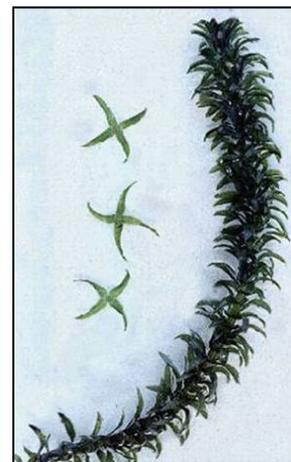


Brazilian Elodea

Egeria densa
Hydrocharitaceae

Class B Noxious Weed
Control Required except in Selected Areas

Legal Status in King County: Brazilian elodea is a class B noxious weed according to Washington State Noxious Weed Law, RCW 17.10 (non-native species that is harmful to environmental and economic resources and that landowners may be required to control based on distribution in the county and local priorities). The King County Noxious Weed Control Board requires property owners to control Brazilian elodea on private and public lands in the county except in Lakes Washington, Sammamish, Union and Fenwick (control, as defined by state law, means to prevent all seed production and to prevent the dispersal of all propagative parts capable of forming new plants). State quarantine laws prohibit transporting, buying, selling, or distributing plants, plant parts or seeds of Brazilian elodea.



BACKGROUND INFORMATION

Impacts and History

- Native to South America and introduced to the United States through the aquarium trade, it is found scattered throughout western Washington. In King County it is established in Lakes Washington, Sammamish, Union, Fenwick and Dolloff. It is also prolific in the Sammamish River and around Fisherman's Terminal on the Lake Washington Ship Canal.
- Very aggressive and can outcompete native aquatic plants, forming dense monotypic stands. Can reduce biodiversity, change the predator/prey relationships in the lake and adversely impact the food web.
- Impacts recreation by eliminating swimming opportunities, fouling boat motors and snagging fishing lines.
- When allowed to grow in dense stands and "top out", the floating mats prevent wind mixing and extensive areas of low oxygen can develop during the summer.
- Stagnant mats create mosquito breeding areas and increase the water temperature underneath by absorbing sunlight.
- These plants may die back in the fall, and



the resulting decay uses up dissolved oxygen and adds nutrients to the water, potentially increasing algae growth and related water quality problems.



Description, Reproduction and Spread

- Perennial, grows in up to 20 feet of water.
- Generally submergent but can form floating mats.
- Leaves are visibly smooth-edged (teeth are visible with magnification) and densely packed in whorls of four (or up to six).
- Relatively showy white flower has three petals and a yellow center. It is fragrant and floats on the water surface. Flowers are attached on slender stalks to the base of leaf whorls, and there are up to three flowers per whorl. Only male plants are known from the United States.
- Can thrive in relatively low light. High temperatures and high light conditions can cause senescence (die back).
- Often has two major growth periods, one in spring and one in fall. Some plants often persist through the winter.
- Is not known to seed in North America. Spreads by fragmentation.
- Can be confused with the native American waterweed (*Elodea canadensis*), which has a less robust appearance and smooth-edged leaves generally in whorls of three.
- In the nursery trade, also known as Brazilian waterweed, South American waterweed, Common waterweed, Egeria, and Anacharis.



Native *Elodea canadensis* (left) and *Brazilian elodea* (right)

Habitat

- Occurs in still and slow moving water up to about 20 feet deep, depending on water clarity.
- Tend to cluster at downwind ends of smaller water bodies or in quiet coves where fragments can settle out of the water column and take root.
- Tolerates a wide range of pH.



CONTROL INFORMATION

Integrated Pest Management

- The preferred approach for weed control is Integrated Pest Management (IPM). IPM involves selecting from a range of possible control methods to match the management requirements of each specific site. The goal is to maximize effective control and to minimize negative environmental, economic and social impacts.
- Use a multifaceted and adaptive approach. Select control methods that reflect the available time, funding, and labor of the participants, the land use goals, and the values of the community and landowners. Management will require dedication over a number of years, and should allow for flexibility in method as appropriate.

Planning Considerations

- Survey area for weeds, set priorities and select best control method(s) for the site conditions and regulatory compliance issues (refer to the King County Noxious Weed Regulatory Guidelines).
- Small infestations may be effectively removed using manual methods or hand tools.
- Brazilian elodea spreads by fragmentation, so extreme care must be taken to contain and remove all plant fragments when using manual or mechanical control methods. Otherwise, the infestation will spread.
- Any control actions taken will necessarily affect all landowners adjacent to the water body and will require their approval and participation in order to succeed. In addition, many control options will be expensive and it will be more cost-effective to pool resources.
- Commit to monitoring. Once initial control has been achieved, be sure to conduct follow up monitoring and control in subsequent years in order to catch any overlooked patches or returning infestations before they can spread. Without this, your control efforts can be wiped out within a few years. Monitor the site each year for at least three years after last observing any Brazilian elodea, and then again after three years.

Permitting and Regulatory Requirements

- Permits are required for all weed control work in natural waterbodies.
- At minimum, the pamphlet [Aquatic Plants and Fish](#) is required. This pamphlet is published by the Washington State Department of Fish and Wildlife (available free of charge online at http://wdfw.wa.gov/licensing/aquatic_plant_removal or by calling (360) 902-2534) and acts as a Hydraulic Project Approval (HPA) permit. This “pamphlet HPA” is all you will need for most manual or light mechanical control methods.
- More extensive control, including some bottom barrier placement and all herbicide use, will require additional permits from Washington State. See the sections below for details.
- Permits and licenses are required for all herbicide use in aquatic systems. Minimum requirements include a pesticide applicator’s license with an aquatic endorsement from

the Washington Department of Agriculture and a permit from the Washington Department of Ecology.

- Some incorporated cities also regulate any work conducted in natural waterbodies. Contact your local jurisdiction for details.
- **Permit requirements can change from year to year. Contact the King County Noxious Weed Control Program for more information on current permitting requirements.**

Early Detection and Prevention

- Look for new plants. Get a positive plant identification from an authority such as King County Noxious Weed Control Program staff.
- Look for plants along lake shorelines and in stagnant or slow-moving water in wetlands and streams. Since these plants are often spread as fragments attached to boat motors and trailers, check especially around boat launches. Also check at the downwind end of the waterbody, and anywhere else where fragments could congregate or settle out of the water column.
- The best time to begin surveys is late spring when plants are visible, and surveys can continue into fall when the plants begin to senesce (die back).
- Clean all plant material off of boats, motors and trailers, and check bilgewater for plant fragments any time you have been in an infested waterbody (or a potentially infested waterbody).
- **Never dump unwanted aquarium or water garden plants or animals into a natural waterbody.** Brazilian elodea is still sold in some areas as an aquarium plant, and it was probably introduced to Washington waters by careless dumping of aquariums. It has several other common names, including Brazilian waterweed, South American waterweed, and Anacharis.

Manual Control

- At minimum, an HPA pamphlet permit is required for all manual control activities in natural waterbodies. In incorporated areas, check with your local jurisdiction for other possible permit requirements.
- Hand pulling and the use of hand mechanical tools is allowable in all critical areas in unincorporated King County.
- Hand-pulling can be successful for a very small area but is impractical for large infestations. Be sure to contain and remove all plants and plant fragments from the water.
- Weed rakes and weed cutters can assist in maintaining open water in a discrete area, such as around a dock, but will not eliminate the plants. Be sure to contain and remove all plants and plant fragments from the water.
- All manual control sites should be monitored for several years for signs of plants growing from roots or fragments.
- **DISPOSAL:** Brazilian elodea can be composted on land away from water or placed in yard waste bins. Do not leave any plant parts or fragments in the water or near the water's edge.

Mechanical Control

- At minimum, an HPA pamphlet permit is required for all mechanical control activities in natural waterbodies. In incorporated areas, check with your local jurisdiction for other possible permit requirements.
- Cutting and harvesting using boat-mounted cutters or in-lake harvesting barges is effective at maintaining open water in waterbodies with 100% of the available habitat infested. It must be done on a regular basis to maintain control. However, these methods will quickly spread these plants by creating numerous fragments, so cutting and harvesting are not recommended for small or partial infestations. Neither method will eradicate an infestation. In unincorporated King County, only an HPA pamphlet permit is required for cutting and harvesting noxious weeds.
- Diver dredging using boat or barge mounted suction dredges can be effective for small infestations or as a follow-up to herbicide treatment. Thurston County successfully controlled Brazilian elodea in the Chehalis River using this method. Special care must be taken to remove all fragments. This method causes a temporary increase in turbidity and requires specific authorization from the Washington Department of Fish and Wildlife (WDFW).
- Rotovation (underwater rototilling) is not recommended since it causes severe fragmentation of the plants. Rotovation also results in significant short term turbidity and loss of water clarity and quality. Rotovation requires an individual HPA permit.

Cultural Methods

- An opaque bottom barrier can be used to suppress growth in small, discrete areas like at a boat launch or around a swimming area. Barriers need to be regularly cleaned because plants, including Brazilian elodea fragments, will root in the sediment that accumulates on top of them. This is not practical for large-scale infestations. Bottom barriers in Lake Washington and Lake Sammamish are not allowed without prior authorization by the Washington Department of Fish and Wildlife (WDFW) due to potential impact on sockeye salmon spawning areas. A pamphlet HPA at minimum is required for bottom barrier installation. Other permits may also be required.
- Waterbodies with control structures can sometimes use water level drawdown to control submerged weeds. Generally the bottom must be exposed to heat or cold long enough to dry out completely, something that can be difficult to achieve in rainy western Washington. Consecutive drawdowns may be more effective than a single attempt. Drawdowns can have major impacts on native plants and other aquatic organisms. Carefully weigh the pros and cons before deciding on this option. A drawdown is not covered by the pamphlet HPA. Consult your local WDFW office for permit information.

Chemical Control

- Permits and licenses are required for all chemical control in water.
- Herbicides may be the most reasonable option for eradication of large submerged noxious weed infestations. Professional licensed contractors are available for hire to perform this task.

- Herbicides can only be applied to aquatic systems in Washington State by a licensed pesticide applicator. Aquatic formulations of herbicides are not available for sale over the counter to anyone without an aquatic pesticide license. **NEVER apply non-aquatic herbicide formulations to water since most of them include ingredients that are toxic to aquatic organisms.**
- Multiple years of treatment may be required to eradicate a Brazilian elodea infestation. For several years following treatment, monitor areas for new plants. Remove any new growth using one of the manual control methods above.

Specific Herbicide Information

The only herbicide allowed in Washington waters that has been shown to be successful against Brazilian elodea is fluridone (e.g., brand name Sonar®). Endothall and diquat have proven successful in combination with copper compounds, but the use of copper is illegal in most Washington State waters due to its demonstrated toxicity to juvenile salmonids.

The mention of a specific product brand name in this document is not, and should not be construed as an endorsement or as a recommendation for the use of that product. Chemical control options may differ for private, commercial and government agency users. **For questions about herbicide use, contact the King County Noxious Weed Control Program at 206-477-9333.**

Biological

- Triploid grass carp can be an option for controlling Brazilian elodea. Tests have shown that the carp prefer Brazilian elodea to native species. However, in practice, grass carp may remove the entire plant community. Grass carp are not allowed in water bodies where the inlet and outlet cannot be screened. Care should be taken to evaluate potential impacts on the native plant community before choosing grass carp to control Brazilian elodea.
- Although research is being done on a variety of invertebrates and pathogens, there are currently no accepted biocontrol agents for Brazilian elodea other than grass carp.

SUMMARY OF BEST MANAGEMENT PRACTICES

- At all times a minimum of a pamphlet HPA permit is required to do any activity that disturbs a lake bottom, wetland or streambed. For more extensive work, more specific permits will be required.
- Hand-pulling is recommended for small populations, with extreme care taken to remove all plants and fragments from the water.
- Where the plant has filled every possible inch of habitat in a water body and its connected waterways, cutting or harvesting can keep a large population under control when done consistently.

- Bottom barriers can maintain small areas of open water around boat launches, swimming areas or docks, as long as care is taken to keep them free of debris and fragments.
- Diver dredging has been effective in the Chehalis River and can be a good option in moving water.
- To eradicate large areas of Brazilian elodea, herbicides are probably the best option.
- **Do not apply any herbicide to water without the proper licenses.** Hire a contractor to do the work.

Control in small isolated or man-made ponds

- Permits may be required (see “Permitting and Regulatory Requirements” section above).
- Drawdowns can be very effective. Remove all plants and plant fragments. Let the bed dry out completely before refilling. Thoroughly clean pond liners. Examine or discard ornamental plants that may harbor plant fragments before re-introducing them to the pond.
- Manual control will work if the infestation is caught early and all fragments are removed.
- Bottom barriers may be effective over natural pond beds.
- Follow recommendations above for chemical control.
- Triploid grass carp may be an option if eradication is not desired.

Control in small lakes

- Permits will be required for all control work (see “Permitting and Regulatory Requirements” section above).
- Community involvement will be essential for successful control efforts.
- For small pioneering infestations, manual control or bottom barriers may be effective. Monitor the lake for fragments and additional infestation sites. Maintain bottom barriers to prevent sediment buildup.
- For large or whole-lake infestations, chemical control will be the most effective (see above for chemical recommendations). Mechanical control, or grass carp where allowed and appropriate, may be used to manage infestations, but will not eradicate the weeds. Bottom barriers, if properly maintained, will create open water in small areas.

Control in flowing water (rivers, streams, ditches)

- Permits will be required for all control work (see “Permitting and Regulatory Requirements” section above).
- The most effective control will start with the furthest upstream infestation and move downstream. If there are any weeds left upstream, any cleared site will likely be re-infested.
- If possible, contain the area being controlled with a boom to catch fragments before they float downstream.
- Diver dredging has proven effective in flowing water.

- Manual control may be the most practical for small infestations. Bottom barriers need to be securely anchored.
- Chemical control in flowing water is difficult. Consult an expert before considering this option.
- Grass carp will not be allowed in flowing water.

Control along shores of Lakes Washington and Sammamish

- Permits will be required for all control work (see “Permitting and Regulatory Requirements” section above).
- Eradication of submerged aquatic weeds from these water bodies is not practical.
- Bottom barriers, if properly maintained, can provide open water around docks, marinas, swimming beaches, and similar areas. Prior authorization by the Washington Department of Fish and Wildlife (WDFW) is required in these lakes due to potential impact on sockeye salmon spawning areas.
- Manual control of small patches may be sufficient.
- Mechanical control can be effective for lakeside communities or large marinas. Be sure to remove all fragments from the water.
- Spot control using chemicals can be effective in the right conditions. It is possible that more than one species of submerged noxious weeds may be present (particularly Eurasian watermilfoil, which is widespread in these lakes). If this is the case, be sure to select an herbicide that will control all targeted weeds (consult BMPs for each weed or ask an expert for assistance in selecting herbicides). If there is any significant wave action or current, the chemicals will drift off target or quickly become diluted. Consult with a professional contractor before choosing this option. Neighboring property owners should be advised prior to spot chemical applications.
- Grass carp are not allowed in the Lake Washington and Lake Sammamish system.

Disposal Methods

- Brazilian elodea can be left on land to dry out and/or decompose where it will not move into a waterway.
- Brazilian elodea can be composted away from water or placed in yard waste bins.
- Never dispose of Brazilian elodea into waterways, wetlands, or other wet sites where it might grow and spread.

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