

# **Aquatic Weed Management**

## **An Integrated Approach**

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**Landshore**

A photograph of a pond filled with numerous lily pads. The water is a deep blue color. In the center of the image, a single white lily flower is in full bloom, surrounded by several lily pads. The text is overlaid on the image.

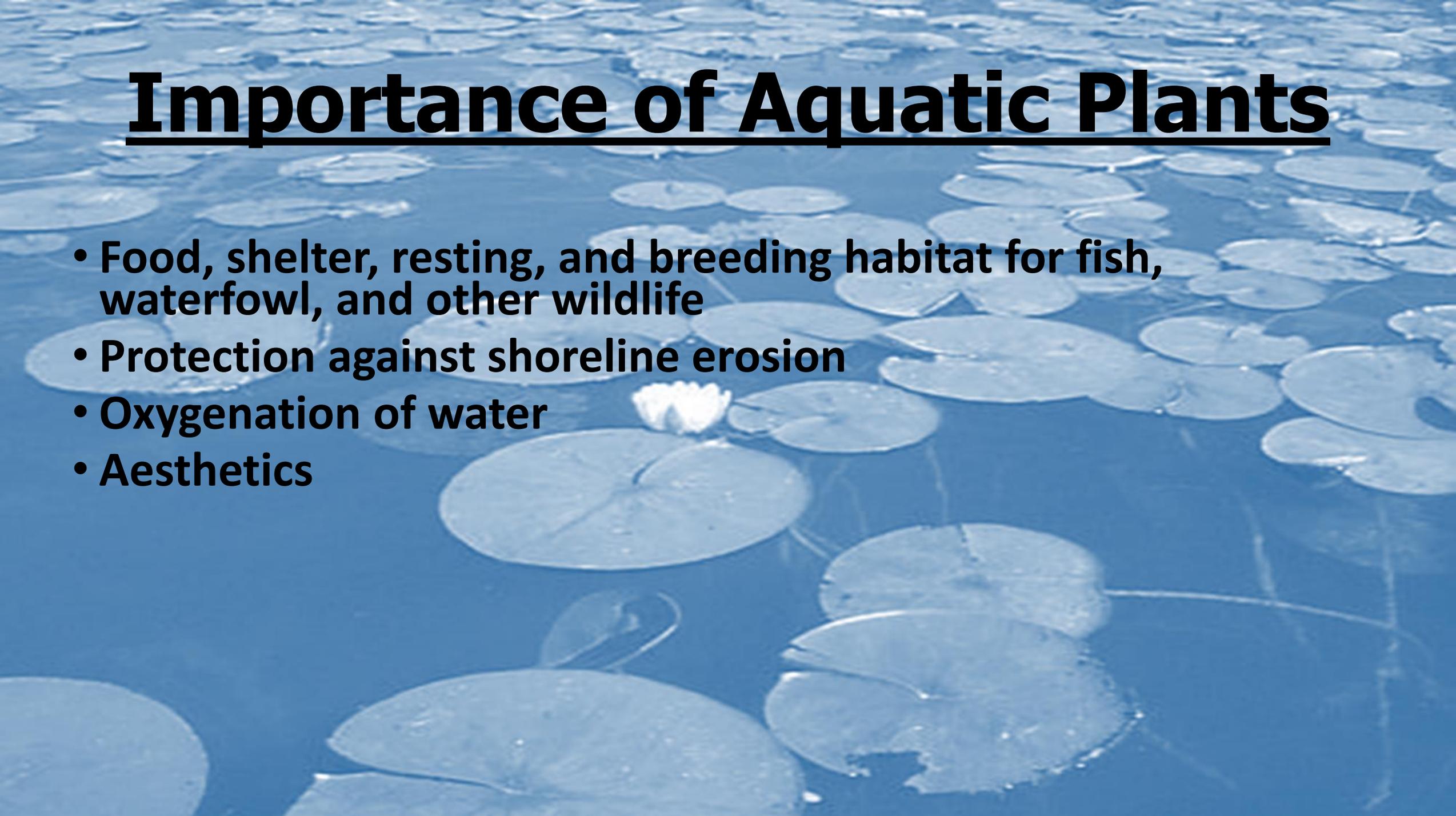
# **There are Two Types of Ponds**

**Ponds with weeds**

**Ponds that, sooner or later, will have weeds**

# Importance of Aquatic Plants

- Food, shelter, resting, and breeding habitat for fish, waterfowl, and other wildlife
- Protection against shoreline erosion
- Oxygenation of water
- Aesthetics



# **Importance of Aquatic Plant Identification**

- **Distinguish between desirable and undesirable species**
- **Assure that the proper management options are selected for the target species**
- **Adjust management strategy to impact the target weeds at most critical points in their life cycles and to minimize adverse impacts on non-target species**

The background of the slide is a photograph of a pond. The water is a deep blue color. Numerous lily pads, which are large, round, and light green, are scattered across the surface. In the center of the image, a single white lily flower is in bloom, its petals fully open. The overall scene is peaceful and natural.

## **Aquatic Plants Classified According to Growth Habit**

- **Submersed**
- **Free-floating**
- **Floating-leaved**
- **Emergent**

# **Aquatic Plant Identification**

- **Clemson Plant Problem Clinic**
- **Aquatic and Wetland Plants of SC**
- **Aquaplant <http://aquaplant.tamu.edu>**

# Prevention

- **Proper Pond Location**
- **Proper Pond Design and Construction**
- **Regular Maintenance**
- **Avoidance of Weed Introductions**

# Overview

- Land Management Practices
- Water Management Practices
- Manual Removal
- Biological Control
- Chemical Control
- Incorporating Multiple Practices



# Land Management Practices

- Slope Management
- Pond Borders
- Effective Fertility
- Wildlife and Livestock



# Slope Management

- **No bare spots!**
  - Increase mower height
  - Rotate grazing
  - Prep. & Plant
- **Species?**
  - Warm Season + Cool Season
  - Cool Season
- **Winter vegetation**
  - Winter water recharge climate
  - Remember SC gets most of its rainfall in Fall and Winter Months.



# Pond Borders



# Effective Fertility

- Soil Test!!!!!!!!!!!!!!!
- Apply required nutrients only
- Soil test reports 100 lbs N, 0 lbs P, and 30 lbs K are needed
  - If using 10-10-10
  - You add 100lbs of unnecessary P
  - You add 70lbs of unnecessary K



# Wildlife and Livestock

- **Ducks and Geese**
  - Discourage feeding
  - Round ups
  - Egg treatments
- **Wild Hogs**
  - Trap
  - Shoot
  - Fence
- **Livestock**
  - Fence out



# Water Management Practices

- Fertility
- Pond Dye
- Phosphorous Management
- Floating Islands



# Pond Fertility

- **Begin fertilizing Spring @ 65°**
  - Granular – 40lbs 20-20-5
  - Liquid – 1-2gal 10-34-0
  - Powdered – 2-8lbs 10-52-0
- **Monitor bloom**
  - Secchi disk readings 18-20”
- **Problems**
  - Over fertilizing favors blue-greens
  - Algaecides kill green algae



# Pond Dye

- Lots of brand and color options
- Substitute for fertilizing
  - Great option when fertilizing is not an option.
    - Following algaecide application
    - Presence of weed problems
- Not recommended for intensively managed fisheries
  - Negatively impacts zooplankton populations



Water-Soluble Packets  
PRINCIPAL FUNCTIONING AGENTS  
Proprietary blend of water-soluble dyes and stabilizers... 100.0%

PRECAUTIONARY STATEMENTS  
Before using this product, read the entire label including the conditions of sale. Consult the MSDS for further information.  
Keep Out Of Reach of Children  
**CAUTION**

STATEMENT OF PRACTICAL TREATMENT

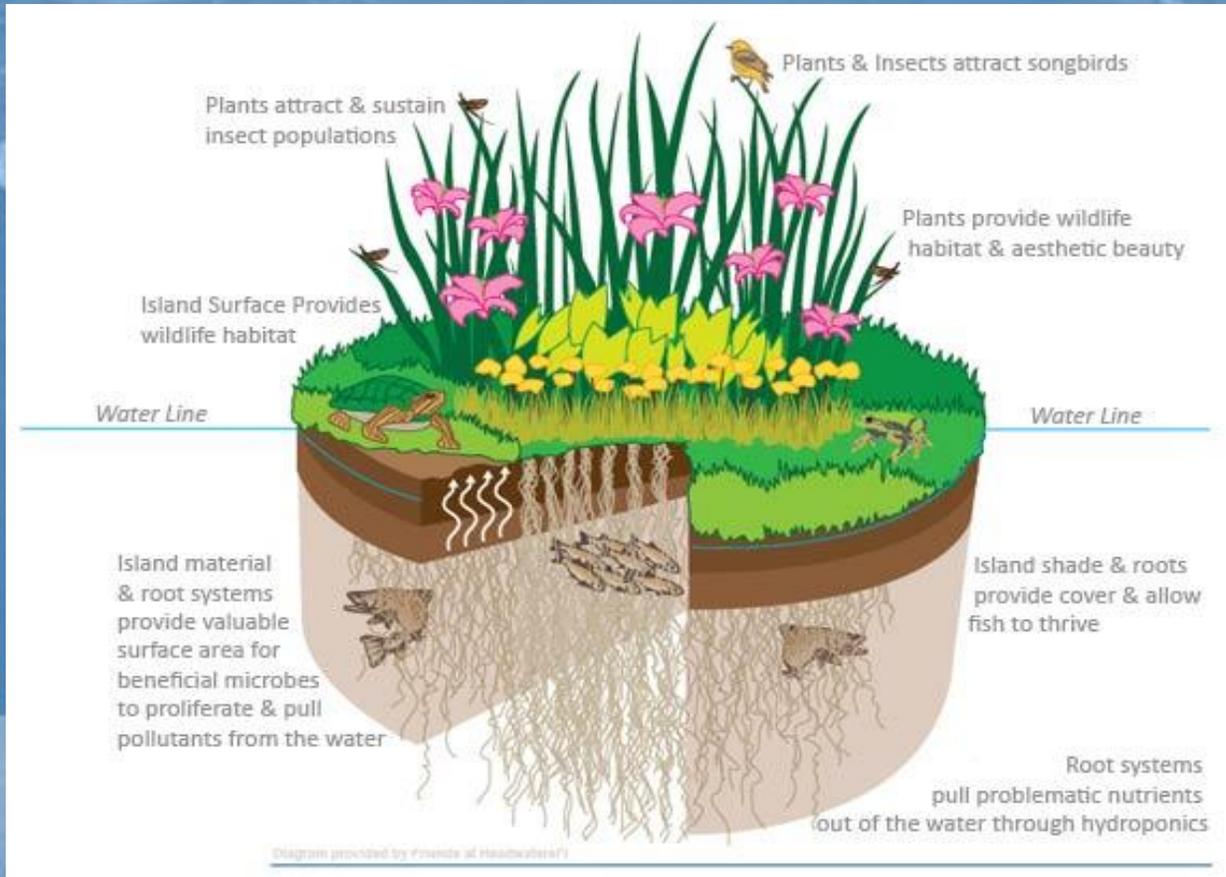
If Swallowed	Do not induce vomiting unless directed to do so by medical personnel. Seek medical attention immediately.
If Inhaled	Move person to fresh air. If person is having problems breathing, give oxygen. If not breathing, give artificial respiration. Get emergency help immediately.
If In Eye	Flush eyes with water for at least 15 minutes. Get medical attention as a precaution.
If On Skin	Remove contaminated clothing. Wash thoroughly.

# Phosphorous Management

- Lanthanum laden clays
- Permanently bind P and sink out of water column



# Floating Islands



# Manual Removal

- Land based machinery
- Aquatic harvesters
- Hand tools



# Land Based Machinery

- **Pros**
  - Chemical free?
  - Readily available
    - Rental or Purchase
    - Most contractors and grading companies have them
  - Remove substantial volume in short time
- **Cons**
  - Expensive
  - Only remove what they can reach
  - Damage to pond edges
  - Bycatch
  - What to do with harvested weeds
  - Fragmentation concerns



# Aquatic Harvesters

- Pros
  - Chemical free?
  - Fast removal of weeds
  - Effective in most water depths
- Cons
  - Availability/cost
  - Bycatch
  - Disposal of weeds
  - Fragmentation concerns



# Hand Tools

- Great option for small ponds
- Inexpensive
- Compost or mulch with harvested weeds



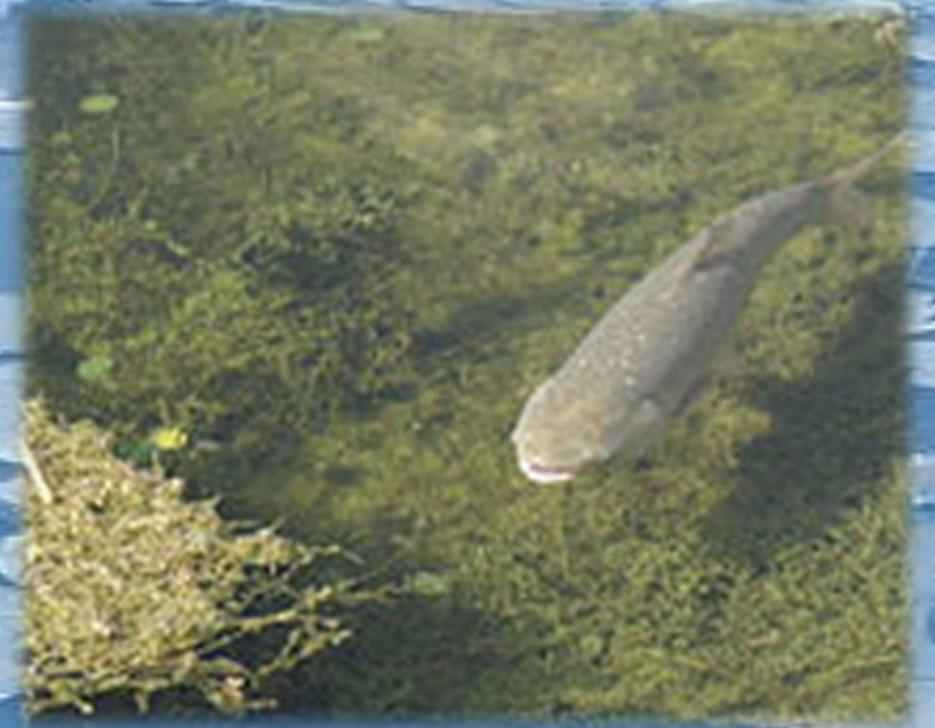
# Biological Control

- **Species Available**
  - Tilapia
  - Triploid Grass Carp
  - Alligatorweed Fleabeetle
- **Pros**
  - Chemical free
  - Cost efficient
  - Fishery supplement
- **Cons**
  - Not effective on all weeds
  - Slow results
  - Permits required
  - Restocking required
  - Potential for fishery imbalance



# Triploid Grass Carp

- *Ctenopharyngodon idella*
- Overwinter well
- 5 years of quality service
- May live 20 years and reach weights in excess of 30lbs
- Primarily feed on aquatic macrophytes
- Preferred plants include: Spikerush, Chara, Pondweeds, and Naiads



# Tilapia

- Tilapia
  - Blue (*Oreochromis aureus*)
  - Nile (*Oreochromis niloticus*)
  - Red-Bellied (*Tilapia zillii*)
- Stocking
  - April-May @ 200-400/acre
- Cold Tolerance
  - Lethal Limit  $\approx 50^{\circ}\text{F}$



# Chemical Control

- NPDES Requirements
- Effective Chemistries
- Water Use Restrictions
- Selecting the Right Herbicide
- Pros and Cons



# NPDES

- **Federal Law**
  - Marriage of Clean Water Act and Federal Fungicide, Insecticide, and Rodenticide Act
  - EPA Regulations
  - Administered by SCDHEC
- **Permit Requirements**
  - General Permit
    - 200 acres or 20 miles of shoreline.
- **Above Thresholds**
  - Notice of Intent (NOI)
  - Integrated Pest Management
  - Pesticide Discharge Management Plan



# Effective Chemistries

- 2,4-D
- Bispyribac
- Carfentrazone
- Copper
- Diquat
- Endothol
- Flumioxazin
- Fluridone
- Glyphosate
- Imazamox
- Imazapyr
- Penoxsulam
- Sodium Carbonate Peroxyhydrate
- Topramezone
- Triclopyr

# Water Use Restrictions

- Herbicides may require a waiting period before treated waters may be used for various activities.
  - Irrigation
  - Fish Consumption
  - Watering Livestock
  - Swimming



Water  
Restrictions

# Selecting the Right Herbicide



Weed Type	Effective Chemistries (Please check label, product effectiveness may vary by species.)
Algae	Copper, Diquat, Endothall, Sodium Carbonate Peroxyhydrate
Floating Plants	Fluridone, Penoxsulam, Flumioxazin  *Several other chemistries are effective on Water Hyacinth
Emergent Plants	2,4-D, Bispyribac, Carfentrazone, Diquat, Flumioxazin, Fluridone, Glyphosate, Imazapyr, Imazamox, Penoxsulam, and Trichlopyr
Submerged Plants	2,4-D, Carfentrazone, Diquat, Endothall, Flumioxazin, Fluridone, Penoxsulam, and Triclopyr

# Chemical Control Pros and Cons

- **Pros**

- **Fast results**
- **Many options**
- **Effective**
- **May be only option for some species**
- **SAFE**

- **Cons**

- **Chemical free movement**
- **Dissolved oxygen concerns**
- **Cost**
- **Multiple treatments may be required**



# IPM

## Options

- Require lawn and landscape fertilizing be done in accordance with soil test.
- Require vegetated buffer a minimum of 15 feet around pond perimeter, one access per residence.
- Annual stocking of 1200 tilapia in April or May.
- Install floating islands.
- Contract with commercial applicator to spray Parrot feather with labelled herbicide.

# **IPM**

## **Situation 2**

**Stormwater pond approximately 1 acre with an average depth of 6 foot at full pool. Pond has sufficient border in place. Problem species are blue-green algae.**

## **Options**

- Stock 400 blue or nile tilapia in April or May.**
- Install floating islands.**
- Apply a labelled aquatic herbicide.**
- Apply a phosphorous binding agent.**

# Weed Management Decisions

- **Plant identification**
- **Budget and Equipment**
- **Control Period - Speed and Duration**
- **Use of the body of water (irrigation, potable water, livestock, fishing, etc.)**
- **Physical, environmental, and economic constraints**
- **Water quality**
- **Fish and wildlife populations (including threatened and endangered species)**

# Questions

- **Applicator License?**
- **Water Use Restrictions?**
- **Downstream Uses?**
- **Ownership?**
- **Local Ordinances?**
- **SC DHEC Buffers?**
- **Read and Follow The Label?**

# YOUR Questions

