

Washington's Aquatic Plant Quarantine

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ABSTRACT

As part of Washington's statewide strategy to eliminate introduction pathways for aquatic nonindigenous species, the Washington Department of Agriculture is proposing to prohibit the sale and transport of selected aquatic plant species. Some of the species are established in Washington's waterways and others are perceived to be a significant threat to Washington waters should they be introduced. The plants already established are suspected to have been introduced via the aquarium and nursery industry. A list of 16 species is proposed for aquatic plant quarantine in Washington.

Key words: invasive aquatic weeds, introduction pathways, plant sales.

INTRODUCTION

Washington's 1998 Aquatic Nuisance Species Management Plan (Washington State Aquatic Nuisance Species Planning Committee 1998) identified eliminating introduction pathways for nonindigenous, invasive aquatic plants as a state priority. Nonindigenous aquatic weeds are a significant problem in Washington, the United States (Pimentel et al. 1999), and other countries (Clayton 1996). The problems caused by these plants, exemplified by Eurasian watermilfoil (*Myriophyllum spicatum* L.) and hydrilla (*Hydrilla verticillata* (L.) Caspary), include: decreased species biodiversity and habitat value, impaired water quality, reduced recreational use, impeded

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water flow, and interference with efficiency of water delivery and power generation systems (Nichols and Shaw 1986, Frodge et al. 1991, Madsen et al. 1991). The Office of Technology Assessment (1993) estimated that in the United States a total of \$100 million is invested annually in nonindigenous aquatic weed control activities.

Two major sources for the introduction of potentially invasive aquatic plants are the nursery industry (ornamental pond plants) and the pet trade (aquarium plants). These plants enter waterbodies when they are purchased and deliberately planted, are discarded into lakes and rivers (aquarium dumping), or produce seeds or fragments that are subsequently transported into natural systems. Most states, especially those in the western United States, maintain noxious weed lists that may include aquatic species and have a regulatory function.² Some states such as Washington, Oregon, Florida, South Carolina, and Texas also have lists of invasive aquatic plants that are prohibited for sale.² The United States maintains a list of noxious weeds³, as do other countries. On a state, regional, or national level identifying potential plant invaders and prohibiting or limiting their sale can help prevent introductions of potentially invasive species to uninfested waters.

The Washington State Department of Agriculture has regulatory authority over the distribution, sale, and transport of plants or plant parts. They maintain a quarantine list of 12 aquatic/wetland plants that are prohibited in Washington (Table 1) as well as a list of prohibited terrestrial weeds. The quarantine is regulated by Department of Agriculture staff who routinely inspect nurseries and pet stores for plant pests that are on the aquatic and terrestrial quarantine lists. The inspectors impound nursery or aquarium plants if prohibited species are discovered being sold, traded, or transported. Persons violating quarantine restrictions for a second or subsequent time may be subject to a civil penalty of up to \$5,000 per violation. The aquatic species on the prohibited list that are established in at least one Washington location are also listed as noxious weeds under Washington Weed Law (RCW

17.10).⁴ Depending on their statewide distribution, noxious weeds may be mandated for eradication (hydrilla) or for control in designated areas of the state (Eurasian watermilfoil). The Washington Department of Ecology provides funds to state and local governments to facilitate the control of these noxious aquatic weeds.

MATERIALS AND METHODS

In 1999 the Washington Department of Agriculture staff asked the authors to recommend additional aquatic plants for the quarantine list. The factors considered in selecting a particular species or genus for inclusion on the quarantine list were:

- The genus or species is not indigenous to Washington.
- The plant is found in Washington waters, has ecosystem/economic impacts, but is not on the existing quarantine list.
- The plant is a problem genera/species in areas with a similar or harsher winter climate than Washington.
- The plant poses an economic and/or ecosystem threat in areas where it is established out of its native range.
- The plant is currently being sold or traded in pet stores, nurseries, or via the Internet.
- The plant is considered attractive in appearance by having showy flowers or unusual foliage, is hardy, or possesses other characteristics that appeal to both sellers and purchasers.
- The genera/species has characteristics that make it easily identifiable to state inspectors.

The authors used several sources to identify potential problem species. We reviewed distribution/survey data from public access lakes in Washington to identify nonindigenous species present but not listed on the 1992 quarantine list. Aquatic plant scientists and aquatic plant managers from other states were asked to advise us, using their best professional judgement, regarding what aquatic species they thought were likely to establish in Washington and be invasive. We reviewed noxious or prohibited weed lists from states and countries with similar climates to Washington. We reviewed scientific journals, state and federal technical reports, and searched the Internet for information to identify problem aquatic genera/species throughout the world. The nursery industry in Washington was consulted about aquatic/wetland plants that they were selling or cultivating for sale. We discovered one nursery propagating water chestnut (*Trapa natans* L.) and European frogbit (*Hydrocharis morsus-ranae* L.) and were able to convince the grower to destroy the plants. Pet stores were visited to determine which plants were commonly being sold to the general public for aquarium use. We developed lists of aquatic plants being sold over the

TABLE 1. AQUATIC AND WETLAND PLANTS AND SEEDS WHOSE SALE HAVE BEEN PROHIBITED IN WASHINGTON STATE SINCE 1992.

Common name	Scientific name
Brazilian Elodea	<i>Egeria densa</i> Planch
Common Cordgrass	<i>Spartina anglica</i> C.E. Hubbard
Eurasian Watermilfoil	<i>Myriophyllum spicatum</i> L.
Giant Hogweed	<i>Heracleum mantegazzianum</i> (Sommier & Levier)
Hydrilla	<i>Hydrilla verticillata</i> (L.) Caspary
Indigobush	<i>Amorpha fruticosa</i> L.
Parrotfeather	<i>Myriophyllum aquaticum</i> (Vell.) Verdc.
Purple Loosestrife	<i>Lythrum salicaria</i> L.
Salt Cedar	<i>Tamarix ramossissima</i> Ledeb.
Salt Meadow Cordgrass	<i>Spartina patens</i> (Aiton) Muhl
Smooth Cordgrass	<i>Spartina alterniflora</i> Loisel.
Wand Loosestrife	<i>Lythrum virgatum</i> L.

²Non-Native, Invasive Aquatic and Wetland Plants in the United States, <http://aquat1.ifas.ufl.edu/seagrant/invlists.html>.

³United States Department of Agriculture, Federal Noxious Weed List, http://www.aphis.usda.gov/ppq/permits/noxiousweed_list.html.

⁴Chapter 17.10 RCW—Noxious Weeds—Control Boards, http://www.wa.gov/agr/weedboard/weed_laws/17.10.html.

Internet for water gardens or as aquarium plants. Photographs and illustrations were used to make a subjective judgement on the attractiveness of a species based on the size and color of the flowers and/or unusual foliage.

After this information was evaluated, an initial list of 22 genera/species was developed and a fact sheet was prepared for each plant. The fact sheets provided information about each plants native and introduced range, biology, potential ecosystem/economic threats, key identifying traits, and a rationale for prohibiting its sale in Washington. Because prohibiting the sale of plants has economic impacts on both the nursery and pet trades, a thoughtful, well-researched approach was necessary to provide scientific justification to add each new genera/species to the quarantine list.

RESULTS AND DISCUSSION

The plants were prioritized into three lists based on perceived threat to Washington waters. The top ten list was the highest priority for quarantine (Table 2). Six other species were considered to be of high priority but of lesser threat to Washington than the ten species listed in Table 2. These species include: slender-leaved naiad (*Najas minor* All.), salvinia (*Salvinia* spp.), mud mat (*Glossostigma* spp. (L.) Kuntze), marsh dewflower (*Murdannia keisak* (Hasskarl) Hand.-Mazz), swollen bladderwort (*Utricularia inflata* (Walt)), and dense-flowered cordgrass (*Spartina densiflora* Brong.).

Six species were not proposed for listing at this time. These were: alligator weed (*Alternanthera philoxerodes* (Mart.)

TABLE 2. THE PRIORITIZED "TOP TEN" LIST OF PLANTS PROPOSED FOR QUARANTINE IN WASHINGTON (KEY REFERENCES ARE FOOTNOTED).

Genera/species proposed for listing	Factors affecting status on list
1. Water Chestnut ^a <i>Trapa natans</i> L.	<ul style="list-style-type: none"> • Not known from WA • Problem species in eastern USA • Sold in nurseries, traded on Internet • Usual appearance makes it appealing for water gardens
2. African Elodea ^b <i>Lagarosiphon</i> spp.	<ul style="list-style-type: none"> • Not known from USA • Problem plant in New Zealand • Some species being sold for aquarium use via the Internet
3. Water Primrose ^c <i>Ludwigia hexapetala</i> (Hook.& Arn.) Zardini, Gu & Raven	<ul style="list-style-type: none"> • Limited distribution and clogging waterways in WA • Sold as a water garden plant in nurseries • Has showy yellow flowers
4. Yellow Floating Heart ^d <i>Nymphoides peltata</i> (Gmel.) Kuntze	<ul style="list-style-type: none"> • Found at one site in WA where it is growing in a dense monoculture • Sold as a water garden plant in nurseries • Has showy yellow flowers
5. Garden Loosestrife ^e <i>Lysimachia vulgaris</i> L.	<ul style="list-style-type: none"> • Limited distribution in WA wetlands where it outcompetes purple loosestrife • Sold as a water garden plant in nurseries • Has showy yellow flowers
6. Flowering Rush ^f <i>Butomus umbellatus</i> L.	<ul style="list-style-type: none"> • Found at one site in WA where it is growing profusely • Sold as a water garden plant in nurseries • Has showy white to pink flowers
7. European Frogbit ^g <i>Hydrocharis morsus-ranae</i> L.	<ul style="list-style-type: none"> • Not known from WA • Problem plant in Canada • Being sold via the Internet • Showy white flowers
8. Fanwort ^h <i>Cabomba caroliniana</i> Gray	<ul style="list-style-type: none"> • One infested site in WA • Widely sold in pet stores as an aquarium plant • Attractive underwater foliage
9. Hairy Willow-herb ⁱ <i>Epilobium hirsutum</i> L.	<ul style="list-style-type: none"> • Limited establishment in WA wetland sites • Sold in nurseries as a water garden plant • Showy, large pink flowers
10. Slender Arrowhead ^j <i>Sagittaria graminea</i> Michx.	<ul style="list-style-type: none"> • Two sites in WA • Problem plant in Australia • Showy white flowers

^aInvasive, Exotic Plants of Canada Fact Sheet No. 13, <http://infoweb.magi.com/~ehaber/>.

^bNon-Native, Invasive Aquatic Plants in the United States, <http://aquat1.ifas.ufl.edu/seagrant/lagmaj2.html>.

^cWritten Findings of the Washington State Noxious Weed Control Board Water Primrose, <http://aquat1.ifas.ufl.edu/seagrant/lagmaj2.html>.

^dWritten Findings of the Washington State Noxious Weed Control Board Yellow Floating Heart, http://www.wa.gov/agr/weedboard/weed_info/nymphoides.html.

^eWritten Findings of the Washington State Noxious Weed Control Board Garden Loosestrife, http://www.wa.gov/agr/weedboard/weed_info/gardenloos.html.

^fInvasive, Exotic Plants of Canada Fact Sheet No. 4, <http://infoweb.magi.com/~ehaber/>.

^gInvasive, Exotic Plants of Canada Fact Sheet No.3, <http://infoweb.magi.com/~ehaber/>.

^hWritten Findings of the Washington State Noxious Weed Control Board Fanwort, http://www.wa.gov/agr/weedboard/weed_info/fanwort.html.

ⁱFreshwater, Nonnative Plants Hairy Willow-herb, <http://www.ecy.wa.gov/programs/wq/plants/weeds/willowherb.html>.

^jAuckland Regional Council Fact Sheet 19 Sagittaria graminea, <http://www.arc.govt.nz/about/biosec/factsheets/19-sagitt.pdf>.

riseb.), Asian anacharis (*Egeria najas* Planch.), variable-leaved milfoil (*Myriophyllum heterophyllum* Michx.), American frogbit (*Limnobium spongia* (Bosc.) Steud), erect bur-reed (*Sparganium erectum* variety *erectum* L.), and dotted duckweed (*Spirodela punctata* (Meyer) Thompson). These species were not listed because they were not perceived to be a threat to Washington or because they were considered too difficult for state inspectors to identify.

In the last step of the quarantine process, the Washington Department of Agriculture, in consultation with their nursery advisory committee, will make the final decision about which plants to include on the list and will conduct a public rule-making process. Once the list is finalized, inspection staff will be trained to identify the newly listed species and the updated quarantine list will be provided to nurseries and pet stores.

In January 2000, 15 genera/species out of the 16 recommended for inclusion on the quarantine list were added to the updated list and are now prohibited for sale in Washington. The only genus not included was *Salvinia*. The rationale for not adding this genus was that the Department of Agriculture staff considered it unlikely to establish and cause problems in Washington. Other states and the authors have asked the Department of Agriculture to reconsider this decision.

Having a quarantine list and inspection and enforcement capability is a useful regulatory tool to help prevent the intro-

duction of potentially invasive aquatic and wetland species to new sites. Washington's noxious weed laws, quarantine lists, and the process used to identify plants for inclusion on the list can serve as a model for other states or countries.

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