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)**:**	*Convolvulus arvensis* L. (USDA 2005)
Synonyms:	*Convolvulus ambigens* House, *Convolvulus incanus* auct. non Vahl, *Strophocaulos arvensis* (L.) Small (USDA 2005)
Common names:	Field bindweed, possession vine, creeping jenny, creeping charlie, field morning-glory, orchard morning-glory, European bindweed, corn-bind, morning-glory, small-flowered morning-glory
Evaluation date (mm/dd/yy)**:**	05/28/03
Evaluator #1 Name/Title:	Kate Watters, Biotech/Plants
Affiliation:	National Park Service/GRCA/CPCESU
Phone numbers:	(928) 523−8518
Email address:	kw6@dana.ucc.nau.edu
Address:	P.O. Box 5765, Flagstaff, Arizona 86011−5765
Evaluator #2 Name/Title:	
Affiliation:	
Phone numbers:	
Email address:	
Address:	

List committee members:	06/24/03: W. Austin, D. Backer, J. Busco, P. Guertin, J. Hall, R. Haughey, L. Moser, F. Northam, R. Paredes, B. Phillips, K. Thomas, K. Watters 08/26/03: W. Albrecht, W. Austin, D. Backer, R. Hiebert, L. Makarick, L. Moser, T. Olson, B. Phillips, T. Robb, K. Thomas, K. Watters
Committee review date:	06/24/03 and 08/26/03
List date:	08/26/03
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	**C**	Other published material	**"Impact"** **Section 1 Score:** **B**	**"Plant Score"** **Overall Score:** **Medium** **Alert Status:** **None**
1.2	Impact on plant community	**B**	Other published material		
1.3	Impact on higher trophic levels	**C**	Observational		
1.4	Impact on genetic integrity	**U**	Other published material		
2.1	Role of anthropogenic and natural disturbance	**B**	Other published material	**"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:* **13 pts** **Section 2 Score:** **B**	
2.2	Local rate of spread with no management	**B**	Observational		
2.3	Recent trend in total area infested within state	**U**	No information		
2.4	Innate reproductive potential	**A**	Other published material		
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**	Observational		RED FLAG **NO** Something you should know.
3.1	Ecological amplitude	**A**	Observational	**"Distribution"** **Section 3 Score:** **A**	
3.2	Distribution	**B**	Observational		

Table 3. Documentation

Note: Comments by the Consistency Review Panel suggested this species should be rated higher because of its ability to encroach into uninfested land and its aggressive, smothering growth. These pestiferous characteristics are expressed in mesic temperate sites where moisture is naturally abundant or supplied by human means. Cropland, hay fields, nursery fields, landscaped areas, gardens, rights-of-ways, and turf can be dominated by field bindweed, but for this type of growth to occur in Arizona wildlands, susceptible sites need to be subjected to intense mechanical soil disturbance (i.e., removal of a majority of the natural vegetation), plus have a dependable source of water during its growing season. In other words, field bindweed encroachment into wildlands will follow disturbances such as road construction, ditch digging, mining, mechanical fire suppression, etc. Therefore, current scores are believed to properly reflect the threat of field bindweed in Arizona wildlands.

Question 1.1 Impact on abiotic ecosystem processes *Score:* **C** *Doc'n Level:* **Other pub.**
Identify ecosystem processes impacted: Soil moisture and geomorphological changes.
Rationale: Can form dense stands in disturbed areas. Extensive root system utilizes deep soil moisture (Swan 1980). Field bindweed can reduce the available soil moisture in the top 60 cm of soil to below the wilting point for many species (Weaver and Riley 1982). Under conditions of water stress, field bindweed can be a better competitor than cultivated crops (Stahler 1948 in Weaver and Riley 1982). These studies were experimental in cropland in Washington and Canada and in controlled greenhouse studies, so some inference has been made. Inferred that deep taproot may lend potential geomorphological changes such as sedimentation rate.
Sources of information: See cited literature.

Question 1.2 Impact on plant community composition, structure, and interactions *Score:* **B** *Doc'n Level:* **Other pub.**
Identify type of impact or alteration: Plant community structure and interactions (resource competition). Much is known about the effects of *Convolvulus arvensis* on cropland, but little is known about its impacts on natural communities and wildlands (Lyons 1998).
Rationale: Vining habit chokes other plants and competes with native forbs and grasses for moisture, sunlight, and nutrients (Swan 1980). Field bindweed is primarily a problem at several Nature Conservancy preserves, found in riparian corridors and mountain-mahogany shrubland/grassland, where it has been noted to choke out native grasses and forbs (Lyons 1998). Field bindweed is also tolerant of a variety of environmental conditions, which makes it highly competitive for resources (USGS Undated).
Sources of information: See cited literature.

Question 1.3 Impact on higher trophic levels *Score:* **C** *Doc'n Level:* **Obs.**
Identify type of impact or alteration: May have some negative effects on foraging animals, though effects are largely unknown.
Rationale: Has been known to poison some grazing animals although effect is unknown on native ungulates (Cox 1915, Callihan et al. 1990) We do not know the impacts of mat-forming structures on nesting and forage or pollinators, though such dense structure could reduce food and habitat for native ground nesting species and pollinators.
Sources of information: See cited literature. Also used inference to assign the score.

Question 1.4 Impact on genetic integrity *Score:* **U** *Doc'n Level:* **Other pub.**
Identify impacts: Potential exists but hybridization unknown.
Rationale: There is a native species, *Convolvulus simulans*, in California (Jepson 1953) but there are no records of hybridization between plants. There are at least two native *Convolvulus* species in Arizona (Kearney and Peebles 1960) but it is unknown if they can hybridize with *C. arvensis*.
Sources of information: See cited literature.

Question 2.1 Role of anthropogenic and natural disturbance in establishment *Score:* **B** *Doc'n Level:* **Other pub.**
Describe role of disturbance: Establishes more frequently with disturbance, mostly anthropogenic, as *Convolvulus arvensis* is spread rapidly through agricultural practices (CDFA Undated).
Rationale: Occurs at roadsides, old agricultural fields, waste places, as well as disturbed rangelands and wildlands (Olliff et al. 2001). Field bindweed is more indicative of disturbed areas than natural systems (Pavek 1992). Working Group disagreed with "readily" to describe invasion of areas with natural disturbance, but recognizes that burrowing of prairie dogs, and root fragments transferred downstream from flooding events, can also produce new populations.
Sources of information: See cited literature.

Question 2.2 Local rate of spread with no management *Score:* **B** *Doc'n Level:* **Obs.**
Describe rate of spread: Increases, but less rapidly than doubling in <10 years.
Rationale: Reproduces rapidly via underground rhizomes (Frasier 1943). Best (1963a) investigated the spread of field bindweed by monitoring 25 shoots growing from transplants under non-competitive conditions. In the first year, new shoots reached 46 to 130 cm from the parent plant and in the second year were as far as 180 to 290 cm from the parent plant. Brown (1946) found one plant was capable of producing 14 new shoots in one year. Lateral root growth per year was found to be on average 4.6 m although in Best's study (1963b) one plant's root grew to 7.0 m (Best 1963a). In disturbed areas on the North Rim of the Grand Canyon, documented *C. arvensis* populations that have been treated with Rodeo are increasing at slow, yet noticeable rates (K. Watters, personal observations, 2002 to 2003).
Sources of information: See literature citations. Also used inference based on personal observations by K. Watters (Research Technician, National Park Service, Grand Canyon National Park, Flagstaff, Arizona, 2002 to 2003).

Question 2.3 Recent trend in total area infested within state *Score:* **U** *Doc'n Level:* **No info.**
Describe trend: Although local population increases have been noted, information does not exist on the overall trend in the state.
Rationale: In disturbed areas on the North Rim of the Grand Canyon, documented *Convolvulus arvensis* populations that have been treated with Rodeo are increasing at slow, yet noticeable rates; however, the overall state trend is unknown.
Sources of information: North Rim observations by K. Watters (Research Technician, National Park Service, Grand Canyon National Park, Flagstaff, Arizona, 2002 to 2003).

Question 2.4 Innate reproductive potential *Score:* **A** *Doc'n Level:* **Other pub.**
Describe key reproductive characteristics: Prolific vegetative reproduction, can regenerate from root fragments (Bellue et al. 1959), and seeds remain viable in the soil for long periods (Brown and Porter 1942).
Rationale: Can reproduce vegetatively and via seed dispersal (Weaver and Riley 1982).
Sources of information: See cited literature; also see DeGennaro and Weller (1984).

Question 2.5 Potential for human-caused dispersal *Score:* **A** *Doc'n Level:* **Other pub.**
Identify dispersal mechanisms: Potential for human-caused dispersal is high along transportation corridors and irrigation canals.
Rationale: Field bindweed can contaminate nursery stock. (Callihan et al. 1990). Propagules may be carried by animals, humans and machinery (Swan 1980).
Sources of information: See cited literature.

Question 2.6 Potential for natural long-distance dispersal *Score:* **B** *Doc'n Level:* **Other pub.**
Identify dispersal mechanisms: New introductions of field bindweed are primarily by seed. Seeds can be transported by water or birds (Proctor 1968).
Rationale: Field bindweed seeds remain viable in the stomachs of migrating birds. Callihan et al. (1990) found that seeds can remain in Killdeer for up to 144 hours and can pass through animals with little or no damage. Quail may retain the seed for 24 hours, ducks, 5, geese, 19, lesser yellowlegs, 6, green jays, 13, ravens, 8, mocking birds, 2 and starlings 10 (Callihan et al. 1990). Flooding events could cause root fragments to move downstream and colonize streambanks in new areas.
Sources of information: See cited literature.

Question 2.7 Other regions invaded *Score:* **C** *Doc'n Level:* **Obs.**
Identify other regions: *Convolvulus arvensis* occurs in each state of the continental U.S. (USDA 2005). In Canada it is found in Alberta, British Columbia and Saskatchewan (Zamora 1991). *Convolvulus arvensis* is a serious weed in Argentina, Australia, Borneo, Sri Lanka, France, Germany, Greece, India, Iran, Lebanon, New Zealand, Pakistan, South Africa, the former Yugoslavia, and is a "principle" or "common" weed in thirty-four other countries including Japan, the former Soviet Union, and Finland (Holm et al. 1991) (Sa'ad 1967).
Rationale: *Convolvulus arvensis* is native to Eurasia and is now a cosmopolitan species that grows between 60°N and 45°S latitudes (Lyons 1998).
Sources of information: See cited literature. Score based on observations and inference from literature.

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: Can range in elevation from 100 to 8,500 feet and has been documented at 10,000 feet (USGS Undated). Can be found mostly in dry soil along roadsides, in open fields or edges of cultivated fields, pastures, on fences, yards, and waste places of farms (Parker 1972). Lyons (1998) reports that *C. arvensis* is primarily a problem in riparian corridors and mountain-mahogany shrubland/grassland. Field bindweed is listed as a dominant forb in 12.4 percent of the sample sites in a riverine United States Fish and Wildlife Service deep water-wetland classification (Olson and Gerhart 1982). Because of its wide distribution, abundance, and economic impact *Convolvulus arvensis* is considered one of the ten 'world's worst weeds' (Holm et al. 1977). Introduced from Europe: thought to have been introduced to North America in 1870 in wheat from Turkey (USGS Undated). Introduced to Arizona in 1905 to Pinal County.
Rationale: See Worksheet B.
Sources of information: See cited literature. Score based on Working Group observations. Introduction date based on information in SEINet (Southwest Environmental Information Network), Arizona herbaria specimen database (available online at: http://seinet.asu.edu/collections; accessed 2003).

Question 3.2 Distribution *Score:* **B** *Doc'n Level:* **Obs.**
Describe distribution: Personal observations by K. Watters (2002 to 2003) from the North Rim of the Grand Canyon National Park and Southwest Exotic Plant Mapping Program (SWEMP) data records indicate that bindweed locations are at roadsides and disturbed slopes below roads.
Rationale: Most common in waste areas and cultivated fields, but has been documented to infest disturbed wildlands and natural areas (Parker 1972).
Sources of information: Score based on observations by K. Watters (Research Technician, National Park Service, Grand Canyon National Park, Flagstaff, Arizona, 2002 to 2003), other Working Group member observations, and SWEMP records (available online at: http://www.usgs.nau.edu/swepic/swemp).

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: 11 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	**U**
Scrublands	Great Basin montane scrub	**D**
	southwestern interior chaparral scrub	**D**
Desertlands	Great Basin desertscrub	
	Mohave desertscrub	
	Chihuahuan desertscrub	
	Sonoran desertscrub	
Grasslands	alpine and subalpine grassland	
	plains and Great Basin shrub-grassland	**D**
	semi-desert grassland	**D**
Freshwater Systems	lakes, ponds, reservoirs	**D**
	rivers, streams	
Non-Riparian Wetlands	Sonoran wetlands	
	southwestern interior wetlands	
	montane wetlands	
	playas	
Riparian	Sonoran riparian	**C**
	southwestern interior riparian	**B**
	montane riparian	
Woodlands	Great Basin conifer woodland	
	Madrean evergreen woodland	
Forests	Rocky Mountain and Great Basin subalpine conifer forest	
	montane conifer forest	**D**
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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