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)**:**	*Asphodelus fistulosus* L. (USDA 2005)
Synonyms:	*Asphodelus tenuifolius* Cav. (USDA 2005)
Common names:	Onionweed, pink asphodel
Evaluation date (mm/dd/yy)**:**	04/22/05
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List committee members:	P. Fenner, J. Hall, L. Making, F. Northam, T. Olson, G. Russell
Committee review date:	04/22/05
List date:	04/22/05
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	**C**	Observational	**"Impact"** **Section 1 Score:** **C**	**"Plant Score"** **Overall Score:** **Low** **Alert Status:** **None**
1.2	Impact on plant community	**C**	Observational		
1.3	Impact on higher trophic levels	**U**	No information		
1.4	Impact on genetic integrity	**D**	Other published material		
2.1	Role of anthropogenic and natural disturbance	**B**	Observational	**"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:* **12 pts** **Section 2 Score:** **B**	
2.2	Local rate of spread with no management	**U**	No information		
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	**A**	Observational		
2.6	Potential for natural long-distance dispersal	**U**	No information		
2.7	Other regions invaded	**A**	Observational		RED FLAG **NO** Something you should know.
3.1	Ecological amplitude	**D**	Observational	**"Distribution"** **Section 3 Score:** **D**	
3.2	Distribution	**D**	Observational		

Table 3. Documentation

Question 1.1 Impact on abiotic ecosystem processes *Score:* **C** *Doc'n Level:* **Obs.**
Identify ecosystem processes impacted: Alters nutrient and moisture content of soil.
Rationale: Growth of onionweed plants results in tufts of leaves originating from plant crowns supported by dense fibrous root systems. In other words, their foliage growth form resembles a 20 to 30 cm tall bunchgrass. Well developed plants (second growing season) produce root systems that can impair growth of other plants up 3 to 4 cm around onionweed crowns (F. Northam, personal observations, 2005). Total surface area dominated can be at least 200 to 300 cm^2 per mature plant (a 6 x 6 inch area is approximately 230 cm^2). As a result, it is assumed natural soil productivity is altered by removal of nutrients and moisture. Likewise, soil near basal areas of onionweed is densely shaded due to the thick mats of leaves attached to onionweed crowns that probably intercept a major portion of available sunlight immediately surrounding these weeds. Observations of onionweed growth habits suggest that dense stands of this species cause at least minor alterations of soil moisture, mineral nutrients, and sunlight intensity.
Sources of information: Personal observations of onionweed populations near Tombstone, Arizona by F. Northam (Weed Biology Consultant, Tempe, Arizona, 2005). Score based on inference drawn from the preceding observations.

Question 1.2 Impact on plant community composition, structure, and interactions *Score:* **C** *Doc'n Level:* **Obs.**
Identify type of impact or alteration: Reduce establishment of native plant seedlings.
Rationale: Abiotic impacts listed in question 1.1 may reduce seedling establishment of other species because onionweed roots can remove soil moisture and nutrients that would normally be available for native seedling growth. Also physical space occupied by onionweed foliage may block sunlight to the point of inhibiting seedling growth of other plants. Parsons (1973) quoted rancher estimates of 75% depletion of forage in southern Australian grazing lands infested by dense populations of onionweed, but this weed does not intrude into areas with abundant perennial plant roots near the surface (i.e. grasslands). Recovery of palatable and productive grazing species was slow in southern Australian rangelands dominated by onionweed (Stretch 2002).
Sources of information: See cited literature. Score based on inference drawn from the literature.

Question 1.3 Impact on higher trophic levels *Score:* **U** *Doc'n Level:* **No info.**
Identify type of impact or alteration: No information.
Rationale: No information.
Sources of information: None.

Question 1.4 Impact on genetic integrity *Score:* **D** *Doc'n Level:* **Other pub.**
Identify impacts: No known hybridization.
Rationale: No native species of *Asphodelus* occur in Arizona (Kearney and Peebles 1960).
Sources of information: See cited literature.

Question 2.1 Role of anthropogenic and natural disturbance in establishment *Score:* **B** *Doc'n Level:* **Obs.**
Describe role of disturbance: Natural or anthropogenic disturbance is necessary for onionweed establishment.
Rationale: Intense grazing and trampling (as around livestock watering facilities or along animal trails) can cause bare ground where onionweed may establish. Natural disturbance due to periodic floods in normally dry washes create open, vegetation-free soil conditions suitable for onionweed

colonization. Grazing disturbance has been noted as an important factor for onionweed encroachment into Australian grazing lands (Parsons 1973, Stretch 2002). An onionweed population in southeast Tombstone has moved from a highway right-of-way into a native rangeland wash adjacent to Highway 87 (F. Northam, personal observations, 2005)
Sources of information: See cited literature. Also considered personal observations of onionweed populations near Tombstone, Arizona by F. Northam (Weed Biology Consultant, Tempe, Arizona, 2005).

Question 2.2 Local rate of spread with no management *Score:* **U** *Doc'n Level:* **No info.**
Describe rate of spread: Several populations of onionweed have been confirmed during the past two years in roadside rights-of-way, landscaped urban sites and private flower gardens (Russell 2004), but only one site has had verified movement into wildlands (see question 2.1). The local rate of spread, however, at this site has not been documented.
Rationale: Only one site has had verified movement into wildlands (see question 2.1). The local rate of spread, however, at this site has not been documented; as a result, no information is available to predict how rapidly Arizona wildland populations of this species will expand in the absence of control measures.
Sources of information: See cited literature. No information available in regard to rate of spread with no management.

Question 2.3 Recent trend in total area infested within state *Score:* **B** *Doc'n Level:* **Obs.**
Describe trend: Increasing, but not doubling in <10 years.
Rationale: Arizona Department of Agriculture observation and abatement records at eight sites from October 1989 to March 1994 indicated onionweed presence in nurseries and gardens in Cochise, Maricopa and Pima Counties (F. Northam, personal observations, 2000–2003). Since 2001 many onionweed sites have been verified including additional infestations in Santa Cruz and Yavapai Counties (Russell 2004; F. Northam, personal observations, 2005); however, only one site indicates dispersal into natural plant communities.
Sources of information: See cited literature. Also considered personal observations of (1) onionweed distribution in Arizona by F. Northam (while acting as the Arizona Department of Agriculture Noxious Weed Program Coordinator, 2000–2003) and (2) onionweed populations near Tombstone, Arizona by F. Northam (Weed Biology Consultant, Tempe, Arizona, 2005).

Question 2.4 Innate reproductive potential *Score:* **B** *Doc'n Level:* **Obs.**
Describe key reproductive characteristics: Herbaceous perennial, but reproduces only by seed.
Rationale: See Worksheet A. Answers based on field observations at Tombstone, Arizona (F. Northam, personal observations, 2005).
Sources of information: Personal observations of onionweed populations near Tombstone, Arizona by F. Northam (Weed Biology Consultant, Tempe, Arizona, 2005).

Question 2.5 Potential for human-caused dispersal *Score:* **A** *Doc'n Level:* **Obs.**
Identify dispersal mechanisms: Human dispersal occurs.
Rationale: Onionweed seed are spread: (1) along transportation corridors by vehicles, road maintenance activities and mining gravel for building material (Russell 2004) and (2) through dispersal by home gardeners as suggested by numerous residential sites identified in Tombstone and Serra Vista (Russell 2004).
Sources of information: See cited literature. Score based on inference drawn from the literature.

Question 2.6 Potential for natural long-distance dispersal *Score:* **U** *Doc'n Level:* **No info.**
Identify dispersal mechanisms: No reports of animal or abiotic dispersal mechanisms found during this investigation.
Rationale: No information.
Sources of information: None

Question 2.7 Other regions invaded *Score:* **A** *Doc'n Level:* **Obs.**
Identify other regions: Western Australia's southern rangelands.
Rationale: Even though onionweed is widely distributed in Australia, its injurious status is expressed mostly in western Australia rangelands where disturbance by human activities remove native plant communities (Parsons 1973, Stretch 2002). Since onionweed has moved into Chihuahuan desertscrub at Tombstone, these Australian observations support an inference that three climatically comparable Arizona minor ecological types may be potential habitat for onionweed including: plains and Great Basin grassland, semi-desert grassland, and Sonoran desertscrub (upper elevations only). Washes, arroyos, and ephemeral stream channels in these types are probably the most susceptible habitats because coarse textured soils are favored colonizing sites in Australia.
Sources of information: See cited literature. Score based on inference drawn from the literature.

Question 3.1 Ecological amplitude *Score:* **D** *Doc'n Level:* **Obs.**
Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: One minor ecological type: Chihuahuan desertscrub.
Rationale: Arizona's oldest herbarium specimen (April 1980) was described as an escape at Desert Botanical Garden, Phoenix, Arizona. A similar collection in 2002 noted onionweed as once cultivated at Desert Botanical Garden (SEINet 2005). These records indicate a 25-year presence in Arizona as a cultivated species. Onionweed distribution as an ecological pollutant in Australia is limited to rangelands that receive winter rainfall in the 10 to 16 inch precipitation zones (Parsons 1973). Furthermore, plant community disturbance by grazing activities or other human-induced vegetation removal that severely reduced native plant cover was necessary for onionweed to encroach into those grazing lands (Stretch 2002). Colonies on light sandy soils establish the highest densities of onionweed populations (Parsons 1973). Because, however, onionweed has colonized roadsides, landscaped sites, and residential gardens from 1700 to 4700 feet, this weed is not limited to coarse textured desert soils (Russell 2004, F. Northam, personal observations, 2000–2003).
Sources of information: See cited literature. Also considered information from SEINet (Southwest Environmental Information Network), Arizona herbaria specimen database (available online at: http://seinet.asu.edu/collections; accessed 2005) and personal observations of onionweed distribution in Arizona by F. Northam (while acting as the Arizona Department of Agriculture Noxious Weed Program Coordinator, 2000–2003).

Question 3.2 Distribution *Score:* **D** *Doc'n Level:* **Obs.**
Describe distribution: As an escaped species into Arizona's wildlands, only one small site (<5 acres) in Chihuahuan desertscrub is known (Russell 2004, F. Northam, personal observations, 2005).
Rationale: Current distribution in Arizona ranges from Sedona in Yavapai to Hereford in Cochise County, approximately eight miles north of the Arizona-Mexico border. Herbarium and field observations indicate onionweed survives at elevations above 1000 feet to about nearly 5000 feet. Dozens of infestations are documented on private home sites, rights-of-way, and municipal lands.

With a 20+ year history in Arizona, however, onionweed escape into wildlands is at present extremely slow.
Sources of information: See cited literature. Also considered information from SEINet (Southwest Environmental Information Network), Arizona herbaria specimen database (available online at: http://seinet.asu.edu/collections; accessed 2005) and personal observations of onionweed populations near Tombstone, Arizona by F. Northam (Weed Biology Consultant, Tempe, Arizona, 2005).

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**	**0 pt.**
Seeds remain viable in soil for three or more years	**Yes**	**No**	**0 pt.**
Viable seed produced with *both* self-pollination and cross-pollination	**Yes**	**No**	**0 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: 5 Total unknowns: 3		
	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	**D**
	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	
	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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