Testimony in support of SB 789 and 790
Senate Committee on Environment and Natural Resources

March 29, 2017

Chair Dembrow and Committee Members,

This written testimony is to support SB 789, requiring a utility growing *Arundo donax L.* to file a bond and SB 790 requiring a meta-analysis on *Arundo* research. I will appear at the hearing and provide a summarized account.

My name is Judi Sanders. I am a Past President of the Native Plant Society of Oregon, a more than 50-year-old society that spans the state of Oregon with chapters across our eco-regions and nearly 1,000 members. I am also a former member of the Oregon Invasive Species Council. And perhaps most importantly, I am a native Oregonian, the descendent of wagon train pioneers who became farmers and ranchers in our beautiful state.

I am in favor of SB 789 for the following reasons:

1. Commercial growing and production of *Arundo donax L.* or other invasive species for biomass (or other purposes) represents a serious threat to our state.

Three points explain this serious threat: *A. donax* is highly invasive, the consequences of invasion are disastrous, and control is difficult and expensive.

First, ***Arundo donax L.* is a highly invasive plant**. The Global Invasive Species Database lists *A. donax* as one of the worst 100 invaders (see http://www.issg.org/database/species/ecology.asp?si=112). Ditomaso, et al., 2010, (writing in the peer reviewed journal *Environmental Science and Technology*) indicate that the three strongest predictors of invasiveness are whether there is a climate match, invasiveness elsewhere, and the amount in the environment. USDA-APHIS in its 2012 Risk Assessment for *Arundo donax L.*, identifies most of the state of Oregon as within the high invasion risk potential. The PGE supported growth projects near Boardman also show we have a climate match. Feral populations in southern Oregon near Talent also support this. As to the second criterion, the Global Invasive Species Database demonstrates that it is invasive elsewhere. Further, USDA-APHIS (2010) says, "it is invasive from northern California across the Southwestern and Southeastern United States to Maryland." They also note *Arundo donax L.* is naturalized as far north as South Bend, Indiana, and Coeur 'd'Alene, Idaho. In terms of the third criterion, although we do not currently have much of it in in our environment, if we plant hundreds or thousands of acres for biomass production (or other reasons), it will be invasive. Even the ODA's most recent risk assessment (2011, which dramatically understates the risk) admits that *Arundo donax* meets the criteria to be listed as a B class weed.

How does *Arundo donax* invade? The California Invasive Plant Council explains,

> "Once *Arundo* is present at a given location it grows and spreads laterally. Lateral spread occurs mainly through lateral rhizome growth and budding (forming new ramets or individuals in the asexual colonial *Arundo* stand) (Decruyenaere & Holt 2005). In addition, *Arundo* canes can drape/bend over and touch the soil surface, and if conditions are favorable (wet and/or sediment covering a node) a new bud may form (developing into a new ramet or individual) (Boland 2006)." (California Invasive Plant Council, 2011, pp. 24-25).

Arundo develops extensive masses of rhizomes and roots. A single clone can cover hundreds of acres (Pacific Island Ecosystems at Risk, 2011). USDA-APHIS (2010) indicates that rhizomes as deep as about 9.5 feet can develop new shoots. Rhizomes can be broken also leading to additional plants. Further, the plant can grow from stem segments and from layering. 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 that are re-sprouting and likely to root through the layering process. Removing rhizomes with potato harvesters (as Mr. Fredrickson in Boardman suggested during an Invasive Species Council fieldtrip to his field) would be very likely to chop and spread rhizomes as observed by Boland in the Santa Margarita River in California. The California Invasive Plant Council says, "Several studies have shown that almost any segment of stem or rhizome can sprout if it possesses an axillary bud (Boose and Holt 1999, Wijte et al. 2005, Else 1996)." (Ibid., p. 25). Citing one specific example, the Cal IPC indicates, "Else (1996) reported that of *Arundo* vegetative reproduction observed following dispersal by flooding on the Santa Margarita River in San Diego County, 57% was from rhizomes, 33% was from stem fragments, and for the remaining 7% the plant part that gave rise to the new plant could not be identified." (Ibid., p. 25).

Plant segments and rhizomes can gradually spread or can be spread through water events (broken irrigation pipes, flooding) or through animal action (such as birds nesting). This can widely disperse plants. In 2013 Tim Butler, Manager of ODA's Noxious Weeds Program, reported that blackberry plants had been found in the Hells Canyon area at elevations and in dry conditions where the plant was not thought capable of growing. Bird distribution is the most likely cause for this growth and birds could spread *Arundo* for nesting or other uses. *Arundo* can also be moved by agricultural transport or by humans who do not clean their clothing and shoes when leaving the fields. Although *Arundo* has not been known to produce fertile seeds in North American, Glasser & Glick (2012) report that plants are highly adaptable and that there have been a number of examples of so-called sterile plants becoming invasive. Townsend's cordgrass *(Spartina* x *townsendii)* was a sterile hybrid developed in England that after a number of decades began producing fertile plants.

The second reason for the threat is that **the consequences of invasion are disastrous.** There are many consequences to *Arundo* invasions because they create

dense monocultures (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). I will discuss three: ecosystem disruption, water flow restrictions and fires, and water wastage. Thus, the first consequence, is that *Arundo* **disrupts ecosystems and crowds out native plants and animals**. The California Invasive Plant Council says that *Arundo donax* often out-competes and replaces native vegetation in riparian areas with collateral effects on fauna -- the greatest effects are on birds, amphibians, and fish.

A second consequence of invasion is that ***Arundo* clogs waterways and promotes fire**. The California Invasive Plant Council indicates that *Arundo donax* increases both the likelihood and severity of fires, restructures river flows, and can cause substantial infrastructure damage in flooding events. A specific example of the fire effects was the Freeway Complex fire in Southern California in 2008 where over 30,000 acres burned and 187 residential structures were destroyed and 127 residential structures were damaged, all at costs in excess of $140 million (Orange County Sheriff's Department Emergency Management). The Hills for Everyone reports, "During the Freeway Complex Fire the flammable *Arundo* acted like a wick and carried the fire upstream from Brea toward Chino Hills." (http://www.hillsforeveryone.org/the-corridor/restoration/chino-hills-restoration/)

A third consequence of invasion is that ***Arundo* wastes enormous amounts of water**. Western Shasta Resource Conservation District in 2004 indicated it consumed up to 3 times the amount of native vegetation in California. The Washington State Noxious Weed Control Board, 2013 found:

> "*Arundo donax* consumes large amounts of water, taking this resource away from native plants, wildlife and other uses such as agriculture. Transpiration rates of *A. donax* are calculated to be 56,200 acre-feet of water per year on the Santa Ana River, compared to an estimated 18,700 acre-feet that would be consumed by native plants (Hoddle 2010). The Orange County Water District (2003) reports that this annual consumption of water by *A. donax* has an estimated value of $18 million (in Miller and Forney 2011). Watts and Moore (2011) studied stands of *A. donax* in south Texas and found they used approximately 8.8 +/- 0.9mm of water per day during a peak growing season and noted this rate of water use is high for plants. Another estimate of water use from Bell (1997) is that *A. donax* can use as much as 528 gallons of water per square meter. Large stands have also significantly increased water loss from underground aquifers in semiarid regions due to high evapotranspiration rates (DiTomaso and Healy 2003)." (http://www.nwcb.wa.gov/siteFiles/Draft_written_findings_arundo_donax.pdf)

Further, the Confederated Tribes of the Umatilla Indian Reservation Technical Analysis of *Arundo Donax*, November 7, 2012 noted that to supply sufficient water for *Arundo donax* to fuel Boardman would require displacement of several food crops or withdrawal of more water from the Columbia River. Withdrawal of more Columbia water "would jeopardize the existing balance between Columbia River flows for fish and wildlife", "would drive up demand for water in the Umatilla Basin, which is already over appropriated and would jeopardize water resources the

CTUIR has rights to under the Treaty of 1855." Finally, growing *A. donax* with additional Columbia River water "would create the absurd result whereby water that would otherwise generate electricity through three public Bonneville Power Administration dams on the Columbia would be pumped out of the river, at a significant energy cost, to grow *A. donax*, which must be planted, irrigated, harvested, processed, transported and torrefied (incurring multiple additional energy inputs) only then to be burned to produce electricity for a private company."

As though it were not enough that *Arundo donax* is highly invasive and that the consequences of invasion are disastrous, *Arundo* is also a serious risk because **control is difficult and expensive.** USDA-APHIS, (2010) concluded "Existing *A. donax* management options are ineffective, expensive, temporary, and have nontarget impacts." ODA's Risk Assessment says, "Control costs using glyphosate applications can reach $20,000 per hectare (Mack 2008)." (ODA, 2011, p. 7). However, the California Invasive Plant Council found the costs to be $25,000 per acre on average – more than twice as high as the costs cited by ODA (California Invasive Plant Council, 2011, p. 3). Actual costs ranged from $4700 to $64,000 an acre.

Why is it so costly to control and eradicate *Arundo donax L.?* Western Shasta Resource Conservation District explains some of the costs indicating that 12 foot plants are easy to see, but young plants in unexpected places are very difficult to detect and are often hidden under the canopy. Further, dense masses and deep rhizomes and roots make control challenging. Although fire and mowing can remove the aboveground portions of the plant, the rhizomes will re-sprout. Control and eradication require complete removal of all rhizomes, rhizome parts, and above ground plant parts (as noted above). Depending on the location of the plants this is likely to require removal by hand and mechanical removal, as well as multiple applications of herbicides. In a recent example in the Salinas River, approximately 1470 acres are invested with *Arundo*. In 2 years of efforts they have cleared only approximately 12 acres through mowing and sequential spraying (Zefferman & Robins, 2016). USDA-APHIS (2010) indicates

> "the most common herbicide used for *A. donax* is glyphosate, which may require continued application for 3 to 5 years for local control (citing Newhouser et al., 1999; Dudley, 2000). The herbicide imazypyr is also used for control along ditches and canals. However, chemical control methods are not feasible for large-scale infestations covering hundreds of river miles, such as the infestation in the Bi-National Rio Grande Basin. Broadcast applications of herbicides could have adverse impacts on nontarget vegetation if not carefully applied" (p. 13).

USDA-APHIS (2010) also reports that

> "mechanical methods of *A. donax* control include use of prescribed fire, heavy machinery (e.g. bulldozer, Hydro-axe,), hand-cutting, chipper, etc. Biomass removal may be necessary if there is a possibility that cut vegetation might create a flood hazard during high water events or prevent regrowth of native vegetation. Chipping is a costly method of removal. Equipment and labor are expensive relative to other forms of removal. . . Biomass removal by vehicle

> is expensive and generally not preferred due to its lack of cost-effectiveness. The use of heavy machinery, such as the Hydro-axe, is extremely expensive and slow, cutting only about 3 to 4 acres per day (Bell, 1997). Mechanical eradication with a backhoe has been ineffective because the rhizome fragments buried under the soil will readily re-sprout. Prescribed burning has not been successful because it cannot kill the rhizomes, and generally promotes *A. donax* regeneration over native riparian species" (p. 13-14).

In another example, after the 2008 Freeway Complex Fire (noted above) Hills for Everyone reports that *Arundo* in the canyon was burned to the ground allowing control efforts. Through cooperative efforts of 8 agencies and repeated spraying and biomass removal "only 2 small stands remain" (http://www.hillsforeveryone.org/the-corridor/restoration/chino-hills-restoration/). In other words, nearly seven years later, after a catastrophic fire, *Arundo* has not been complete eradicated.

The second main reason for supporting this bill is:

2. SB 789 is necessary to protect Oregon and its residents from the ravages of *Arundo donax L.* or other invasive species used for biofuel.

When *Arundo* escapes or if a commercial operation abandons its plantings the **People of Oregon should not have to pay the costs**. Although I'm a native Oregonian, my professional career sent me on a detour to Southern California for about three decades. In that time, I watched *Arundo* eclipse Carbon Canyon and a large camping area outside of Yorba Linda (that became an *Arundo* jungle). The California Invasive Plant Council reported that Orange County California, with a population about equivalent to Oregon but less than 1% of Oregon's landmass, spent $40 million the 15 years prior to 2011 to control *Arundo* and that they are still fighting the battle. Unless we plan to usurp kicker tax rebates in good times, we just don't have that kind of money to spend. We also cannot trust commercial producers to adequately monitor or clean their fields. Yellow Tuft Alyssum in Southern Oregon is a tragic example of this. Although years of research suggested it would not be invasive, Texas company, Viridian, ignored research and best agricultural practices and planted nine sites near O'Brien, Oregon in 2002 in a plant-based nickel-mining debacle. They abandoned the project and exited Oregon, leaving the plants to invade the tender serpentine soils of the area. By 2005 it was obviously invasive and in 2009 ODA listed it as a noxious weed. As of 2012 ODA and the federal government had spent $300,000 trying to eradicate it. In November of 2014, Dan Hilburn, the then Plant Programs Director of ODA reported that the fight against Yellow Tuft Alyssum was continuing. (OPB, 2012, http://www.opb.org/news/article/how-a-nickel-mining-scheme-brought-an-invasive-flo/; http://oregoninvasivespecies.blogspot.com/).

The current ODA rules are not sufficient to protect Oregon from the costs of *Arundo*. First, **the bond requirement is insufficient to meet the costs of eradication**. The bond requirement in OAR 603-052-1211 is a measly $100 per acre, far less that the costs of cleanup ODA indicated in its conservative and understated risk assessment ($20,000 per hectare) and dramatically less than the average cost of $25,000 per acre in California (or even the minimum cost of $4700 per acre in California). We should not have to pick up the tab for the balance.

Second, **the ODA rules have no enforcement means**. Even if the current ODA regulations had sufficient bonding requirements, ODA has no way to enforce this under their regulations.

Third, **the ODA rules rely entirely on ODA actions**. However, ODA is caught in the middle (as its rules recognize) between agricultural production interests and ecological interests – an issue I'm sure is very familiar to this committee. ODA's mission is:

- "Ensure food safety and provide consumer protection
- Protect the natural resource base for present and future generations of farmers and ranchers
- Promote economic development and expand market opportunities for Oregon agricultural products"
  (http://www.oregon.gov/ODA/AboutUs/Pages/Mission.aspx)

ODA's mission requires it to protect farmers, ranchers, and agricultural business—natural resources are protected only for the benefit of farm/ranch interests, not for the rest of Oregon.

Worthy of note, even if PGE abandons it's plans to plant *Arundo* to fuel the Boardman plant, another entity could step in at any time and try to do the same.

I am in favor of SB 790 for the following reasons:

The purpose of SB 790 is to provide an objective, scientifically valid, meta-analysis and risk analysis on *Arundo donax* specifically including research on new patented and patent-pending varieties designed for better survival in colder (and other climatic) conditions, and updating prior research reports.

ODA's last risk assessment was in 2011 and dramatically understated the risks because it failed to include discovered feral populations in Oregon and understated the costs of removal. [ODA's Risk Assessment says, "Control costs using glyphosate applications can reach $20,000 per hectare (Mack 2008)." (ODA, 2011, p. 7). However, the California Invasive Plant Council found the costs to be $25,000 per acre on average – more than twice as high as the costs cited by ODA (California

Invasive Plant Council, 2011, p. 3). Actual costs ranged ranged from $4700 to $64,000 an acre.] ODA is a hard-working agency in Oregon but it's primary purpose is to promote agriculture so such risk assessments tend to favor production rather than environmental protection.

The EDRR prepared for PGE by Vanessa Morgan and Mark Sytsma Center for Lakes and Reservoirs of Portland State University is a thorough analysis but was prepared for PGE and so not an objective assessment. Moreover, the document does not consider the risks created by newly patented and patent-pending varieties of *Arundo*.

Consequently, in order to make the best decisions on *Arundo*, a scientific study by an objective and neutral entity is appropriate. OSU's College of Agricultural Sciences, as the state's premier land grant university is an appropriate choice to complete such a study.

Thank you for your time and consideration.

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