

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

Table 1. Species and Evaluator Information

Species name (Latin binomial):	Cardaria chalepensis
Synonyms:	Cardaria draba ssp. chalepensis, Cardaria draba ssp. repens, C. draba ver. repens, Lepidium draba var. repens, Lepidium repens
Common names:	lens-podded whitetop, hoary cress, lens-podded hoary cress, peppergrass, whitetop, whiteweed, cranson rampant, chalapa whitetop
Evaluation date (mm/dd/yy):	8/6/2004
Evaluator #1 Name/Title:	Brianna Richardson, Project Manager
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Evaluator #2 Name/Title:	Joseph M. DiTomaso/ Cooperative Ext. Specialist
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Section below for list committee use—please leave blank

List committee members:	Cynthia Roye, John Randall, Jake Sigg, Peter Warner, Joe DiTomaso, Alison Stanton
Committee review date:	8/27/2004
List date:	enter text here
Re-evaluation date(s):	enter text here

General comments on this assessment:

enter text here

Table 2. Criteria, Section, and Overall Scores

1.1	Impact on abiotic ecosystem processes	C	Other Pub. Mat'l
1.2	Impact on plant community	B	Other Pub. Mat'l
1.3	Impact on higher trophic levels	C	Other Pub. Mat'l
1.4	Impact on genetic integrity	D	Other Pub. Mat'l

Impact

Enter four characters from Q1.1-1.4 below:

CBCD

Using matrix, determine score and enter below:

B

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

Invasiveness

Enter the sum total of all points for Q2.1-2.7 below:

12

Use matrix to determine score and enter below:

B

Plant Score

Using matrix, determine Overall Score and Alert Status from the three section scores and enter below:

Medium

Red Alert

3.1	Ecological amplitude/Range	B	Other Pub. Mat'l
3.2	Distribution/Peak frequency Wksht C	D	Other Pub. Mat'l

Distribution

Using matrix, determine score and enter below:

C

Table 3. Documentation

<p>Question 1.1 Impact on abiotic ecosystem processes</p>	<p>C Other Pub. Mat'l back</p>
<p>Identify ecosystem processes impacted: Reduces available soil moisture and nutrients early in the season. In Australia, slowed water drainage and increased flooding. <i>Cardaria draba</i> is known to salinify the soil, but no evidence indicates that <i>C. chalepensis</i> does the same.</p>	
<p>Rationale: Has the potential to impact abiotic systems, unclear whether this occurs in CA.</p>	
<p>Sources of information: Kadrmas, T., WS Johnson. UNR Cooperative Extension Fact Sheet FS-02-56: Managing hoary cress. Accessed 8/2004 www.unce.unr.edu. Bossard, CC. JM Randall, MC Hoshovsky. 2000. Invasive Plants of California's Wildlands. University of California Press, Berkeley: 81-86.</p>	
<p>Question 1.2 Impact on plant community composition, structure, and interactions</p>	<p>B Other Pub. Mat'l back</p>
<p>Identify type of impact or alteration: Threatens several rare plants in ID. Dense stands of perennial grasses are somewhat immune from invasion in the PNW. Considered by TNC to be a moderate threat to habitat and other plant species. "Reduces native biodiversity and forage quality." Can form dense monocultures, displacing native plants. Populations in California are not common.</p>	
<p>Rationale: Though said to reduce native biodiversity, this plant is considered easy to control. It is not competitive against shrubs. May not be competitive against established perennial grasses. Needs high moisture or irrigation to become established and thrive. May be a problem along waterways or in high rainfall areas. Primarily an agricultural pest. May form monocultures under ideal conditions. Can cause moderate (sometimes severe) alteration of plant community composition.</p>	
<p>Sources of information: Hill, Janice. 1999. Weed Report: <i>Cardaria draba</i> ssp. <i>chalepensis</i>. TNC Wildland Weed Survey. Miller, TW. 1991. Hoary cress and related whitetops. PNW Weeds 359. Lyons, KE. 2000. Element Stewardship Abstract: <i>Cardaria draba</i>, <i>C. chalepensis</i>, <i>C. pubescens</i>. The Nature Conservancy Wildland Invasive Species Team. Anonymous. Montana Omes and Land website: Noxious Weeds: hoary cress (<i>C. chalepensis</i>). Accessed 8/2004. Kadrmas, T., WS Johnson. UNR Cooperative Extension Fact Sheet FS-02-56: Managing hoary cress. Accessed 8/2004 www.unce.unr.edu.</p>	
<p>Question 1.3 Impact on higher trophic levels</p>	<p>C Other Pub. Mat'l back</p>
<p>Identify type of impact or alteration: Flowers often visited by insects. "Reduces native biodiversity and forage quality." Reduces available forage for livestock. Toxic to cattle. Provide nectar for honeybees.</p>	
<p>Rationale: Unclear whether <i>C. chalepensis</i> significantly reduces forage (or poses a poisoning threat to) wildlife in California.</p>	
<p>Sources of information: Mulligan, GA, JN Findlay. 1973. 3. <i>Cardaria draba</i>, <i>C. chalepensis</i>, and <i>C. pubescens</i>.</p>	

<p>The Biology of Canadian Weeds. Canadian Journal of Plant Science 54: 149-160.</p> <p>Lyons, KE. 2000. Element Stewardship Abstract: Cardaria draba, C. chalepensis, C. pubescens. The Nature Conservancy Wildland Invasive Speices Team.</p> <p>Anonymous. Montana omes and Land website: Noxious Weeds: hoary cress (C. chalepensis). Accessed 8/2004.</p> <p>Kadrmas, T., WS Johnson. UNR Cooperative Extension Fact Sheet FS-02-56: Managing hoary cress. Accessed 8/2004 www.unce.unr.edu.</p>	
<p>Question 1.4 Impact on genetic integrity</p>	<p>D Other Pub. Mat'l back</p>
<p>Identify impacts: No native members of the genus in California.</p>	
<p>Rationale: All Cardaria spp in CA are introduced.</p>	
<p>Sources of information: CalFlora database. www.calflora.org. Accessed 8/2004</p>	
<p>Question 2.1 Role of anthropogenic and natural disturbance in establishment</p>	<p>B Other Pub. Mat'l back</p>
<p>Describe role of disturbance: Establishes more readily on irrigated land. Heavy grazing may encourage establishment. Invasion potential is greater under conditions of disturbance.</p>	
<p>Rationale: Literature indicates that disturbance increases establishment, but is not necessary under all conditions.</p>	
<p>Sources of information: Mulligan, GA, JN Findlay. 1973. 3. Cardaria draba, C. chalepensis, and C. pubescens. The Biology of Canadian Weeds. Canadian Journal of Plant Science 54: 149-160.</p> <p>Lyons, KE. 2000. Element Stewardship Abstract: Cardaria draba, C. chalepensis, C. pubescens. The Nature Conservancy Wildland Invasive Speices Team.</p> <p>CDFa Encycloweedea: www.cdfa.ca.gov Accessed 8/2004.</p>	
<p>Question 2.2 Local rate of spread with no management</p>	<p>A Rev'd, Sci. Pub'n back</p>
<p>Describe rate of spread: In Saskatchewan, C. chalepensis often spreads more than 2 ft in diameter/year under favorable conditions (moisture present, no shrubs). In sites dominated by shrubs, however, it receded in size. In MT, a single plant can grow to cover 12 ft in diameter in its first year, growing 2-5 ft in diameter in subsequent years.</p>	
<p>Rationale: Under favorable conditions (likely present if establishment occurs) the plant can spread very quickly.</p>	
<p>Sources of information: Mulligan, GA, JN Findlay. 1973. 3. Cardaria draba, C. chalepensis, and C. pubescens. The Biology of Canadian Weeds. Canadian Journal of Plant Science 54: 149-160.</p> <p>Anonymous. Montana omes and Land website: Noxious Weeds: hoary cress (C. chalepensis). Accessed 8/2004.</p>	
<p>Question 2.3 Recent trend in total area infested within state</p>	<p>C Other Pub. Mat'l back</p>
<p>Describe trend: Since the plant is on the state noxious weed list, it is often controlled. Populations are not</p>	

<p>common in the state and it does not appear to be spreading, perhaps do to the management efforts. It may even be declining.</p>	
<p>Rationale: enter text here</p>	
<p>Sources of information: California Dept. of Food and Agriculture. Encycloweedia. Accessed 8/2004. www.cdfa.ca.gov.</p>	
<p>Question 2.4 Innate reproductive potential</p>	<p>A Rev'd, Sci. Pub'n back</p>
<p>Describe key reproductive characteristics: Vigorously creeping horizontal roots can create clonal colonies. Under favorable conditions, plants can increase vegetatively by more than 61 cm radius/year. Self-incompatible. Root fragments can generate new plants. Flowers April-August. Plants do not flower the first year. One flowering stem can produce up to 850 mature pods. Will regenerate from roots after mowing (and probably grazing). Has a higher ability to recover from injury than <i>C. draba</i>. 52% of seeds can remain viable after 3 years. Under favorable conditions, seeds produced every year after the first. Under unfavorable (dry) conditions seeds are sometimes not produced. Under favorable conditions, a single stem can produce 1000-5000 seeds.</p>	
<p>Rationale: 11 points.</p>	
<p>Sources of information: DiTomaso, J, E. Healy. Weeds of California and Other Western States. Not yet published.</p> <p>Mulligan, GA, JN Findlay. 1973. 3. <i>Cardaria draba</i>, <i>C. chalepensis</i>, and <i>C. pubescens</i>. The Biology of Canadian Weeds. Canadian Journal of Plant Science 54: 149-160.</p> <p>Bossard, CC. JM Randall, MC Hoshovsky. 2000. Invasive Plants of California's Wildlands. University of California Press, Berkeley: 81-86.</p>	
<p>Question 2.5 Potential for human-caused dispersal</p>	<p>C Other Pub. Mat'l back</p>
<p>Identify dispersal mechanisms: Cultivation can enhance dispersal by moving root fragments. Seeds and root fragments can be spread by vehicles and machinery, and seeds can be moved in hay and crop seed. Movement to wildland areas however, is probably uncommon.</p>	
<p>Rationale: Potential exists for dispersal as a contaminant. Commonly spread by human activities. Illegal to import products contaminated with <i>C. chalepensis</i> into CA. (May be spread within CA.)</p>	
<p>Sources of information: DiTomaso, J, E. Healy. Weeds of California and Other Western States. Not yet published.</p> <p>Anonymous. Montana omes and Land website: Noxious Weeds: hoary cress (<i>C. chalepensis</i>). Accessed 8/2004. CDFa. Encycloweedia. www.cdfa.ca.gov. Accessed 8/2004.</p> <p>Bossard, CC. JM Randall, MC Hoshovsky. 2000. Invasive Plants of California's Wildlands. University of California Press, Berkeley: 81-86.</p>	

Question 2.6 Potential for natural long-distance dispersal	C Other Pub. Mat'l back
Identify dispersal mechanisms: Seeds can be spread by wind and on waterways. Seeds remain viable for only 1 month in manure. Root fragments carried by streams. Most seed probably fall directly to the soil beneath the parent plant and very few seeds are transported long distances.	
Rationale: At least occasionally spread by animal and abiotic action.	
Sources of information: Anonymous. Montana omes and Land website: Noxious Weeds: hoary cress (<i>C. chalepensis</i>). Accessed 8/2004. CDFA. Encycloweedia. www.cdfa.ca.gov. Accessed 8/2004. Bossard, CC. JM Randall, MC Hoshovsky. 2000. Invasive Plants of California's Wildlands. University of California Press, Berkeley: 81-86.	
Question 2.7 Other regions invaded	C Rev'd, Sci. Pub'n back
Identify other regions: State-listed noxious weed in AZ, OR, and UT. Common in fields in western and central Canada. Found along watercourses in Canada. Invades bluebunch wheatgrass, Idaho fescue, and snowberry-rose communities in ID.	
Rationale: Invades similar ecotypes in other areas. (May invade ecotypes not yet invaded in CA, information lacking.)	
Sources of information: DiTomaso, J, E. Healy. Weeds of California and Other Western States. Not yet published. Mulligan, GA, JN Findlay. 1973. 3. <i>Cardaria draba</i> , <i>C. chalepensis</i> , and <i>C. pubescens</i> . The Biology of Canadian Weeds. Canadian Journal of Plant Science 54: 149-160. Hill, Janice. 1999. Weed Report: <i>Cardaria draba</i> ssp. <i>chalepensis</i> . TNC Wildand Weed Survey.	
Question 3.1 Ecological amplitude/Range	B Other Pub. Mat'l back
Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: Disturbed sites, moderately moist sites. A problem in crops. Roadsides, ditches. Needs moisture to spread and thrive. First collected in Chino, CA in 1918, probably introduced in alfalfa seed imported from Turkestan. Found in riparian-upland ecotones.	
Rationale: Invades at least 2 major ecotypes in CA.	
Sources of information: DiTomaso, J, E. Healy. Weeds of California and Other Western States. Not yet published. Mulligan, GA, JN Findlay. 1973. 3. <i>Cardaria draba</i> , <i>C. chalepensis</i> , and <i>C. pubescens</i> . The Biology of Canadian Weeds. Canadian Journal of Plant Science 54: 149-160. CDFA. Encycloweedia. www.cdfa.ca.gov. Accessed 8/2004. Bossard, CC. JM Randall, MC Hoshovsky. 2000. Invasive Plants of California's Wildlands. University of California Press, Berkeley: 81-86.	

Question 3.2 Distribution/Peak frequency	D Other Pub. Mat'l back
Describe distribution: More frequent in the Sacramento Valley, southern San Joaquin Valley, and northern Siskiyou Co, but not common. Not nearly as widespread as either <i>Cardaria draba</i> or <i>Cardaria pubescens</i> .	
Rationale: Occurs in less than 5% of the meadows, seeps, and riparian scrub in CA.	
Sources of information: DiTomaso, J, E. Healy. Weeds of California and Other Western States. Not yet published. Mulligan, GA, JN Findlay. 1973. 3. <i>Cardaria draba</i> , <i>C. chalepensis</i> , and <i>C. pubescens</i> . The Biology of Canadian Weeds. Canadian Journal of Plant Science 54: 149-160. Anonymous. Map of <i>C. chalepensis</i> in CA, 1935-1984. Bossard, CC, JM Randall, MC Hoshovsky. 2000. Invasive Plants of California's Wildlands. University of California Press, Berkeley: 81-86. Observational, Joe DiTomaso, 2004.	

Worksheet A

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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	No: 0 pt
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 **Total Unknowns**

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	score
	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	score
	valley and foothill grassland	score
	Great Basin grassland	score
	vernal pool	score
	meadow and seep	D. present
	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	score
	riparian scrub (incl. desert washes)	D. present
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).