

## COMMON EXOTIC AND INVASIVE AQUATIC PLANTS – CONTROL TECHNIQUES

PLANT	CONTROL METHOD	DESCRIPTION	CONCERNS/ISSUES	COST
SUBMERSED PLANTS <ul style="list-style-type: none"> <li>▪ Eurasian Watermilfoil</li> <li>▪ Variable or Broadleaf Watermilfoil</li> <li>▪ Fanwort</li> <li>▪ Curlyleaf Pondweed</li> </ul>	Chemical Treatment Fluridone (Sonar™)	Formulation: Liquid (AS) & Pellet (SRP) Comments: Systemic – selective control of Eurasian watermilfoil, fanwort and curlyleaf pondweed at low application rates. Most effective on contiguous areas > 5 ac. Duration of Control: 2-3 years or longer – except for curlyleaf pondweed.	<ul style="list-style-type: none"> <li>▪ 30 day irrigation precaution/restriction</li> <li>▪ May not be effective for shoreline or partial waterbody treatments</li> </ul>	\$200-\$600 per acre
	2,4-D (Navigate®)	Formulation: Granular Comments: Systemic – effective for both species of milfoil. Used for both spot and whole-lake treatments Duration of Control: 1-2 years or longer.	<ul style="list-style-type: none"> <li>▪ Currently not approved for use in Zone II – Wellhead Protection Areas.</li> <li>▪ Extended use restrictions for irrigation, watering livestock or drinking/domestic purposes.</li> </ul>	\$300-\$400 per acre
	Diquat (Reward®)	Formulation: Liquid Comments: Contact – fast acting herbicide effective on both species of milfoil and curlyleaf pondweed. Used for both spot and whole-lake treatments. Duration of Control: Typically 1 year.	<ul style="list-style-type: none"> <li>▪ Seasonal control</li> <li>▪ May impact more non-target species</li> </ul>	\$175-\$400 per acre
	Cutting / Harvesting	Mechanized cutting to depth of 5-7 feet. Two cuttings per year desirable. Used for maintenance control of larger, established plant infestations.	<ul style="list-style-type: none"> <li>▪ Non-selective</li> <li>▪ Typically two or more cuttings required annually.</li> <li>▪ Care must be taken to contain fragments.</li> <li>▪ Shoreline disposal operation required.</li> </ul>	\$350-\$600 per acre per cutting
	Hydro-Raking	Mechanical raking of plant and root material to depths of 12 feet. Used for smaller beach/swim areas < 1 acre. Once raking per year is generally adequate. Maintenance technique for established milfoil infestations.	<ul style="list-style-type: none"> <li>▪ Seasonal control</li> <li>▪ Temporary disruption of bottom sediments and increases in turbidity.</li> <li>▪ Care must be taken to contain fragments.</li> <li>▪ Shoreline disposal operation required.</li> </ul>	\$1,500-\$2,500 per acre
	Bottom/Benthic Weed Barriers	PVC sheeting or PVC coated fiberglass screening. Used for small, dense infestations and beach/swim areas < 1 acre.	<ul style="list-style-type: none"> <li>▪ Barriers must be removed, cleaned, repaired and reinstalled every 1-3 years</li> <li>▪ May require SCUBA divers for installations in waters &gt; 4 feet deep.</li> <li>▪ Cuts off bottom to other aquatic organisms</li> </ul>	~\$40,000 per acre installed
	Diver Operated Suction Harvesting	Effective in removing sparse growth or beds of rooted plants over smaller areas. Control is generally 1 year or longer.	<ul style="list-style-type: none"> <li>▪ Seasonal control</li> <li>▪ Labor intensive</li> <li>▪ Equipment and operator availability</li> </ul>	~\$8,000 per acre
	Hand Pulling	Limited to depths of < 5 feet without SCUBA divers. Most effective where plants are widely scattered over small areas. Control is 1 year or longer depending on site.	<ul style="list-style-type: none"> <li>▪ Seasonal control</li> <li>▪ Labor intensive</li> </ul>	Varies
	Dredging	Control by deepening beyond the plant's photic zone – typically 10 feet or more. Rare to control milfoil by change in substrate type alone.	<ul style="list-style-type: none"> <li>▪ Considerable short-term disruption</li> <li>▪ Complex permitting</li> </ul>	\$5-\$10 per cu. yd. or \$16,000-\$32,000 to remove 2 ft. of sediment over a 1 acre area
	Drawdown	Lower water level in fall and winter to expose plants to freezing and drying conditions. Generally requires 6-8 weeks of sustained freezing/drying for effective control. Control usually 1 year or longer.	<ul style="list-style-type: none"> <li>▪ Weather conditions and sediment composition may influence effectiveness.</li> <li>▪ Potential for numerous impacts and constraints.</li> </ul>	Varies
	Herbivorous Insects (Weevils)	Specific to Eurasian watermilfoil. Weevils are native to North America and have the potential for long term control. Naturally occurring weevil populations have generally yielded better results than new introductions. Extensive research in process	<ul style="list-style-type: none"> <li>▪ Slow response</li> <li>▪ Duration of control variable and cyclical.</li> <li>▪ Milfoil remains viable</li> </ul>	Varies

WATER CHESTNUT	Cutting/Harvesting	Annual seed producing plant. Generally requires 3-4 consecutive years of harvesting before reductions in density are observed	<ul style="list-style-type: none"> <li>Shoreline disposal operation required.</li> <li>Work must be completed prior to seed drop.</li> </ul>	\$1,500-\$2,000 per acre
	Hand Pulling	Effective for widely scattered plants and in areas inaccessible to harvesters	<ul style="list-style-type: none"> <li>Labor intensive</li> </ul>	Varies
PHRAGMITES (Common Reed)	Chemical Treatment 2,4-D (Navigate®)	Formulation: Granular Comments: Treatment of immature plants before seed drop. Like harvesting, 3-4 consecutive years of treatment necessary to see long term reductions	<ul style="list-style-type: none"> <li>Currently not approved for use in Zone II – Wellhead Protection Areas.</li> <li>Extended use restrictions for irrigation, watering livestock or drinking/domestic purposes.</li> </ul>	\$350-\$500 per acre
	Chemical Treatment Glyphosate (Rodeo®)	Formulation: Liquid Comments: Systemic – application techniques can provide for area and species selective control. Targeted plants are sprayed directly. Most effective in late summer/fall when plants are in full fluorescence. 2-3 consecutive years of treatment required for effective control.	<ul style="list-style-type: none"> <li>Rain within 8 hours of treatment can reduce effectiveness.</li> <li>Dead stalks and rhizomes require several years to decompose.</li> <li>Impact to non-target plants</li> </ul>	\$600-\$1,200 per acre
	Mechanical Removal Raking or Excavation	Removal of plants and rhizomes can provide effective control and allow for immediate replanting efforts. Biomass is immediately removed from the system. Complete rhizome removal is rare, maintenance control is most always required.	<ul style="list-style-type: none"> <li>Considerable short-term disruption</li> <li>Complex permitting</li> </ul>	\$5,000-\$15,000 per acre
	Mowing/Cutting	Provides immediate control. Removes biomass. Typically requires several cuttings per year. Duration of control can be enhanced by covering with black plastic.	<ul style="list-style-type: none"> <li>Labor intensive</li> <li>Does not remove/control rhizomes allowing for immediate regrowth</li> </ul>	Varies
	Flooding	Most effective in coastal areas where tidal flows can be increased to control plants by flooding and increasing salinity. Freshwater less effective and requires sustained flooding.	<ul style="list-style-type: none"> <li>Limited application in freshwater systems.</li> </ul>	Varies
	Chemical Treatment Glyphosate (Rodeo®)	Formulation: Liquid Comments: Systemic – application techniques can provide for area and species selective control. Targeted plants are sprayed directly. Most effective in mid-late summer while plants are in fluorescence but prior to seed drop. Duration of Control: 1-2 years or longer.	<ul style="list-style-type: none"> <li>Rain within 8 hours of treatment can reduce effectiveness.</li> <li>Dead stalks and root structures may require several years to decompose.</li> <li>Impacts to non-target plants</li> </ul>	\$600-\$1,200 per acre
PURPLE LOOSESTRIFE	Mechanical Removal Raking or Excavation	Removal of plants and rhizomes can provide effective control and allow for immediate replanting efforts. Biomass is immediately removed from the system. Complete rhizome removal is rare, maintenance control in subsequent seasons may be required.	<ul style="list-style-type: none"> <li>Considerable short-term disruption</li> <li>Complex permitting</li> </ul>	\$5,000-\$15,000 per acre
	Mowing/Cutting	Provides immediate control. Removes biomass. Typically requires several cuttings per year. Duration of control can be enhanced by covering with black plastic.	<ul style="list-style-type: none"> <li>Labor intensive</li> <li>Does not remove/control rhizomes allowing for immediate regrowth.</li> </ul>	Varies
	Herbaceous Insects Beetle and Weevil	Weevils can be used to attack the root structures, while beetles attack the leaves and stalks. Still being heavily researched. Has potential for long-term management.	<ul style="list-style-type: none"> <li>Slow response</li> <li>Impacts to non-targets still being researched.</li> </ul>	Varies