

Plant Assessment Form

For use with the “Criteria for Categorizing Invasive Non-Native Plants that Threaten Wildlands”
by the California Exotic Pest Plant Council and the Southwest Vegetation Management Association
(Warner et al. 2003)

Printable version, February 28, 2003
(Modified for use in Arizona, 07/02/04)

Table 1. Species and Evaluator Information

Species name (Latin binomial):	<i>Saccharum ravennae</i> (L.) L. (USDA 2005)
Synonyms:	<i>Erianthus ravennae</i> (L.) Beauv., <i>Erianthus ravennae</i> (L.) Beauv. var. <i>purpurascens</i> (Anderss.) Hack. (USDA 2005)
Common names:	Ravennagrass
Evaluation date (mm/dd/yy):	04/15/05
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Committee review date:	04/15/05
List date:	04/15/05
Re-evaluation date(s):	

Table 2. Scores, Designations, and Documentation Levels

Question		Score	Documentation Level	Section Scores	Overall Score & Designations
1.1	Impact on abiotic ecosystem processes	B	Other published material	<p>“Impact”</p> <p>Section 1 Score:</p> <p>B</p>	<p>“Plant Score”</p> <p>Overall Score:</p> <p>Medium</p> <p>Alert Status:</p> <p>Alert</p>
1.2	Impact on plant community	B	Observational		
1.3	Impact on higher trophic levels	U	No information		
1.4	Impact on genetic integrity	D	Other published material		
				<p>“Invasiveness”</p> <p><i>For questions at left, an A gets 3 points, a B gets 2, a C gets 1, and a D or U gets=0. Sum total of all points for Q2.1-2.7:</i></p> <p>13 pts</p> <p>Section 2 Score:</p> <p>B</p>	 <p>Something you should know.</p>
2.1	Role of anthropogenic and natural disturbance	B	Observational		
2.2	Local rate of spread with no management	B	Observational		
2.3	Recent trend in total area infested within state	B	Observational		
2.4	Innate reproductive potential	B	Observational		
2.5	Potential for human-caused dispersal	B	Observational		
2.6	Potential for natural long-distance dispersal	C	Other published material		
2.7	Other regions invaded	B	Other published material		
				<p>“Distribution”</p> <p>Section 3 Score:</p> <p>D</p>	
3.1	Ecological amplitude	D	Observational		
3.2	Distribution	D	Observational		

Table 3. Documentation

<p>Question 1.1 Impact on abiotic ecosystem processes</p>	<p>Score: B Doc'n Level: Other pub.</p>
<p>Identify ecosystem processes impacted: Alters fire dynamics, interferes with sunlight penetration to soil surface, and alters moisture and nutrient content of wetland or riparian habitat soils.</p>	
<p>Rationale: Ravennagrass plants produce densely tufted, perennial clumps with flowering stalks 2 to 4 meters tall (Welsh et al. 1987). Foliage of individual plants in Phoenix, Arizona can mature into clumps that are 1 meter tall and 1 to 1.5 meters in diameter with dozens of densely intertwined leaves (F. Northam, personal observation, 2005).</p>	
<p>Based on inferences from observations and published taxonomic information, ravennagrass appears capable of adding additional vegetation to streambank and moist floodplain plant communities, which could increase fire frequency and intensity in riparian areas.</p>	
<p>Large, multi-leafed clumps shade soil surfaces and disrupt natural light conditions near ground level; this shading may displace short stature native vegetation. Dense extensive infestations in small stream corridors will probably impede storm water flow, which will increase sediment and organic matter deposition. Root systems required to support ravennagrass plants may limit soil moisture and nutrient availability to native plants.</p>	
<p>Because ravennagrass has growth and habitat requirements similar to pampas grass (<i>Cortaderia sellona</i>), as described in DiTomaso (2000) and Gadcil et al. (1984), the Working Group inferred that similar impacts (fire and flood) are potential natural detriments if ravennagrass populations establish large infestations.</p>	
<p>Sources of information: See cited literature. Also considered personal observations of ravennagrass biology in Arizona by F. Northam (Weed Biology Consultant, Tempe, Arizona, 2005) and inference drawn from the literature.</p>	
<p>Question 1.2 Impact on plant community composition, structure, and interactions</p>	<p>Score: B Doc'n Level: Obs.</p>
<p>Identify type of impact or alteration: Reduce survival of natives plant seedlings; adds another another vegetative layer to riparian plant communities.</p>	
<p>Rationale: Aboitic impacts listed in question 1.1 may cause seedling mortality of native plants by reducing sunlight under or adjacent to ravennagrass canopies. Removal of soil moisture and nutrients by ravennagrass roots are also possible competitive impacts that may be harmful to native seedling growth and health of established native plants.</p>	
<p>Stevens (Undated) reported ravennagrass as highly competitive in Grand Canyon riparian zones, but gave no documentation. Makarick (1999) identified ravennagrass as highly competitive and capable of altering plant succession along Grand Canyon stream banks.</p>	
<p>Sources of information: See cited literature. Also see sources cited in question 1.1 and information in Stevens, L. Undated. Controlling the Aliens: Ravenna Grass in Grand Canyon. Grand Canyon River Guides, Flagstaff, Arizona. Available online at www.gcr.org/bqr/6-4/ravenna.htm; accessed April 14, 2005.</p>	
<p>Question 1.3 Impact on higher trophic levels</p>	<p>Score: U Doc'n Level: No info.</p>
<p>Identify type of impact or alteration: Unknown.</p>	
<p>Rationale: None.</p>	
<p>Sources of information: None.</p>	

Question 1.4 Impact on genetic integrity	<i>Score: D Doc'n Level: Other pub.</i>
Identify impacts: No known hybridization.	
Rationale: No other species of <i>Saccharum</i> in Arizona (Kearney and Peebles 1960).	
Sources of information: See cited literature.	

Question 2.1 Role of anthropogenic and natural disturbance in establishment	<i>Score: B Doc'n Level: Obs..</i>
Describe role of disturbance: Natural and human disturbance is involved in establishment.	
Rationale: Arizona populations occur in areas where unstable stream conditions (floods) or human activities cause ground disturbance including the Colorado River within the Grand Canyon (Makarick, 1999), a drainage ditch within a municipal park (F. Northam, personal observation, 2005), and along canal banks (Hitchcock 1950).	
Sources of information: See cited literature. Also considered personal observations of ravennagrass biology in Arizona by F. Northam (Weed Biology Consultant, Tempe, Arizona, 2005).	

Question 2.2 Local rate of spread with no management	<i>Score: B Doc'n Level: Obs.</i>
Describe rate of spread: New populations have been identified in southwestern Arizona during the past five years in riparian areas along the lower Colorado River.	
Rationale: Grand Canyon populations are subjected to a control program (Makarick 1999). A ditch bank population in a Tempe, Arizona park has doubled in three years, but another park population appears stable since a specimen was collected in 1966 (F. Northam, personal observation, 2005). Populations near Yuma, Arizona that were not present 10 years ago are now recorded on Bureau of Land Management land, but do not appear to be expanding rapidly (F. Northam, personal observation, 2005).	
Sources of information: See cited literature. Also considered personal observations of ravennagrass biology in Arizona by F. Northam (Weed Biology Consultant, Tempe, Arizona, 2005).	

Question 2.3 Recent trend in total area infested within state	<i>Score: B Doc'n Level: Obs.</i>
Describe trend: Some increase in area has been detected, but less than doubling in <10 years.	
Rationale: New populations of a few plants have been recorded in Colorado River area near Yuma within the last five years, but this is only a small increase in total range of this species across the state (F. Northam, personal observation, 2005). Colorado River populations in the Grand Canyon were identified in early 1980s (Stevens Undated). Ravennagrass was identified on the Virgin River in 1986 (http://seinet.asu.edu).	
Sources of information: Personal observations of ravennagrass biology in Arizona by F. Northam (Weed Biology Consultant, Tempe, Arizona, 2005), information in Stevens, L. (Undated. Controlling the Aliens: Ravenna Grass in Grand Canyon. Grand Canyon River Guides, Flagstaff, Arizona. Available online at www.gcr.org/bqr/6-4/ravenna.htm ; accessed April 14, 2005), and SEINet (Southwest Environmental Information Network), Arizona herbaria specimen database (available online at: http://seinet.asu.edu/collections ; accessed March 17, 2005).	

Question 2.4 Innate reproductive potential	<i>Score: B Doc'n Level: Obs..</i>
Describe key reproductive characteristics: Seeds (caryopses) are the only reported form of reproduction in wildlands.	
Rationale: Horticultural manuals note that ravennagrass readily self-sows in warm climates (Meyer 1975, Darke 1999). Answers to reproductive questions in Worksheet A are the results of ravennagrass observations in Canal Park, Tempe, Arizona (F. Northam, personal observation, 2005).	
Sources of information: See cited literature. Also considered personal observations of ravennagrass biology in Arizona by F. Northam (Weed Biology Consultant, Tempe, Arizona, 2005).	

Question 2.5 Potential for human-caused dispersal	<i>Score: B Doc'n Level: Obs.</i>
Identify dispersal mechanisms: This species is sold as an ornamental product across the southern U.S.	
Rationale: Numerous vendors can be accessed on internet websites and several garden websites give horticultural advice for growing ravennagrass including the Kemper Center for Home Gardening at Missouri Botanical Garden in St. Louis, Missouri (available online at: http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=A410).	
Even though this species has been in Arizona for over 50 years, it does not seem to be a popular garden plant. Ravennagrass needs continual watering during the hottest part of Arizona's growing season and is killed by extended frost periods. Therefore, current distribution indicates limited use and dispersal from human-caused activities.	
Sources of information: Personal observations by F. Northam (Weed Biology Consultant, Tempe, Arizona, 2005).	

Question 2.6 Potential for natural long-distance dispersal	<i>Score: C Doc'n Level: Other pub.</i>
Identify dispersal mechanisms: Wind.	
Rationale: Caryopses are enclosed in 3.5 to 7 mm spikelets that have long silky hairs (Baldwin et al. 2002). When spikelets disarticulate from panicles, spikelet hairs enable dispersal by air currents. Natural long distance dispersal would require a strong wind phenomenon, such as large whirlwinds to keep spikelets airborne for one kilometer (F. Northam, personal observation, 2005).	
Sources of information: See cited literature. Also considered personal observations of ravennagrass biology in Arizona by F. Northam (Weed Biology Consultant, Tempe, Arizona, 2005).	

Question 2.7 Other regions invaded	<i>Score: B Doc'n Level: Other pub.</i>
Identify other regions: Infests two other minor ecological types that exist in Arizona , but are not yet invaded in Arizona: Mohave desertscrub in Utah and Sonoran desertscrub in California.	
Rationale: Occurs on open slopes at 610 to 910 feet in Mohave desertscrub, Washington County, Utah (Welsh et al. 1987). Occurs in Lower Colorado subdivision Sonoran desertscrub at the Algonones Dunes east of Brawley, California on Bureau of Land Management land (Calflora 2005).	
Sources of information: See cited literature. Also considered information from the Calflora plant species occurrence database (available at: http://www.calflora.org/species/ ; accessed 2005).	

Question 3.1 Ecological amplitude	<i>Score: D Doc'n Level: Obs.</i>
Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: One minor ecological type: Sonoran riparian.	
Rationale: New populations of a few plants have been recorded in Colorado River area near Yuma, Arizona within the last five years (F. Northam, personal observation, 2005). Colorado River populations in the Grand Canyon were identified in early 1980s (Stevens Undated). Ravennagrass was identified on the Virgin River in 1986 (SEINet 2005).	
The oldest ravennagrass herbarium specimen for Arizona is 1942 from the Arizona Canal (Gould 1973). Non-wildland and wildland collections in Arizona that are escapes from horticultural situations were observed in sites having water during the hot, dry months of summer (SEINet 2005).	
Ravennagrass is an ornamental species with limited distribution in Arizona wildlands. Plants that have escaped from horticultural settings have been present in Arizona for at least 60 years, but few escapes have established in wildlands. Summer drought in desert regions and winter temperatures at elevations above 5000 feet limit establishment and population maintenance in Arizona.	

The population in northwest Tempe, Arizona occurs along a desert wash that has water flowing through it for at least eight months of the year due to urban runoff from a city water-treatment plant and lawn/garden irrigation. Ravennagrass plants grow at the margin of the water’s edge during low flow conditions; as a result, they are frequently inundated for a time when flash flood events occur. They apparently can tolerate some degree of flooding, but do not require standing water to survive (F. Northam, personal observation, 2005).

Sources of information: See cited literature. Also considered personal observations of ravennagrass biology in Arizona by F. Northam (Weed Biology Consultant, Tempe, Arizona, 2005), information in Stevens, L. (Undated. Controlling the Aliens: Ravenna Grass in Grand Canyon. Grand Canyon River Guides, Flagstaff, Arizona. Available online at www.gcr.org/bqr/6-4/ravenna.htm; accessed April 14, 2005), and SEINet (Southwest Environmental Information Network), Arizona herbaria specimen database (available online at: <http://seinet.asu.edu/collections>; accessed March 17, 2005).

Question 3.2 Distribution	<i>Score: D Doc'n Level: Obs.</i>
Describe distribution: Currently known ravennagrass infestations in Arizona are limited to wet areas along streams, rivers and riparian areas adjacent to rivers and streams (SEINet 2005; F. Northam, personal observation, 2005).	
Rationale: Known locations of ravennagrass in Arizona do not occupy large tracts of land. Most sites are composed of several plants covering a few dozen square meters. Large infestations (found in Colorado River floodplain areas in Grand Canyon) cover only a few acres.	
Sources of information: Personal observations of ravennagrass biology in Arizona by F. Northam (Weed Biology Consultant, Tempe, Arizona, 2005) and SEINet (Southwest Environmental Information Network), Arizona herbaria specimen database (available online at: http://seinet.asu.edu/collections ; accessed March 17, 2005).	

Worksheet A. Reproductive Characteristics

Complete this worksheet to answer Question 2.4.

Reaches reproductive maturity in 2 years or less	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	1 pt.
Dense infestations produce >1,000 viable seed per square meter	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	2 pt.
Populations of this species produce seeds every year.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	1 pt.
Seed production sustained for 3 or more months within a population annually	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	1 pt.
Seeds remain viable in soil for three or more years	<input type="checkbox"/> Yes	<input type="checkbox"/> No	0 pt.
Viable seed produced with <i>both</i> self-pollination and cross-pollination	<input type="checkbox"/> Yes	<input type="checkbox"/> No	0 pt.
Has quickly spreading vegetative structures (rhizomes, roots, etc.) that may root at nodes	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	1 pt.
Fragments easily and fragments can become established elsewhere	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	2 pt.
Resprouts readily when cut, grazed, or burned	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	1 pt.
Total pts: 5 Total unknowns: 2			
Score : B			

Note any related traits:

Worksheet B. Arizona Ecological Types

(sensu Brown 1994 and Brown et al. 1998)

Major Ecological Types	Minor Ecological Types	Code*
Dunes	dunes	
Scrublands	Great Basin montane scrub	
	southwestern interior chaparral scrub	
Desertlands	Great Basin desertscrub	
	Mohave desertscrub	
	Chihuahuan desertscrub	
	Sonoran desertscrub	
Grasslands	alpine and subalpine grassland	
	plains and Great Basin shrub-grassland	
	semi-desert grassland	
Freshwater Systems	lakes, ponds, reservoirs	
	rivers, streams	
Non-Riparian Wetlands	Sonoran wetlands	
	southwestern interior wetlands	
	montane wetlands	
	playas	
Riparian	Sonoran riparian	D
	southwestern interior riparian	
	montane riparian	
Woodlands	Great Basin conifer woodland	
	Madrean evergreen woodland	
Forests	Rocky Mountain and Great Basin subalpine conifer forest	
	montane conifer forest	
Tundra (alpine)	tundra (alpine)	

*A means >50% of type occurrences are invaded; B means >20% to 50%; C means >5% to 20%; D means present but ≤5%; U means unknown (unable to estimate percentage of occurrences invaded).

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