

Aquatic Weed Identification & Management



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Aquatic Plants

- Adapted to grow in standing water or saturated soils
- **Good because they:**
 - Stabilize shorelines
 - Absorb nutrients – improve water quality
 - Food source and habitat for pollinators & wildlife, especially ducks, fish
 - Plantings on banks deter Canadian geese
 - Can be attractive



Pickerelweed

Pontederia cordata

Can Be Bad When Out of Balance

- Reduce habitat value, fish kills when out of balance
- Impede water flow
- Impede recreational activities
- Aesthetics, appearance



This started with one plant!!!



Water Hyacinth *Eichornia crassipes*

When Does a Plant Become a Weed?

Weed Definitions

- Weed Science Society:
 - “Any plant that is objectionable or interferes with the activities or welfare of **people**”
- A plant out of place



Why do some aquatic plants become weeds?

- **Introduced from other regions or countries**
 - No natural enemies to limit spread
 - Have a competitive advantage
- Aquatic habitats are vulnerable to disruption

Both native and non-native species of water primrose (*Ludwigia*) occur in NC



Most Aquatic Weeds That Cause Serious Problems Are Non-Native

- Non-native plants that invade natural areas and displace native species are termed **invasive**.
- Many of our most threatening invasive species are aquatic.

Giant Salvinia

In summer, can double its coverage every day!



What about native plants?

Native Plants

- Occur naturally in a region without human interference

Can they be weeds?

- **Yes**, particularly in non-native conditions
 - Man-made ponds, drainage canals



Variable Leaf Watermilfoil,
Myriophyllum heterophyllum

Why do some aquatic plants become weeds?

Reproduce and spread rapidly

- Seed, fragments, roots

Large bodies of clear, shallow water

- High nutrient levels, esp. nitrogen and phosphorus

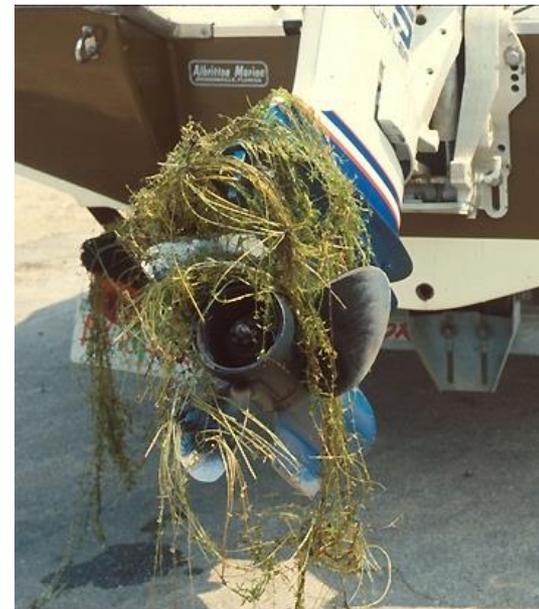


Brittle Naiad
Najas minor

Disturbance propagates it!

How do aquatic plants spread?

- **Human activities**
 - Wildlife plantings, boating, fishing enhancement, aquarium dumping, water gardens, dredging
- **Animals**
 - Wading birds, aquatic mammals
- **Water movement**
- **Transport by wind and rain**



Hydrilla

Why Do We Have to Manage Aquatic Weeds?

- Irrigation
- Drainage
- Flood control
- Water supplies
- Power generation
- Aesthetics
- Aquaculture
- Transportation
- Mosquito control
- Fishing/Recreation

NC 4th in nation for inland water area, 2690 sq. miles!

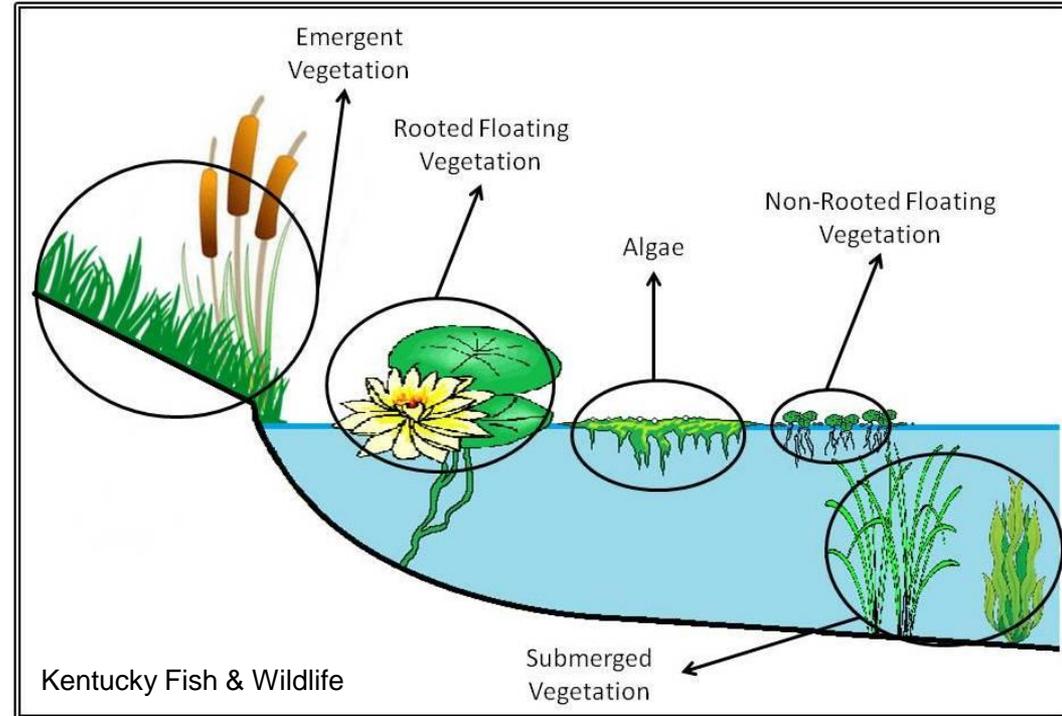
Functional Groups

- Emergent/Shoreline
- Rooted Floating (Emerged)
- Submersed
- Free Floating
- Filamentous Algae
- Planktonic Algae

Taxonomic Groups

- Blue-green algae (Cyanobacteria)
- Green algae
- Ferns (*Azolla*)
- Angiosperms
 - Broadleaf Dicots
 - Grasses, sedges, rushes

Types of Aquatic Plants



Algae

- Very simple structure - no stems, flowers, or roots
- Problematic in **clear, shallow water**
- Prolific in water with excess nutrients, **especially nitrogen and phosphorous**
 - Common sources: fertilizers, geese



Algae

Planktonic Algae

- 'Pea Soup'
- Excess nutrients

Filamentous Algae

- Grow up from the bottom, "Moss"



Filamentous Algae

Spirogyra

- Bright green in spring, darker later in year
- Spiral chloroplasts
- Feels slimy

Pithophora

- Cottony masses – not slimy

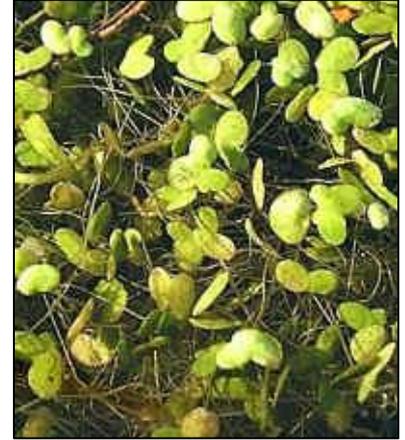
Lyngbya

- Cyanobacteria
- Releases toxins, dermatitis
- Musky smell
- Invasive

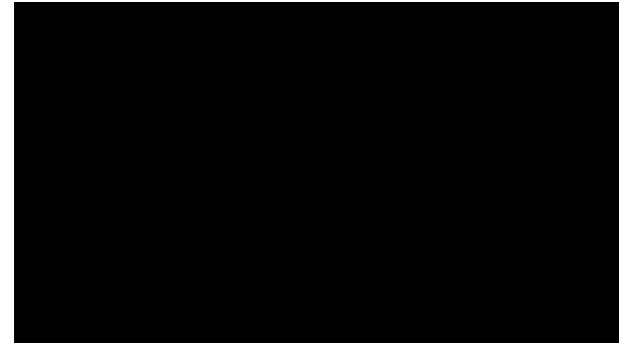


Free Floating True Plants

- Float on water surface with roots dangling below
- Move freely on water surface
- Often very prolific
- **Many aggressive weed species**



Duckweed



Free Floating

Duckweed *Lemna spp.*

- Up to ¼", small root

Watermeal *Wolffia spp.*

- Smaller, gritty
- No roots
- Wind will blow colony to one end of pond
- Often occur together



Floating Rooted (Emersed) Plants

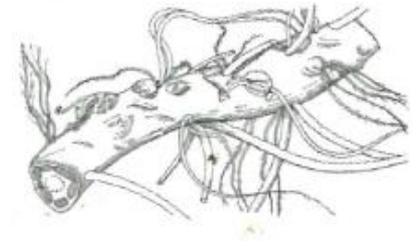
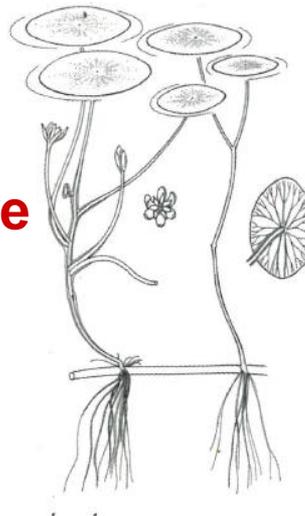
Rooted in pond soil

- Leaves attached to long, tough stems, float on surface or emerge
- Flowers float on surface or emerge

Most are rhizomatous

- Spread rapidly

Can grow in 6' of water or more



Floating Rooted (Emerged) Plants



Leaves growing underwater may differ from leaves growing above water

Variable Leaf Waterilfoil
Myriophyllum heterophyllum

Floating Rooted (Emerged) Plants

Spadderdock

Larger leaves; still water



Nuphar luteum ssp. luteum

Narrow leaves; flowing water



Nuphar luteum ssp. sagittifolium

Floating Rooted (Emerged) Plants



Water lily
Nymphaea odorata



American Lotus
Nelumbo lutea

Native, but both can quickly colonize shallow ponds

Floating Rooted (Emerged) Plants

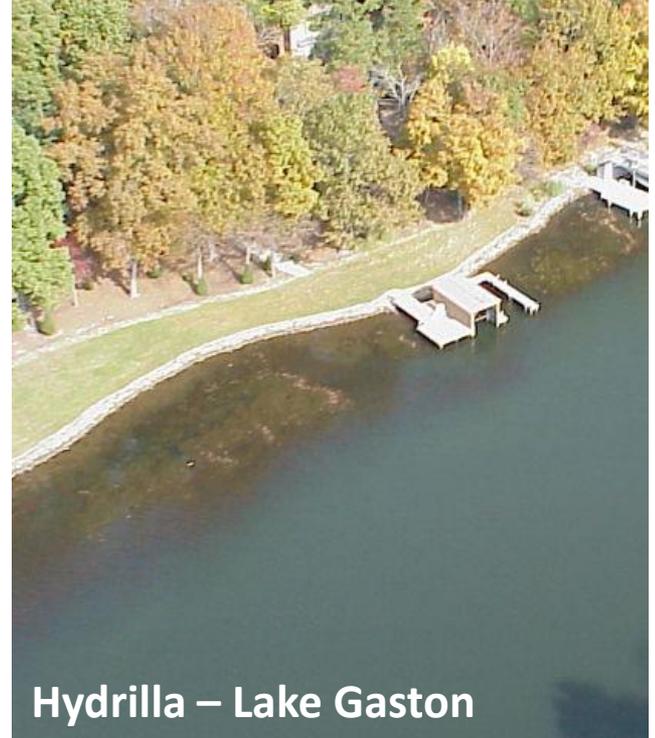
Watershield *Brasenia schreberi*

- Underwater parts covered in mucus or jelly like substance
- A.k.a. snotweed!
- Leaves float at water surface, backside red and slimy
- Non-showy flowers emerge out of water in summer



Submersed Plants

- Rooted in the bottom, can grow to depths of 10'+
- Leaves grow up through water
- Flowers may emerge above
- Native species provide habitat for fish
- **Non-native species are some of our worst aquatic weeds**



Hydrilla – Lake Gaston

Native Submersed Plants

Coontail *Ceratophyllum demersum*

- Rootless – attaches to sediment by rhizoids
- One main, highly branched stem
- Feels rough and stiff
 - Denser towards tips
- Non-showy flowers stay submersed
- Duck food
- Habitat



Native Submersed Plants

- **Bladderworts** *Utricularia* spp.
- Carnivorous
 - Catch insects in underwater bladders
 - Stems photosynthesize
- Favors acidic water
- No true roots
- Yellow flowers in spring, above water
- Invertebrate habitat



Submersed Plants

Pondweeds *Potamogeton* spp.

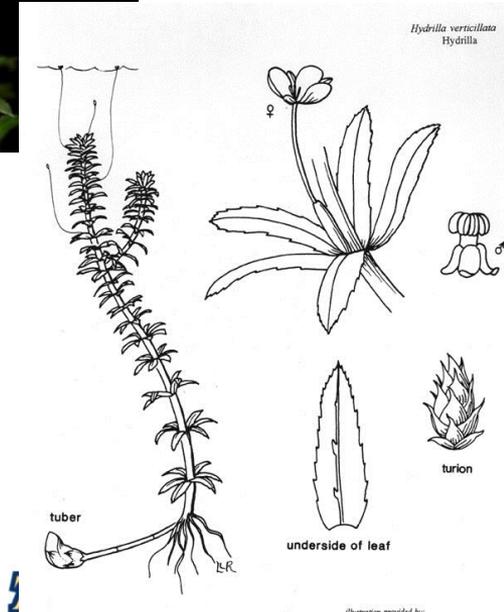
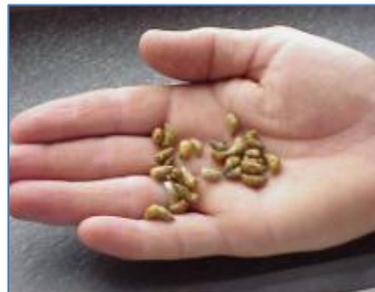
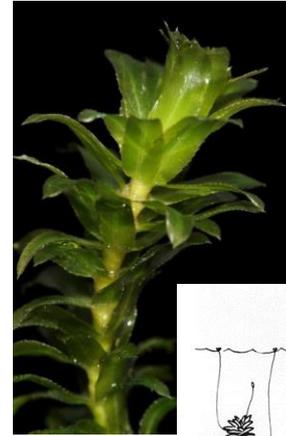
- Several species
- Leaves float at water surface
- Non showy flowers emerge out of water
- Feed on by ducks
- Habitat for macro and micro invertebrates (fish food)



Invasive Submersed Plants

Hydrilla *Hydrilla verticillata*

- Rough to the touch
- Toothed leaf margins and midrib
- Leaves in whorls of 3-8
- Propagates by tubers & turions
- Adapted to low light conditions
- **NC's most costly aquatic weed > \$1 million spent annually in control**



Invasive Submersed Plants

Brazilian Elodea *Egeria densa*

- Smooth to touch
- Showy flowers
- Leaves in whorls of 3-6
- Less common than hydrilla
- Used in aquariums
- Not to be confused with native *Elodea canadensis* →



Shoreline (Emergent) Plants

- Grow in shallow water (6" to 1') with leaves and flowers held well above water surface
- Often grow up onto banks in moist soils
- Can tolerate periods of dryness
- **Native shoreline plants are rarely problematic**



Pickerelweed



Native Shoreline Plants

Many are attractive

- Natives may be planted
- **Blue Flag Iris**
 - *Iris virginica*
 - Shallow water
- **Swamp Mallow**
 - *Hibiscus moscheutos*



Arrowhead/Duck Potato *Sagittaria latifolia*

- Flowers in summer
- Rhizomatous and forms tubers



Shoreline Plants

Smartweeds *Polygonum spp.*

- Native perennial species

Nodding Smartweed

- *Polygonum lapathifolium*
- **Non-native**, annual



Shoreline Plants

Primrose *Ludwigia spp.*

- Many species, some native, some **non-native**
- Most perennial
- Summer flowers
- Alternate, variable-shaped leaves
- Flowers critical for ID



Creeping Water Primrose,
L. hexapetala - non native

Invasive Shoreline Plants

Alligatorweed *Alternanthera philoxeroides*

- Spreads rapidly by seed or fragmentation
- Can be aquatic or terrestrial
- Aquatic forms have hollow stems
- Opposite leaves
- Flowers summer



Other Shoreline Monocots



Rushes *Juncus* spp.
20+ spp.
“Rushes are round”



Sedges *Carex* spp.
60+ spp.
“Sedges have edges”

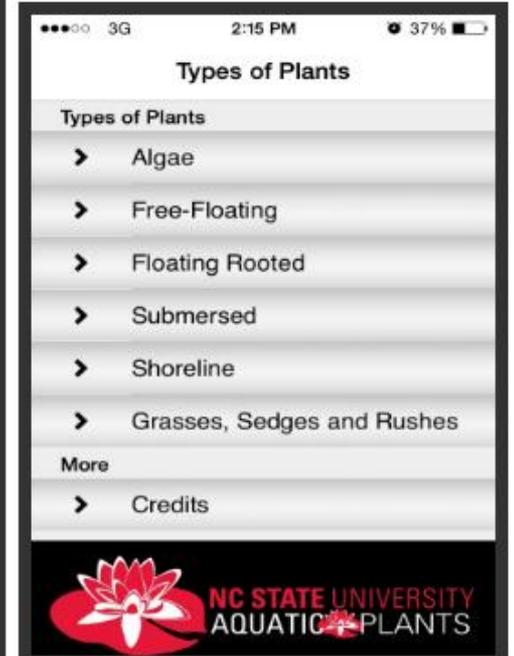
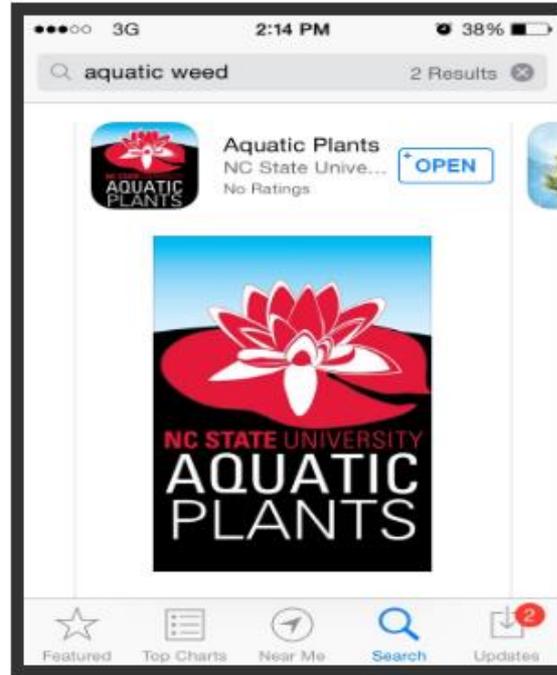


Cattails *Typha latifolia*.
Form large monocultures

Aquatic Weed Identification

NC STATE UNIVERSITY

Aquatic Plants App



Aquatic Weed Identification

Contact your local Extension Agent!

- Fresh sample
- In jar with water
- Wrapped in moist paper towels in a plastic bag
- Whole plant or sections with stems + several leaves
- Flowers and/or seed pods, if present

List of NCCE County Centers:

<https://www.ces.ncsu.edu/local-county-center/>

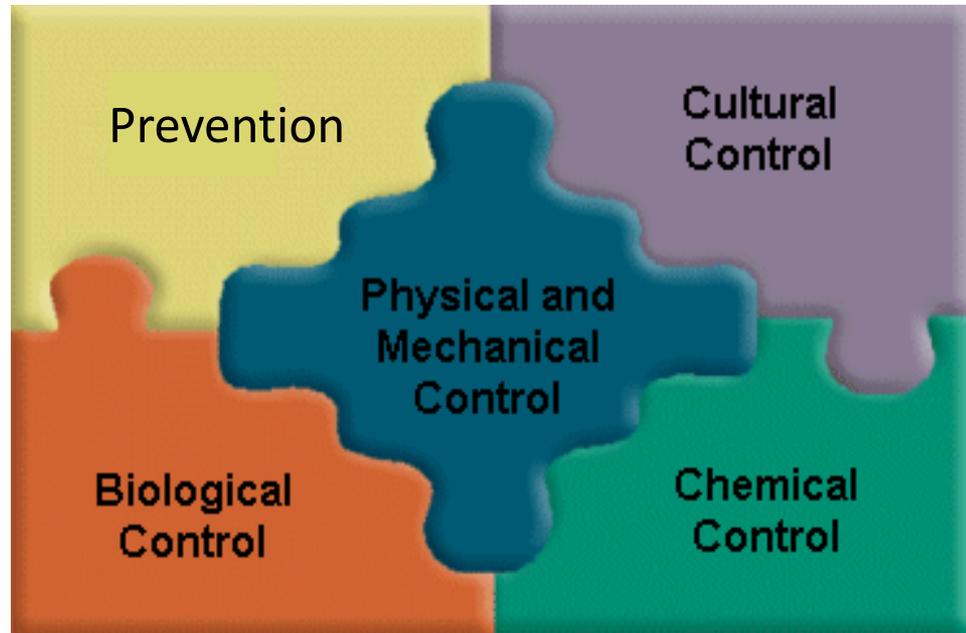
Chatham's finest agent!



Integrated Weed Management

Choose combination of methods best suited to:

- **Weed species**
- **Water use**
- Budget
- Environmental issues & wildlife
- Aesthetics



Prevention

- **Don't plant weeds!**
 - Avoid rhizomatous species
- **Inspect new plant material** for hitchhikers
- **Don't bring weeds in** on equipment
 - Seeds, roots, fragments



Scouring Rush/Horsetail – spreads rapidly in shallow water and dry land

Disposing of Excess Plants

- **Dispose of properly** – allow them completely desiccate before disposal
- **DO NOT** “Give them a good home” in a nearby water body



Prevention



Cultural Control Pond Dyes

- Not herbicides
 - Admiral Liquid®
 - Aquashade®
- Reduce sunlight
 - Filamentous algae
 - Submersed weeds
 - Not effective w/in 18 in. of surface
- No aquaculture
- No outflow
- Not for drinking water



Apply in early spring

Cultural Control Pond Drawdown

- Requires water control infrastructure
- Done in winter
- Not selective, impacts other organisms



Cultural Control Benthic Barriers

- Special fabrics block sunlight and inhibit germination of seed bank
- Broad spectrum
- Immediate effect
- Ideal near water intakes
- +\$3,000 per acre



This ain't cheap...

Physical Control Hand Removal

- Cheap, but labor intensive
 - Got friends?
- Plant ID critical
- Some my spread when fragmented
- Dry on-shore to reduce weight



Mechanical Control



Solitude Lake Management

Mechanical Harvesting

- Direct and immediate
- \$400/acre
- Slow, temporary, ongoing
- Fragmentation and disposal



Solitude Lake Management

Hydro-raking

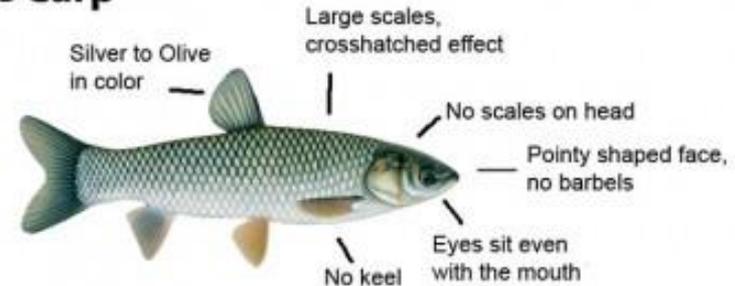
- Good control of rooted species
- Up to 12' depths
- Fragmentation and disposal

Biological Control: Triploid Grass Carp

- Native to rivers of eastern Eurasia
- Herbivorous
- Sterilized
- Excellent control of many submersed weeds



Grass Carp



Weeds Controlled by Triploid Grass Carp



- 1) Submersed plants
- 2) Tender shoots of some emergent or floating plants

Weeds Sometimes Controlled by Triploid Grass Carp

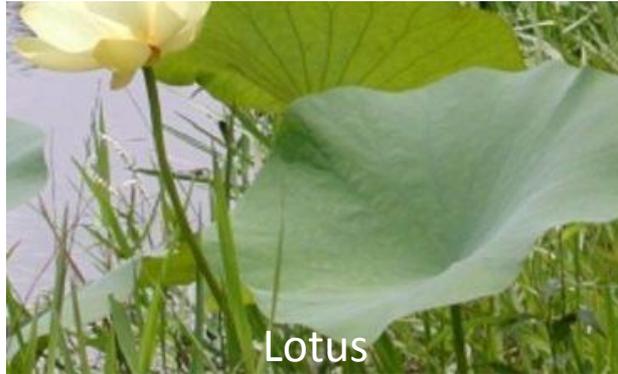


Adults cannot feed on small plants



High stocking rates (50-75 per acre) of juveniles required

Weeds NOT Controlled by Triploid Grass Carp



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Using Triploid Grass Carp

Stocking Rates

- 10-15 per acre
- 10-20 per vegetated acre (large ponds)
- 8-10 in. long to avoid predation
- Live 5-10 years

Regulations

- Permit from WRC if >150 fish
- Notify WRC

Purchasing Grass Carp

- \$7-10 per fish
- Licensed Suppliers:

<http://www.ncagr.gov/markets/aquaculture/grasscarp.htm>

Aquatic Herbicides

- Must use herbicides labeled for use on aquatic plants
- “The Label is the Law”
- Refer to the label for specific instructions on application methods, applications amounts, target weeds, environmental hazards, and personal safety

Aquatic Herbicides Application Methods

- Spray Shoreline
 - Small Ponds
 - Shoreline weeds
 - Emergent weeds
- Spray from boat
 - Larger ponds
- Weighted trailing hoses
 - Submersed weeds
- Granular spreaders
 - Copper sulfate crystals (algae)



Aquatic Herbicides

Applying the Right Amount

Surface Area Treatments

- Emergent and floating weeds

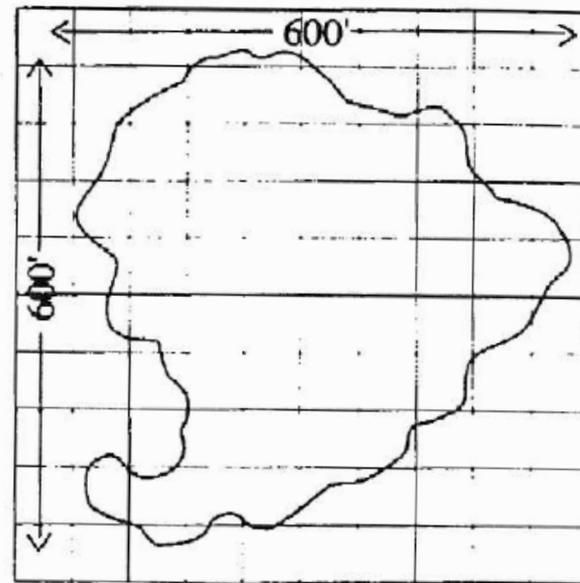
Acre-Foot Treatments

= Area x Depth x Rate

- Take average depth of pond

PPMW Treatments

= Area x Depth x 2.72 x PPM %
Active Ingredient



Estimate number of overlaid squares on large, irregular bodies

Avoiding Fish Kills

Most caused by oxygen depletion

- Hot weather cold water (O_2 -depleted) turnover
- Algal or weed die-off
- Do not treat more than $\frac{1}{4}$ - $\frac{1}{3}$ at a time!
 - If more than $\frac{1}{4}$ of pond is covered
 - If weedy area > 2 acres

Direct herbicide die-off rare

- Exception: copper algacides at high pH or in wrong amount



Selecting Herbicides

- 1) Know the right species
- 2) Understand use restrictions
- 3) Read the label
- 4) Read the label
- 5) Read the label again



Selecting Aquatic Herbicides: Correct Species Identification

- Herbicides vary in efficacy among species
- More closely related species respond similarly

Using the NC Ag. Chem. Manual Selecting a Herbicide

Chapter VII – 2018 N.C. Agricultural Chemicals Manual

Table 7-23. Effectiveness of Herbicides and Triplod Grass Carp for Control of Weeds Commonly Found in N.C. Ponds

Weeds	endothal																
	2,4-D	haloxyfop	carfentrazone	cooper	carboximide	glufosinate	Acifluorfen	Hydrothal	flumetsulfuron	fluroxypyr	glyphosate	imazamox	imazapyr	picosulfuron	proflumarion	haloxyfop	triploid grass carp
Algae																	
Pinnellton	NR	ID	NR	G	P	G	NR	P	ID	NR	NR	NR	NR	G	NR	NR	NR
Pinnellton	NR	ID	NR	G	E	E	NR	E	ID	NR	NR	NR	NR	ID	NR	NR	P
Chara / Nelia	NR	ID	G	G	G	E	NR	G	P	NR	NR	NR	NR	ID	NR	NR	P
Floating Plants																	
Azolla (resolute form)	NR	G	F	F	E	E	NR	NR	ID	E	NR	ID	NR	NR	G	NR	P
Duckweed	P	G	G	P	G	G	NR	NR	E	E	NR	NR	NR	NR	G	P	P
Frogbit	F	ID	ID	NR	E	E	NR	NR	G	NR	P	E	E	NR	ID	G	P
Salvinia, common	NR	G	G	P	E	E	NR	NR	G	E	G	E	ID	NR	ID	NR	P
Salvinia, giant	NR	G	G	P	E	E	NR	NR	F	E	G	P	G	NR	E	NR	P
Waterhyacinth	E	G	G	NR	G	G	NR	P	F	G	E	G	NR	E	E	P	P
Watermeal	NR	NR	NR	NR	P	P	NR	NR	G	G	NR	NR	NR	NR	P	NR	P
Water lettuce	NR	G	G	NR	G	G	G	G	E	NR	E	G	E	NR	E	NR	P
Emergent Plants																	
Alligatorweed	P	G	F	NR	NR	NR	NR	NR	F	F	G	G	G	NR	G	G	P
American lotus	G	ID	NR	NR	NR	NR	NR	NR	ID	G	E	F	G	NR	ID	G	P
Cattail	F	ID	NR	NR	F	F	NR	NR	F	G	E	G-E	E	NR	ID	F	P
Creeping waterhemp	E	ID	F	NR	NR	NR	NR	NR	ID	F	E	F	E	NR	G	E	P
Floating heart	P	ID	NR	NR	F	F	E	E	ID	F	G	G	G	NR	F	P	P
Fragrant waterlily	G	ID	NR	NR	NR	NR	NR	NR	ID	G	E	G	E	NR	ID	G	P
Grass species	NR	ID	NR	NR	F	F	NR	NR	NR	F	E	F	E	NR	ID	NR	P
Parnoteather	E	G	F	NR	NR	NR	NR	NR	F	NR	F	G	E	NR	G	E	NR
Phragmites (Common reed)	NR	ID	NR	NR	NR	NR	NR	NR	P	NR	G	F-G	E	NR	NR	F	P
Potamogeton	G	ID	NR	NR	NR	NR	NR	NR	ID	NR	F	E	E	NR	ID	G	P
Rush	NR	ID	NR	NR	NR	NR	NR	NR	ID	NR	G	E	E	NR	ID	F	P
Scatterdock	G	ID	NR	NR	NR	NR	NR	NR	ID	G	E	G	E	NR	ID	F	P
Smartweeds	F	ID	NR	NR	F	F	NR	NR	ID	F	G	G	G	NR	F	G	P
Water pennywort	G	G	NR	NR	F	F	NR	NR	G	G	E	E	E	NR	F	G	P
Water shield	E	ID	NR	NR	F	F	NR	NR	ID	F	E	G	G	NR	ID	E	P
Submersed Plants																	
Bladderwort	P	ID	ID	NR	F	F	P	P	ID	E	NR	F-G	NR	NR	ID	P	E
Cabomba	NR	ID	ID	NR	F	F	F	F	G	F	NR	F	NR	NR	ID	NR	F
Coontail	G	ID	ID	NR	E	E	E	E	G	E	NR	NR	NR	NR	ID	G	E
Eggs (Brazilian elodea)	NR	ID	ID	F	E	E	P	P	ID	E	NR	ID	NR	NR	G	NR	E
European watermilfoil	E	G	G	NR	G	G	E	NR	G	E	NR	F	NR	NR	G	E	P
Hydrilla, monoecous	NR	G	ID	F	G	E	E	E	G	E	NR	F	NR	NR	G	NR	E
Najas, brittle	NR	ID	ID	G	E	E	E	E	G	E	NR	ID	NR	NR	F	NR	E
Najas, southern	NR	ID	ID	G	P	G	P	P	G	G	NR	ID	NR	NR	F	NR	E
Parnoteather	E	G	ID	NR	G	G	E	E	G	E	NR	F	NR	NR	G	E	F
Pondweed species	NR	G	ID	NR	E	E	E	E	G	E	NR	G	NR	NR	G	NR	E
Proflorating sagothorn	NR	ID	ID	NR	NR	NR	NR	NR	P	F	NR	F	NR	NR	F	NR	E
Variable leaf milfoil	E	ID	G	NR	E	E	E	E	E	G	NR	NR	NR	NR	NR	E	P

Key: NR = Not Recommended; P = Poor; G=Good; ID = Insufficient Data; F = Fair; E = Excellent

Herbicides rated on efficacy of common species

- Excellent
- Good
- Fair
- Poor
- Insufficient Data
- Not Recommended

Selecting Aquatic Herbicides: Use Restrictions

Chapter VII—2018 N.C. Agricultural Chemicals Manual

Herbicides may have waiting periods for use of pond water

- Irrigation of crops or turf
- Fish Consumption
- Watering Livestock
- Swimming

Table 7-22. Waiting Period (in Days) Before Using Water After Application of Herbicides for Aquatic Weed Control

Herbicide	Irrigation ¹	Fish Consumption	Watering Livestock	Swimming
2,4-D (various formulations and manufacturers)	Water use restrictions vary by formulation and manufacturer. In general, if water is used for irrigating sensitive crops, 2,4-D should not be used. Turfgrasses are generally tolerant to low concentrations of 2,4-D. Also, many 2,4-D formulations are NOT labeled for aquatic use. Read the label before purchasing and/or use.			
Bispyribao (Tradewind)	Do not irrigate until concentrations are < 1 ppb	No restrictions	Do not water livestock until concentrations are ≤ 1 ppb	No restrictions
carfentrazone (Sitrifry)	1 to 14 ²	No restrictions	0 to 1	No restrictions
copper (Copper sulfate pentahydrate, including Bluestone and EarthTec; and complexed copper formulations, including Algae-Pro, Captain, Clearigate, Cutrine-Plus, Cutrine-Plus Granular, K-Tea, Komeen, etc.)	No restrictions	No restrictions	No restrictions	No restrictions
diquat (Reward)	3 to 5 ¹	No restrictions	1	No restrictions
endothall (Aquatol K) (Aquatol Super K) (Hydrothol 191) (Hydrothol 191 granular)	No restrictions for many situations. See label for specific restrictions	No restrictions	7 to 25	No restrictions
flumioxazin (Clipper)	0 to 5 ¹	No restrictions	No restrictions	No restrictions
fluridone (Sonar 4AS, Sonar SRP)	7 to 30 ²	No restrictions	No restrictions	No restrictions
Glyphosate (AquaMaster, Aqua Neat, Rodeo, Touchdown Pro)	No restrictions	No restrictions	No restrictions	No restrictions
imazamox (Clearcast)	0 ¹	No restrictions	No restrictions	No restrictions
imazapyr (Habitat)	120	No restrictions	No restrictions	No restrictions
penoxsulam (Galeon)	Do not irrigate food crops until residues ≤ 1 ppb	No restrictions	No restrictions	No restrictions
sodium carbonate peroxyhydrate (GreenClean Pro, Pak 27)	No restrictions	No restrictions	No restrictions	No restrictions
topramezone (Oasis)	See label for specific irrigation restrictions	No restrictions	No restrictions	No restrictions
triflopyr (Renovate 3, Renovate OTF)	120 0 to established grass	No restrictions	Next growing season for lactating dairy animals	No restrictions

¹ Irrigation restrictions may be removed for specific products if a laboratory assay of treated water meets a standard as stated on the product label.

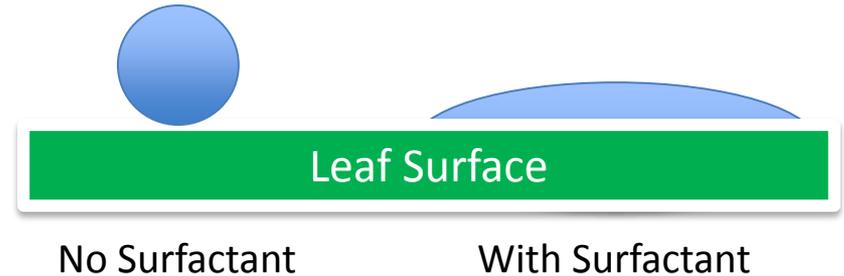
² Do not use treated water for irrigation in commercial nurseries or greenhouses.

*What herbicides can be used to treat
PARROTFEATHER in a pond used for
watering dairy cows?*

POP QUIZ!

Some Herbicides Require Adjuvants

- Read the label!
- Improve herbicide efficacy
- Most require non-ionic surfactant
 - Many, many brands
 - 80% active ingredient
 - 0.25% v/v to herbicide solution



Aquatic Herbicides

Sodium Carbonate Peroxyhydrate

Weed Controlled

- Cyanobacteria (blue-green algae)

Labeled Sites

- Ponds, lakes, lagoons, canals, ditches

Trade Names

- Pak 27®
- GreenClean Pro®

Restrictions

- Do not apply to treated, finished drinking water

Other Notes

- Fast-acting
- Degrades into H₂O₂
- Non-toxic to fish

Aquatic Herbicides

Copper Compounds

Weed Controlled

- Green algae

Labeled Sites

- Potable water reservoirs, farm and fish ponds, lakes, golf course water hazards, fish hatcheries

Trade Names

- Cutrine-Plus® (chelated)
- Copper Sulfate (various)

Restrictions

- No restrictions on use in treated water.
- Check tolerances for crop sensitivity
- Toxic to fish in hard water
 - Especially trout
 - Have water tested (NCDA \$3)

Other Notes

- Chelated compounds less corrosive

Weed Controlled

- Many emerged & some submersed and floating plants
- Waterhyacinth, Eurasian Watermilfoil

Labeled Sites

- Potable water reservoirs, farm and fish ponds, lakes, golf course water hazards, fish hatcheries (2,4-D amine); ponds and lakes (2,4-D granular)

Trade Names

- Weedar 64® (amine)
- Navigate ® (granular)

Restrictions

- Many restrictions for irrigating crops, dairy livestock, domestic use
- Varies by manufacturer

Other Notes

- Know for drift tendencies and non-target effects
- Systemic auxin mimic

Aquatic Herbicides

Diquat

Weed Controlled

- Filamentous algae, floating plants except watermeal; many submersed, few emerged plants

Labeled Sites

- Lakes, still ponds, ditches, laterals, waterways

Trade Names

- Reward®

Restrictions

- 1-5 day restrictions for irrigation and watering livestock

Other Notes

- Also mixed with copper for enhanced algal control
- Contact herbicide

Aquatic Herbicides

Endothall

Weed Controlled

- Submersed plants

Labeled Sites

- Drainage canals, lakes, ponds

Trade Names

- Aquathol®
- Hydrothol®

Restrictions

- 7-25 days watering livestock, some crop irrigation

Other Notes

- Fast-acting contact herbicide

Aquatic Herbicides

Triclopyr

Weed Controlled

- Invasive exotic emersed & submersed plants & water hyacinth (floating)

Labeled Sites

- Quiescent and slow-moving waters, non-irrigation canals

Trade Names

- Renovate®

Restrictions

- Next growing season for lactating animals
- 120 days for crops except established grass

Other Notes

- Systemic auxin mimic

Aquatic Herbicides

Fluridone

Weed Controlled

- Good-excellent control of most floating and submersed weeds, including duckweed and watermeal

Labeled Sites

- Lakes, ponds, canals

Trade Names

- Sonar®

Restrictions

- 7-30 days for crop irrigation

Other Notes

- Slow-acting, long contact time
 - Especially submersed plants
- Targets chlorophyll-related enzyme
- Selectivity decreases with concentration

Aquatic Herbicides

Imazapyr

Weed Controlled

- Emerged weeds and some larger floating weeds
- Not watermeal or duckweed

Labeled Sites

- In and around standing & floating waters, including estuarine and marine sites

Trade Names

- Habitat®

Restrictions

- 120 days for crop irrigation

Other Notes

- Slow-acting
- ALS-inhibitor

Aquatic Herbicides

Glyphosate

Weed Controlled

- Emerged & some floating weeds

Labeled Sites

- Varies by label
- MUST use aquatic-approved glyphosate, not RoundUp®!

Trade Names

- AquaMaster®
- AquaNeat®
- Rodeo®
- Touchdown Pro®

Restrictions

- None

Other Notes

- Rapidly deactivated in water
- Systemic: most effective in fall when plants translocating sugars to roots and tubers
- Need aquatic-approved non-ionic surfactant

Barley straw for weed control?

- Some efficacy on algae
 - Not effective on other pond weeds
- Poorly understood mechanism inhibits algal growth
- Does not kill existing algae
- Winter or early spring
 - 4-6 month effect



Apply 2-3 bales per surface acre

Pond Management Professionals

- Don't want to do this yourself?
- See provided list
- Based on NCDA aquatic weed licensees

North Carolina

Licensed aquatic herbicide application services

Pesticide license database: <https://apps.ncagr.gov/licensesearch/index>
 Selected license type: "Commercial Pesticide Applicator (005)"

ALBEMARLE APPLICATORS

James Saunders
 343 Holiday Island Rd.
 Sanford, NC 27884
 (919) 333-7907

AquaticED

Michael A. Norton
 1382 Sunnyside St., SW
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AQUATIC, LAKE, and POND MANAGEMENT

Sherwood M. Jones
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 Knightdale, NC 27545
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Coastal Carolina Resource Group

Nick Garner
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CW TECHNOLOGIES

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DAVID JACKSON

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Dragonfly Pond Works

Thomas Moore
 o (919) 851-0038 m (919) 621-2296
 Apex, Charlotte, Wilmington
<http://www.dragonflypondworks.com/>

ECOLOGICAL SOLUTIONS, LLC

Michael Ribault
 306 Grand Ave.
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FOSTER LAKE & POND MANAGEMENT, Inc.

Ryan Stanley
 PO Box 1295
 Garner, NC 27529
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J & I ENVIRONMENTAL, LLC

Amory L. Dimes, Jr.
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 Edenton, NC 27822
 (252) 482-7044
amory@jandienvironmental.com

KLEEN LINE, LTD.

Kegan Lynn
 PO Box 1348
 Grifton, NC 28520
 1-800-648-7235
 (252) 796-3204
klynn@klinecorp.com

MOUNTAIN LAKE & POND MANAGEMENT

Skip Kathy
 871 Mountain Forest Estates
 Sylva, NC 28779
 (828) 586-4768 (828) 621-8783

PJM Lake and Land Management Corp.

Robert Sills
 1375 NC HWY 903
 Lenoir, NC 27640
 (512) 586-2900 / (866) 468-6259

RETENTION POND SERVICES

Salesperson: Edward Coleman
 451 Landmark Drive
 Wilmington, NC 28412
 (888) 790-3600
www.retentionponds.com

SOUTHEAST POND STOCKING, LLC

Kevin Patterson
 11090 Highway 421 North
 Currie, NC 28835
www.seponds.com
 (919) 253-7880

Triangle Pond Management

www.trianglepondmanagement.com
 2718 Overlook Rd.
 Raleigh, NC 27616
 (919) 868-3221

Wayne Batten Agronomic Services

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 Ruggaw, NC 28435
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 (919) 620-0382 cell
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SOLitude Lake Management

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brharris@solitudelake.com

Questions?

Resources and slides will be available online next week:

<https://golinks.ncsu.edu/link/details/linkId/171248>