Pest Risk Assessment for *Spartina* spp. in Oregon

Identity

Names: *Spartina* spp., including: (*Spartina densiflora*), (*Spartina alterniflora*), (*Spartina anglica*), (*Spartina patens*)

Taxonomic Position: order Cyperales, family Poaceae

Common Names: Invasive estuarine cordgrasses, including: denseflower cordgrass, smooth cordgrass, common cordgrass, saltmeadow cordgrass,

What is Spartina?

Perennial grasses native to South America, the southeastern coastal United States, and western Europe. (Global Invasive Species Database 2005).

Where Can it be Found?

Spartina invades coastal wetlands, estuarine habitats and saltmarshes along the Pacific Northwest shore, from California to British Columbia.

Look-alikes

Species of invasive *Spartina* vary in appearance. Depending on species, they may resemble native sedges (*Carex* spp.), or other grasses like saltgrass (*Distichlis spicata*), tufted hairgrass (*Deschampsia caespitosa*) or American dunegrass (*Leymus mollis*). Other noxious weeds such as the common reed (*Phragmites australis*) also look similar.

What Can You Do?

The best way to prevent invasion of this species in Oregon is early detection and rapid response. Learn how to recognize this species and watch for it when in coastal areas. If you find any Spartina species or a suspicious look-alike, note the location and contact OISC at their toll-free number 1-866-INVADER or report it online at http://oregoninvasiveshotline.org/.

Risk Rating Summary

Relative Risk Rating: VERY HIGH
Numerical Score: 9 (on a 1-9 scale)
Uncertainty: Low*

*The format the risk assessment follows was originally developed for forest pest species and, as such, fails to take into consideration characteristics of invasive species that may be unique to aquatic plants.

Recommendation

Spartina spp. are aggressive invaders with fast growth rates and multiple means of reproduction and transportation. They are established in both California and Washington, and small populations have been eradicated or are under current management in four Oregon locations. These characteristics put Oregon at great risk for future infestations. Coastal communities and visitors to areas of highest concern should stay alert for presence and regrowth or spread from known infestations.

Should *Spartina* become established in Oregon again, the likelihood of spread is also high, with potential for high levels of environmental impact on local biodiversity and shorebird habitat, and moderate economic impact on commercial shellfish farming and state tourism. The Oregon *Spartina* Response Plan outlines five strategies to prevent future establishment of *Spartina spp.* This includes reducing propagule pressure in the state whenever possible, educating and informing the public and related agencies, eradicating any infestations immediately upon detection, supporting current and ongoing eradication efforts, and coordinating efforts between agencies to manage the species cooperatively (Howard 2007). These strategies should decrease the likelihood of *Spartina* establishment.

Risk Rating Details

Establishment Potential is: HIGH
Justification:

Spartina spp. were historically introduced outside their native ranges for bank stabilization and erosion control, and to provide habitat and food for birds and grazers. *Spartina*, an ecosystem engineer in both its native and introduced ranges, grows at both low and high elevations in tidal salt marshes allowing it to drastically change the dynamics and function of those communities.

Spartina spp. are aggressive invaders with fast growth rates and many ways of reproducing and being transported (Global Invasive Species Database 2005). Nearly 60,000 acres of Oregon coastal habitat are now considered to be at risk for invasion due to these factors (Howard 2007). Along the west coast of the United States, four non-native species of Spartina have been introduced with subsequent establishment and spread. In California and Washington, *Spartina* was intentionally introduced for bank stabilization and marsh habitat restoration in the 1970's; certain infestations may date to the late 19th century when they were accidentally introduced via solid ballast or when used as packing material for oysters (Ayres 2004, Howard 2007). In Oregon, two of the four introduced species have been detected (*S. alterniflora* and *S. patens)* in four locations: Cox Island along the Siuslaw River, the Port of Siuslaw, Coos Bay and the Columbia River. Cooperative management between city, state, and nonprofit agencies is actively combating these infestations. One population was thought eradicated but 10 years later was found growing back in the same location; this highlights the need for long-termmonitoring of all (Howard 2007).

Spread Potential is: HIGH
Justification:
Current Oregon state laws designate Spartina as a Class A noxious weed and a Class T obnoxious weed. These laws classify them as illegal to import, sell, buy, grow, or transport into Oregon, and prioritizes them for management by the Oregon Department of Agriculture (Howard 2007). However, unintentional spread of *Spartina* can be facilitated by both human and non-human actions, including:
-ocean currents
- shipping, primarily via solid ballast
-packing materials associated with live seafood
-recreational boating activities
- -migratory waterfowl

Sexual and vegetative reproduction may produce propagules (seed or rhizome fragments) capable of surviving in a wide array of conditions; these often become established where there is little competition from native plants. Seedlings grow to be about 20 cm (8 in.), and produce flowers during their first growing season (NOAA 2009).

Eradication of Spartina can be achieved by a combination of several methods, but is challenging due to the larger amount of below ground biomass versus above ground biomass (EPA 2006). Manual and mechanical methods such as covering or digging, can be effective for small populations (Global Invasive Species Database 2005). On larger populations, the chemical Imazapyr has been tested as a safe and effective chemical agent, along with glyphosate to a lesser degree (Patten 2002). Any application of herbicides to aaquatic habitats must strictly

follow label instructions; controversy over such uses may make chemical treatments less desireable, but any delay in treatment has the potential to increase the likelihood of spread.

Economic Impact Potential is: MODERATE
Justification:
Economic impacts from *Spartina* infestations are predicted to be both direct and indirect. Oyster crop production and cultivation, a multi-million dollar per year industry, could be threatened when Spartina raises the level of intertidal flats and reduces the area of oyster habitat, resulting in job losses and economic de-stability to coastal communities. Other commercial activities concerning Dungeness crab and salmonid production could be adversely affected due to reduced eelgrass habitat which supports healthy crab and salmonid populations. Indirectly, recreational opportunities including sport and shell fishing, boating, beach access, wildlife viewing and other tourism activities could decrease, resulting in economic loss to Oregon, estimated at approximately $33 million per year (Howard 2007).

Environmental Impact Potential is: HIGH
Justification:
Once *Spartina* is established, it dramatically changes tidal marsh ecosystem functions. Sediments that normally move with the tides begin to accumulate around *Spartina* root systems, causing mudflats, which are important habitats for resident and migratory shorebirds, to become monocultures of *Spartina* (Global Invasive Species Database 2005). This may lead to severe changes in local hydrology and the habitats available to native species like eelgrass (*Zostera marina*)Spartina may also facilitate invasion by other detrimental species such as the green crab.

Management programs involving prolonged human presence in invaded areas could further disrupt ecological processes, disturb breeding, feeding, or resting wildlife, and trample sensitive plants or harm non-target species.

Human Health Impact is: NONE
Justification: *Spartina* spp. are grasses and pose no direct threats to human heath.

Bibliography

Ayres, Debra R., K. Zaremba, and D. R. Strong. 2004. Extinction of a Common Native Species by Hybridization with an Invasive Congener. Weed Technology. Vol. 18:1288-1291.

Daehler, Curtis C. and D. R. Strong. 1997. Hybridization Between Introduced Smooth Cordgrass (*Spartina alterniflora*; Poaceae) and Native California Cordgrass (*S. foliosa*) in San Francisco Bay, California, USA. American Journal of Botany. Vol. 84(5): 607-611.

EPA. 2006. Spartina Species. Region 10: the Pacific Northwest. Available from: http://yosemite.epa.gov/r10/ECOCOMM.NSF/B724CA698F60547988257057006936 50/24BA3C25A56AD971882574160055E44E?OpenDocument. [Accessed 21st February 2009].

Global Invasive Species Database. 2005. *Spartina alterniflora* (grass). Available from: http://www.issg.org/database/species/search.asp?sts=sss&st=sss&fr=1&x=0&y=0&sn=spartina&rn=&hci=-1&ei=-1&lang=EN. [Accessed 20th February 2009].

Global Invasive Species Database. 2005. *Spartina densiflora* (grass). Available from: http://www.issg.org/database/species/search.asp?sts=sss&st=sss&fr=1&x=0&y=0&sn=spartina&rn=&hci=-1&ei=-1&lang=EN. [Accessed 20th February 2009].

Howard, Vanessa, M. Pfauth, M. Sytsma, and D. Isaacson. 2007. Oregon Spartina Response Plan. Center for Lakes and Reservoirs, Portland State University. 80 p.

Lawler, Elizabeth P. 1992. *Discover Nature at the Seashore: Things to Know and Things to Do*. Stackpole Books, Mechanicsburg, PA. 224 p.

National Oceanic and Atmospheric Administration (NOAA), Marine Resources Research Institute, and Coastal Services Center. 2009. Ashepoo-Combahee-Edisto (ACE) Basin Species Gallery: Smooth Cordgrass. Available from: http://www.dnr.sc.gov/marine/mrri/acechar/specgal/smoothgr.htm#top. [Accessed 20th February 2009].

Patten, Kim. 2002. Smooth Cordgrass (*Spartina alterniflora*) Control with Imazapyr. Weed Technology 16(4):826-832.

Format

This pest risk assessment (PRA) is based on the format used by the Exotic Forest Pest Information System for North America. For a description of the evaluation process used, see Step 3 – Pest Risk Assessment under Guidelines at: <http://spfnic.fs.fed.us/exfor/download.cfm>

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