

Part IV. Plant Assessment Form

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

Electronic version, February 28, 2003

Table 1. Species and Evaluator Information

Species name (Latin binomial):	Convolvulus arvensis L.
Synonyms:	Convolvulus ambigens, Convolvulus incanus, Strophocaulos arvensis
Common names:	field bindweed, field morningglory, cornbind, orchard morningglory, creeping charlie, creeping jenny, greenvine, lovevine, European morningglory, small bindweed, small-flowered morningglory, wild morningglory
Evaluation date (mm/dd/yy):	08/12/04
Evaluator #1 Name/Title:	Scott Steinmaus Associate Professor
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Evaluator #2 Name/Title:	enter text here
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Email address:	enter text here
Address:	enter text here

Section below for list committee use—please leave blank

List committee members:	Joe DiTomaso, John Randall, Carla Bossard
Committee review date:	3/11/05 (Revised 9/13/05 Joe DiTomaso, Jake Sigg, Carla Bossard)
List date:	enter text here
Re-evaluation date(s):	enter text here

General comments on this assessment:

Convolvulus arvensis is an aggressive weed in agricultural systems, but does not impact wildlands.

Table 2. Criteria, Section, and Overall Scores

1.1	Impact on abiotic ecosystem processes	D	Rev'd, Sci. Pub'n
1.2	Impact on plant community	D	Rev'd, Sci. Pub'n
1.3	Impact on higher trophic levels	U	No Information
1.4	Impact on genetic integrity	D	Rev'd, Sci. Pub'n

<p>Impact</p> <p><i>Enter four characters from Q1.1-1.4 below:</i></p> <p>DDUD</p> <p><i>Using matrix, determine score and enter below:</i></p> <p>D</p>

2.1	Role of anthropogenic and natural disturbance	C (1 pt)	Rev'd, Sci. Pub'n
2.2	Local rate of spread with no management	B (2 pts)	Rev'd, Sci. Pub'n
2.3	Recent trend in total area infested within state	C (1 pt)	Rev'd, Sci. Pub'n
2.4	Innate reproductive potential Wksht A	A (3 pts)	Rev'd, Sci. Pub'n
2.5	Potential for human-caused dispersal	C (1 pt)	Rev'd, Sci. Pub'n
2.6	Potential for natural long-distance dispersal	C (1 pt)	Rev'd, Sci. Pub'n
2.7	Other regions invaded	C (1 pt)	Rev'd, Sci. Pub'n

<p>Invasiveness</p> <p><i>Enter the sum total of all points for Q2.1-2.7 below:</i></p> <p>11</p> <p><i>Use matrix to determine score and enter below:</i></p> <p>B</p>
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<p>Plant Score</p> <p><i>Using matrix, determine Overall Score and Alert Status from the three section scores and enter below:</i></p> <p>Not listed</p> <p>No Alert</p>

3.1	Ecological amplitude/Range	A	Rev'd, Sci. Pub'n
3.2	Distribution/Peak frequency Wksht C	D	Observational

<p>Distribution</p> <p><i>Using matrix, determine score and enter below:</i></p> <p>B</p>

Table 3. Documentation

<p>Question 1.1 Impact on abiotic ecosystem processes</p>	<p>D Rev'd, Sci. Pub'n back</p>
<p>Identify ecosystem processes impacted: Field bindweed can draw down soil moisture levels to a point that other species are disadvantaged. It is not a good competitor for light and is not very competitive when soil moisture is adequate for other species. There is extensive literature on <i>C. arvensis</i> as it impacts agricultural environments but very sparse on impacts to natural ecosystems.</p>	
<p>Rationale: It has a competitive root system with both an extensive lateral horizontal architecture as well as a vertical vertical architecture that can penetrate soils 3m or greater. This architecture insures that it can efficiently extract soil moisture throughout the soil profile especially the top 60 cm. Because this root system is perennial, it will be prepared to grow whenever soil moisture and temperatures are sufficient for growth.</p>	
<p>Sources of information: Weaver, S.E. and W.R. Riley. 1982. The biology of Canadian weeds. 53. <i>Convolvulus arvensis</i> L. Canadian Journal of Plant Science 62:461-472.</p>	
<p>Question 1.2 Impact on plant community composition, structure, and interactions</p>	<p>D Other Pub. Mat'l back</p>
<p>Identify type of impact or alteration: Field bindweed can be a serious threat to native plant communities. It is found in large patches rather than small (except where it is first establishing) patches and is associated with annual, biennial and short-lived weeds. If water is abundant, field bindweed will have trouble competing with other species. It is competitive under dry to moderately moist conditions. As specified above, the literature covers mostly agricultural impacts and is sparse with regard to impacts on natural ecosystems.</p>	
<p>Rationale: It is a threat to native communities because of its great capacity for regeneration. Its extensive perennial root systems are capable of extracting available moisture from the upper soil layers so that it is not available for other species. Because it has a broad environmental tolerance range it is presumed to be highly competitive, however, it probably is not as competitive as a species that is specifically adapted to a particular set of environmental conditions.</p>	
<p>Sources of information: Element Stewardship Abstract for <i>Convolvulus arvensis</i> field bindweed. 1995. The Nature Conservancy. Holm, L.G., D.L. Plunkett, J.V. Pancho, J. P. Herberger. 1977. The Worlds Worst Weeds. pg. 96-103.</p>	
<p>Question 1.3 Impact on higher trophic levels</p>	<p>U No Information back</p>
<p>Identify type of impact or alteration: No information about native wildlife, however, field bindweed foliage contains tropane alkaloids and can cause intestinal problems in horses, and presumably other single stomached animals such as deer, etc. . Bindweed can also harbor viruses that cause potato X disease, tomato spotted wilt, and vaccinium false bottom, which possibly could affect natives.</p>	
<p>Rationale: Most information reported for agricultural situations where horses can be affected by ingesting bindweed.</p>	
<p>Sources of information: Field bindweed. Anonymous. http://agric.wa.gov.au/agency/pubns/infonote/infonotes/</p>	

Question 1.4 Impact on genetic integrity	D Rev'd, Sci. Pub'n back
Identify impacts: There are no reports in the botanical literature of natural interspecific hybrids in <i>C. arvensis</i> in North America.	
Rationale: The closest relative is the uncommon native morningglory, <i>Calystegia</i> spp.	
Sources of information: Weaver, S.E. and W.R. Riley. 1982. The biology of Canadian weeds. 53. <i>Convolvulus arvensis</i> L. Canadian Journal of Plant Science 62:461-472.	
Question 2.1 Role of anthropogenic and natural disturbance in establishment	C Rev'd, Sci. Pub'n back
Describe role of disturbance: Cultivation appears to favor field bindweed growth and spread, however, repeated cultivation as might occur on a well-managed farm will deplete the carbohydrate reserves in the perennial root systems resulting ultimately in death. It establishes in waste areas, presumably, disturbed at some point.	
Rationale: Infrequent tillage will facilitate the spread of perennial roots and destroy above-ground vegetation that might otherwise compete with field bindweed. Presumably, natural disturbance would have similar effects on bindweed infestation levels.	
Sources of information: Peterson, D.L., Element Stewardship Abstract for <i>Convolvulus arvensis</i> field bindweed. 1995. The Nature Conservancy. Holm, L.G., D.L. Plunckett, J.V. Pancho, J. P. Herberger. 1977. The Worlds Worst Weeds. pg. 96-103.	
Question 2.2 Local rate of spread with no management	B Rev'd, Sci. Pub'n back
Describe rate of spread: Once a population of field bindweed has become established it can spread rapidly from the point of origin. It has the potential for extensive lateral spread through regeneration from underground parts. Long-lived, dormant seeds are another mechanism by which bindweed can spread with water, birds, and mechanical equipment. Spreads much more rapidly in disturbed sites than in undisturbed wildland sites.	
Rationale: A 5 cm section of a lateral root with buds could produce as many as 25 shoots four months after planting. Four months after transplanting, shoots can be produced up to 120 cm from the transplant. Shoot can be found nearly 300 cm away from the transplant after 15 months. Even young seedlings have the ability to resprout successfully. Bindweed seedlings cut 1 cm below the soil surface will regrow between one to four weeks.	
Sources of information: Swan, D.G. 1983. Regeneration of field bindweed seedlings. Proc. W. Soc. 36:18. Peterson, D.L., Element Stewardship Abstract for <i>Convolvulus arvensis</i> field bindweed. 1995. The Nature Conservancy. Holm, L.G., D.L. Plunckett, J.V. Pancho, J. P. Herberger. 1977. The Worlds Worst Weeds. pg. 96-103.	
Question 2.3 Recent trend in total area infested within state	C Rev'd, Sci. Pub'n back
Describe trend: Most areas that have conditions that can support field bindweed populations have been exposed and infested with the species. New infestations are likely only where new disturbances occurs. About 1.8 million acres (770,000 hectares) of agricultural land was infested in 1981.	

<p>Rationale: Field bindweed has been in the state and widely distributed through contaminated crop propagation and by birds since European settlement during the 1800's. It was first recorded in the U.S. in Virginia in 1739 and probably originated in western Asia or the Mediterranean region.</p>	
<p>Sources of information: Field bindweed. Anonymous. http://agric.wa.gov.au/agency/pubns/infonote/infonotes/ ; P.E. Boldt, S.S. Rosenthal, and R. Srinivasan. 1998. Integrated Pest Management. Distribution of field bindweed and hedge bindweed in the USA. Journal of Production Agriculture 11:377-381.</p>	
<p>Question 2.4 Innate reproductive potential</p>	<p>A Rev'd, Sci. Pub'n back</p>
<p>Describe key reproductive characteristics: Bindweed usually does not produce seeds in the first season but will in its second year after emerging from seed. Field bindweed has high reproductive potential.</p>	
<p>Rationale: One plant can produce 500 seeds. Seeds remain viable in the soil for 20 years or more. Seeds germinate throughout the growing season and is discontinuous because of its hardseed, which requires scarification to break dormancy. Seed is produced over 3 months within a population. It reproduces vegetatively by perennial roots/rhizomes, fragments easily to become established elsewhere, and cut shoot fragments can become established.</p>	
<p>Sources of information: Weaver, S.E. and W.R. Riley. 1982. The biology of Canadian weeds. 53. Convolvulus arvensis L. Canadian Journal of Plant Science 62:461-472.</p> <p>Peterson, D.L., Element Stewardship Abstract for Convolvulus arevensis field bindweed. 1995. The Nature Conservancy.</p> <p>Holm, L.G., D.L. Plunckett, J.V. Pancho, J. P. Herberger. 1977. The Worlds Worst Weeds. pg. 96-103. Field bindweed. Anonymous. http://agric.wa.gov.au/agency/pubns/infonote/infonotes/</p>	
<p>Question 2.5 Potential for human-caused dispersal</p>	<p>A Rev'd, Sci. Pub'n back</p>
<p>Identify dispersal mechanisms: Humans sowing contaminated crop seed and subsequent escape, planting nursery stock containing bindweed roots. Seeds also move by clinging to mud on farm vehicles or any vehicles frequenting an infested site.</p>	
<p>Rationale: Humans disposing of contaminated nursery soils, allowing bindweed to escape from contaminated crops, and vehicular traffic in and out of contaminated areas allow ample opportunity or this species to spread to new and conducive environments.</p>	
<p>Sources of information: Peterson, D.L., Element Stewardship Abstract for Convolvulus arevensis field bindweed. 1995. The Nature Conservancy.</p> <p>Holm, L.G., D.L. Plunckett, J.V. Pancho, J. P. Herberger. 1977. The Worlds Worst Weeds. pg. 96-103.</p>	
<p>Question 2.6 Potential for natural long-distance dispersal</p>	<p>B Rev'd, Sci. Pub'n back</p>
<p>Identify dispersal mechanisms: Field bindweed seeds are dispersed naturally by water and by migrating birds and mammals following ingestion.</p>	

<p>Rationale: Seeds can survive up to 144 hours in the stomach of some migrating birds, which would enable their dispersal over thousands of kilometers. Because the seed has some hardseed characteristics, it is dormant when it is shed by the mother plant. Dormancy insures dispersal in time which facilitates its spread in space.</p>	
<p>Sources of information: Peterson, D.L., Element Stewardship Abstract for Convolvulus arvensis field bindweed. 1995. The Nature Conservancy.</p> <p>Holm, L.G., D.L. Plunckett, J.V. Pancho, J. P. Herberger. 1977. The Worlds Worst Weeds. pg. 96-103.</p> <p>Weaver, S.E. and W.R. Riley. 1982. The biology of Canadian weeds. 53. Convolvulus arvensis L. Canadian Journal of Plant Science 62:461-472.</p>	
<p>Question 2.7 Other regions invaded</p>	<p>C Rev'd, Sci. Pub'n back</p>
<p>Identify other regions: This species has been present for sufficient time that all susceptible California ecosystems that could be invaded have been invaded. C. arvensis is distributed throughout the world from latitude 60 degrees north to 45 degrees south and is found in temperate, tropical, and Mediterranean climates. Bindweed seeds were found in adobe bricks of an 1839 mission near San Francisco. By 1900, this species was established in most of California and considered to be an economic problem in all western states.</p>	
<p>Rationale: Spread throughout California is associated with settlers from Germany and Russia between 1870 and 1875 with sacks of contaminated crop seed. In 1995, 47 of 48 contiguous states were infested by field bindweed. Only Florida and the southern parts of South Carolina and Texas did not report its presence. Field bindweed has serious infestations (>1000 acres/county) in north-eastern, all through the Central and San Joaquin valleys, Central coast and south-eastern counties.</p>	
<p>Sources of information: Peterson, D.L., Element Stewardship Abstract for Convolvulus arvensis field bindweed. 1995. The Nature Conservancy.</p> <p>Holm, L.G., D.L. Plunckett, J.V. Pancho, J. P. Herberger. 1977. The Worlds Worst Weeds. pg. 96-103.</p> <p>Weaver, S.E. and W.R. Riley. 1982. The biology of Canadian weeds. 53. Convolvulus arvensis L. Canadian Journal of Plant Science 62:461-472.</p> <p>P.E. Boldt, S.S. Rosenthal, and R. Srinivasan. 1998. Integrated Pest Management. Distribution of field bindweed and hedge bindweed in the USA. Journal of Production Agriculture 11:377-381.</p>	
<p>Question 3.1 Ecological amplitude/Range</p>	<p>A Doc'n level back</p>
<p>Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: C. arvensis is distributed throughout the world from latitude 60 degrees north to 45 degrees south and is found in temperate, tropical, and Mediterranean climates. Bindweed seeds were found in adobe bricks of an 1839 mission near San Francisco.</p>	
<p>Rationale: Field bindweed has serious infestations (>1000 acres/county) in north-eastern, all through the Central and San Joaquin valleys, Central coast and south-eastern counties.</p>	
<p>Sources of information: Peterson, D.L., Element Stewardship Abstract for Convolvulus arvensis field bindweed. 1995. The Nature Conservancy.</p>	

<p>Holm, L.G., D.L. Plunkett, J.V. Pancho, J. P. Herberger. 1977. The Worlds Worst Weeds. pg. 96-103.</p> <p>Weaver, S.E. and W.R. Riley. 1982. The biology of Canadian weeds. 53. Convolvulus arvensis L. Canadian Journal of Plant Science 62:461-472.</p> <p>P.E. Boldt, S.S. Rosenthal, and R. Srinivasan. 1998. Integrated Pest Management. Distribution of field bindweed and hedge bindweed in the USA. Journal of Production Agriculture 11:377-381.</p>	
<p>Question 3.2 Distribution/Peak frequency</p>	<p>D Observational back</p>
<p>Describe distribution: Not common in wildlands areas. Most common in disturbed grasslands.</p>	
<p>Rationale: .</p>	
<p>Sources of information: Observational - Joe DiTomaso, Weed Science program, UC Davis</p>	

Worksheet A[back](#)

Reaches reproductive maturity in 2 years or less	Yes: 1 pt
Dense infestations produce >1,000 viable seed per square meter	Yes: 2 pts
Populations of this species produce seeds every year.	Yes: 1 pt
Seed production sustained over 3 or more months within a population annually	Yes: 1 pt
Seeds remain viable in soil for three or more years	Yes: 2 pts
Viable seed produced with <i>both</i> self-pollination and cross-pollination	Unknown: 0 pts
Has quickly spreading vegetative structures (rhizomes, roots, etc.) that may root at nodes	Yes: 1 pt
Fragments easily and fragments can become established elsewhere	Yes: 2 pts
Resprouts readily when cut, grazed, or burned	Yes: 1 pt
	11 pts 1 unknown
	A (6+ pts)
Note any related traits: enter text here	

Worksheet C - California Ecological Types

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(*sensu* Holland 1986)

Major Ecological Types	Minor Ecological Types	Code*
Marine Systems	marine systems	score
Freshwater and Estuarine Aquatic Systems	lakes, ponds, reservoirs	score
	rivers, streams, canals	score
	estuaries	score
Dunes	coastal	score
	desert	score
	interior	score
Scrub and Chaparral	coastal bluff scrub	D. present
	coastal scrub	score
	Sonoran desert scrub	score
	Mojavean desert scrub (incl. Joshua tree woodland)	score
	Great Basin scrub	score
	chenopod scrub	score
	montane dwarf scrub	score
	Upper Sonoran subshrub scrub	score
	chaparral	score
Grasslands, Vernal Pools, Meadows, and other Herb Communities	coastal prairie	D. present
	valley and foothill grassland	D. present
	Great Basin grassland	score
	vernal pool	score
	meadow and seep	score
	alkali playa	score
	pebble plain	score
Bog and Marsh	bog and fen	score
	marsh and swamp	score
Riparian and Bottomland	riparian forest	score
	riparian woodland	D. present
	riparian scrub (incl. desert washes)	score
Woodland	cismontane woodland	score
	piñon and juniper woodland	score
	Sonoran thorn woodland	score
Forest	broadleaved upland forest	score
	North Coast coniferous forest	score
	closed cone coniferous forest	score
	lower montane coniferous forest	score
	upper montane coniferous forest	score
	subalpine coniferous forest	score
Alpine Habitats	alpine boulder and rock field	score
	alpine dwarf scrub	score

* 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).