AQUATIC WEEDS

Rates are expressed on basis of active ingredient unless trade product is named. Where weed growth is heavy, treat only a portion of the area at one time to avoid depleting oxygen in the water during decomposition of vegetation. Treatment of entire ponds or lakes heavily infested with aquatic weeds can result in death of fish.

Calculations for amount of herbicide needed on basis of parts per million by weight (ppmw)

Ditch or canal
W = A x L x C x 0.0000625

W = pounds of active ingredient needed
A = cross section area of channel in sq. ft.
L = length of channel in feet
C = desired concentration of herbicide in ppmw

Pond or lake
W = A x D x C x 2.7

W = pounds of active ingredient needed
A = area of water surface in acres
D = average depth in feet
C = desired concentration of herbicide in ppmw

TREATED WATER USE RESTRICTIONS (NUMBERS OF DAYS).

Common Name	Trade Name	Human			Animal	Irrigation		
		Drinking	Swimming	Fish Consumption	Drinking	Turf	Forage	Food Crops
2,4-D	DMA 4 IVM, Hardball, Navigate, AquaKleen	-[ab]	0	0	0	21b[c]	21b[c]	21b[c]
Carfentrazone-ethyl	Stingray	1	0	0	-[d]	14[e]	14[e]	14[e]
Copper Complexes Copper Sulfate	Algimycin PWF, Captain, Clearigate, Current, Cutrine Plus, Cutrine-Ultra, Harpoon, Komeen, K-Tea, Nautique, Symmetry	0[f]	0	0	0	0	0	0
Diquat	Harvester, Redwing, Reward, Weedtrine	1-3	0	0	1	1-3	5	5
Endothall	Aquathol K, Aquathol Super K, Hydrothol 191, Hydrothol Granular	7-25[o]	0	0	7-25	0	7-25	7-25
Fluridone	Avast, Sonar A.S. Sonar One, Sonar PR, Sonar Q, Sonar SRP, Whitecap	0	0	0	0	30	30	30
Glyphosate	Avocet, Aquapro, Rodeo, Shore-Klear, Shore-Klear Plus, Touchdown Pro	0	0	0	0	0	0	0
Imazamox	Clearcast	-[g]	0	0	0	-[g]	-[g]	-[g]
Imazapyr	Aquapier, Gullwing, Habitat	2	0	0	0	120[h]	120[h]	120[h]
Penoxsulam	Galleon	0	0	0	0	-[i]	-[j]	-[k]
Sodium Carbonate Peroxyhydrate	Pak 27, Phycomycin SCP	0	0	0	0	0	0	0
Triclopyr	Renovate3, Renovate OTF	-[l]	0	0	0	-[m]	120	120
Acid Blue #9 & Yellow #23 Dyes	Aquashade, Enviro-Blue	0	0	0	0	0	0	0

[a]See the label distance allowed from potable water intake.
[b]A shorter interval may be used if an approved assay indicates less than 0.1 ppm 2,4-D.
[c]Do not use in ditches where water is used to irrigate highly susceptible crops, such as cotton, grapes, and tomatoes unless an approved assay indicates that 2,4-D concentrations are less than 100 ppb.
[d]Treated water may not be used as a source for livestock until an approved assay indicates carfentrazone-ethyl and degradate is below 0.2 ppm.
[e]This is the interval for applications made to more than 20% of water surface. Consult the label for reduced restriction criteria.
[f]Drinking water restrictions are product-specific; read the label carefully.
[g]Water can be used when an approved assay indicates imazamox concentrations are less than 50 ppb.
[h]Use restrictions can be reduced if an approved assay indicates imazapyr concentrations are less than 1 ppb.
[i]Water treated with penoxsulam can be used for turf irrigation if concentrations are less than 30 ppb.
[j]For other nonfood crop irrigation or for other irrigation uses, contact SePRO Corporation before irrigation if concentrations exceed 1 ppb.
[k]Do not irrigate established food crops, other than rice, until penoxsulam concentrations are no more than 1 ppb in the irrigation water source. Do not irrigate established rice if concentrations in treated water exceed 30 ppb.
[l]Drinking water can be used only when triclopyr concentrations are less than 0.4 ppm by an approved assay.
[m]If triclopyr residues are determined to be nondetectable by an approved assay, there is no restriction for use of irrigation water on established grasses.
[o]The manufacturer suggests a 600-foot potable water application set back.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

CONTROL OF SOME COMMON AQUATIC WEEDS WITH HERBICIDES.

	2,4-D	Carfentrazone-ethyl	Copper Complexes Copper Sulfate[1]	Diquat	Endothall	Fluridone	Glyphosate	Hydrothol 191	Imazamox	Imazapyr	Penoxsulam	Sodium Carbonate Peroxyhydrate	Triclopyr	Acid Blue # & Yellow #23
Algae														
green algae														•[2]
blue-green algae (Cyanobacteria)			•									•		•[2]
filamentous and water net			•	•				•						
Chara and Nitella			•					•						
Floating Weeds (not attached to bottom)														
duckweed		•		•		•				•	•			
common salvinia		•		•			•				•			
giant salvinia		•		•			•				•			
watermeal		•		•		•				•	•			
waterhyacinth	•	•		•			•		•	•	•		•	
water lettuce		•		•			•		•	•	•			
Emergent Weeds (attached to bottom)														
American lotus	•	•		•		•			•				•	
watershield	•	•				•			•				•	
white waterlilly	•	•				•			•	•			•	
frogbit	•	•								•	•		•	
water pennywort		•		•					•	•				
Submersed Weeds														
bladderwort				•	•	•			•					
coontail				•	•	•							•	
bushy pondweeds (*Najas*)				•	•	•								
parrotfeather	•	•		•	•	•				•	•		•	
Eurasian watermilfoil	•	•		•	•	•					•		•	
fanwort						•							•	
pondweeds (*Potamogeton*)				•	•	•								
elodea			•	•		•								
hydrilla		•	•	•	•	•		•			•			
spikerush	•					•								
Marginal Weeds														
alligatorweed	•	•		•		•	•		•	•			•	
water primrose	•	•		•		•	•		•	•			•	
smartweed	•			•		•	•		•	•			•	
arrowhead	•			•		•				•			•	
willows	•						•			•			•	
cattail				•			•		•	•				
cutgrass				•			•			•				
bulrush							•			•				
burweed	•													
phragmites							•		•	•			•	

NOTE: It is not intended that any suggested usage in this table be in violation with existing regulations or manufacturer's label.

[1]Use products containing copper with caution because its toxicity to fish and its effectiveness in controlling aquatic weeds depend on total alkalinity of the water.

[2]May reduce the growth of submersed plant species at higher dye concentrations.

Aquatic weeds	Treatment	Rate	Comments
Algae			
algae	copper sulfate (pentahydrate)	1 to 2 ppmw	Toxicity to fish and algae increases with temperature but decreases with water alkalinity. For water with less than 50 ppm total alkalinity, do not use copper sulfate. For water above 50 ppm, determine the amount of copper to use by dividing total alkalinity (ppm) by 100. This equals the desired copper concentration in the water. Catfish are not very tolerant to copper. Always leave untreated aquatic areas for fish to move into.
	copper complex	0.67 to 0.75 gal per acre-foot	Complexed forms of copper are more active in alkaline water than the sulfate. For water with less than 50 ppm alkalinity, catfish may be killed. Apply a surface spray. Apply when algae begin to grow and water temperature is above 60 °F. Best results when applied on sunny days.
		1.25 to 1.5 gal per acre-foot	Apply when total alkalinity is above 50 ppm.
blue-green (Cyano-bacteria)	sodium carbonate peroxyhydrate	3 to 100 lb per acre-foot	Decaying algae can reduce dissolved oxygen, which can result in fish kills. To avoid oxygen depletion, apply so that 8 to 10 hours of daylight remain. Do not reapply within 48 hours.
Floating			
duckweed	diquat	1 gal per surface acre	Foliar spray or injection in nonflowing water. **Do not** apply diquat to muddy water. Apply as overall spray in 50 to 150 gallons of water plus 1 pint of nonionic surfactant. Spray marginal areas to reduce reinfestation. Retreat if necessary.
giant salvinia	diquat	0.5 to 0.75 gal per surface acre	Use with an approved aquatic wetting agent at 0.25-1% v/v. Repeat treatments may be necessary for complete control.
	glyphosate	1 to 2 gal per surface acre	Use with an approved aquatic wetting agent at 0.25-1% v/v.
	carfentrazone-ethyl	0.21 to 0.42 qt per surface acre	Use with an approved aquatic wetting agent at 0.25–1% v/v. Repeat treatments may be necessary for complete control.
waterhyacinth	DMA-4 IVM	0.5 to 1 gal per surface acre	Spray when plants are actively growing. Delay use of treated water for irrigation or domestic purpose for 3 weeks or until approved assay shows no more than 0.1 ppm 2,4-D acid. For use in water bodies that are still or slow moving. Must be applied by trained or licensed applicators. **Do not** treat more than half of a lake or pond at one time to avoid oxygen depletion and fish kill. In large lakes, leave a 100-foot buffer strip.
	Hardball	0.25 to 0.5 gal per surface acre	
Submersed			
elodea	diquat	2 gal per surface acre	Inject or apply on surface of nonflowing water. **Do not** apply diquat to muddy water.
Eurasian watermilfoil	DMA-4 IVM	0.5 to 1 gal per acre-foot	**Do not** treat more than half of a lake or pond at one time to avoid oxygen depletion and fish kill. In large lakes, leave a 100-foot buffer strip. **Do not** treat within ½ mile of potable water intakes. Treat in spring when milfoil starts to grow. Spray on or inject under water.
	Renovate3	0.7 to 2.3 gal per acre-foot	
	Renovate OTF	20 to 270 lb per surface acre	Application rate is dependent upon the mean water depth in the treated area. Potable water set back distances are dependent upon the total area treated; consult the label for proper set-back distances. Applications should be made in the spring or early summer to actively growing plants.
	Hardball	1 to 5 gal per acre-foot	
	diquat	1 to 2 gal per surface acre	Distribute evenly over infested area. Inject or apply on surface of slow-flowing water. **Do not** apply diquat to muddy water.
	endothall (Aquathol Super K)	0.5 to 2.5 ppmw	Safer to fish than dimethyalkylamine salts. Spray or inject liquids under water. Apply granules evenly with cyclone seeder. Apply as soon as possible after weeds begin to grow and water temperature is above 65 °F. When treating in sections, treat on a 5- to 7-day interval. Use higher rates when spot treating.

Aquatic weeds	Treatment	Rate	Comments
Submersed			
Eurasian watermilfoil	2,4-D (20% granules)	100 to 200 lb per surface acre	Best results when applied in spring to early summer during early growth stage. Apply uniformly using portable spreader (cyclonic seeder). Rate depends upon weed species, weed mass, water depth, and water pH. Repeat application if needed. **Do not** use water for agricultural purposes, watering dairy animals, or domestic purposes.
bladderwort coontail	2,4-D (20% granules)	150 to 100 lb per surface acre	Rates are based on type of water body treated and average water depth. See label for details. **Do not** use water for irrigation from ponds for 30 days or lakes for 7 days after treatment.
elodea hydrilla naiad pondweed coontail Eurasian watermilfoil	Sonar AS	0.5 to 4 qt per surface acre	Fluridone requires a long contact time (more than 60 days) to be effective. A test available from the manufacturer may be advisable for some water bodies to ensure that adequate concentrations of herbicide remain in the waterbody for effective control.
	Sonar PR Sonar SRP	10 to 80 lb per surface acre	
	Biological control		Grass carp can be stocked in ponds and lakes to suppress submersed aquatic plants. Grass carp are typically stocked at rates of 5–30 fish per acre, depending on the size and extent of plant infestation. In new ponds, 2- to 6-inch fish can be stocked. However, in ponds with established bass populations, 8- to 10-inch carp should be stocked to prevent bass from eating them. Grass carp are somewhat specific about which plants they will eat. They prefer tender, nonwoody vegetation and are best suited for control of submersed plants such as some pond-weeds, bushy pondweeds, hydrilla, egeria, and some macro-algae. As grass carp grow, consumption of plant material will decrease. Additional fish should be stocked about every 5 years to maintain plant suppression.
Emergent and Marginal			
alligatorweed	Biological control		Chemical treatment may not be necessary if specific biocontrol insects, the alligatorweed flea beatle (*Agasicle hygrophila*) and/or stem borer moth (*Vogtia malloi*), are present. The flea beetle is more active in the southern part of the state, and the stemborer is active throughout the state. These insects may not provide control in areas adjacent to fields subject to heavy insecticide usage; e.g., near cotton fields. Contact your county agent or a qualified entomologist for positive identification.
arrowhead	DMA 4 IVM	0.5 to 1 gal per surface acre	Spray on foliage. Use only formulations labeled for aquatics.
	Hardball	0.25 to 0.5 gal per surface acre	
cattail	glyphosate	3 to 5 qt per surface acre	Spray on foliage. See Rodeo entry below.
cattail pondlily waterlily	imazapyr 2 lb ae/gal	2 to 3 pt per surface acre or 1% solution	Spray on foliage. Add 1 quart of aquatic-approved nonionic surfactant per 100 gallons of spray solution.
Actively growing (floating or emersed) grasses, broadleafs and brush	glyphosate	1.5 to 7.5 pt per surface acre or spot treatments use 0.75 to 1.5% solution	For application to floating or emerged vegetation, undesirable shoreline weeds and brush by air, booms, or handheld equipment using 3 to 20 gallons of spray per acre. Do not expect control of vegetation that has a majority of the leaf surface submerged. Add 1 to 2 quarts of nonionic surfactant to 100 gallons of spray, but use only X-77 if applications are made to aquatic sites. For hand guns, use 3 to 6 quarts of Rodeo in 100 gallons of water depending upon weed species. Spray to wet. For broadcast application, use 1.5 to 2.5 pints for small annuals and 3 to 7.5 pints for perennial weeds and brush.
Emergent broadleafs	Renovate 3	2 to 8 qt per surface acre	Use a nonionic surfactant at 1% v/v.
	carfentrazone-ethyl	4 to 14 oz per acre	Use a nonionic surfactant at 1% v/v. Repeat applications as necessary.
	DMA 4 IVM	0.5 to 1 gal per surface acre	For control of aquatic weeds in lakes, ponds, drainage ditches, and marshes. Apply 2.5 to 4.5 pints per acre of 3.8 pounds per gallon or 1.67 to 3 pints per acre of 5.64 pounds per gallon formulation in 50 to 100 gallons of water. Spray to wet foliage thoroughly. Apply when leaves are fully developed, actively growing, and are above the water level. Restrict applications to one-third to one-half of lake or pond. Repeat treatment once if needed.
	Hardball	0.25 to 0.5 gal per surface acre	