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)**:**	*Eragrostis lehmanniana* Nees (USDA 2005)
Synonyms:	None identified in USDA (2005)
Common names:	Lehmann lovegrass
Evaluation date (mm/dd/yy)**:**	04/08/03
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Committee review date:	07/10/03
List date:	07/10/03
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	**A**	Reviewed scientific publication	**"Impact"** **Section 1 Score:** **A**	**"Plant Score"** **Overall Score:** **High** **Alert Status:** **None**
1.2	Impact on plant community	**A**	Reviewed scientific publication		
1.3	Impact on higher trophic levels	**B**	Reviewed scientific publication		
1.4	Impact on genetic integrity	**D**	Reviewed scientific publication		
2.1	Role of anthropogenic and natural disturbance	**B**	Reviewed scientific publication	**"Invasiveness"** *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:* **16 pts** **Section 2 Score:** **B**	
2.2	Local rate of spread with no management	**A**	Observational		
2.3	Recent trend in total area infested within state	**B**	Reviewed scientific publication		
2.4	Innate reproductive potential	**A**	Reviewed scientific publication		
2.5	Potential for human-caused dispersal	**A**	Reviewed scientific publication		
2.6	Potential for natural long-distance dispersal	**B**	Reviewed scientific publication		
2.7	Other regions invaded	**C**	Observational		RED FLAG **NO** Something you should know.
3.1	Ecological amplitude	**A**	Observational	**"Distribution"** **Section 3 Score:** **A**	
3.2	Distribution	**A**	Observational		

Table 3. Documentation

Question 1.1 Impact on abiotic ecosystem processes *Score:* **A** *Doc'n Level:* **Rev. sci. pub.**
Identify ecosystem processes impacted: Increased fire return interval and decreased light availability.
Rationale: Lehmann lovegrass drastically changes the fire cycle in a manner that favors the increase of Lehmann lovegrass and the decrease of native grasses. Along with changing the fire regime, dense stands are light-limiting; these factors can change soil temperatures.
Sources of information: See Humphrey (1958), Cable (1971), and McPherson et al. (2001).

Question 1.2 Impact on plant community composition, structure, and interactions *Score:* **A** *Doc'n Level:* **Rev. sci. pub.**
Identify type of impact or alteration: Decreases plant species richness, alters species composition, and alters stand structure.
Rationale: Lehmann lovegrass has the ability to form dense (50 to 80% by biomass) stands that affect both species composition and stand structure. Dense stands are light limiting and these factors can lead to a change in plant species composition. Decreases species richness.
Sources of information: See Humphrey (1958), Cable (1971), Bock et al. (1986), Biedenbender and Roundy (1996), Anable (1990), Anable et al. (1992), McClaran and Anable (1992), Angell and McClaran (2001), and McPherson et al. (2001).

Question 1.3 Impact on higher trophic levels *Score:* **B** *Doc'n Level:* **Rev. sci. pub.**
Identify type of impact or alteration: Decreased grasshopper species diversity and alteration of bird and small mammal diversity.
Rationale: The research on the effects of Lehmann lovegrass on higher trophic levels is slim; however, the research that has been done suggests that Lehmann lovegrass can have a profound effect on species diversity. In the case of small mammals and birds, research suggests that these animals respond to stand structure more than species composition, so dense Lehmann lovegrass stands can support those animals who associate with dense cover.
Sources of information: See Bock et al. (1986), Medina (1988), and McPherson et al. (2001). Also considered inference based on the literature.

Question 1.4 Impact on genetic integrity *Score:* **D** *Doc'n Level:* **Rev. sci. pub.**
Identify impacts: None
Rationale: Lehmann lovegrass reproduces apomicticly (produces maternal clones via seed production) with occasional sexual events with other tetraploid Lehmann plants. Although a number of native *Eragrostis* occur in Arizona (Kearney and Peebles 1960), it is safe to say that Lehmann lovegrass is not hybridizing with natives based on its ploidy number and recent genetic analysis.
Sources of information: See cited literature; also see Voigt et al. (1992), Burson and Voigt (1996), and Schussman (2002).

Question 2.1 Role of anthropogenic and natural disturbance in establishment *Score:* **B** *Doc'n Level:* **Rev. sci. pub.**
Describe role of disturbance: Lehmann lovegrass increases after disturbances such as fire, drought, road construction. Anything that opens up ground that was previously covered by plants.
Rationale: Lehmann lovegrass increases most quickly post-disturbance; however, once established Lehmann lovegrass continues to spread into new areas with speed of spread connected to disturbance. For example Lehmann lovegrass will spread rapidly following a fire to all areas burned. However, Lehmann lovegrass will also spread at a moderate pace following a drought and the die off of native grasses.

Sources of information: See Cable (1971), Anable (1990), Anable et al. (1992), McClaran and Anable (1992), Angell and McClaran (2001), and Geiger et al. (2003).

Question 2.2 Local rate of spread with no management	*Score:* **A** *Doc'n Level:* **Obs.**
Describe rate of spread: Increases rapidly, doubling in <10 years.	
Rationale: In areas where Lehmann lovegrass seed is present and the habitat is ideal, it will spread quickly.	
Sources of information: See Cable (1971), Cox and Ruyle (1986), Anable et al. (1992), McClaran and Anable (1992), Angell and McClaran (2001), and Geiger et al. (2003).	

Question 2.3 Recent trend in total area infested within state	*Score:* **B** *Doc'n Level:* **Rev. sci. pub.**
Describe trend: Since its introduction state-wide between 1930 and 1960, Lehmann lovegrass has spread from the original 69,000 ha seeded to an additional 79,000 ha by 1984. Current attempts to identify its distribution suggest a larger area of spread.	
Rationale: In 1986 researchers thought that we had seen the limits of Lehmann lovegrass spread. We now know those limits to be false and have reason to believe that the plasticity of this plant is greater than has been currently documented and hence it should still be considered a spreading threat.	
Sources of information: See Cable (1971), Cox and Ruyle (1986), Anable et al. (1992), McClaran and Anable (1992), Angell and McClaran (2001), and Geiger et al. (2003).	

Question 2.4 Innate reproductive potential	*Score:* **A** *Doc'n Level:* **Rev. sci. pub.**
Describe key reproductive characteristics: Lehmann lovegrass produces lots of seeds multiple times in one growing season. These seeds are viable for long periods of time, and are the product of no pollination, self pollination, and rare cross pollination. The plant re-sprouts following grazing.	
Rationale: Because of the above mentioned reproductive characteristics, Lehmann lovegrass has high reproductive potential.	
Sources of information: See Crider (1945), Voigt et al. (1992), Burson and Voigt (1996), and Schussman (2002).	

Question 2.5 Potential for human-caused dispersal	*Score:* **A** *Doc'n Level:* **Rev. sci. pub.**
Identify dispersal mechanisms: Cars on roadways and deliberate seeding.	
Rationale: Due to the original planting of Lehmann lovegrass along all of the major roadways in Arizona by the Arizona Department of Transportation, the mere act of driving a car transports seed to new areas and furthers Lehmann lovegrass spread. This is especially evident on ranches where Lehmann lovegrass was not seeded, but roadsides are the first site of colonization. Also there are still occasional seedings of Lehmann lovegrass for revegetation, which although rare is a threat. It is still seeded for livestock forage and for soil protection on disturbed sites such as mine spoils and highway rights-of-way (Biedenbender and Roundy 1996).	
Sources of information: See cited literature; also see Cable (1971), Cox and Ruyle (1986), Anable et al. (1992), McClaran and Anable (1992), Angell and McClaran (2001), and Geiger et al. (2003). In addition, considered information from a personal communication with D. Robinett (Rangeland Management Specialist, U.S. Department of Agriculture, Natural Resources Conservation Service, Tucson, Arizona, 2002).	

Question 2.6 Potential for natural long-distance dispersal	*Score:* **B** *Doc'n Level:* **Rev. sci. pub.**
Identify dispersal mechanisms: Wind.	
Rationale: Lehmann lovegrass is a small seed that can be easily carried by wind. However, few animals eat it because of its small size.	

Sources of information: See Cable (1971), Cox and Ruyle (1986), Anable et al. (1992), McClaran and Anable (1992), Angell and McClaran (2001), and Geiger et al. (2003). In addition, considered information from a personal communication with D. Robinett (Rangeland Management Specialist, U.S. Department of Agriculture, Natural Resources Conservation Service, Tucson, Arizona, 2002).

Question 2.7 Other regions invaded	*Score:* **C** *Doc'n Level:* **Obs.**
Identify other regions: New Mexico and Texas.	
Rationale: It has only invaded similar desert grassland/desert scrub ecosystems. Minimum growth temperature is 3°C, it's drought tolerant, and is adapted to coarse and medium textured soils (Uchytil 1992). It occurs at elevation ranges of 800 to 1500 meters, with annual precipitation from approximately 250 to 500mm, and has a high tolerance for caliche and dolomite (Cox and Ruyle 1986).	
Sources of information: See cited literature; also see Crider (1945) and Schussman (2003).	

Question 3.1 Ecological amplitude	*Score:* **A** *Doc'n Level:* **Obs.**
Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: Introduced in 1937 at the Santa Rita Experimental Range and then subsequently along roadsides and pasture in New Mexico and Texas. Introduced to Arizona in 1906 to Pima County (SEINet 2004).	
Rationale: Lehmann lovegrass currently occupies desert scrub, semi-desert grassland, and madrean oak woodland areas.	
Sources of information: See Schussman (2002). Also considered information from SEINet (Southwest Environmental Information Network), Arizona herbaria specimen database (available online at: http://seinet.asu.edu/collections; accessed January 2004).	

Question 3.2 Distribution	*Score:* **A** *Doc'n Level:* **Obs.**
Describe distribution: Widespread through southeastern Arizona and gaining area in higher elevation cooler climates throughout the rest of the state.	
Rationale: Once it has seeded in an area it has the potential to establish a population.	
Sources of information: See Cox and Ruyle (1986) and Geiger et al. (2003).	

Worksheet A. Reproductive Characteristics

Complete this worksheet to answer Question 2.4.

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

Total pts: 9 Total unknowns: 0
Score : A

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	**B**
	Sonoran desertscrub	**C**
Grasslands	alpine and subalpine grassland	
	plains and Great Basin shrub-grassland	**B**
	semi-desert grassland	**A**
Freshwater Systems	lakes, ponds, reservoirs	
	rivers, streams	
Non-Riparian Wetlands	Sonoran wetlands	
	southwestern interior wetlands	
	montane wetlands	
	playas	
Riparian	Sonoran riparian	
	southwestern interior riparian	
	montane riparian	
Woodlands	Great Basin conifer woodland	
	Madrean evergreen woodland	**C**
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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