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Comments on ODA's proposed rule establishing a statewide control area for *Arundo donax* (OAR 603-052-1207 to 603-052-1212)

The Native Plant Society of Oregon opposes growing *Arundo donax* in Oregon. This plant is extremely aggressive, one of the fastest-growing weeds in the world. In areas where it becomes established, it alters river ecology and drastically reduces populations of native plants and animals. There is still a question whether *Arundo* will become invasive in Oregon's climate. However, if it grows well enough to be successful as a biofuel, it will become invasive. No regulations can be strong enough to prevent this plant from escaping cultivation when it is planted on a large scale for biofuel production. (PGE estimates as many as 50,000-90,000 acres could be needed to feed the Boardman power plant.) Once *Arundo* is present in Oregon on a large scale, the danger of its escaping is permanent, and this will certainly happen

with time. Future Oregonians will be saddled with the high cost of trying to slow the spread of *Arundo* whether or not it provides any benefit as an energy source.

The ODA proposed regulations for *Arundo donax* are not nearly adequate for containing a plant that the Global Invasive Species Database lists as one of the world's 100 worst invaders. One small piece of rhizome can start a fast-spreading infestation. This rule is adequate only to reduce the possibility that escaped pieces will be able to get established outside of the production fields, but in the case of this particular weed, it is necessary ensure that no pieces of rhizomes or other plant propagules can escape.

The following are problems where unjustified assumptions were made about the biology of *Arundo donax*, leading to an underestimation of its likelihood of escape.

1) The rule assumes that *Arundo donax* propagates only asexually by plant fragments. However, the species has a sexual propagation mode that can release a large quantity of seed. Even though this mode of propagation is rare for *Arundo*, the fact that it exists assures that it will occur under some conditions or by a small fraction of plants. In an area under cultivation for a number of years that includes thousands to millions of canes, a seed release is not impossible.

2) The rule assumes that the only mode of cane removal from cultivated fields is agricultural transport. Animal-mediated transport is also a way that plant materials spread naturally. Harvest of cane fragments by birds for nest materials is particularly relevant for *Arundo donax*.

3) The rule assumes that *Arundo donax* will grow only in wet ground in or adjacent to standing or running water. This premise is not supported by science. Fields in Oregon already have plants growing beyond the line of irrigation. USDA-APHIS notes that in Texas there are stands of *Arundo* that are half a mile wide – far beyond the wet zone near a waterway. Furthermore, soil desiccation during the dry season does not kill the plants; they just go dormant. Research on *Arundo* indicates that while drying can kill first-year plants, plants that have reached the second and third year can survive extended periods of severe drought, due to deep roots that can reach moisture at depth.

4) The rule exempts variegated varieties from the control. However, variegated varieties are no less invasive than the feral *Arundo donax*, and feral *Arundo* includes plants that are variegated. In 2008 researchers genetically fingerprinted 185 invasive clones sampled in 15 states across the United States and 7 cultivated clones. With the exception of simple mutations detected in four plants, *Arundo donax* exhibited a single multilocus DNA fingerprint indicating a single genetic clone. (Aquatic Botany, February 2008) We recommend that all varieties be completely phased out of the Oregon nursery trade.

5) The rule indicates “Where giant cane is invasive, primary dispersal is by

movement of rhizome and stem fragments in floods.” This, however is not entirely consistent with the scientific literature. While spread of rhizome and stem segments in floods has been common in some areas, Boland’s 2006 research indicates that layering is a major means of spread as is attempted mechanical removal of plants [Boland, J. M. (2006) *MADROÑO*, 53, 303–312]. Current fields in Oregon contain plants knocked down in harvest (Fredrickson field, see photo) that are re-sprouting and likely to root through the layering process. The suggestion of removing rhizomes with potato harvesters would be very likely to chop and spread rhizomes as observed by Boland in the Santa Margarita River in California.

Fredrickson field, 9-19-12

The following are more problems with the rule because, while the ideas are good, they are unenforceable:

1) A highly probable way for *Arundo donax* to be spread is through pieces of rhizome being broken off and transported by moving water. The rule prohibits growing *Arundo* near bodies of water, but the word “near” is so vague that the rule is unenforceable. The size of a body of water may change, and the roots of *Arundo* in a field will grow further and further out beyond the edges of a field the longer the field stays in production. Water may be present at certain times in places that are normally dry, including the 100-year flood plain. Floods will occur in the 100-year flood plain, which guarantees that the *Arundo* will eventually be spread to the Columbia River. One hundred years is not a long time in ecological terms. There is no way to keep all *Arundo donax* rhizomes away from moving water permanently because water must be close enough to the fields to provide irrigation.

2) A second highly probable way for *Arundo donax* to be spread is by being transported on agricultural equipment. The rule requires that equipment be cleaned free of soil and plant debris prior to leaving a field. However, with trucks, tractors and agricultural implements being moved from field to field hundreds of times, there is no way to ensure that all this equipment is completely clean, with no rhizome pieces concealed in attached soil. This is particularly a problem since there is no provision in the rule for inspection of equipment and there is no penalty to growers for failure to clean their equipment properly.

Native Plant Society of Oregon recommends changing the rule so that, at the very least, more thorough surveillance for escaped plants is implemented and monitoring of fields taken out of production continues for five years rather than just two. Since this will be more expensive, the \$2.00 per acre fee as well as the \$100.00 per acre bond that growers are required to post should be increased substantially. (It is fairly easy to spot a 20 foot *Arundo* plant but escapee plants could grow weakly at first like those at the Hermiston Experiment Station and these would be hard to spot among grasses and other flora – making monitoring much more difficult and expensive.) The ODA needs to include in its planning enough money to handle the

costly eradication of the *Arundo donax* infestations we are certain will occur in the future if growing this plant in Oregon is allowed to continue. In addition, the distance from water bodies where planting *Arundo donax* is prohibited should be defined in the rule at no less than the current setback of ¼ mile (preferably more). Because *Arundo* can hide deeply in the soil only to re-sprout years later, the monitoring and bond time should be extended to 5 years (rather than 2). Lastly, provisions in the rule should be included for at least spot-checking agricultural equipment for cleanliness and compliance with transport rules, and ODA should have authority to enforce it with a fine.

In essence, the Native Plant Society of Oregon feels that if we are going to grow *Arundo donax* in Oregon, we should do so under enforceable and effective regulations that do not shift the cost of monitoring and eradication to the taxpayers. There are some aspects to the current regulation that we favor.

- 1) Requiring permits for growing *Arundo* is essential to prevent planting in especially high-risk areas and so that we are aware of areas where escapes are probable (though the routes of escape through animal transport are highly unpredictable), as well as to fund monitoring efforts. Had we implemented a permit system prior to allowing planting of *Alyssum murale* and *Alyssum corsicum* we might have prevented escape and saved hundreds of millions of dollars that government is now spending to eradicate these species. Notably these plants were not predicted to be invasive prior to import.
- 2) Prohibiting the import of planting stock (rhizomes and plant segments) is essential to avoiding importation of other noxious invasive pests (such as nematodes). This provision also encourages Oregon industry.
- 3) Requiring *Arundo donax* to be baled and dried in the field (and the rules should require dessication to a nonviable level such as less than 5% moisture) and requiring transport in covered containers (though closed containers would be superior) is essential to reducing the risk of spreading the plant while transporting harvested *Arundo*. It is important to remember that current projections call for planting and harvesting this on an immense scale including a very dramatic up-scaling between 2014 and 2020. The quantity alone, along with the pressures of the huge increase in production, massively increases the risk of escape due to human error. Current fields in Oregon will require transport near high-risk riparian areas and, of course, the Boardman PGE plant has its own body of water.