

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):	Acrotilon repens
Synonyms:	Centaurea repens, hardheads, creeping knapweed, mountain bluet, Turkestan thistle
Common names:	Russian knapweed
Evaluation date (mm/dd/yy):	07/20/04
Evaluator #1 Name/Title:	Rob Wilson, Weed Ecology/Cropping Systems Farm Advisor
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Section below for list committee use—please leave blank

List committee members:	Peter Warner, Cynthia Roye, Alison Stanton, Jake Sigg, John Randall, Joe DiTomaso
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	B	Other Pub. Mat'l
1.2	Impact on plant community	A	Rev'd, Sci. Pub'n
1.3	Impact on higher trophic levels	B	Rev'd, Sci. Pub'n
1.4	Impact on genetic integrity	D	Anecdotal

“Impact”
Enter four characters from Q1.1-1.4 below:
BABD
Use matrix determine the score; enter below:
B

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

“Invasiveness”
For questions at left, recall that an A gets 3 points, a B gets 2, a C gets 1, and a D or U gets=0. Enter the sum total of all points for Q2.1-2.7 below:
14
Use matrix to determine score and enter below:
B

“Plant Score”
Using matrix, determine the Overall Score and Alert Status from the three section scores and enter them below:
Medium
No Alert

3.1	Ecological amplitude/Range	A	Observational
3.2	Distribution/Peak frequency Wksht C	D	Observational

“Distribution”
Use matrix determine the score; enter below:
B

Table 3. Documentation

<p>Question 1.1 Impact on abiotic ecosystem processes</p>	<p>B Other Pub. Mat'l back</p>
<p>Identify ecosystem processes impacted: Very little information is available regarding Russian knapweed's affects on abiotic ecosystem processes. Since russian knapweed produces a deep, extensive root system, the plant likely has significant effects on soil moisture levels especially at deeper depths compared to native grassland ecotypes. The plant commonly forms monoculture stands and may influence soil erosion and soil infiltration rates compared to native ecotypes. Russian knapweed is also commonly found in saline/sodic soils and may change soluble salt distributions in the soil profile. Some evidence suggests that it leads to the accumulation of high levels of zinc in the soil surface which can alter the ability for more desirable plants to develop.</p>	
<p>Rationale: enter text here</p>	
<p>Sources of information: Bottoms, R., C.J.Nelson, T.D. Whitson, and J.H. Coutts. 1999. Factors being considered that make russian knapweed a highly competitive plant. Proc. Western Soc. Weed Sci. 52:73</p>	
<p>Question 1.2 Impact on plant community composition, structure, and interactions</p>	<p>A Other Pub. Mat'l back</p>
<p>Identify type of impact or alteration: Russian knapweed will commonly form monoculture stands especially in disturbed areas. In open areas, Russian knapweed often spreads aggressively covering over 12m² within a two year period. Russian knapweed stands are also very persistent with documented infestations dominating a site for >75 years.</p>	
<p>Rationale: Russian knapweed is a strong competitor. It can grow in saline/sodic conditions and effectively competes for soil moisture and nutrients with several native plants. Russian knapweed's deep root system allows the plant to mine deep soil moisture that most native grasses and shrub cannot obtain. Russian knapweed is allelopathic and inhibits the growth of several plants. Russian knapweed is also unpalatable to most grazers and tends to dominate rangeland and grazed areas.</p>	
<p>Sources of information: Carpenter, Alan and Murry, Thomas. 1998. <i>Acroptilon repens</i>. Element Stewardship abstract. The Nature Conservancy. http://tncweeds.ucdavis.edu/esadocs/acrorepe.html</p> <p>Zouhar, Kristin L. 2001. <i>Acroptilon repens</i>. In: Fire Effects Information System, [Online]. USDA, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. http://www.fs.fed.us/dtabase/feis</p> <p>Beck, K.G. 2004. Russian Knapweed. Colorado State University Cooperative Extension Fact Sheet. no. 3.111. http://www.ext.colostate.edu</p> <p>Whitson, Tom. 1999. Russian Knapweed. In: Sheley, Roger; Petroff, Janet., eds. <i>Biology and Management of Noxious Rangeland Weeds</i>. Corvallis, OR: Oregon State University Press: 315-322.</p>	
<p>Question 1.3 Impact on higher trophic levels</p>	<p>B Other Pub. Mat'l back</p>
<p>Identify type of impact or alteration: Russian knapweed is generally avoided by grazing animals due to it's bitter taste. Prolonged consumption of Russian knapweed is toxic to horses. Russian knapweed is grazed by bighorn sheep in British Columbia. Birds and rodents eat the seed. The BLM estimates an annual loss of 55% in livestock carrying capacity.</p>	
<p>Rationale: enter text here</p>	

Sources of information: Zouhar, Kristin L. 2001. <i>Acroptilon repens</i> . In: Fire Effects Information System, [Online]. USDA, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. http://www.fs.fed.us/dtabase/feis	
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Question 1.4 Impact on genetic integrity	D Other Pub. Mat'l back
Identify impacts: The author was not able to find any native plants that might hybridize with Russian knapweed. No plants native to CA are in the <i>Acroptilon</i> or <i>Centaurea</i> genus.	
Rationale: enter text here	
Sources of information: The Jepson manual. higher plants of California/ James C. Hickman, editor. 1993. University of California Press.	
Question 2.1 Role of anthropogenic and natural disturbance in establishment	B Other Pub. Mat'l back
Describe role of disturbance: Russian knapweed typically invades disturbed, open sites such as roadsides, riverbanks, irrigation ditches, pasture, waste places, and cropland. Russian knapweed does not readily establish/thrive in healthy, natural habitats because it's sensitive to shading and aggressive competition with other plants. Occasionally, Russian knapweed is found growing in healthy native plant communities, especially in ecotypes that lack aggressive plant competition or areas that border sites with recent natural or anthropogenic disturbance. Once established in disturbed areas, Russian knapweed commonly spreads into greasewood habitats in NE California.	
Rationale: enter text here	
Sources of information: Carpenter, Alan and Murry, Thomas. 1998. <i>Acroptilon repens</i> . Element Stewardship abstract. The Nature Conservancy. http://tncweeds.ucdavis.edu/esadocs/acrorepe.html	
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Personal Observations by Rob Wilson.	
Question 2.2 Local rate of spread with no management	A Other Pub. Mat'l back
Describe rate of spread: The local spread rate of Russian knapweed varies quite a bit from location to location depending on soil type, soil moisture, disturbance, and the existing plant community. Under favorable conditions, Russian knapweed will spread quite rapidly extending radially in all directions (creeping roots) over	

<p>12m2 during a two year period. Tom Whitson claimed an 11% average increase in Russian knapweed populations in Wyoming. The BLM estimates an average annual rate of spread of 8% in the northwestern US.</p>	
<p>Rationale: enter text here</p>	
<p>Sources of information: Carpenter, Alan and Murry, Thomas. 1998. <i>Acroptilon repens</i>. Element Stewardship abstract. The Nature Conservancy. http://tncweeds.ucdavis.edu/esadocs/acrorepe.html</p> <p>Zouhar, Kristin L. 2001. <i>Acroptilon repens</i>. In: Fire Effects Information System, [Online]. USDA, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. http://www.fs.fed.us/dtabase/feis</p> <p>Whitson, Tom. 1999. Russian Knapweed. In: Sheley, Roger; Petroff, Janet., eds. <i>Biology and Management of Noxious Rangeland Weeds</i>. Corvallis, OR: Oregon State University Press: 315-322.</p>	
<p>Question 2.3 Recent trend in total area infested within state</p>	<p>B Other Pub. Mat'l back</p>
<p>Describe trend: Russian knapweed infestations have been documented throughout most of California (32 counties). Russian knapweed invades a wide range of ecosystems, plant communities, and soils, but Russian knapweed's rate of spread in California is quite dependent on location and land-use. Russian knapweed is most invasive on open, disturbed sites. It will grow on several soil types, but it spreads and thrives best in arid areas with clay soil. It reproduces primarily by root and tends spread at alarming rates following soil disturbance. Russian knapweed populations located in poor growing conditions have remained static with minimal spread, while other infestations growing under optimal conditions have spread at alarming rates. The rating given in this section is based on the author's estimate of average spread throughout the state.</p>	
<p>Rationale: enter text here</p>	
<p>Sources of information: Carpenter, Alan and Murry, Thomas. 1998. <i>Acroptilon repens</i>. Element Stewardship abstract. The Nature Conservancy. http://tncweeds.ucdavis.edu/esadocs/acrorepe.html</p> <p>Zouhar, Kristin L. 2001. <i>Acroptilon repens</i>. In: Fire Effects Information System, [Online]. USDA, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. http://www.fs.fed.us/dtabase/feis</p> <p>Whitson, Tom. 1999. Russian Knapweed. In: Sheley, Roger; Petroff, Janet., eds. <i>Biology and Management of Noxious Rangeland Weeds</i>. Corvallis, OR: Oregon State University Press: 315-322.</p>	
<p>Question 2.4 Innate reproductive potential</p>	<p>A Other Pub. Mat'l back</p>
<p>Describe key reproductive characteristics: Russian knapweed reproduces by adventitious buds on horizontally spreading roots and by seed. Local infestations increase primarily by shoots arising from the root system. A single knapweed plant can produce 1,200 seeds per year. Seed viability data differs from 2-3 years up to 9 years under dry storage. Fragmented roots quickly grow into new plants.</p>	
<p>Rationale: enter text here</p>	
<p>Sources of information: Carpenter, Alan and Murry, Thomas. 1998. <i>Acroptilon repens</i>. Element Stewardship abstract. The Nature Conservancy. http://tncweeds.ucdavis.edu/esadocs/acrorepe.html</p> <p>Zouhar, Kristin L. 2001. <i>Acroptilon repens</i>. In: Fire Effects Information System, [Online]. USDA, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. http://www.fs.fed.us/dtabase/feis</p>	

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Question 2.5 Potential for human-caused dispersal	B Other Pub. Mat'l back
Identify dispersal mechanisms: Russian knapweed commonly infests cropland and can be found as a contaminant (seeds and propagules) in hay, straw, and fill dirt. Plants often grow in roadsides, ditches, and parking areas and are spread along transportation corridors.	
Rationale: enter text here	
Sources of information: Carpenter, Alan and Murry, Thomas. 1998. Acroptilon repens. Element Stewardship abstract. The Nature Conservancy. http://tncweeds.ucdavis.edu/esadocs/acrorepe.html Zouhar, Kristin L. 2001. Acroptilon repens. In: Fire Effects Information System, [Online]. USDA, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. http://www.fs.fed.us/dtabase/feis Whitson, Tom. 1999. Russian Knapweed. In: Sheley, Roger; Petroff, Janet., eds. Biology and Management of Noxious Rangeland Weeds. Corvallis, OR: Oregon State University Press: 315-322.	
Question 2.6 Potential for natural long-distance dispersal	C Other Pub. Mat'l back
Identify dispersal mechanisms: Plants generally spread over short distances via root to form dense patches, but plants growing near waterways can easily spread over long distances via propagules and seed washing downstream. However, the plant does not generally grow near water sources. Seasonal high water flow or floods often spread plants over large distances. Seeds may occasionally be spread by rodents and birds.	
Rationale: enter text here	
Sources of information: Zouhar, Kristin L. 2001. Acroptilon repens. In: Fire Effects Information System, [Online]. USDA, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. http://www.fs.fed.us/dtabase/feis Whitson, Tom. 1999. Russian Knapweed. In: Sheley, Roger; Petroff, Janet., eds. Biology and Management of Noxious Rangeland Weeds. Corvallis, OR: Oregon State University Press: 315-322.	
Question 2.7 Other regions invaded	C Observational back
Identify other regions: Russian knapweed is wide spread in the western United States and is currently found in at least 412 counties in 21 states.	
Rationale: enter text here	
Sources of information: Observations by Rob Wilson, Peter Warner, Joe DiTomaso, John Randall, Jake Sigg.	
Question 3.1 Ecological amplitude/Range	A Other Pub. Mat'l back
Describe ecological amplitude, identifying date of source information and approximate date of introduction to	

the state, if known: Russian knapweed has wide ecological amplitude and is found in several ecological types. First introduced in California between 1910-1914.	
Rationale: enter text here	
Sources of information: Carpenter, Alan and Murry, Thomas. 1998. <i>Acroptilon repens</i> . Element Stewardship abstract. The Nature Conservancy. http://tncweeds.ucdavis.edu/esadocs/acrorepe.html Zouhar, Kristin L. 2001. <i>Acroptilon repens</i> . In: Fire Effects Information System, [Online]. USDA, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. http://www.fs.fed.us/dtabase/feis Whitson, Tom. 1999. Russian Knapweed. In: Sheley, Roger; Petroff, Janet., eds. <i>Biology and Management of Noxious Rangeland Weeds</i> . Corvallis, OR: Oregon State University Press: 315-322.	
Question 3.2 Distribution/Peak frequency	D Observational back
Describe distribution: More common in northern California, but not widespread at the present time.	
Rationale: enter text here	
Sources of information: Wilson, R. and DiTomaso, J.M. - observational	

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	No: 0 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	Yes: 1 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	D. presen
	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	D. presen
	Great Basin grassland	D. presen
	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	D. presen
	riparian woodland	D. presen
	riparian scrub (incl. desert washes)	D. presen
Woodland	cismontane woodland	score
	piñon and juniper woodland	D. presen
	Sonoran thorn woodland	score
Forest	broadleaved upland forest	D. presen
	North Coast coniferous forest	score
	closed cone coniferous forest	score
	lower montane coniferous forest	D. presen
	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).