

## 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**

<b>Species name</b> (Latin binomial):	<i>Erodium cicutarium</i> (L.) L’Hér. ex Ait. (USDA 2005)
<b>Synonyms:</b>	None identified in USDA (2005).
<b>Common names:</b>	Redstem filaree, cutleaf filaree, redstem stork’s bill, heron’s bill, cranesbill, pin-clover, pingrass, alfilaria
<b>Evaluation date</b> (mm/dd/yy):	05/08/03
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<b>Committee review date:</b>	07/10/03 and 09/19/03
<b>List date:</b>	09/19/03
<b>Re-evaluation date(s):</b>	

**Table 2. Scores, Designations, and Documentation Levels**

Question		Score	Documentation Level	Section Scores	Overall Score & Designations
1.1	Impact on abiotic ecosystem processes	D	Other published material	<b>“Impact”</b>  <b>Section 1 Score:</b>  C	<b>“Plant Score”</b>
1.2	Impact on plant community	C	Other published material		
1.3	Impact on higher trophic levels	C	Other published material		
1.4	Impact on genetic integrity	U	No information		
2.1	Role of anthropogenic and natural disturbance	B	Reviewed scientific publication	<b>“Invasiveness”</b>  <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>  14 pts  <b>Section 2 Score:</b>  B	<b>Overall Score:</b>  Medium  <b>Alert Status:</b>  None
2.2	Local rate of spread with no management	B	Other published material		
2.3	Recent trend in total area infested within state	C	Observational		
2.4	Innate reproductive potential	A	Reviewed scientific publication		
2.5	Potential for human-caused dispersal	A	Other published material		
2.6	Potential for natural long-distance dispersal	B	Other published material		
2.7	Other regions invaded	C	Other published material		
3.1	Ecological amplitude	A	Observational	<b>“Distribution”</b>  <b>Section 3 Score:</b>  A	  Something you should know.
3.2	Distribution	A	Observational		

**Table 3. Documentation**

<b>Question 1.1</b> Impact on abiotic ecosystem processes	Score: <b>D</b> Doc'n Level: <b>Other pub.</b>
<b>Identify ecosystem processes impacted:</b> Fire.	
<b>Rationale:</b> <i>Erodium cicutarium</i> can increase the fuel load in areas that are otherwise not susceptible to fire, thereby potentially increasing the spread, frequency, and intensity of wildland fire. Prostrate stems aid in spreading ground fire. Dead plants contribute to fuel loads but it was noted that the fuel load is not continuous.	
(Frequent prescribed burning favors <i>E. cicutarium</i> and other herbs over annual grasses. Buried seeds, or seeds and seedlings under litter can escape light to moderate fires, and seeds buried more than 0.5 in. can escape severe fires enabling <i>E. cicutarium</i> to colonize a burned site and perpetuate its presence).	
Because <i>E. cicutarium</i> is a potential forage plant, when it does respond to winter precipitation grazing pressure may keep the fuel load reduced. In areas where there is no grazing, fuel loads may be increased by a combination of winter annuals (mostly non-natives) of which <i>E. cicutarium</i> is one of several.	
<b>Sources of information:</b> See Howard (1992).	
<b>Question 1.2</b> Impact on plant community composition, structure, and interactions	Score: <b>C</b> Doc'n Level: <b>Other pub.</b>
<b>Identify type of impact or alteration:</b> Potential impact of competing with or displacing native annual species.	
<b>Rationale:</b> <i>Erodium cicutarium</i> can form a rapidly spreading and dominant ground cover in some areas, thereby inhibiting germination and survival of other desert annuals and grasses. Burgess et al. (1991) have observed that <i>E. cicutarium</i> is self-seeding in undisturbed habitats, occurring sometimes as frequently as common native species. <i>Erodium cicutarium</i> , <i>Schismus</i> spp. and <i>Bromus</i> spp. initiate vegetative growth earlier than most native species in the Mojave Desert (Jennings 2001 in Brooks and Esque 2002). Established annual plants seedlings can inhibit the subsequent germination of annual plants seeds (in the Sonoran Desert; Inouye 1980), though specific effects of alien seedlings on germination of native seeds is unknown. <i>Bromus rubens</i> , <i>Schismus</i> spp. and <i>E. cicutarium</i> appear to compete effectively with native annuals for soil nitrogen in the Mojave Desert (Brooks 1998, 2000 in Brooks and Esque 2002). It is not well documented whether natives are out-competed explicitly by <i>E. cicutarium</i> . It is noted that the Mojave Desert experiences predominately winter rainfall. F. Northam (personal communication, 2003) suggested that in years of above-average winter precipitation, seeds of <i>E. cicutarium</i> are prolific and will remain viable in the soil for years, perhaps even to the point of accumulating in greater amounts than natives.	
<b>Sources of information:</b> See cited literature. Also considered personal communication with F. Northam (Arizona Department of Agriculture, Noxious Weed Coordinator, 2003).	
<b>Question 1.3</b> Impact on higher trophic levels	Score: <b>C</b> Doc'n Level: <b>Other pub.</b>
<b>Identify type of impact or alteration:</b> Both positive and negative impacts on wildlife forage and cover.	
<b>Rationale:</b> Foliage and seeds of <i>E. cicutarium</i> are used by wildlife, as well as by domestic livestock for forage. Some wildlife that have been documented as using the plant for food include elk, mule deer, pronghorn, desert tortoise, wood rats, songbirds, and numerous species of small rodents. <i>Erodium cicutarium</i> is rated as poor to good palatability cover for wildlife (Howard 1992). However, to the extent that <i>E. cicutarium</i> competes with native annuals and grasses for space, water, and nutrients, and thereby alters composition of flora, the availability of foods that native wildlife are adapted to may be negatively impacted, especially for the endangered desert tortoise.	

<b>Sources of information:</b> See cited literature; also see Biswell (1956), Biswell and Gilman (1961), Inouye (1980), Longland (1987), Webb et al. (1988), Meyer and Karasov (1989), and Brooks and DeFalco (1999). Also considered information from K. Berry (1998. Alien annual plants and the Desert Tortoise. Notes from an Oct. 4, 1998 CALEPPC field trip.).	
<b>Question 1.4</b> Impact on genetic integrity	Score: <b>U</b> Doc'n Level: <b>No info.</b>
<b>Identify impacts:</b> None known.	
<b>Rationale:</b> <i>Erodium cicutarium</i> (2n=40) shares habitat with a native species, <i>E. texanum</i> (2n=20) (Kearney and Peebles 1960), in much of its range in Arizona. Plants often grow adjacent to each other and have similar phenology. Based on the reviewed literature, the opportunity to and possible occurrence of hybridization has not been studied to my knowledge.	
<b>Sources of information:</b> See cited literature. No information available on the possibility of hybridization with the native taxon.	
<b>Question 2.1</b> Role of anthropogenic and natural disturbance in establishment	Score: <b>B</b> Doc'n Level: <b>Rev. sci. pub.</b>
<b>Describe role of disturbance:</b> Needs bare soil to establish; any anthropogenic or natural disturbance will do.	
<b>Rationale:</b> <i>Erodium cicutarium</i> tolerates severely disturbed conditions, such as strip mines, as well as being opportunistic where minor natural disturbances occur, such as rodent burrows.	
<b>Sources of information:</b> See Wagner et al. (1978) and Webb et al. (1988).	
<b>Question 2.2</b> Local rate of spread with no management	Score: <b>B</b> Doc'n Level: <b>Other pub.</b>
<b>Describe rate of spread:</b> Increases, but does not double in <10 years.	
<b>Rationale:</b> Characteristics of prolific reproduction, long range animal dispersal, excellent seed viability, and generalist habitat preferences enable <i>E. cicutarium</i> to rapidly occupy and spread in open disturbed areas that do not experience long periods of freezing. Because <i>E. cicutarium</i> is already widely distributed it may not have the opportunities for doubling in <10 years.	
<b>Sources of information:</b> See Howard (1992) and references therein.	
<b>Question 2.3</b> Recent trend in total area infested within state	Score: <b>C</b> Doc'n Level: <b>Obs.</b>
<b>Describe trend:</b> Stable.	
<b>Rationale:</b> <i>Erodium cicutarium</i> is found in a wide variety habitats in every county in Arizona. Where it can grow, it is most likely already growing. Found throughout Arizona, up to approximately 8300 feet; common and often abundant on plains and mesas (Kearney and Peebles 1960, SEINet 2003).	
<b>Sources of information:</b> See cited literature; also see Howard (1992). Also considered information from SEINet (Southwest Environmental Information Network), Arizona herbaria specimen database (available online at: <a href="http://seinet.asu.edu/collections">http://seinet.asu.edu/collections</a> ; accessed 2003), via search through University of Arizona Herbarium, 'In-State' folders of <i>Erodium cicutarium</i> collections; highest collection at 8320 feet in Barfoot Park, Chiricahua Mountains. Score based on inference based on literature and herbaria records.	
<b>Question 2.4</b> Innate reproductive potential	Score: <b>A</b> Doc'n Level: <b>Rev. sci. pub.</b>
<b>Describe key reproductive characteristics:</b> Sexually reproduces; annual/biennial; rapid germination; high seed production (2400 to 9900 seeds per plant); self-fertile.	
<b>Rationale:</b> Innate reproductive potential is high. See Worksheet A.	
<b>Sources of information:</b> See Hull (1973), Roberts (1986), Stamp (1989), Felger (1990), Blackshaw and Harker (1998), and Drezner et al. (2001).	

<b>Question 2.5</b> Potential for human-caused dispersal	<i>Score: A Doc'n Level: Other pub.</i>
<b>Identify dispersal mechanisms:</b> Easily catches on clothing, to be deposited in locations distant from source. Indirect dispersal by humans as in transportation with hay or by movement of livestock also occurs readily.	
<b>Rationale:</b> Potential for human-caused dispersal is high.	
<b>Sources of information:</b> See Howard (1992) and Guertin and Halvorson (2003) and references therein. Also considered information from the Environment News Service. April 18, 2003. Roads Open Up Paths for Weed Invasions. Available online at: <a href="http://ens-news.com/ens/apr2003/2003-04-18-09.asp">http://ens-news.com/ens/apr2003/2003-04-18-09.asp</a> .	

<b>Question 2.6</b> Potential for natural long-distance dispersal	<i>Score: B Doc'n Level: Other pub.</i>
<b>Identify dispersal mechanisms:</b> Seeds easily catch on animal fur and are transported in feces to be deposited in locations distant from source; rodent may also cache seeds in areas distant from source.	
<b>Rationale:</b> Potential for natural long-distance dispersal is high.	
<b>Sources of information:</b> See Howard (1992) and Guertin and Halvorson (2003) and references therein.	

<b>Question 2.7</b> Other regions invaded	<i>Score: C Doc'n Level: Other pub.</i>
<b>Identify other regions:</b> <i>Erodium cicutarium</i> is found throughout North America and on nearly every continent on Earth. It is native to the Mediterranean region.	
<b>Rationale:</b> <i>Erodium cicutarium</i> has a broad ecological distribution. Flourishes in semiarid climates yet will tolerate a broad range of climates. There are no known other ecological regions invaded outside Arizona that are not already invaded in Arizona.	
<b>Sources of information:</b> See Howard (1992) and Guertin and Halvorson (2003) and references therein.	

<b>Question 3.1</b> Ecological amplitude	<i>Score: A Doc'n Level: Obs.</i>
<b>Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known:</b> <i>Erodium cicutarium</i> has existed in North America since the early 1700s, coincident with early Spanish expeditions (Webb et al. 1988). The species probably arrived in Arizona during that time. The first record of the species in Arizona, however, is 1886. Native American tribes include the species in their medicinal and food plant knowledge, which indicates a long history of establishment for the species. The species is widespread in Arizona, occupying nearly all ecological and soil types in the state.	
<b>Rationale:</b> <i>Erodium cicutarium</i> is widely established throughout Arizona. Occurs at or below 8300 feet in Arizona.	
<b>Sources of information:</b> See cited literature; also see Kearney and Peebles (1960), Hodgson (2002), and Guertin and Halvorson (2003) and references therein. Also considered information from SEINet (Southwest Environmental Information Network), Arizona herbaria specimen database (available online at: <a href="http://seinet.asu.edu/collections">http://seinet.asu.edu/collections</a> ; accessed 2003), via search through University of Arizona Herbarium, 'In-State' folders of <i>Erodium cicutarium</i> collections.	

<b>Question 3.2</b> Distribution	<i>Score: A Doc'n Level: Obs.</i>
<b>Describe distribution:</b> Present in numerous habitats in Arizona (see Worksheet B), especially areas that have been disturbed by livestock grazing, but seems to be limited to areas at or below 8,300 feet.	
<b>Rationale:</b> <i>Erodium cicutarium</i> is widespread in Arizona.	
<b>Sources of information:</b> See Howard (1992) and Guertin and Halvorson (2003) and references therein. Also considered information from SEINet (Southwest Environmental Information Network), Arizona herbaria specimen database (available online at: <a href="http://seinet.asu.edu/collections">http://seinet.asu.edu/collections</a> ; accessed 2003), via search through University of Arizona Herbarium, 'In-State' folders of <i>Erodium cicutarium</i> collections. See section below on <i>Erodium cicutarium</i> distribution references, with annotation.	

**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 checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	1 pt.
Seeds remain viable in soil for three or more years	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	2 pt.
Viable seed produced with <i>both</i> self-pollination and cross-pollination	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	1 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.
		<b>Total pts: 9 Total unknowns: 0</b>	
		<b>Score : A</b>	

**Note any related traits:**

**Worksheet B. Arizona Ecological Types**

(sensu Brown 1994 and Brown et al. 1998)

<b>Major Ecological Types</b>	<b>Minor Ecological Types</b>	<b>Code*</b>
<b>Dunes</b>	dunes	<b>D</b>
<b>Scrublands</b>	Great Basin montane scrub	<b>A</b>
	southwestern interior chaparral scrub	<b>A</b>
<b>Desertlands</b>	Great Basin desertscrub	<b>A</b>
	Mohave desertscrub	<b>A</b>
	Chihuahuan desertscrub	<b>A</b>
	Sonoran desertscrub	<b>A</b>
<b>Grasslands</b>	alpine and subalpine grassland	
	plains and Great Basin shrub-grassland	<b>A</b>
	semi-desert grassland	<b>A</b>
<b>Freshwater Systems</b>	lakes, ponds, reservoirs	
	rivers, streams	
<b>Non-Riparian Wetlands</b>	Sonoran wetlands	
	southwestern interior wetlands	
	montane wetlands	
	playas	
<b>Riparian</b>	Sonoran riparian	<b>A</b>
	southwestern interior riparian	<b>A</b>
	montane riparian	<b>C</b>
<b>Woodlands</b>	Great Basin conifer woodland	<b>A</b>
	Madrean evergreen woodland	<b>A</b>
<b>Forests</b>	Rocky Mountain and Great Basin subalpine conifer forest	
	montane conifer forest	
<b>Tundra (alpine)</b>	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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Shreve, F., and I.L. Wiggins. 1964. Vegetation and Flora of the Sonoran Desert: Vols. I and II. Stanford University Press, Stanford, California. 1740 p.

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### **Published Literature, Online Information, and Personal Communications Used to Determine the Distribution of *Erodium cicutarium* in Arizona, with Annotation (question 3.2)**

Bowers, J. E., and S. P. McLaughlin. 1986. Flora and vegetation of the Rincon Mountains, Pima County, Arizona. *Desert Plants* 8:51–94. ***Present; to 8000 feet, but usually much lower; gravelly flats; in several plant communities.***

Daniel, T.F., and M.L. Butterwick. 1992. Flora of the South Mountains of south-central Arizona. *Desert Plants* 10:99–119. ***Occasional to locally common.***

Felger, R.S. 1990. Non-Native Plants of Organ Pipe Cactus National Monument, Arizona. Technical Report No. 31. U.S. Geological Survey, Cooperative Park Studies Unit, The University of Arizona and National Park Service, Organ Pipe Cactus National Monument. 93 p. ***On Organ Pipe Cactus National Monument: widespread from low to peak elevations.***

Felger R.S., D.S. Turner, and M.F. Wilson. 2003. Flora and vegetation of the Mohawk Dunes, Arizona. Sida 20:115–1187. ***Erodium cicutarium was not listed in the Mohawk Dunes, Arizona.***

Jenkins, P. 2003. Assistant Curator, University of Arizona Herbarium. Personal communication at the University of Arizona Herbarium on June 19, 2003. ***Erodium cicutarium can be found up from the low elevations and up into the pines in Arizona.***

Johnson, W.T. 1988. Flora of the Pinaleno Mountains, Graham County, Arizona. Desert Plants 8:147–162 and 175–191. ***Present in Tripp Canyon at 4000 feet.***

Kearney, T.H., and R.H. Peebles (and collaborators). 1960. Arizona Flora. 2<sup>nd</sup> edition with supplement by J.T. Howell and E. McClintock and collaborators. University of California Press, Berkeley. 1085 p. ***Common and often abundant on plains and mesas; occurs throughout Arizona.***

Mauz, K. Sawtooth Mountains. Available online:  
<http://eebweb.arizona.edu/HERB/SAWPAGES/flora3.html#gera>. ***Describes Erodium cicutarium as growing on desert flats, mesas, and hillsides below 7000 feet. Describes its presence in the Sawtooth Mountains on alluvial flats and lower bajadas, with a few individuals in higher areas.***

McDougall, W.B. 1973. Seed Plants of Northern Arizona. The Museum of Northern Arizona, Flagstaff. 594 p. ***Found in all northern Arizona counties up to 7200 feet.***

McLaughlin, S. P. 1992. Vascular flora of Buenos Aires National Wildlife Refuge, Pima County, Arizona. Phytologia 73:353–377. ***Present.***

McLaughlin, S. P., and J. E. Bowers. 1990. A floristic analysis and checklist for the northern Santa Rita Mountains, Pima County, Arizona. The Southwest Naturalist 35:61–75. ***Present.***

McLaughlin, S. P., E. L. Geiger, and J. E. Bowers. 2001. A flora of the Appleton-Whittell Research Ranch, northeastern Santa Cruz County, Arizona. Journal of the Arizona-Nevada Academy of Science 33:113–131. ***Uncommon, mostly on disturbed sites.***

Phillips, B.G., A.M. Phillips, III, and M.A. Schmidt Bernzott. 1987. Annotated checklist of vascular plants of the Grand Canyon National Park. Grand Canyon Natural History Association. Monograph Number 7. ***Scattered on beaches, gravel bars, washes of Inner Gorge the length of the river, 1200 to 7600 feet; also found on North and South Rims. (North: western areas. South: west of El Tovar and Hermit's Rest).***

Rondeau, R.J., T.R. Van Devender, C.D. Bertelsen, P.D. Jenkins, R.K. Van Devender, and M.A. Dimmitt. Flora and Vegetation of the Tucson Mountains, Pima County, Arizona. Available online at:  
<http://eebweb.arizona.edu/HERB/TUCSONS/tucsonsg-r.html>. ***Describes Erodium cicutarium as being present in all habitats within the Tucson Mountains, Pima County, Arizona.***

Shreve, F., and I.L. Wiggins. 1964. Vegetation and Flora of the Sonoran Desert: Vols. I and II. Stanford University Press, Stanford, California. 1740 p. ***Common throughout Arizona.***

Tidestrom, I., and S.T. Kittell. 1941. A Flora of Arizona and New Mexico. The Catholic University of America Press, Washington, D.C. ***Fields, canyons, and mountain sides, up to the Yellow Pine belt.***

SEINet (Southwest Environmental Information Network), Arizona herbaria specimen database (available online at: <http://seinet.asu.edu/collections>; accessed 2003), via search through University of Arizona Herbarium, 'In-State' folders of *Erodium cicutarium* collections. ***Found in all deserts on flats and bajadas, and along desert washes; in grasslands and mesas, and along grassland rivers and drainages; along major rivers and lakes, agricultural, rangelands, and in cities and along roadways/highways; in major and smaller canyons along rivers and their tributary canyons; chaparral; pinyon-juniper; in Ponderosa pine vegetation, and the meadows in Ponderosa pine. Highest collection at 8320 feet in Barfoot Park, Chiricahua Mountains.***