

Oregon Department of Agriculture
Plant Pest Risk Assessment for
Flowering Rush, *Butomus umbellatus* L.
2008 (Revised 2011)

Name: Flowering rush, *Butomus umbellatus* L.

Family: Flowering rush, *Butomaceae*

Findings of this Review and Assessment: Flowering rush, *Butomus umbellatus*, was evaluated and determined to be a category **“A”** rated noxious weed, as defined by the Oregon Department of Agriculture (ODA) Noxious Weed Policy and Classification System. This determination was based on a literature review and analysis using two ODA evaluation forms. Using the Noxious Qualitative Weed Risk Assessment v.3.8, flowering rush scored **59** indicating a Risk Category of **A**; and a score of **17** with the Noxious Weed Rating System v.3.2, indicating an **“A”** rating.

Introduction: Flowering rush is a perennial aquatic plant in the family, *Butomaceae*, and not a true rush species. First discovered in North America about 1879 along the St. Laurence River, it has spread throughout the river into the Great Lakes and sporadically across the Northern United States and Southern Canada. Its preferred habitat is lake shorelines and slow moving waters to a depth of around 2 meters. It is especially well adapted to fluctuating water levels found in reservoirs; a habitat that stresses most other plant species (Hroudová 1996). Flowering rush densities can be quite variable from scattered clumps to populations exceeding 50% cover in the St. Laurence waterway (Lavoie C. et.al. 2003). It has been documented in Idaho and Montana though populations in Western North American are still limited (Rice and Dupuis 2008). There are no infestations surveyed or identified in Oregon. The aquatic nursery trade has been responsible for the introduction of plants into new states. The plant is still available at some nurseries.



Image by Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

Biology and Morphology: Flowering rush is distinctive and easy to identify when flowering. It is a tall plant growing to a height of four to five inches in marshes, longer in aquatic habitats. The plant crown is topped by an umbel of showy-white or pink flowers. The flowers consist of petal-like sepals with no real petals present. Leaf stems are triangular in cross-section. Flowering rush can grow either as an emergent in meter deep water or in the lower marsh (King County 2011). Plants growing in these two environments acquire two distinct growth forms. The aquatic morph has limp, narrow leaves and doesn't flower. The emergent form has stiff narrow leaves growing rigid and upright.

Reproduction and Dispersal: Flowering rush reproduces both asexually by rhizomes and bulblets and sexually through seed production. Seed production only occurs in diploids. Triploid plants reproduce entirely by bulblets and rhizomes. Moving water is the predominant dispersal mechanism for more localized movement, dispersing seeds and bulblets, human activities such as boating and waterfowl feeding contribute to long-distant movement (ISSG 2005). Nurseries continue to sell flowering rush to aquatic gardeners facilitating long-distant spread and introduction to non-infested areas.

Biological Factors Effecting Establishment and Success: Flowering rush experiences very little grazing pressure from either mammals or invertebrates. Some muskrat or nutria feeding occurs but the impact is localized and not significant on a landscape level. The species functions at its full biological potential in North America.

Probability of Detection: Flowering rush is not a highly showy plant and escapes the attention of most people. Various native look-alikes also make identification of new infestations difficult. The potential environment for establishment is huge nationwide so that many new infestations escape identification until they become quite large or problematic. The Columbia River offers hundreds of miles of habitat that does not get surveyed in any systematic manner. Introduction into Oregon is probable and may not be addressed until it is beyond eradication.

Economic Impact: Fishing and boating impacts may occur but documentation is weak on these topics.

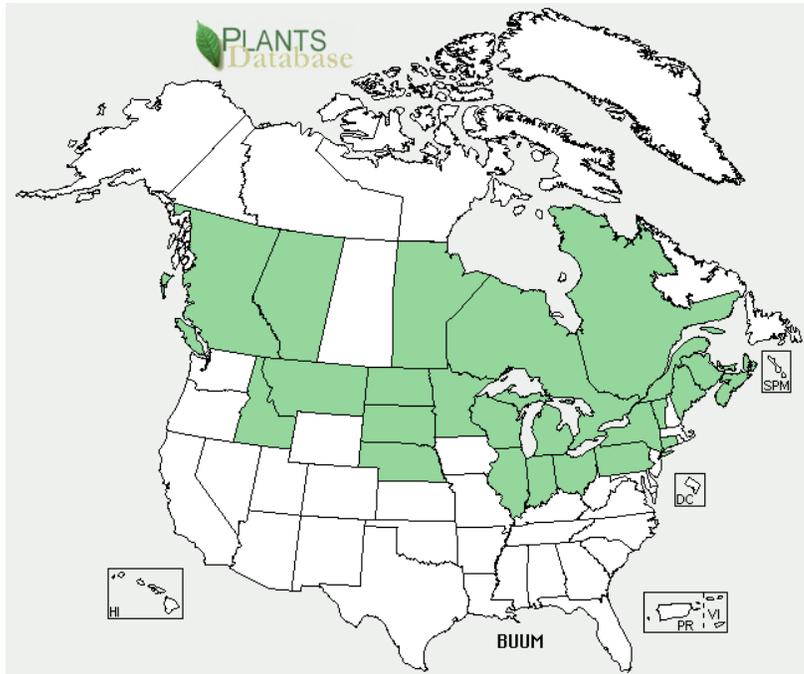
Environmental Impacts: Literature indicates a range of concern about the impact on wetlands in North America. Authors state that the plant has the potential to invade and disrupt native marshlands though densities do not reach that of purple loosestrife; therefore, landscape-level monocultures may not be forming. Anderson et al describe flowering rush out-competing cattails and willows in Idaho but data from the St. Laurence River shows that even at high infestation levels, native plant diversity has not been seriously affected (Livoie C et.al.2003).

Native Range: Widespread throughout the European and Asian continent.

North American Range: Flowering rush is very abundant in the North-eastern States, the Great Lakes region and parts of the upper Mississippi River. Infestations west of these regions tend to be scattered (AIS 2009). Flowering rush is best adapted to colder temperate hardiness zones and can survive hard winter freezes buried in mud.

Hardiness Zones: As a plant of primarily cooler temperate zones, flowering rush occurs in around 3 hardiness zones. See attachment A.

Proximity to Oregon: Infestations already exist on the Columbia River and tributaries in Washington State near the Tri cities and in the Flathead and Clarks Fork rivers of the Upper Snake system (Rice 2008). It is not currently identified in Oregon.



*US distribution of
flowering rush on USDA
Plants Database*

Control: Manual control can be used on smaller infestations to reduce root vigor and flowering. Two cuttings in early to mid summer weaken root reserves. Digging small patches is possible but labor intensive. All bulblets and root fragments must be removed (NBII 2005). Habitat™ herbicide is registered for emerged vegetation control in standing water in Oregon and may be effective. Aquatic formulations of glyphosate may also be useful when the water recedes.

Noxious Weed Qualitative Risk Assessment

Oregon Department of Agriculture

Common name: Flowering rush
Scientific name: *Butomus umbellatus*
Family: Flowering rush, *Butomaceae*

For use with plant species that occur or may occur in Oregon to determine their potential to become serious noxious weeds. For each of the following categories, select the number that best applies. Numerical values are weighted to increase priority categories over less important ones. Choose the best number that applies, intermediate scores can be used.

Total Score: 59

Risk Category: A

GEOGRAPHICAL INFORMATION

1) 6 Invasive in Other Areas

- 0 Low- not know to be invasive elsewhere.
- 2 Known to be invasive in climates dissimilar to Oregon's current climates.
- 6 Known to be invasive in geographically similar areas.

Comments: Known to be invasive in geographically similar areas.

2) 6 Habitat Availability: Are there susceptible habitats for this species and how common or widespread are they in Oregon?

- 1 *Low* – Habitat is very limited, usually restricted to a small watershed or part of a watershed (e.g., tree fern in southern Curry County).
- 3 *Medium* – Habitat encompasses 1/4 or less of Oregon (e.g., oak woodlands, coastal dunes, eastern Oregon wetlands, Columbia Gorge).
- 6 *High* – Habitat covers large regions or multiple counties, or is limited to a few locations of high economic or ecological value (e.g., threatened and endangered species habitat).

Comments: The Columbia River and Oregon reservoirs are highly susceptible to invasion.

3) 6 Proximity to Oregon: What is the current distribution of the species?

- 0 *Present* – Occurs within Oregon.
- 1 *Distant* – Occurs only in distant US regions or foreign countries.
- 3 *Regional* – Occurs in Western regions of US but not adjacent to Oregon border.
- 6 *Adjacent* – Weedy populations occur adjacent (<50 miles) to Oregon border.

Comments: Species is found in Idaho and Washington river systems.

4) 0 Current Distribution: What is the current distribution of escaped populations in Oregon?

- 0 *Not present* – Not known to occur in Oregon.
- 1 *Widespread* – Throughout much of Oregon (e.g., cheatgrass).
- 5 *Regional* – Abundant (i.e., occurs in eastern, western, central, coastal, areas of Oregon) (e.g., gorse, tansy ragwort).
- 10 *Limited* – Limited to one or a few infestations in state (e.g., kudzu).

Comments: Not known in Oregon

BIOLOGICAL INFORMATION

- 5) 3 **Environmental Factors:** Do abiotic (non-living) factors in the environment effect establishment and spread of the species? (e.g., precipitation, drought, temperature, nutrient availability, soil type, slope, aspect, soil moisture, standing or moving water).
- 1 *Low* – Severely confined by abiotic factors.
 - 2 *Medium* – Moderately confined by environmental factors
 - 4 *High* – Highly adapted to a variety of environmental conditions (e.g., tansy ragwort, Scotch broom).

Comments: Species is highly adapted to temperate zones.

- 6) 6 **Reproductive Traits:** How does this species reproduce? Traits that may allow rapid population increase both on and off site.
- 0 *Negligible* – Not self-fertile, or is dioecious and opposite sex not present.
 - 1 *Low* – Reproduction is only by seed, produces few seeds, or seed viability and longevity are low.
 - 3 *Medium* – Reproduction is vegetative (e.g., by root fragments, rhizomes, bulbs, stolons).
 - 3 *Medium* – Produces many seeds, and/or seeds of short longevity (< 5 years).
 - 5 *High* – Produces many seeds and/or seeds of moderate longevity (5-10 years) (e.g., tansy ragwort).
 - 6 *Very high* – Has two or more reproductive traits (e.g., seeds are long-lived >10 years and spreads by rhizomes).

Comments: Species has multiple reproductive traits.

- 7) 4 **Biological Factors:** Do biotic (living) factors restrict or aid establishment and spread of the species? (What is the interaction of plant competition, natural enemies, native herbivores, pollinators, and pathogens with species?)
- 0 *Negligible* – Host plant not present for parasitic species.
 - 1 *Low* – Biotic factors highly suppress reproduction or heavily damage plant for an extended period (e.g., biocontrol agent on tansy ragwort).
 - 2 *Medium* – Biotic factors partially restrict or moderately impact growth and reproduction, impacts sporadic or short-lived.
 - 4 *High* – Few biotic interactions restrict growth and reproduction. Species expresses full growth and reproductive potential.

Comments: Species is not subject to herbivory.

- 8) 3 **Reproductive Potential and Spread After Establishment - Non-human Factors:** How well can the species spread by natural means?
- 0 *Negligible* – No potential for natural spread in Oregon (e.g., ornamental plants outside of climate zone).
 - 1 *Low* – Low potential for local spread within a year, has moderate reproductive potential or some mobility of propagules (e.g., propagules transported locally by animals, water movement in lakes or ponds, not wind blown).
 - 3 *Medium* - Moderate potential for natural spread with either high reproductive potential or highly mobile propagules (e.g., propagules spread by moving water, or dispersed over longer distances by animals) (e.g., perennial pepperweed).
 - 5 *High* – Potential for rapid natural spread throughout the susceptible range, high reproductive capacity and highly mobile propagules. Seeds are wind dispersed over large areas (e.g., rush skeletonweed).

Comments: Propagules are highly mobile in water.

- 9) 3 **Potential of Species to be Spread by Humans.** What human activities contribute to spread of species? Examples include: interstate or international commerce; contaminated commodities; packing materials or products; vehicles, boats, or equipment movement; logging or farming; road maintenance; intentional introductions of ornamental and horticultural species, or biofuel production.
- 1 *Low* – Potential for introduction or movement minimal (e.g., species not traded or sold, or species not found in agricultural commodities, gravel or other commercial products).
 - 3 *Medium* – Potential for introduction or off-site movement moderate (e.g., not widely propagated, not highly popular, with limited market potential; may be a localized contaminant of gravel, landscape products, or other commercial products) (e.g., lesser celandine, Canada thistle).
 - 5 *High* – Potential to be introduced or moved within state high (e.g., species widely propagated and sold; propagules common contaminant of agricultural commodities or commercial products; high potential for movement by contaminated vehicles and equipment, or by recreational activities) (e.g., butterfly bush, spotted knapweed, Eurasian watermilfoil).

Comments: Species can be dispersed in nursery trade, on boats, and sporting equipment.

IMPACT INFORMATION

- 10) 5 **Economic Impact:** What impact does/can the species have on Oregon's agriculture and economy?
- 0 *Negligible* – Causes few, if any, economic impacts.
 - 1 *Low* – Potential to, or causes low economic impact to agriculture; may impact urban areas (e.g., puncture vine, pokeweed).
 - 5 *Medium* – Potential to, or causes moderate impacts to urban areas, right-of-way maintenance, property values, recreational activities, reduces rangeland productivity (e.g., English ivy, Himalayan blackberry, cheatgrass).
 - 10 *High* – Potential to, or causes high impacts in agricultural, livestock, fisheries, or timber production by reducing yield, commodity value, or increasing production costs (e.g., gorse, rush skeleton weed, leafy spurge).

Comments: Can impact recreation, property values and certain economic activities. Can seriously block irrigation and flood control canals.

- 11) 3 **Environmental Impact:** What risks or harm to the environment does this species pose? Plant may cause negative impacts on ecosystem function, structure, and biodiversity of plant or fish and wildlife habitat; may put desired species at risk.
- 0 *Negligible* – None of the above impacts probable.
 - 1 *Low* – Can or does cause few or minor environmental impacts, or impacts occur in degraded or highly disturbed habitats.
 - 4 *Medium* – Species can or does cause moderate impacts in less critical habitats (e.g., urban areas, sagebrush/ juniper stands).
 - 6 *High* – Species can or does cause significant impacts in several of the above categories. Plant causes severe impacts to limited or priority habitats (e.g., aquatic, riparian zones, salt marsh; or T&E species sites).

Comments: Can impact fish and wildlife habitat. Total impacts to west coast waterways are uncertain.

- 12) 0 Impact on Health:** What is the impact of this species on human, animal, and livestock health? (e.g., poisonous if ingested, contact dermatitis, acute and chronic toxicity to livestock, toxic sap, injurious spines or prickles, causes allergy symptoms).
- 0 *Negligible* – Has no impact on human or animal health.
 - 2 *Low* – May cause minor health problems of short duration, minor allergy symptoms (e.g., leafy spurge).
 - 4 *Medium* – May cause severe allergy problems, death or severe health problems through chronic toxicity, spines or toxic sap may cause significant injury. (e.g., giant hogweed, tansy ragwort).
 - 6 *High* – Causes death from ingestion of small amounts, acute toxicity (e.g. poison hemlock).

Comments: No health effects identified.

CONTROL INFORMATION

- 13) 8 Probability of Detection at Point of Introduction:** How likely is detection of species after introduction and naturalization in Oregon?
- 1 *Low* – Grows where probability of early detection is high, showy and easily recognized by public; access to habitat not restricted (e.g., giant hogweed).
 - 5 *Medium* – Easily identified by weed professionals, ranchers, botanists; some survey and detection infrastructure in place. General public may not recognize or report species (e.g., leafy spurge).
 - 10 *High* – Probability of initial detection by weed professionals low. Plant shape and form obscure, not showy for much of growing season, introduction probable at remote locations with limited access (e.g., weedy grasses, hawkweeds, skeletonweed).

Comments: Probability of initial detection is low. May occur in areas not regularly surveyed by weed specialists. Public may not recognize this species.

- 14) 6 Control Efficacy:** What level of control of this species can be expected with proper timing, herbicides, equipment, and biological control agents?
- 1 *Negligible* – Easily controlled by common non-chemical control measures (e.g., mowing, tillage, pulling, and cutting; biocontrol is very effective at reducing seed production and plant density) (e.g., tansy ragwort).
 - 2 *Low* – Somewhat difficult to control, generally requires herbicide treatment (e.g., mechanical control measures effective at preventing flowering and but not reducing plant density; herbicide applications provide a high rate of control in a single application; biocontrol provides partial control).
 - 4 *Medium* – Treatment options marginally effective or costly. Tillage and mowing increase plant density (e.g., causes tillering, rapid regrowth, spread from root fragments). Chemical control is marginally effective. Crop damage occurs or significant non-target impacts result from maximum control rates. Biocontrol agents ineffective.
 - 6 *High* – No effective treatments known or control costs very expensive. Species may occur in large water bodies or river systems where containment and complete control are not achievable. Political or legal issues may prevent effective control.

Comments: No effective controls noted. Control in irrigation canals are very costly.

Category Scores:

18 Geographic score (Add scores 1-4)

19 Biological Score (Add lines 5-9)

08 Impact Score (Add lines 10-12)

14 Control Score (Add Lines 13-14)

59 Total Score (Add scores 1-14 and list on front of form)

Risk Category: 55-89+ = **A** 24-54 = **B** < 24 = unlisted

This Risk Assessment was modified by ODA from the USDA-APHIS Risk Assessment for the introduction of new plant species.

1/15/2013 v.3.8

Oregon Department of Agriculture
Noxious Weed Rating System

Common name: Flowering rush
Scientific name: *Butomus umbellatus*

Point Total: 17 Rating: A

- 1) **1 Detrimental Effects:** Circle all that apply, enter number of circles.
1. *Health:* causes poisoning or injury to humans or animals
 2. *Competition:* strongly competitive with crops, forage, or native flora
 3. *Host:* host of pathogens and/or pests of crops or forage
 4. *Contamination:* causes economic loss as a contaminate in seeds and/or feeds
 5. *Interference:* interferes with recreation, transportation, harvest, land value, or wildlife and livestock movement
- 2) **4 Reproduction & Capacity for Spread:** Circle the number that best describes, enter that number.
1. Few seeds, not wind blown, spreads slowly
 2. Many seeds, slow spread
 3. Many seeds, spreads quickly by vehicles or animals
 4. Windblown seed, or spreading rhizomes, or water borne
 5. Many wind-blown seeds, high seed longevity, spreading rhizomes, perennials
- 3) **3 Difficulty to Control:** Circle the number that best describes, enter that number.
1. Easily controlled with tillage or by competitive plants
 2. Requires moderate control, tillage, competition or herbicides
 3. Herbicides generally required, or intensive management practices
 4. Intensive management generally gives marginal control
 5. No management works well, spreading out of control
- 4) **6 Distribution:** Circle the number that best describes, enter that number.
1. Widely distributed throughout the state in susceptible habitat
 2. Regionally abundant, 5 or more counties, more than 1/2 of a county
 3. Abundant throughout 1- 4 counties, or 1/4 of a county, or several watersheds
 4. Contained in only 1 watershed, or less than 5 square miles gross infestation
 5. Isolated infestation less than 640 acres, more than 10 acres
 6. Occurs in less than 10 acres, or not present, but imminent from adjacent state
- 5) **3 Ecological Impact:** Circle the number that best describes, enter that number.
1. Occurs in most disturbed habitats with little competition
 2. Occurs in disturbed habitats with competition
 3. Invades undisturbed habitats and crowds out native species
 4. Invades restricted habitats (i.e. riparian) and crowds out native species

17 TOTAL POINTS

Note: Noxious weeds are non-native plants with scores of 11 points or higher. Any plants in 4.1, 4.2, and 4.3 should not be classified as “A” rated weeds. *Ratings:* 16 + = A, 15 – 11 = B
ODA Weed Rating System 1/15/2013 v.3.8

RA produced by: Glenn Miller, ODA, revised 2011

References:

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Hroudová Zdenka¹, Krahulcová Anna¹, Zákřavský Petr¹ and Jarolímová Vlasta¹ (1996). The biology of *Butomus umbellatus* in shallow waters with fluctuating water level. Hydrobiologia Volume 340, Numbers 1-3 / December, 1996

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USDA Plants Profile (<http://plants.usda.gov/java/profile?symbol=BUUM>)

Rice P., Dupuis V. 2008 Flowering rush: An invasive aquatic macrophyte infesting the headwaters of the Columbia River system. Northern Interior Columbia Basin Invasive Aquatic Plant Summit. Coeur d' Alene ID 10/21/2008

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www.in.gov/dnr/files/FLOWERING_RUSH.pdf

Attachment A

