

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):	Euphorbia esula L.
Synonyms:	Euphorbia discolor, Euphorbia virgata, Euphorbia gmelinii
Common names:	leafy spurge, faitours-grass, wolf’s milk
Evaluation date (mm/dd/yy):	1/18/05, info added 5/3/05
Evaluator #1 Name/Title:	Elizabeth Brusati, project manager
Affiliation:	California Invasive Plant Council
Phone numbers:	510-843-3902
Email address:	edbrusati@cal-ipc.org
Address:	1442A Walnut St. #462, Berkeley, CA 94709
Evaluator #2 Name/Title:	enter text here
Affiliation:	enter text here
Phone numbers:	enter text here
Email address:	enter text here
Address:	enter text here

Section below for list committee use—please leave blank

List committee members:	Carla Bossard, Matt Brooks, Joe DiTomaso, Jake Sigg, Cynthia Roye, Jake Sigg, Peter Warner
Committee review date:	5/16/05
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	Observational
1.2	Impact on plant community	A	Rev'd, Sci. Pub'n
1.3	Impact on higher trophic levels	A	Rev'd, Sci. Pub'n
1.4	Impact on genetic integrity	U	Rev'd, Sci. Pub'n

Impact

Enter four characters from Q1.1-1.4 below:

BAAU

Using matrix, determine score and enter below:

A

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

Invasiveness

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

19

Use matrix to determine score and enter below:

A

Plant Score

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

High Alert

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

Distribution

Using matrix, determine score and enter below:

C

Table 3. Documentation

<p>Question 1.1 Impact on abiotic ecosystem processes</p>	<p>B Observational back</p>
<p>Identify ecosystem processes impacted: In the Dakotas and other highly infested states, lands invaded by leafy spurge renders the land completely unusable from a soil and water profile standpoint. Causes lower water tables and erosion.</p>	
<p>Rationale: enter text here</p>	
<p>Sources of information: Pirosko, Carri., California Dept. of Food and Agriculture. Personal communication. 3/11/05.</p>	
<p>Question 1.2 Impact on plant community composition, structure, and interactions</p>	<p>A Rev'd, Sci. Pub'n back</p>
<p>Identify type of impact or alteration: Allelopathic, dense roots outcompete other plants, reduces germination of native plants. Threatens the federally threatened species western prairie fringed orchid in North Dakota.</p>	
<p>Rationale: Cover values of native species in Canada were negatively correlated with spurge (1). Germination and growth of other plants are inhibited by extracts from the roots of spurge (2). Growth of seedlings can be inhibited up to 60% when leafy spurge litter, roots, or leaves are incorporated into the soil (3).</p>	
<p>Sources of information: 1. Belcher J.W., and S.D. Wilson S.D. 1989. Leafy Spurge and the Species Composition of a Mixed-grass Prairie. <i>Journal of Range Management</i> 42(2): 172-175</p> <p>2. Best K.F., G. G. Bowes, A. G. Thomas, and M. G. Maw. 1980. The Biology of Canadian Weeds .39 <i>Euphorbia esula</i> L. <i>Canadian Journal of Plant Science</i> 60: 651-663</p> <p>3. Steenhagen D.A., and R. L. Zimdahl R.L. 1979. Allelopathy of Leafy Spurge (<i>Euphorbia esula</i>). <i>Weed Science</i> 27(1): 1-3.</p> <p>4. Lym, R.G. 2005. Leafy spurge (<i>Euphorbia esula</i>). In, <i>Invasive plants of Range and Wildlands and Their Environmental, Economic, and Societal Impacts</i>. Pp. 99-118.</p>	
<p>Question 1.3 Impact on higher trophic levels</p>	<p>A Rev'd, Sci. Pub'n back</p>
<p>Identify type of impact or alteration: Wildlife avoids eating it and it causes skin irritation. Reduces sparrow populations. Reduces habitat utilization by bison, deer, and elk.</p>	
<p>Rationale: Caustic latex produced by plant causes blistering and loss of hair on horses' feet, and presumably has the same effect on wildlife (1).</p>	
<p>Sources of information: 1. Best et al. 1980</p> <p>Lym, R.G. 2005. Leafy spurge (<i>Euphorbia esula</i>). In, <i>Invasive plants of Range and Wildlands and Their Environmental, Economic, and Societal Impacts</i>. Pp. 99-118.</p>	

Question 1.4 Impact on genetic integrity	U No information back
Identify impacts: There are seven native Euphorbia species in California (1) and E. esula is known to hybridize (2). The leafy spurge present in the U.S. may actually be a hybrid between Old World spurges, resulting in genetic plasticity that allows it to adapt to a variety of conditions (3).	
Rationale: enter text here	
Sources of information: 1. Hickman, J. C. (ed.) 1993. The Jepson Manual, Higher Plants of California. University of California Press. Berkeley, CA 2. Best et al. 1980 3. Goodwin, K., R. Sheley, R. Nowierski, and R. Lym. 2003. Leafy Spurge: Biology, Ecology and Management. Montana State University Extension Publication . http://www.montana.edu/wwwpb/pubs/eb134.pdf	
Question 2.1 Role of anthropogenic and natural disturbance in establishment	A Rev'd, Sci. Pub'n back
Describe role of disturbance: Mostly invades disturbed sites but is listed in native grasslands as well.	
Rationale: In one study, 95% of the leafy spurge infestations were on disturbed sites such as trails, roads, and plowed firebreaks (1). Can occur in croplands, abandoned fields, native grasslands, and among trees and shrubs (2). Emergence on cultivated plots was 8x greater than on undisturbed grasslands (2). In Saskatchewan, occurs in "almost every terrestrial habitat with the exception of coniferous forest" (3).	
Sources of information: 1. Belcher and Wilson 1989 2. Best et al. 1980 3. Selleck G.W., R.T. Coupland, and C. Frankton. 1962. Leafy Spurge in Saskatchewan. Ecological Monographs 32(1):1-28.	
Question 2.2 Local rate of spread with no management	A Rev'd, Sci. Pub'n back
Describe rate of spread: Average annual spread within stands of brome in Canada was 50cm, while spread in ungrazed pasture was 64cm (1). In absence of competition, seedling roots can penetrate to three feet deep and spread 40 inches laterally in four months (2). Cattle will generally avoid leafy spurge and subsequently overgraze more desirable neighboring plants. This type of selection allows leafy spurge to rapidly establish large dense stands (3).	
Rationale: enter text here	
Sources of information: 1. Best et al. 1980 2. Goodwin et al. 2003 3. California Dept. of Food and Agriculture, Encyclopedica: Notes on Identification, Biology, and Management of Plants Defined as Noxious Weeds by California Law. Available: http://www.cdfa.ca.gov/phpps/ipc/weedinfo/euphorbia.htm . Accessed 5/3/05	

Question 2.3 Recent trend in total area infested within state	B Observational back
Describe trend: The only large infestation (Siskiyou county, Klamath and Scott Rivers) is increasing. Small infestations (<100 plants each) in Modoc, Lassen, and Sierra counties are stable to decreasing.	
Rationale: enter text here	
Sources of information: Pirosko, Carri., California Dept. of Food and Agriculture. Personal communication. 3/11/05.	
Question 2.4 Innate reproductive potential	A Rev'd, Sci. Pub'n back
Describe key reproductive characteristics: Perennial forb. Can reproduce in first year (1). Produces dense roots that spread rapidly. Most spread is vegetative (1). Usually requires cross-pollination, but can occasionally self-pollinate (2). New roots can branch from root nodes. Can resprout easily when roots are cut. Can produce 2500 seeds per m ² (1). After three years of burial, 64% of seeds were still viable at 20cm depth (1). High temperatures cause capsules to dehisce and throw seeds up to 5m from parent plant (1). Seeds can remain viable for 8 years (3). (Another study listed 5 yrs dormancy (4)). In Montana, seedlings rarely reproduce in first year (5). Roots can remain dormant until growing conditions are favorable (5), and can produce vegetative shoots for 5 years from a depth of 3 ft. after the major portion of the root system has been removed (4). In one study, patches increased by 30 - 387x within 5 years (4). Seedlings can reproduce vegetatively after 7-10 days emergence (4).	
Rationale:	
Sources of information: 1. Best et al. 1980 2. Selleck et al. 1962 3. Foley M.E. 2004. Leafy Spurge (<i>Euphorbia esula</i>) Seed Dormancy. <i>Weed Science</i> 52: 74-77 4. Selleck et al. 1962 5. Goodwin et al. 2003.	
Question 2.5 Potential for human-caused dispersal	B Rev'd, Sci, Pub'n back
Identify dispersal mechanisms: Domestic animals (1). Transport on farm or other machinery (2). Probably not intentional introduction. Most likely sources are driving tractor/ATV through patch and dispersing plant seeds or parts to another location; walking/hiking/rafting along river; new infestation brought into state through fire equipment, logging equipment or other gear. More likely to be spread by non-human dispersal (3).	
Rationale: enter text here	
Sources of information: 1. Selleck et al. 1962 2. Goodwin et al. 2003 3. Pirosko, Carri., California Dept. of Food and Agriculture. Personal communication. 3/11/05.	

Question 2.6 Potential for natural long-distance dispersal	A Rev'd, Sci. Pub'n back
Identify dispersal mechanisms: Spread by birds and animals. Seeds can float and germinate in water (1). Mostly dispersed by water movement, especially during floods (2).	
Rationale: In Saskatchewan, often found along ditches or other waterways.	
Sources of information: 1. Selleck et al. 1962. 2. Pirosko, Carri., California Dept. of Food and Agriculture. Personal communication. 3/11/05.	
Question 2.7 Other regions invaded	A Rev'd, Sci. Pub'n back
Identify other regions: Native to Europe. Present throughout US and into southern Canada (1, 2). Worldwide, ranges from xeric to subhumid habitats, and subtropical to subarctic (2). In Canada, occurs in abandoned pastures, native grasslands, and among trees and shrubs (3). Populations are small in California so there is a large potential for spread (4).	
Rationale: enter text here	
Sources of information: 1. USDA, NRCS. 2004. The PLANTS Database, Version 3.5 (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA. 2. Selleck et al. 1962 3. Best et al. 1980 4. Pirosko, Carri. California Dept. of Food and Agriculture. Personal communication. 3/11/05.	
Question 3.1 Ecological amplitude/Range	B Other Pub. back
Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: Uncommon. Modoc Plateau (sw Modoc, se Lassen cos.). Previous infestations now considered eradicated in Cascade Ranges (ne Siskiyou Co.), eastern Klamath Ranges (cw Siskiyou Co.), southern North Coast Ranges (nw Sonoma Co.); to eastern U.S. To 1400 m (4600 ft) (1). In California, invades pasture, rangeland, borders of production ag fields, forested/woodland areas bordering range/pasture lands, sand bars in and along the Klamath River, and dry, upland forested areas such as juniper forest. May have been originally introduced into the state by miners as a medicinal plant (2).	
Rationale: Reported collection from coastal sage scrub in Los Angeles County (3) appears to be an oddity, as there is no further information on it, and the site now contains Euphorbia terracina.	
Sources of information: 1. California Dept. of Food and Agriculture, Encycloweedia: Notes on Identification, Biology, and Management of Plants Defined as Noxious Weeds by California Law. Available: http://www.cdfa.ca.gov/phpps/ipc/weedinfo/euphorbia.htm . Accessed 5/3/05 2. Pirosko, Carri., California Dept. of Food and Agriculture. Personal communications. 3/11/05 and 5/16/05. 3. Unknown. 1997. Noteworthy Collections, California. Madrono. 44(2):203	

Question 3.2 Distribution/Peak frequency	D Observational back
Describe distribution: Uncommon and only scattered populations in California so far.	
Rationale: enter text here	
Sources of information: Pirosko, Carri., California Dept. of Food and Agriculture. Personal communication. 3/11/05.	

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.	Unknown: 0 pts
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	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	No: 0 pts
Resprouts readily when cut, grazed, or burned	Yes: 1 pt
	9 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	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	D
	Great Basin grassland	D
	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	score
	riparian scrub (incl. desert washes)	score
Woodland	cismontane woodland	D
	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).