Oregon Department of Agriculture
Plant Pest Risk Assessment for Giant Reed
Arundo donax L.
February 2011

Name: Giant reed **(*Arundo donax*)**; a.k.a. giant cane, Spanish reed

Family: Grass (Poaceae)

Purpose: *Arundo donax* was evaluated in 2007 and placed on the Oregon Department of Agriculture (ODA) Watch List. ODA and the Oregon State Weed Board (OSWB) are reevaluating *Arundo* due to the current interest in using *Arundo* as a biomass energy crop and the potential for production in Oregon.

Findings of this Assessment and Recommendations: Using a rating system adapted from United States Department of Agriculture, Animal and Plant Health Inspection Services, Plant Protection and Quarantine Weed Risk Assessment Guidelines, *Arundo donax* scored **41** out of a potential score of 90 (moderate B-listing). Using the ODA Noxious Weed Rating System, it scored **16** out of 25 (low A-listing).

This low score, even with its limited distribution in Oregon, is attributed to its lack of seed production, lower risk of natural spread, limited economic impacts, lack of health impacts, capacity to control, and probability of detection.

Literature clearly indicates that *Arundo* is a serious invader of tropical and warm temperate environments. What is less clear, is its ability to become invasive in colder temperate zones.

Bear Creek near Medford, Oregon

The Noxious Weed Control Program recommends that *Arundo donax* remain on the ODA Watch List, allowing for a Control Area Order to be established in Morrow and Umatilla Counties under ORS 570.405, which would allow continued review and research on a limited production level.

Introduction: *Arundo donax*, is considered a serious weed in California and the Southwest. Due to the proximity of weedy populations in California and an increased use as an ornamental in the late 1990's, it was evaluated in a 2007 risk assessment by ODA. Currently, only one escaped population has been found in Oregon. The findings of the 2007 risk assessment determined that *Arundo* should be placed on the ODA Watch List and undergo additional evaluation. The 2007 findings where based on field observations of *Arundo* growing in southern Oregon and the Willamette Valley. It was observed to only grow vigorously in Jackson County along Bear Creek in Medford. No eastern Oregon ornamental plantings or escaped populations where reported or observed. (ODA 2007).

The Plant Epidemiology and Risk Analysis Laboratory, Center for Plant Health Science and Technology of the United States Department of Agriculture, Animal Plant Health Inspection Service, Plant Protection and Quarantine (USDA-APHIS-PPQ) reviewed the 2007 plant pest risk assessments of *Arundo donax*. Overall, they agree with the general conclusion of the assessment that *Arundo donax* is a weed of concern. Although, they would have given *Arundo* a slightly higher score and made the statement "The key question is would it be invasive in Oregon's climate?" (USDA-APHIS-PPQ 2011).

They provided a recommendation that ODA consider more carefully how widely and extensively it is cultivated in Oregon, and evaluate the opportunities it has and has not had for escaping. The USDA-APHIS-PPQ evaluation used a process that includes a very basic climate matching tool to evaluate the geographic potential of a species in the United States. The analysis suggests that 55.9% of the U.S. is suitable for the growth of this species (Figure 1), including most of Oregon. However, just because it can grow in most of Oregon, doesn't mean that it would be invasive there. (USDA-APHIS-PPQ 2011).

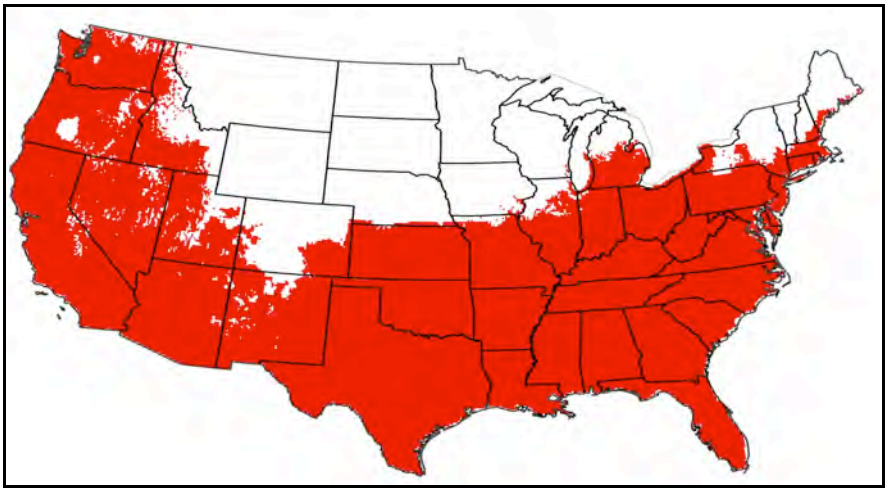

***Figure 1**. Climatically suitable areas for the growth of A. donax in the United States, USDA-PPQ 2011.*

In Oregon, the feasibility of large-scale production and using *Arundo* as an alternative energy source is being reviewed by Portland General Electric (PGE) to fuel the Boardman coal-fired power plant in Morrow County. The issue has renewed the urgency in evaluating its invasiveness in Oregon and whether it qualifies to be included as a State Listed Noxious Weed.

World Distribution: It is native to the Asian subcontinent and introduced to Europe several thousand years ago (Benton 2005). *Arundo donax* can now be found in most tropical and warm temperate geographic area due to human introduction. Naturalized populations are reported from North and South America, Asia, Australia, New Zealand and the Pacific Islands (Haflinger and Scholz 1981). *Arundo* is prevalent throughout the southwest United States from California to Florida. The degree to which *Arundo* is naturalized and problematic in each country or region is mixed.

Growth Habits and Reproduction: *Arundo donax* is one of the world's largest herbaceous grasses growing in dense compact masses and reaching heights of 20 feet. Canes develop leaves that are alternate growing up to 2 feet in length and 2 inches wide. Fleshy, almost bulbous creeping rootstocks anchor deep into the soils and form dense root masses. *Arundo* tolerates all types of soils and thrives especially well in sandy or moist well-drained soils commonly found in riparian zones subjected to annual flooding (Hoshovsky 1986). It prefers flood plains and riparian areas (Hoshovsky 1986). Steep-banked river systems or non-fluctuating waterways offer less opportunity for establishment (Dudley 2000). The edges of wetlands and marshes can provide adequate moisture for survival. Although *Arundo* is capable of establishing at springs and in uplands where there is adequate moisture (Dudley 2000). *Arundo* does not thrive in soils that are waterlogged or submerged year-round. Populations established in riparian zones can creep outward into drier to droughty soils utilizing deep-growing roots to gather subsurface water during the dry season. Roadsides and non-irrigated lands make poor habitats for *Arundo* establishment and spread.

Arundo is a species of tropical and warm temperate zones. It is hardy to Zone 6 (Bir 2010). The grass grows vigorously in tropical to warm temperate climates where it produces perennial canes. In colder temperate zones, canes are not perennial and die back or become ragged during winter. *Arundo* is affected by cold spells and freeze events early in the growing season. These events stunt the grass and can prevent it from reaching its full biological potential. Dormant plants are resistant to moderate freezing temperatures. New growth is impacted by frost events that stunt overall height (Hoshovsky 1986). Severe cold winter temperatures coupled with low soil moisture might be expected to kill or injure dormant roots, limiting its range in colder temperate zones.

Flowers are produced on large plume-like panicles between March and September, but fertile seeds are extremely rare. DNA analysis demonstrates that the genetic diversity of *Arundo* in both Europe and North America is low and indicates that the populations are in fact large clones (Mariani, Cabrini et.al. 2010). The lack of genetic variability is the leading cause of seed sterility.

Vegetative reproduction from roots is the primary source of spread in both Europe and North America. All material testing in North America was determined to be of a single clone imported in the 1500's and is genetically identical to Western European populations (Ahmad, Liow et.al. 2008). Stems are not a major factor in reproduction. In southern latitudes, older stems two years or more, develop nodal tissue capable of producing roots if buried with adequate moisture (Ceotto, di Candillo 2010). Stems deposited downstream in debris piles or silt can establish and root. In northern latitudes, such as the Pacific Northwest, stems rarely develop into two-year culms due to cold winter temperatures.

First-year stems do not develop nodal tissue capable of rooting (Ceotto, di Candillo 2010).

Factors Contributing to Spread: Humans have played a significant role in the distribution and spread of *Arundo* in North America for nearly 400 years. The first introductions were in California in the early 1500's by Spanish missions. *Arundo* was used for animal pens, basket weaving and windbreaks. Other early introductions are attributed to the French (Bir 2010). From these early introductions, plantings were intentionally established in waterways for erosion control. Root fragments can be easily stored and transported with little care. Sharing and use of plant material continued throughout the southwest and has lead to the invasive problems of today.

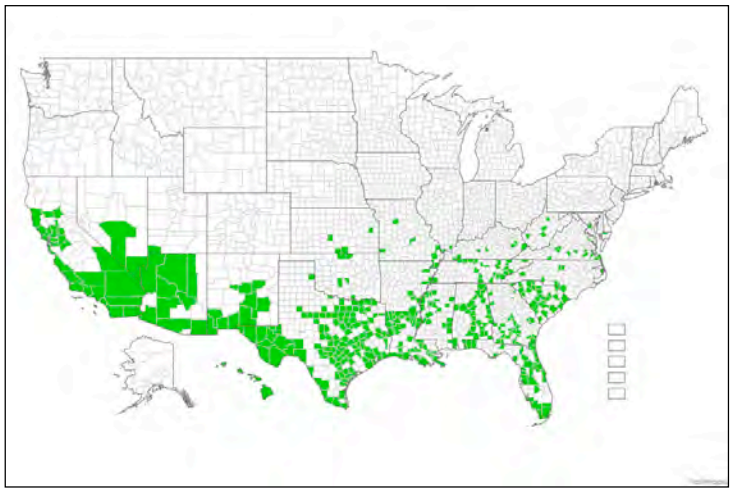

Figure 2. *Invasive populations of Arundo in the U.S., Bugwood 2010*

The majority of escaped populations reported as invasive occur in the southern half of the United States (Figure 2). Information regarding more northern escaped populations and its invasiveness in northern latitudes in not well documented. Further expansion in the United States can be expected if *Arundo* proves to be a viable bioenergy source. Ornamental plantings may contribute to spread by being introduced into riparian areas through dumping of yard debris or by being intentionally planted next to streams by homeowners who are unaware of the potential problems. Animals are causal agents of spread, though *Arundo* produces a host of compounds that serve to discourage grazing or insect feeding.

Pacific Northwest Observations: Gardeners and producers have some experience with *Arundo* in the Pacific Northwest. A five-acre plantation established near Junction City (Lane County Oregon) grew poorly in the clay soils normally utilized for grass seed production and was removed in 2009. The Lane County plot was established to determine *Arundo's* suitability as an energy crop. The planting did not thrive after several years of growth.

Lane County Planting 2008

Small patches exist in landscapes and water gardens throughout the Northwest, including a xeric garden in a city park in Yakima, Washington where it is reported as doing well (Jacobson per. comm. 2011). Such plantings are not common and only one escaped population has been observed or reported in the Northwest.

It does not appear to be aggressively spreading from ornamental plantings in the Willamette Valley and it is not clear if it will be invasive in the colder winter environment of Eastern Oregon. The climate of Jackson, Josephine, Coos and Curry Counties in southwest Oregon and the mid- Columbia River counties of Gilliam and Umatilla may provide sufficient temperatures to enable giant reed to grow vigorously and the ability to spread laterally. Oregon's only escaped population was identified in 2006 on Bear Creek near Medford; it has since been eradicated (French pers. comm. 2006).

Plantings established in 2003 and 2006 in Prosser, Washington serves as the most reliable source for information concerning the vigor of plants growing east of the Cascades in the Pacific Northwest. The 2006 plantings diminished in vigor and density during the time it was maintained. Plant mortality during the winter of 2008 averaged 83 percent. It is speculated that this may be due to a shallow planting of the rootstock or insufficient water going into the winter season. The plantings were removed in 2009. (Stevens, Parker et.al. 2008)

Positive Economic Impact: *Arundo donax* is a highly versatile plant that has been cultivated for over 5,000 years (Perdue 1958). The recent sharp rise in petroleum prices, climate change, energy security, and a desire for greener energy has increased global interest in biofuels. The Oregon legislature and U.S. Congress have signed renewable energy bills into law that promote and provide incentives for developing and using renewable resources for energy. *Arundo* has the ability to produce large quantities of biomass per acre and is being studied as a promising alternative energy source. Many countries are looking at biofuels as a key to help reduce reliance on foreign oil, lowering emissions of greenhouse gases and meeting economic development goals (Demirdas 2007).

Historically *Arundo* has played an important role in the development of music in Western culture (Perdue 1958). The hollow stems are used widely for flutes, pipes, clarinets, and bagpipes. Reeds for woodwind instruments are made from the culms and no satisfactory substitute had been developed. Canes and leaves provide an important source of building materials for roofing, shelter, shreens and fencing (Bir 2000). *Arundo* has been planted widely for windbreaks, erosion control and as an ornamental. It makes high quality paper and is used for the production rayon in Italy (Duke 1983). *Arundo* is grown commercially in Mediterranean Europe, South America, Caribbean Islands, and China. In Oregon, it is a minor nursery crop and can be found for sale and used as an accent plant in landscapes and water gardens.

Negative Economic Impact: Economic impacts are documented in California and the Southwestern resulting from flood damage, water loss, structural damage, and increased fire hazard. *Arundo* canes can create large debris piles that threaten the structural integrity of bridges and other in-stream structures that require expensive removal and cleanup following flood events. In some cases, *Arundo* completely dominates streams and flood channels forcing waters to cut away from the main channel. Water in the desert southwest is often in short supply.

Arundo removes large amounts of in-stream and groundwater that could be used for irrigation, drinking water, native plants, and wildlife. Compared to native plants, it consumes three times as much the water. In the Santa Ana River alone, *Arundo* consumes an estimated 56,200 acre-feet of water annually with a estimated value of $18 million (Orange County Water District 2003).

Ecological Impacts: Streamside and riparian impacts occur from aggressive annual growth and the ability of giant reed to spread laterally by rhizomes to form monotypic stands that displace native species. *Arundo donax* dramatically alters the ecological processes in riparian systems and ultimately transforms most riparian habitats towards pure stands of alien grass. By current estimates there are tens of thousands of acres of *Arundo* along the major coastal drainage systems of southern California (Bell 1997). Studies of native plant richness in areas invaded by *Arundo* show greatly decreased native plant cover (Cushman, Gaffney 2010), with willows, cottonwoods and streamside shrubbery suffering the most. Many species of migratory songbirds including the threatened southwestern willow flycatcher and Bell's vireo require these native plants for feeding, nesting and cover (Humple, Geupel 2002). When *Arundo* invades their numbers decline. Additionally, native insects required by these songbirds for food no longer exist in sufficient numbers to sustain reproductive populations (Herrera and Dudley 2003). In addition to impacts on wildlife food webs through trophic level simplication, *Arundo* is believed to have microclimate effects on stream temperature through reduction in shading. Leaf litter quality also decreases reducing food sources for aquatic invertebrates (Beerling, Dawah 1993).

Aerial view of Arundo near Eagle Pass, Texas, along the Rio Grande

Probability of Early Detection: Most regions of Oregon have active weed control programs, watershed councils, or Soil and Water Conservation Districts that are actively engaged in early detection of invasive species. *Arundo* is a large easily detected plant even in early stages of establishment. An informed public and weed professionals can readily identify and report this plant.

Control: Control requires the killing or removal of the root-mass. Small populations of *Arundo* can be removed manually but care must be taken to completely remove all root fragments. Large-scale control programs require treatment with a systemic herbicide and appropriate timing to achieve effective control. The most effective treatment is a foliar application of glyphosate applied at 3-5% solution mid-August to early November prior to dormancy (Spencer et.al. 2008).

Large infestations covering many river miles present challenges and many methods of vegetation removal are employed with varying degrees of success; these include prescribed fire, heavy machinery, mowing and cutting. Control costs using glyphosate applications can reach $20,000 per hectare (Mack 2008).

The United States Department of Agriculture-Agricultural Research Service (USDA-ARS) is investigating four insects as classical weed biological control agents. Each of the four attacks giant reed at a different place. The scale insect, *Rhizaspidiotus donacis,* attacks the root; the wasp *Tetramesa romana* attacks the main stem; the *Arundo* fly *Cryptonevra* spp. feeds the inside of the new shoots; and the leaf sheath miner, *Lasioptera donacis,* attacks the leaves. The *Arundo* wasp, was released in Texas in 2009, the first natural enemy to be employed against *Arundo donax* (Agriculture Research 2009).

Noxious Weed Qualitative Risk Assessment
Oregon Department of Agriculture

Common name: Giant reed
Family: Poaceae
Scientific name: *Arundo donax*

Total Score: **41** Risk Category: **B** weed

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.

GEOGRAPHICAL INFORMATION

1. 3 **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 worldwide.

Comments: *Arundo* is well adapted to subtropical to warm temperate climates. The majority of Oregon is outside of the ideal climate zones. It has only been observed to grow vigorously in southwest Oregon. It does not survive in areas with prolonged or regular periods of freezing temperatures.

2. 5 **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: Prefers riparian habitats and there are many miles of this habitat in Oregon.

3. 3 **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: California is the only boarding state with weedy populations and there are no populations adjacent to Oregon. It is most abundant in central (Sacramento Valley, San Joaquin Valley, South Coast Regions) and southern California.

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: There are no known escaped populations in Oregon. The escaped population is from Bear Creek in Jackson County. It was controlled by ODA in 2006.

BIOLOGICAL INFORMATION

5. 2 **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: Frost and freezing temperatures significantly impact the growth of *Arundo*. It is dependant on adequate soil moisture for establishment and spread.

6. 3 **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: Viable seeds are not produced. Reproduction is by root fragments only.

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: Arundo is highly resistant to herbivory. In North America there is no significant grazing by animals or damage by indigenous insect. Insects for classical biological control are being introduced USDA-ARS. The first of four insects was released in Texas 2009. There is no evidence that biocontrol agents will impact spread.

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: Arundo is spread by moving water during flood events.

9. 4 **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: *Arundo* is not a popular ornamental in the nursery trade. *Arundo* is being evaluated as a possible biofuel. It is not a contaminant in agricultural commodities or other products.

IMPACT INFORMATION

10. 3 **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: Establishment could result in financial losses due to limitations on recreational activities, may increase property maintenance costs and increase costs for control on public lands.

11. 6 **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: Environmental impacts would likely occur in priority habitats and result in loss of plant, animal and insect species richness. Competition for water and increased stream temperatures may result from invasion.

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 impact.

CONTROL INFORMATION

13. 3 **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: Plant are large and showy. Access to habitat for control may be limited or difficult.

14. 2 **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. Control costs very expensive. Species may occur in large water bodies or river systems where containment and complete control are not achievable.

Comments: Glyphosate applications have proven to be effective.

Category Scores:

11 Geographic score (Add scores 1-4)
16 Biological Score (Add lines 5-8)
9 Impact Score (Add lines 9-11)
5 Control Score (Add Lines 12-13)

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

Risk Category: 55-90 = **A** 24-60 = **B** < 24 = unlisted.

This Risk Assessment was modified by ODA from the USDA-APHIS Risk Assessment for the introduction of new plant species
Vers. 3.6 12/2/2010

OREGON DEPARTMENT OF AGRICULTURE
NOXIOUS WEED RATING SYSTEM

Giant reed — *Arundo donax*
Common Name — **Scientific Name**

Points	**Category**

1. __2___ **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. __1___ **Reproduction and Capacity for spread** Circle the number that best describes
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
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
1. Widely distributed throughout the state in susceptible habitat
2. Regionally abundant in a part of the state, 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. __4___ **Ecological Impact** Circle the number that best describes, enter
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

__16__ TOTAL POINTS

Note: Noxious weeds are those non-native plants with total 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

Acknowledgments:

Authors: Glenn Miller and Tom Forney, Oregon Department of Agriculture

Editor: Tom Forney, Oregon Department of Agriculture

Photo credits: Bear Creek, Medford Oregon 2006, Ken French, Oregon Department of Agriculture; Lane County Planting 2008, Glenn Miller, Oregon Department of Agriculture; Aerial view of *Arundo* near Eagle Pass, Texas, along the Rio Grande, by John Goolsby, USDA-ARS

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