

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):	Eucalyptus globulus Labill.
Synonyms:	None known
Common names:	bluegum; Tasmanian bluegum; bluegum eucalyptus
Evaluation date (mm/dd/yy):	03/19/04
Evaluator #1 Name/Title:	Peter J. Warner
Affiliation:	California Dept. of Parks and Recreation; Cal-IPC
Phone numbers:	(707) 937-2278; (707) 937-9172
Email address:	corylus@earthlink.net; pwarner@mcn.org; pwarn@parks.ca.gov
Address:	P. O. Box 603, Little River, CA 95456
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, Joe DiTomaso, John Randall, Cynthia Roye, Jake Sigg, Alison Stanton, Peter Warner
Committee review date:	03/19/04
List date:	enter text here
Re-evaluation date(s):	enter text here

Step 2a: Complete the first portion of Table 2 by selecting the appropriate response to each of the thirteen criteria questions in Part II. Select the correct letter code from the “score” pull-down menus.

For question 2.4, first complete Worksheet A located below Table 3.

For questions 3.1 and 3.2, first complete the appropriate ecological type worksheet for your state (either Worksheet B, C, or D found below Table 3) by following the instructions in Section 3, then respond to questions 3.1 and 3.2.

Table 2. Criteria, Section, and Overall Scores

1.1	Impact on abiotic ecosystem processes	B	Rev'd, Sci. Pub'n
1.2	Impact on plant community	A	Rev'd, Sci. Pub'n
1.3	Impact on higher trophic levels	B	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:

BABD

Use matrix determine the score; enter below:

B

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

“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:

13

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	A	Other Pub. Mat'l
3.2	Distribution	C	Observational

“Distribution”

Use matrix determine the score; enter below:

B

Table 3. Documentation

<p>Question 1.1 Impact on abiotic ecosystem processes</p>
<p>Identify ecosystem processes impacted: 1. Changes fire intensity when growing in mixed stands with native tree species; 2. affects local soil moisture regimes and 3. light availability; 4. litter reduces nitrogen mineralization rates in soil; 5. purported to have impacts on soil chemistry and "allelopathic" effects on other species</p>
<p>Rationale: Effects are not lasting in the sense that tree removal can ameliorate impacts on ecological processes; effects are generally restricted to within stands</p>
<p>Sources of information: 1., 2. U. S. Dept. of Agriculture, Forest Service @ http://www.fs.fed.us/database/feis/plants/tree/eucglo/fire_ecology.html;</p> <p>Boyd, D. 2000. Eucalyptus globulus in Bossard, CC, JM Randall, and MC Hoshovsky. Invasive Plants of California's Wildlands. University of California Press, Berkeley. pp. 183-187.</p> <p>Bean, C and MJ Russo. 1986. The Nature Conservancy. Element Stewardship Abstract for Eucalyptus globulus (Tasmanian blue gum). Online @ http://members.lycos.co.uk/WoodyPlantEcology/invasive/invasive.htm</p> <p>3. Warner, PJ. 2004. Personal observations from 1980-2004 working in and adjacent to eucalyptus stands in Marin, Sonoma, and Mendocino Counties. 707/937-9172; pwarner@mcn.org.</p> <p>4. Aggangan, RG, AT O'Connell, JF McGrath, and B Dell. 1999. The effects of Eucalyptus globulus Labill. leaf litter on C and N mineralization in soils from pasture and native forest. Soil Biology and Biochemistry 31 (1999): 1481-1487.</p> <p>5. Del Moral, R, and CH Muller. 1969. Fog drip: a mechanism of toxin transport from Eucalyptus globulus. Bulletin of the Torrey Botanical Club 96(4): 467-475.</p> <p>Molina, A, MJ Reigosa, and A Carballeira. 1991. Release of allelochemical agents from litter, throughfall, and topsoil in plantations of Eucalyptus globulus Labill., in Spain. Journal of Chemical Ecology 17(1): 147-160.</p>
<p>Question 1.2 Impact on plant community composition, structure, and interactions</p>
<p>Identify type of impact or alteration: Alters canopy structure, displacing most native species; inhibits germination and growth of native plant species; introduces or alters composition of tree layer, and can eliminate shrub and herbaceous layers</p>
<p>Rationale: 1. observations of pronounced impacts in dense Eucalyptus stands; 2. published scientific research and review information</p>
<p>Sources of information: 1. Warner, PJ. 2004. Personal observations from 1980-2004 working in and adjacent to Eucalyptus stands in Marin, Sonoma, and Mendocino Counties, CA. 707/937-9172; pwarner@mcn.org.</p> <p>2. Del Moral, R, and CH Muller, 1969. Fog drip: a mechanisms of toxin transport from Eucalyptus globulus. Bulletin of the Torrey Botanical Club 96(4): 467-475.</p> <p>Watson, Kam. 2000. The effect of Eucalyptus and oak leaf extracts on California native plants. Online @ http://ist-socrates.berkeley.edu/~es196/projects/2000final/watson.pdf</p> <p>Bean, C, and MJ Russo. 1986. Element Stewardship Abstract for Eucalyptus globulus (Tasmanian blue gum). The Nature Conservancy, Arlington, VA. Online @ http://members.lycos.co.uk/WoodyPlantEcology/invasive/invasive.htm</p> <p>Molina, A, MJ Reigosa, and A Carballeira. 1991. Release of allelochemical agents from litter, throughfall, and</p>

topsoil in plantations of <i>Eucalyptus globulus</i> Labill., in Spain. <i>Journal of Chemical Ecology</i> 17(1): 147-160.
Question 1.3 Impact on higher trophic levels
Identify type of impact or alteration: replaces a diversity of native plant species, including forage for wildlife; purported to cause mortality in native bird species; may disrupt native bird migratory patterns; provides roost sites for migratory monarch butterflies; provides nest sites and perches for raptors
Rationale: impacts mixed; ecological niches for butterflies and raptors probably formerly filled by native plant species; loss of native plant forage for wildlife and migratory disruptions may have greater long-term impact on wider diversity of wildlife species, including invertebrates and microorganisms in soil
Sources of information: Warner, PJ. 2004. Personal observations from 1980-2004 working in and adjacent to <i>Eucalyptus</i> stands in Marin, Sonoma, and Mendocino Counties, CA. 707/937-9172; pwarner@mcn.org Stallcup, Rich. (date of original publication unknown) Deadly <i>Eucalyptus</i> . Point Reyes Bird Observatory Observer 108. Online @ http://www.prbo.org/OBSERVER/Observer108/Focus108.2.htm Bean, C, and MJ Russo. 1986. Element Stewardship Abstract for <i>Eucalyptus globulus</i> (Tasmanian blue gum). The Nature Conservancy, Arlington, VA. Online @ http://members.lycos.co.uk/WoodyPlantEcology/invasive/invasive.htm
Question 1.4 Impact on genetic integrity
Identify impacts: None known.
Rationale: Inferred from lack of congeners native to California.
Sources of information: Hickman, JC (ed.). 1993. <i>The Jepson Manual: Higher Plants of California</i> . University of California Press, Berkeley. pp. 766-768.
Question 2.1 Role of anthropogenic and natural disturbance in establishment
Describe role of disturbance: Germinates best on bare mineral soil (1), and litter and allelochemicals may inhibit germination (1, 2); germination in dense forests "difficult," (1) but establishment in undisturbed forests and scrub observed repeatedly (3)
Rationale: germination research cited in #1 below; personal observations
Sources of information: 1. Bean, C, and MJ Russo. 1986. Element Stewardship Abstract for <i>Eucalyptus globulus</i> (Tasmanian blue gum). The Nature Conservancy, Arlington, VA. Online @ http://members.lycos.co.uk/WoodyPlantEcology/invasive/invasive.htm 2. Molina, A, MJ Reigosa, and A Carballeira. 1991. Release of allelochemical agents from litter, throughfall, and topsoil in plantations of <i>Eucalyptus globulus</i> Labill., in Spain. <i>Journal of Chemical Ecology</i> 17(1): 147-160. Watson, Kam. 2000. The effect of <i>Eucalyptus</i> and oak leaf extracts on California native plants. Online @ http://ist-socrates.berkeley.edu/~es196/projects/2000final/watson.pdf 3. Warner, PJ. 2004. Personal observations from 1980-2004 working in and adjacent to <i>Eucalyptus</i> stands in

Marin, Sonoma, and Mendocino Counties, CA. 707/937-9172; pwarner@mcn.org.
Question 2.2 Local rate of spread with no management
Describe rate of spread: Once a tree matures and produces seed, it can produce a profusion of progeny within a few years; doubling of stand area within 10 years possible but not well documented
Rationale: Without quantitative data, this response is conservative; stands have certainly expanded far beyond initial plantings in many locations, based on unpublished photodocumentation (1, 2) and personal observations (3)
Sources of information: 1. Potts, Michael. 2003. About this edition. Caspar News. Online @ http://casparcommons.org/Press/News0305.htm . 2. Site Stewardship Program, Parks Conservancy. Unpublished photographs of Oakwood Valley, Marin Headlands, Golden Gate National Recreation Area. 3. Warner, PJ. 2004. Personal observations from 1980-2004 working in and adjacent to Eucalyptus stands in Marin, Sonoma, and Mendocino Counties, CA. 707/937-9172; pwarner@mcn.org.
Question 2.3 Recent trend in total area infested within state
Describe trend: Many stands continuing to expand; removal of stands and management aimed at containment also increasing
Rationale: Estimated that removal efforts are roughly equal to expansion of stands, based on personal observations.
Sources of information: Warner, PJ. 2004. Personal observations from 1980-2004 working in and adjacent to Eucalyptus stands in Marin, Sonoma, and Mendocino Counties, CA. 707/937-9172; pwarner@mcn.org.
Question 2.4 Innate reproductive potential
Describe key reproductive characteristics: Prolific seed production; germination optimal on bare mineral soil in good light (1,3), but will germinate in forests (4); seeds can persist in dry sites for years (3); seeds can spread on wind or in water (1,3); stump sprouts, even from seedlings and saplings (1, 2, 3); lignotubers (vegetative propagule at base of stems) persist even when stems die (1).
Rationale: published biological accounts; seed is not typically dispersed far from parent trees (1, 2, 3), but wind and water can facilitate spread beyond adjacent areas (4)
Sources of information: 1. U. S. Dept. of Agriculture, Forest Service @ http://www.fs.fed.us/database/feis/plants/tree/eucglo/fire_ecology.html ; 2. Boyd, D. 2000. Eucalyptus globulus in Bossard, CC, JM Randall, and MC Hoshovsky. Invasive Plants of California's Wildlands. University of California Press, Berkeley. pp. 183-187. 3. Bean, C and MJ Russo. 1986. The Nature Conservancy. Element Stewardship Abstract for Eucalyptus globulus (Tasmanian blue gum). Online @

<p>http://members.lycos.co.uk/WoodyPlantEcology/invasive/invasive.htm</p> <p>4. Warner, PJ. 2004. Personal observations from 1980-2004 working in and adjacent to eucalyptus stands in Marin, Sonoma, and Mendocino Counties. 707/937-9172; pwarner@mcn.org.</p>
<p>Question 2.5 Potential for human-caused dispersal</p>
<p>Identify dispersal mechanisms: This species still planted as windbreak and as fuel source; not widely planted ornamentally.</p>
<p>Rationale: published accounts; survey of horticultural websites (personal observation)</p>
<p>Sources of information: 1., 2. U. S. Dept. of Agriculture, Forest Service @ http://www.fs.fed.us/database/feis/plants/tree/eucglo/fire_ecology.html;</p> <p>Bean, C and MJ Russo. 1986. The Nature Conservancy. Element Stewardship Abstract for Eucalyptus globulus (Tasmanian blue gum). Online @ http://members.lycos.co.uk/WoodyPlantEcology/invasive/invasive.htm</p> <p>3. Warner, PJ. 2004. Personal observations from 1980-2004 working in urban forestry and landscaping; also reviews of online horticultural websites (2004). 707/937-9172; pwarner@mcn.org.</p>
<p>Question 2.6 Potential for natural long-distance dispersal</p>
<p>Identify dispersal mechanisms: Most seed dispersed by wind and gravity, but water, erosion, and birds can also move seed. Probability for long-distance dispersal is low (inferred).</p>
<p>Rationale: Since Eucalyptus is not native, mechanisms for long-distance transport, such as seed predation and seed survival post-ingestion, have probably not evolved (inferred).</p>
<p>Sources of information: Bean, C and MJ Russo. 1986. The Nature Conservancy. Element Stewardship Abstract for Eucalyptus globulus (Tasmanian blue gum). Online @ http://members.lycos.co.uk/WoodyPlantEcology/invasive/invasive.htm</p> <p>Warner, PJ. 2004. Inferred from available information. 707/937-9172; pwarner@mcn.org.</p>
<p>Question 2.7 Other regions invaded</p>
<p>Identify other regions: Hawai'i</p>
<p>Rationale: Not documented outside California from climate types other than Mediterranean with cool, wet winters, and warm, dry summers; summer fogs and lack of hard frost are factors in California range.</p>
<p>Sources of information: Bean, C and MJ Russo. 1986. The Nature Conservancy. Element Stewardship Abstract for Eucalyptus globulus (Tasmanian blue gum). Online @ http://members.lycos.co.uk/WoodyPlantEcology/invasive/invasive.htm</p> <p>Warner, PJ. 2004. Personal observations from 1980-2004 working in urban forestry and landscaping; also</p>

reviews of online horticultural websites (2004). 707/937-9172; pwarner@mcn.org.
Question 3.1 Ecological amplitude
Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: In California, establishment in wildlands appears dependent on proximity to planted or otherwise established, seed-producing stands, summer fog OR sufficient year-round groundwater OR irrigation, as well as lack of killing winter frosts. Introduced ca. 1853.
Rationale: Published information on distribution and biology and ecology, and observations.
Sources of information: Bean, C and MJ Russo. 1986. The Nature Conservancy. Element Stewardship Abstract for Eucalyptus globulus (Tasmanian blue gum). Online @ http://members.lycos.co.uk/WoodyPlantEcology/invasive/invasive.htm Warner, PJ. 2004. Personal observations from 1980-2004 working in urban forestry and landscaping; also reviews of online horticultural websites (2004). 707/937-9172; pwarner@mcn.org.
Question 3.2 Distribution
Describe distribution: Fairly common outside cultivation in central and north coastal California; no reports from inland riparian areas, but could become established where moisture is sufficient.
Rationale: observations
Sources of information: Warner, PJ. 2004. Personal observations from 1980-2004 working in urban forestry and landscaping; also reviews of online horticultural websites (2004). 707/937-9172; pwarner@mcn.org.

Worksheet A

Complete this worksheet to answer Question 2.4.

Reaches reproductive maturity in 2 years or less	No: 0 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	No: 0 pt
Has quickly spreading vegetative structures (rhizomes, roots, etc.) that may root at nodes	No: 0 pt
Fragments easily and fragments can become established elsewhere	No: 0 pts
Resprouts readily when cut, grazed, or burned	Yes: 1 pt
	4 pts Total Unknowns
	A (6+ pts)
Note any related traits: enter text here	

Worksheet C - California Ecological Types

(*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	D. present
	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
Grasslands, Vernal Pools, Meadows, and other Herb Communities	coastal prairie	C. 5-20%
	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	C. 5-20%
	riparian woodland	D. present
	riparian scrub (incl. desert washes)	D. present
Woodland	cismontane woodland	score
	piñon and juniper woodland	score
	Sonoran thorn woodland	score
Forest	broadleaved upland forest	D. present
	North Coast coniferous forest	C. 5-20%
	closed cone coniferous forest	C. 5-20%
	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).