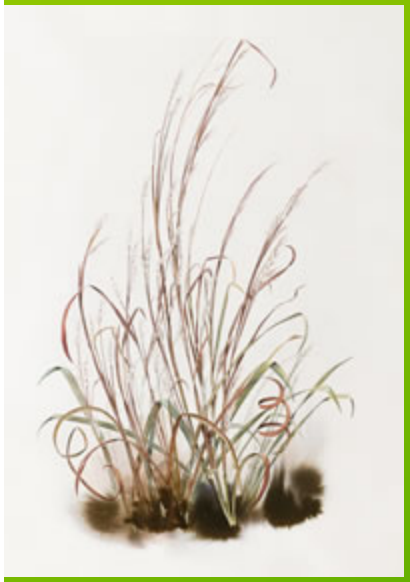
Which of these is more likely to attract desirable wildlife and reduce pollutant loads?

Native Buffer Grasses & Wildflowers

http://www.kansasnativeplantsociety.org/

Kansas Native Plant Landscaping Fact Sheet

http://www.kansasnativeplantsociety.org/documents/gardening.pdf



Little Blue Stem

Coreopsis grandiflora

Bracted Spiderwort

Purple Coneflower