Round-Leaved Filaree (*Erodium macrophyllum*)

Status

Federal: None
State: Meets requirements as a rare, threatened, or endangered species under CEQA
CNPS: List 2

Population Trend

Global: Declining
State: Declining
Within Inventory Area: Unknown

Data Characterization

Estimates of the number of populations of round-leaved filaree in California range from 75 (California Natural Diversity Database 2005) to approximately 100 (Gillespie 2003). The records range from 1846 to 2004. Eighteen occurrences have been documented in the previous 10 years. All but two occurrences are believed to be extant (California Natural Diversity Database 2005), although many of the populations are known from historic collections and have not been documented recently. Eight occurrences are located within the inventory area. These are general occurrences, mostly historic, that cannot be located precisely.

Very little information is available for round-leaved filaree; the literature on the species pertains to its taxonomy. Gillespie (2003) completed a doctoral dissertation on the ecology of round-leaved filaree and the effects of different methods to restore the species. The main sources of general information on this species are *The Jepson Manual* (Hickman 1993), the California Native Plant Society (2005), and the California Natural Diversity Database (CNDDB) (2005). Specific observations on habitat and plant associates, threats, and other factors appear in the CNDDB occurrence records and in Gillespie (2003).

Range

Round-leaved filaree ranges from southern Oregon through California into northern Mexico (Gillespie 2003). In California, it is known from scattered occurrences in the Great Valley, southern North Coast Ranges, San Francisco Bay Area, South Coast Ranges, Channel Islands, Transverse Ranges, and Peninsular Ranges (Taylor 1993; California Natural Diversity Database 2005). Most of the populations occur in California: one historic collection is recorded from southern Oregon, and three historic collections are recorded from Baja California (Gillespie 2003). Most of the recently documented occurrences are in the interior foothills of the South Coast Ranges (Gillespie 2003).

Occurrences within the ECCC HCP/NCCP Inventory Area

Eight occurrences of round-leaved filaree are listed within the inventory area, in the Mount Diablo foothills south of Antioch. Six of the occurrences are only known from collections made in or before 1941; at least one of these may be extirpated (California Natural Diversity Database 2005). One of the occurrences is known to be on public lands, in the EBRPD's Black Diamond Mines Regional Preserve (CalFlora 2005).

Biology

Physical Description

Round-leaved filaree is an annual herb that generally grows prostrate. The plants bloom between March and May (California Native Plant Society 2005), producing small (1 cm) white flowers. The flowers are self-pollinating (Gillespie 2003). Seeds are produced and dispersed following the blooming period.

Habitat

Round-leaved filaree occurs in grasslands on friable clay soils (California Native Plant Society 2005; California Natural Diversity Database 2005), although it may historically have been common on other soil types (Gillespie 2003). It has been found in nonnative grassland on clay soils with relatively low cover of annual grasses (Jones & Stokes 2002, 2003). It most often occurs in foothill locations at elevations between 200 and 2,000 feet, but is has been collected from locations as low as 30 feet and as high as 4,000 feet.

Species Associated with Round-leaved Filaree	
Achyrachaena mollis	blow-wives
Allium munzii	Munz' onion
Apiastrum angustifolium	wild celery
Convolvulus simulans	small-flowered morning-glory
Deinandra halliana	Hall's tarplant
Hirschfeldia incana	Mediterranean mustard
Lupinus succulentus	arroyo lupine
Madia radiata	showy madia

Threats

Population trends are not known for any of the occurrences (California Natural Diversity Database 2005). However, round-leaved filaree is presumed to be declining in southern California due to loss of its friable clay microhabitat (Reiser 1994). Because information about the species is so limited, no specific

threats have been documented, although urbanization, vehicles, overgrazing, and competition from nonnative species are cited as threats (California Native Plant Society 2005; Gillespie and Allen 2004). Other potential threats include recreation activities, illegal dumping, and erosion (California Natural Diversity Database 2005; Gillespie 2003). Because most populations are small (<1,000 plants), the populations are vulnerable to natural events (e.g., drought) as well as human disturbances, both of which reduce the number of seeds produced.

Special Biological Considerations

The cause for rarity of round-leaved filaree is uncertain. The cause may be abiotic, such as the loss of habitat by urbanization, or biotic, such as competition from nonnative grasses (Gillespie 2003; Gillespie and Allen 2004). Populations need to be located, secured, and protected, and research is needed to determine the cause of the species' rarity, to identify actual threats, and to determine management measures, if needed. The friable clay soils on which the species occurs are uncommon and may occur as small inclusions within larger soil map units, making it difficult to locate areas for potential preservation or mitigation.

Observations of round-leaved filaree on fire trails suggest that disturbance may benefit the populations (Jones & Stokes 2002, 2003). The nature of this benefit is not clear, but could range from uncovering buried, dormant seeds to providing a micro-site free from competing nonnative grasses. Gillespie (2003) studied the effects of hand removal of exotic species and controlled burns on round-leaved filaree. He found that hand removal of exotic species enhanced the successful establishment of round-leaved filaree in grassland test plots. He found that controlled burns have mixed effects, reducing establishment but enhancing seed production (Gillespie and Allen 2004).

Species Distribution Model

Model Description

Model Assumptions

1. Primary habitat: Nonnative grassland between 200 and 2,000 feet on clay or clay loam soils (Soil Conservation Service 1977).
2. Secondary habitat: All other nonnative grassland below 4,000 feet on clay or clay loam soils (Soil Conservation Service 1977).

Model Rationale

The CNDDB records indicate that round-leaved filaree generally occurs in grasslands on friable clay soils (California Native Plant Society 2005; California Natural Diversity Database 2005). It has been found in nonnative grassland on clay soils with relatively low cover of annual grasses (Jones & Stokes 2002, 2003). It most often occurs in foothill locations at elevations between 200 and 2,000 feet, but it has been collected from locations as low as 30 feet and as high as 4,000 feet (California Natural Diversity Database 2005). For the purpose of

the model, clay or clay loam soils were defined as those soils described in the Contra Costa soil surveys as having a clay or clay loam component in the upper 16 inches of the soil profile (Welch 1977).

Literature Cited

CalFlora. 2005. CalFlora: Information on California plants for education, research and conservation. [web application].Berkeley, California: The CalFlora Database [a non-profit organization]. Available: http://www.calflora.org/. (Accessed: Dec 19, 2005)

California Native Plant Society (CNPS). 2005. Inventory of Rare and Endangered Plants (online edition, v6-05d). California Native Plant Society. Sacramento, CA. Accessed on Mon, Dec. 26, 2005 from http://www.cnps.org/inventory

California Natural Diversity Database. 2005. RareFind 3, Version 3.0.3 (September 30, 2005 update). California Department of Fish and Game, Sacramento, CA.

Gillespie, I. G. 2003. Ecology and Restoration of *Erodium macrophyllum*. Ph.D. dissertation: University of California, Riverside, CA.

Gillespie, I. G., and E. A. Allen. 2004 Fire and competition in a southern California grassland: impacts on the rare forb *Erodium macrophyllum*. *Journal of Applied Ecology* 41:643-652.

Hickman, J. C. (ed.). 1993. *The Jepson Manual: higher plants of California*. Berkeley, CA: University of California Press.

Jones & Stokes. 2002. *Special-status plant species surveys and vegetation mapping at Lawrence Livermore National Laboratory*. (J&S 02-136). September. Sacramento, CA. Prepared for Lawrence Livermore National Laboratory.

Jones & Stokes. 2003. *Results of the 2003 spring special-status plant surveys conducted along the proposed Path 15 Transmission Line project in Fresno and Merced Counties*. May. (J&S 02-172). Sacramento, CA. Prepared for Western Area Power Administration, Lakewood, CO.

Reiser, C. H. 1994. *Rare plants of San Diego County*. Aquafir Press, Imperial Beach, California. (Available at: http://sandiego.sierraclub.org/rareplants/)

Soil Conservation Service. 1977. Soil survey of Contra Costa County, California. Concord, CA.

Taylor, M. S. 1993. *Erodium*. Pages 672–673 in J. C. Hickman (ed.), *The Jepson manual: higher plants of California*. Berkeley, CA: University of California Press.

Welch, L. E. 1977. *Soil survey of Contra Costa County, California.* U.S. Department of Agriculture Soil Conservation Service, in cooperation with University of California Agricultural Experiment Station, Washington, DC.