

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):	Geranium robertianum L.
Synonyms:	
Common names:	Herb Robert, Robert geranium
Evaluation date (mm/dd/yy):	09/27/04
Evaluator #1 Name/Title:	Peter J. Warner
Affiliation:	California Department of Parks and Recreation; CNPS; Cal-IPC
Phone numbers:	(707) 937-9172 (w);
Email address:	pwarner@mcn.org; pwarn@parks.ca.gov ; corylus@earthlink.net
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, John Randall, Cynthia Roye, Jake Sigg, Peter Warner
Committee review date:	2/11/05
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	U	No Information
1.2	Impact on plant community	B	Other Pub. Mat'l
1.3	Impact on higher trophic levels	C	Rev'd, Sci. Pub'n
1.4	Impact on genetic integrity	C	Rev'd, Sci. Pub'n

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

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	Rev'd, Sci. Pub'n
2.3	Recent trend in total area infested within state	U 0	No Information
2.4	Innate reproductive potential Wksht A	A 3	Rev'd, Sci. Pub'n
2.5	Potential for human-caused dispersal	B 2	Other Pub. Mat'l
2.6	Potential for natural long-distance dispersal	B 2	Other Pub. Mat'l
2.7	Other regions invaded	B 2	Rev'd, Sci. Pub'n

“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:
Low
No Alert

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

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

Table 3. Documentation

Question 1.1 Impact on abiotic ecosystem processes	U No Information back
Identify ecosystem processes impacted: None documented. This species cited as the source of allelopathic interactions with other herbaceous species (1), but this is not assumed to have ecosystem-level impact.	
Rationale: No evidence provided for ecosystem-level impact resulting from production allelopathic secondary metabolites.	
Sources of information: 1. Reichard, S. 2004. Alien invasive plants in the Pacific Northwest. Guest lecture, Univ. of Washington. http://courses.washington.edu/bot113/Summer/LectNotes/2004/noteswk7.pdf	
Question 1.2 Impact on plant community composition, structure, and interactions	B Other Pub. Mat'l back
Identify type of impact or alteration: Noted to be allelopathic (1), and to displace other herbaceous vegetation, including native species (2, 3).	
Rationale: Displacement of native species in understory vegetation only.	
Sources of information: 1. Reichard, S. 2004. Alien invasive plants in the Pacific Northwest. Guest lecture, Univ. of Washington. http://courses.washington.edu/bot113/Summer/LectNotes/2004/noteswk7.pdf	
2. Washington State Noxious Weed Control Board. 2004. Technical Bulletin for Herb Robert – Geranium robertianum. http://www.nwcb.wa.gov/weed_info/herbrobert2.html	
3. Tofts, RJ. 2004. Geranium robertianum L. Journal of Ecology 92:537-555.	
Question 1.3 Impact on higher trophic levels	C Rev'd, Sci. Pub'n back
Identify type of impact or alteration: Damage to plants by herbivores or parasitism appears to be rare (1). A pollination study (3) suggests that herb Robert may draw pollinators from other species when growing in the same vicinity. However, a demographic study (4) of this species asserts that on average a single flower of herb Robert receives perhaps 2 pollinator visits.	
Rationale: The short list of documented herbivory and parasitism of G. robertianum suggest that it is not a favored forage species. Glandular hairs are cited as a possible protective mechanism; the plant also has a disagreeable odor to most humans (2). The rate of pollinator visitation does not seem to constitute a major threat to pollination of native species.	
Sources of information: 1. Tofts, RJ. 2004. Geranium robertianum L. Journal of Ecology 92:537-555.	
2. Warner, PJ. 2004. Personal observations, 1995-2004, Marin, Sonoma, Mendocino Counties. (707) 937-2278/ corylus@earthlink.net	
3. Goyder, DF. 1983. Pollination ecology of five species in a limestone community. Watsonia 14: 397-405.	
4. Bertin, RI. 2001. Life cycle, demography, and reproductive biology of herb Robert (Geranium robertianum). Rhodora 103 (913):96-116.	

Question 1.4 Impact on genetic integrity	C Rev'd, Sci. Pub'n back
Identify impacts: Hybridization experiments (1) indicated that of all combinations tested, none produced fertile progeny (1).	
Rationale: Results suggest that hybridization, while possible in California with its native congeners, would likely not result in fertile offspring.	
Sources of information: 1. Van Loon, JC. 1984. Hybridization experiments in Geranium. <i>Genetica</i> 65:167-171.	
Question 2.1 Role of anthropogenic and natural disturbance in establishment	A Other Pub. Mat'l back
Describe role of disturbance: The Washington State Noxious Weed Control Board states that disturbance is not a requirement for this species to establish and to dominate forest understory vegetation (1); this assertion is corroborated by observations in New England. (2). My observations suggest that some disturbance or proximity to horticultural introduction facilitates its establishment in otherwise suitable habitat (3).	
Rationale: My personal observations of this species are limited to somewhat disturbed habitats in Mendocino Co., so the Washington report has more significant implications for suitable forest habitats on the North Coast of California.	
Sources of information: 1. Washington State Noxious Weed Control Board. 2004. Technical Bulletin for Herb Robert – <i>Geranium robertianum</i> . http://www.nwcb.wa.gov/weed_info/herbrobert2.html	
2. Bertin, RI. 2001. Life cycle, demography, and reproductive biology of herb Robert (<i>Geranium robertianum</i>). <i>Rhodora</i> 103 (913):96-116.	
3. Warner, PJ. 2004. Personal observations, 2002-2004 Mendocino County. (707) 937-2278/ corylus@earthlink.net	
Question 2.2 Local rate of spread with no management	B Rev'd, Sci. Pub'n back
Describe rate of spread: Based on observations of its high rate of seed production, germination rate, forceful expulsion of seeds, and its ability to compete well (1,2, 3), this plant would probably spread rapidly in optimal habitats, including those with basic soils or rocky substrates (1, 4) and year-round moisture without temperature extremes (1, 2).	
Rationale: Inference based on germination, life history, and phenological studies and observations	
Sources of information: 1. Bertin, RI. 2001. Life cycle, demography, and reproductive biology of herb Robert (<i>Geranium robertianum</i>). <i>Rhodora</i> 103 (913):96-116.	
2. Tofts, RJ. 2004. <i>Geranium robertianum</i> L. <i>Journal of Ecology</i> 92:537-555.	
3. Washington State Noxious Weed Control Board. 2004. Technical Bulletin for Herb Robert – <i>Geranium robertianum</i> . http://www.nwcb.wa.gov/weed_info/herbrobert2.html	
4. Falinska, K, and E. Piroznikow. 1983. Ecological structure of <i>Geranium robertianum</i> L. populations under natural conditions and in the garden. <i>Ekologia Polska</i> 31:93-121.	

Question 2.3 Recent trend in total area infested within state	U No Information back
Describe trend: Reported from SF Bay Area and sporadically along the north coast of California (1,2, 3); no information on recent trend of areas infested.	
Rationale: enter text here	
Sources of information: 1. Hickman, JC (editor). 1993. The Jepson Manual: Higher Plants of California (Third Printing, with corrections). University of California Press, Berkeley. p. 674. 2. DiTomaso, J, and E. Healy. (in production). Weeds of California and Other Western States (unpublished). 3. CalFlora: Information on California plants for education, research, and conservation. [web application]. 2004. Albany, California: The CalFlora Database [a non-profit organization]. Available: http://www.calflora.org/	
Question 2.4 Innate reproductive potential	A Rev'd, Sci. Pub'n back
Describe key reproductive characteristics: Repeated episodes of reproduction (1), although this may vary under different environmental conditions (2); self-pollination and -compatibility (2, 3); high numbers of viable seeds (4)	
Rationale: Attributes described from studies suggest that the species exhibits considerable plasticity in reproductive strategies, depending on environmental conditions.	
Sources of information: 1. Falinska, K, and E. Piroznow. 1983. Ecological structure of <i>Geranium robertianum</i> L. populations under natural conditions and in the garden. <i>Ekologia Polska</i> 31:93-121. 2. Tofts, RJ. 2004. <i>Geranium robertianum</i> L. <i>Journal of Ecology</i> 92:537-555. 3. Bertin, RI. 2001. Life cycle, demography, and reproductive biology of herb Robert (<i>Geranium robertianum</i>). <i>Rhodora</i> 103 (913):96-116. 4. Washington State Noxious Weed Control Board. 2004. Technical Bulletin for Herb Robert – <i>Geranium robertianum</i> . http://www.nwcb.wa.gov/weed_info/herbrobert2.html	
Question 2.5 Potential for human-caused dispersal	B Other Pub. Mat'l back
Identify dispersal mechanisms: Historically, <i>G. robertianum</i> has been grown horticulturally and used medicinally (1). I've seen herb Robert for sale in a few nurseries (2), but does not appear to me to be widely used in gardens. Possible dispersal in garden debris could pose a risk to uninvaded areas.	
Rationale: Limited personal observations.	
Sources of information: 1. Washington State Noxious Weed Control Board. 2004. Technical Bulletin for Herb Robert – <i>Geranium robertianum</i> . http://www.nwcb.wa.gov/weed_info/herbrobert2.html 2. Warner, PJ. 2004. Personal observations, 2002-2004, Mendocino County. (707) 937-2278 / corylus@earthlink.net	

Question 2.6 Potential for natural long-distance dispersal	B Other Pub. Mat'l back
Identify dispersal mechanisms: Other than the forceful expulsion of seeds from the fruit (1), no direct, quantified evidence for either dispersal or morphological adaptations for long-distance dispersal. However, rostrum of fruit may abet dispersal in animal fur or human clothing, and remote populations (such as the populations cited in (2))got there somehow.	
Rationale: inference and logic	
Sources of information: 1. Washington State Noxious Weed Control Board. 2004. Technical Bulletin for Herb Robert – <i>Geranium robertianum</i> . http://www.nwcb.wa.gov/weed_info/herbrobert2.html 2. Bertin, RI. 2001. Life cycle, demography, and reproductive biology of herb Robert (<i>Geranium robertianum</i>). <i>Rhodora</i> 103 (913):96-116.	
Question 2.7 Other regions invaded	B Rev'd, Sci. Pub'n back
Identify other regions: This species and its closely related congener <i>G. purpureum</i> are reported as widely distributed across Europe (its native range), northern to central Africa, most of Asia except SE Asia, and South America; it has spread to eastern North America and along the Pacific coast from British Columbia south to northern California (1, 2, 3, 4). It grows in shady or partly shaded habitats (5), often on rocky ground or in nutrient-rich or basic soils (including limestone (6, 7)), in gravelly areas, rocky shores, along roads and trails	
Rationale: Widespread and numerous documentations from many parts of the world, including optimal habitats. Certainly, many of the suitable habitat types for this species' success exist in California and have not yet been invaded, but other environmental constraints (e.g, lack of year-round moisture, presence of basic (alkaline) soils) may inhibit the invasiveness of this species, and preclude its invasion of additional areas, or even spread further into types already invaded. A conservative, yet wary, score.	
Sources of information: 1. Tofts, RJ. 2004. <i>Geranium robertianum</i> L. <i>Journal of Ecology</i> 92:537-555. 2. Washington State Noxious Weed Control Board. 2004. Technical Bulletin for Herb Robert – <i>Geranium robertianum</i> . http://www.nwcb.wa.gov/weed_info/herbrobert2.html 3. Bertin, RI. 2001. Life cycle, demography, and reproductive biology of herb Robert (<i>Geranium robertianum</i>). <i>Rhodora</i> 103 (913):96-116. 4. Hickman, JC (editor). 1993. <i>The Jepson Manual: Higher Plants of California</i> (Third Printing, with corrections). University of California Press, Berkeley. p. 674. 5. DiTomaso, J, and E. Healy. (in production). <i>Weeds of California and Other Western States</i> (unpublished). 6. Goyder, DF. 1983. Pollination ecology of five species in a limestone community. <i>Watsonia</i> 14: 397-405. 7. Silvertown, JW. 1983. The distribution of plants in limestone pavement: tests of species interaction and niche separation against null hypotheses. <i>Journal of Ecology</i> 71:819-828.	
Question 3.1 Ecological amplitude/Range	C Other Pub. Mat'l back
Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: Not much information on specific ecological types invaded, but general distribution in California is along the north coast south to SF Bay Area, and in Sierra Nevada foothills (1, 2, 3).	

Rationale: Juxtaposition of range in CA with published habitat preferences.	
Sources of information: 1. DiTomaso, J, and E. Healy. (in production). Weeds of California and Other Western States (unpublished). 2. Hickman, JC (editor). 1993. The Jepson Manual: Higher Plants of California (Third Printing, with corrections). University of California Press, Berkeley. p. 674. 3. CalFlora: Information on California plants for education, research, and conservation. [web application]. 2004. Albany, California: The CalFlora Database [a non-profit organization]. Available: http://www.calflora.org/	
Question 3.2 Distribution/Peak frequency	D Observational back
Describe distribution: Noted very infrequently in coniferous and closed-cone pine forests along north coast.	
Rationale: observations	
Sources of information: Warner, PJ. 2004. Personal observations, 2002-2004, Mendocino County. (707) 937-2278 / corylus@earthlink.net	

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	Yes: 1 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	No: 0 pt
	8 pts Total Unknowns
	A (6+ pts)

Note any related traits: Highly self-compatible pollination in the absence of pollinators; sustained plant germination and voluminous seed production, provided optimal environmental conditions exist. Seeds are expelled vigorously from fruit, so local spread is abetted through this mechanism.

Worksheet C - California Ecological Types

[back](#)

(*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	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	score
	piñon and juniper woodland	score
	Sonoran thorn woodland	score
Forest	broadleaved upland forest	score
	North Coast coniferous forest	D. present
	closed cone coniferous forest	D. present
	lower montane coniferous forest	D. present
	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).