

# NOXIOUS AQUATIC VEGETATION IN LOUISIANA

## & MEASURES TO CONTAIN THE PLANTS

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### LSU AgCenter Advice for Shoreline Property Owners - Claiborne Parish Agent, Robin Bridges

- May spray along shorelines with any of the [herbicide products](#) listed for floating weeds or rooted weeds with foliage above the waterline.
- Lake Claiborne is deep enough in most areas that weeds like hyacinth (water lily) are not a problem.
- Products like Sonar, Rodeo, or Aquamaster become diluted in a large expanse of water like Lake Claiborne, which makes control of submerged weeds like hydrilla difficult. Control is easier to accomplish in a smaller body of water like a pond.
- Many herbicides are expensive. Consult an LSU AgCenter agent for advice.

- **Remember to use a recommended surfactant. Do not use diesel fuel as a surfactant.**
- **The best spray times are spring and early summer, when weeds are young and vegetative.**

<b>AQUATIC PLANT SPECIES IN LOUISIANA</b>	
<b>Exotic Invasive Species++</b>	<b>Dominant Native Species</b>
+hydrilla or Florida elodea or water thyme ( <i>Hydrilla verticillata</i> )	coontail ( <i>Ceratophyllum demersum</i> )
milfoil ( <i>Myriophyllum heterophyllum</i> )	fanwort ( <i>Cabomba caroliniana</i> )
*water hyacinth or water orchid ( <i>Eichhornia crassipes</i> )	southern water grass ( <i>Hydrochloa caroliniensis</i> )
*+salvinia or water spangle ( <i>Salvinia molesta/ariculata</i> )	duckweed ( <i>Lemna minor</i> )
alligator weed ( <i>Alternanthera philoxeroides</i> )	watershield ( <i>Brasenia schreberi</i> )
common salvinia ( <i>Salvinia minima</i> )	American lotus ( <i>Nelumbo lutea</i> )
<b>Other Species in Louisiana</b>	
*Pickerel Weed ( <i>Pontederia cordata &amp; others</i> )	*Purple loosestrife ( <i>Lythrum salicaria</i> )
*Water Lettuce ( <i>Pistia stratiotes</i> )	*Elodea ( <i>Elodea Canadensis</i> )
*+Rooted/anchored hyacinth ( <i>Eichhornia azurea</i> )	*Eurasian watermilfoil ( <i>Myriophyllum spicatum</i> )
*+African elodea ( <i>Lagarosiphon muscoides &amp; major</i> )	*Torpedograss ( <i>Panicum repens</i> )
*Marine & slender naiad ( <i>Najas marina &amp; minor</i> )	*Giant duckweed ( <i>Spirodela oligorrhiza</i> )
*Kapok tree ( <i>Melaleuca quinquenvia</i> )	*Waterchestnut ( <i>Trapa</i> )
<p>*May not sell or distribute in Louisiana per recreational fishery regulations of LA Dept. of Wildlife and Fisheries (DWLF)</p> <p>+May not disseminate without a permit [also mosquito fern (water velvet), rooted/anchored water hyacinth, miramar weed, water-spinach (swamp morning-glory), ambulia, monochoria, arrowhead, exotic bur-reed, water-aloe] per Federal Noxious Weed Act of 1974 (7 U.S.C. 2809) (Sec. 10)</p> <p>++Introduced as ornamental plants or contaminants of mail-order ornamentals, or accidentally, usually from water craft</p>	

Source: [http://www.epa.gov/waters/tmdl/docs/napChauvin\(f\).pdf](http://www.epa.gov/waters/tmdl/docs/napChauvin(f).pdf) 2002

## Problems introduced by a dense mat of noxious aquatic plants

- alters water quality (raises pH, decreases oxygen under the mats, increases temperature)
- excludes many forms of aquatic life, including harvestable-sized sport fishes
- creates stagnant water, providing good breeding grounds for mosquitoes
- discourages migrating birds from stopping at waterbodies
- clogs water intakes to interfere with agricultural irrigation and electrical generation
- interferes with recreation such as swimming, boating, fishing and water skiing
- costs millions of dollars for management activities

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## Specific Plants (do not transport these plants or allow them to spread)

(Photos are from the named educational websites, not for commercial purposes.)

### Water hyacinth (*Eichhornia crassipes*)- fresh water throughout Louisiana



1. **Description:** A floating plant that may double in size within 1-2 weeks. Leathery, round leaves connected to a sponge like stalk; can root in mud temporarily
2. **Propagation:** primarily through seed production
3. **Control:** Manual/mechanical removal, herbicides [2,4-D, diquat, triclopyr, glyphosate]; biocontrol (insect)

[http://aquaplant.tamu.edu/database/floating\\_plants/water\\_hyacinth\\_mgmt.htm](http://aquaplant.tamu.edu/database/floating_plants/water_hyacinth_mgmt.htm)

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## Hydrilla (*Hydrilla verticillata*) - fresh water throughout Louisiana



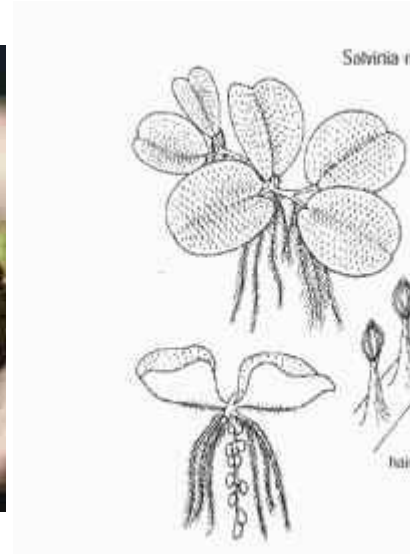
1. **Description:** a submersed, freshwater perennial herb, generally rooted on the bottom in depths of greater than 20 feet where water clarity is good. Stems are slender, branched and up to 25 feet long; 1/3-1/2 in. long narrow, pointed leaves in whorls of 3 - 10 leaves along the stem; sharp spines along the leaf margin; often spines are also along the lower midrib of the leaf, imparting a roughness; small, axillary leaf scales next to the stem and inserted at the base of the leaf (distinguishing feature). Flower (female) has 3 translucent petals 10 - 50 mm long by 4 - 8 mm wide and 3 whitish sepals; grows attached to the leaf axils and float on the water surface.
2. **Propagation:** 1) 1/4 in. long turions (dark green, spiny buds, in leaf axils or stem tips, break off and drift or settle in sediment) and potato-like tubers (yellowish turions attached to roots in the mud; dormant tubers, produced in the fall, are viable for years; one tuber can produce over 5,000 new tubers per sq. meter; survive ice cover, drying, ingestion by waterfowl, and herbicides; 2) rhizome, root crown, and stem fragments (as few as two nodes or whorls of leaves can produce new plants); 3) seedlings (rare).
3. **Advantages over many other plants:** grow at lower light intensities; absorb carbon from the water more efficiently; store extra phosphorus needed for growth; tolerate a wide range of water conditions; thrive in flowing water as well as still water; tolerate salinity of up to 10 parts per thousand
4. **Control:** Manual/mechanical removal; water-level drawdowns; biocontrol (grass carp, insects); herbicides [fluridone-of choice for state use; endothall; copper compounds, endothall with copper (also an algicide)]. None affect hydrilla seeds, tubers, and turions, so repeat measures needed.

<http://www.wapms.org/plants/hydrilla.html>

<http://plants.ifas.ufl.edu/hyvepic.html>

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## **Giant Salvinia** (*Salvinia molesta/auriculata/biloba/herzogii*) - south Louisiana & Toledo Bend area



1. **Description:** free-floating aquatic fern with irregularly branched stems and an absence of roots. Leaves (fronds): whorls of 3 hairs -- 2 floating [20mm x 13mm, stiff, tiny water resistant hairs above topped with 4 branches joined at tip, eggbeater-like and wettable hairs beneath] and 1 submerged [fine linear segments functioning as modified roots]. Leaves compress into tight chains, forming extensive mats.
2. **Propagation:** may double within week (8 plants can cover 1/4 acres in 6 weeks) via apical and lateral buds on stems that fragment as plant matures. Sporocarps are in clusters along the submersed leaves but plant may be infertile in U.S.
3. **Advantages over other plants:** mats up to 3 feet thick; withstands periods of stress (low temperature, dewatering) as dormant buds [produces heavy growth as an annual in temperate climates]
4. **Control Options (U.S. law forbids possession of salvinia):** Manual/mechanical removal; herbicides (2,4-D, diquat, fluridone); biocontrol insects (Australian imported weevils)

[http://www.invasive.org/browse/subject.cfm?sub=2785;](http://www.invasive.org/browse/subject.cfm?sub=2785)

[http://aquaplant.tamu.edu/database/floating\\_plants/giant\\_salvinia.htm](http://aquaplant.tamu.edu/database/floating_plants/giant_salvinia.htm)

<http://salvinia.er.usgs.gov/>

<http://www.wapms.org/plants/salvinia.html>

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**Common Salvinia "Water Spangles" (*Salvinia minima*)** fresh water in south and north central Louisiana

1. **Description:** See Giant Salvinia below, but leaf hair branches are free at the tips. [Photos: see "Giant Salvinia"]
2. **Control Options (U.S. law prohibits possessing salvinia):** Herbicides [2,4-D, diquat, fluridone]; mechanical control (rake, seine but propagates from fragments), possibly insect control; 7 to 15 per surface acre grass carp (but incomplete control, esp. in first year-only triploid grass carp are legal and LDWF must permit)

[http://aquaplant.tamu.edu/database/floating\\_plants/common\\_salvinia\\_mgmt.htm](http://aquaplant.tamu.edu/database/floating_plants/common_salvinia_mgmt.htm)

<http://www.wapms.org/plants/salvinia.html>

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**Alligator weed (*Alternanthera philoxeroides*)** - fresh and brackish water throughout Louisiana



1. **Description:** Stems are long, branched, and hollow. Leaves are simple, elliptic, and have smooth margins. Flowers during the warm months of the year and has whitish, papery ball-shaped flowers that grow on stalks.
2. **Propagation:** through stem fragments and seeds

3. **Control Options:** Manual/mechanical removal (cut or graze but will propagate from fragments); biocontrol insects (in Texas, alligatorweed flea beetle *Agasicles hygrophila*); herbicides [(2,4-D (G), glyphosate, triclopyr, fluridone, imazapyr]

<http://aquat1.ifas.ufl.edu/alphpic.html>

[http://aquaplant.tamu.edu/database/emergent\\_plants/alligator\\_weed\\_mgmt.htm](http://aquaplant.tamu.edu/database/emergent_plants/alligator_weed_mgmt.htm)

<http://bc4weeds.tamu.edu/weeds/aquatic/alligatorweed.html>

<http://plants.ifas.ufl.edu/alphpic.html>

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### **Milfoil** (*Eurasian Watermilfoil*)



1. **Description:** a submersed perennial plant with finely dissected feather-like leaves; **Leaves:** in whorls of 4 around the stem at each node, 5 to 24 paired divisions per leaflet (leaves of land form are smaller, stiffer, with fewer divisions); growing stem tips are tassel-like and often red; **Flowers:** on reddish spikes several inches above the water (spikes submerge after pollination). Lower flowers are pistillate, upper flowers staminate. Seeds are produced, but seedlings are rare
2. **Propagation:** may double within week (8 plants can cover 1/4 acres in 6 weeks) via apical and lateral buds on stems that fragment as plant matures. Sporocarps are in clusters along the submersed leaves but plant may be infertile in U.S.
3. **Advantages over other plants:** extremely adaptable in still or flowing waters, tolerates salinity to 1.5% parts per thousand, pHs from 5.4-11, and broad temperature range; roots in water depths 1-10 meters, requires high light, grows best on fine-textured, inorganic sediments
4. **Annual growth:** Spring shoots branching near surface; after July flowering, stems fragment, fall die back to root crowns, which sprout again in the spring; may overwinter in an evergreen form;
5. **Control Options:** Manual/mechanical removal (enhanced spread when plant is invading); biannual harvesting (cut plants 5 feet below the water's surface & bury on land); biocontrol insects (Australian imported weevils); triploid grass carp (may compete with more desirable food fish); control with bottom barriers or screens to block light. Herbicides [2,4-D, diquat +/- complexed copper, endothall

**preparation +/- complexed copper; fluridone 10-15 ppb maintained in water 10-12 weeks, followed by hand-pulling surviving plants; (under study) triclopyr];**

<http://www.wapms.org/plants/milfoil.html>

Center for Bioenvironmental Research

<http://is.cbr.tulane.edu>

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## MANAGEMENT & CONTROL IN LOUISIANA

Louisiana aims to "keep nuisance aquatic plants at their lowest feasible levels by a constant program of search and destroy."

**WHAT YOU CAN DO: Reduce fertilizer use and properly discard dead vegetation around water bodies.** This helps reduce nitrogen/ ammonia in a water body, thereby reducing growth, especially of algae and non-rooted aquatic plants, in turn achieving dissolved oxygen levels needed to support other aquatic life. **Inspect watercraft; avoid importing noxious plants.** Manual/mechanical removal [for hydrilla, can cost \$1200/acre] may enhance spread while plants are invading.

**LDWF most often uses combinations of (EPA approved) herbicide control, water level fluctuations, and approved biological agents** to control noxious rooted plants and invasive plants, which have extremely high growth and reproduction rates and may be imported from other waterbodies.

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**Herbicides** [<http://www.lsuagcenter.com/NR/rdonlyres/F71B2A47-E904-4740-AF51-2216E6F1DD62/21004/06WEEDGUIDE.pdf>]

A Summary of some herbicides to reduce aquatic vegetation presented below. Please consult the website listed above or an LSU AgCenter agent for full information.

<b>HERBICIDES TO USE ON UNDESIRABLE AQUATIC PLANTS</b>			
<b>Active Ingredient; Indication</b>	<b>Available Formulation(s)</b>	<b>Application [*] during active growth</b>	<b>Activity &amp; Notes</b>
2,4-D Amine;	Navigate, Aqua-Kleen	[*] 4.0#/A in 100 gal water + 1 qt. surfactant ° per 4.0#; may add 10%	Systemic herbicide - Spray wet foliage. Repeat every 4-6 weeks.



Floating & emersed weeds		fuel oil surfactant	RESTRICT DRINKING & IRRIGATION 21 DAYS, DO NOT USE ON IRRIGATION DITCHES
Diquat; water hyacinth, duckweeds & other floating weeds, ***salvinia	Reward	[*] 1.0 gal./A (inject into water or more if surface or areal spray&ndashread directions) + 1.0 pt. (0.5%) surfactant/ 100gal water	Contact algaecide and herbicide - Use only areal spray to control water hyacinth and water lettuce. Some control of submerged weeds yet to reach surface. Read label for directions. DO NOT USE IN MUDDY WATER. WAIT 10 DAYS BEFORE USING WATER.
Glyphosate; water hyacinth, grasses, alligator weed, *salvinia	Rodeo, Aqua-master, Eraser AQ, Touchdown Pro, AquaNeat	[*] 4.0/6.0 pt/A + 0.5% aquatically registered surfactant. (see the label for preparation)	Broad spectrum, systemic herbicide. Effective above the water line but ineffective on plants in the water. DO NOT APPLY WITHIN 0.5 MILES UPSTREAM OF POTABLE WATER INTAKES
Triclopyr; broadleaves, water hyacinth, alligator weed, many trees	Renovate	3.2 to 8 qt/A in 20 to 200 gal water + 0.5% label approved aquatic surfactant Apply by air or ground.	Selective broadleaf, systemic herbicide. Requires only 18- 48 hours contact. APPLY TO IMPOUNDED WATER ONLY - NOT TO FLOWING STREAM
Fluridone; most rooted plants (milfoil, hydrilla, pondweeds, other)	Sonar, Avast	[*] Read label for specific rates	Broad spectrum, systemic herbicide. Slow kill. Effective in the water. If water is deeper than 6 ft. increase rate by 50%. RESTRICT 30 DAYS FOR IRRIGATION per manufacturer; read directions.
Imazapyr; grasses, rushes, sedges, broadleaf weeds, trees & brush in water	Habitat	[*] REQUIRES CERTIFIED APPLICATOR; POTABLE & IRRIGATION WATER RESTRICTIONS	Systemic herbicide. Inhibits a plant enzyme. Effective on post-emergent floating and emergent aquatics. Effective at low-volume rates. Does not contain heavy metals, organochlorides or phosphates. Requires spray on post-emergents.
endothall; submersed weeds (milfoil, hydrilla, pondweed)	Aquathol®	[*] liquid: 1.0-2.0gal; granular 125-250#/A (water 4-6 ft.)	fast-acting, contact herbicide, for immediate control; may use with copper; inject into upper end of pond or spray over surface. RESTRICT (granules): DRINKING 7 DAYS, SWIM 1 DAY, EAT FISH 3 DAYS.
copper sulfate; submersed weeds, algae-scum, moss	2.0-3.0#/A ft. of water (more the softer the water)	Apply at any stage of growth	Use alone or with endothall;  NO RESTRICTIONS

Systemic herbicides act slowly, moving in the plant to site of action. Contact formulations act quickly, killing cells they contact.

\*\* Salvinia: use highly active non-ionic surfactants (e.g. AQUA-KING) at 1/2% solution or 1.0 qt. surfactant to spray mix

To minimize oxygen depletion by decomposing dead plants, treat pond in sections allowing two weeks between sections & aerate.

IT IS BEST TO CHECK FIRST -- CONSULT LSU AgCenter or Dept. of Wildlife and Fisheries before treating water in order to be assured of correct plant identification, recommended herbicide for Louisiana and your particular need, and precautions to take.

**Danger: Many registered herbicides have water use restrictions. Always read and follow all label directions.**

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