Plant Species Evaluation Form

Erythronium revolutum Sm.

COAST FAWN LILY

Family: Liliaceae (CNPS 2018) | **PLANTS Symbol:** ERRE5 (USDA 2018) | **Calif. Endemic:** No (CNPS 2018)

Synonyms/Other Names: *Erythronium revolutum* was described by J.E. Smith in 1809. This name serves as the basionym for A. Voss's 1895 description of *E. grandiflorum* fo. *revolutum*; a taxon that is not widely recognized. It is unlikely that the latter name will be encountered in the literature or in collections (Tropicos 2018).

Identification Issues: Provided that flowers are available for examination, species in *Erythronium* are relatively easy to differentiate. Characteristics that separate *E. revolutum* from its congeners in California include the following: leaves are irregularly mottled, rather than uniformly green, filaments are at least 1 mm wide, and perianth parts are violet-pink with a yellow base (Allen 2012). In practice, there appears to be much confusion in field identification of *E. revolutum*, possibly as a result of hybridization with *E. oreganum* and *E. californicum* (CNDDB 2017).

Taxonomy:

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Species In Genus: +- 27 species: especially temperate North America. Etymology: (Greek: red, from flowers of some). Note: Leaf, flower markings to be noted when fresh, because of fading in pressed specimens.

Habit: Bulb 35--50 mm, narrowly ovoid. Leaf: 10--25 cm, widely lanceolate to ovate, entire to +- wavy-margined, mottled brown or white. Inflorescence: peduncle 15--40 cm, green to +- red; flowers 1--3. Flower: perianth parts 25--40 mm, lanceolate to narrowly elliptic, violet-pink with yellow bands at base, inner with small sac-like folds at base; stamens 12--22 mm, filaments 2--3 mm wide, +- lanceolate, white to pink, anthers yellow; style 12--18 mm, white to pink, stigma lobes 4--6 mm, slender, recurved. eFlora Treatment Author: Geraldine A. Allen.

Status:

Note: Federally recognized Endangered, Threatened, Proposed, or Candidate species under the Endangered Species Act are omitted as they do not meet the definition of a Species of Conservation Concern (FSH 1909.12 § 12.52).

State Listing	G-rank	S-rank	CRPR	R5 FSS	NFP SM	CA BLM
CA: Not listed NV: Not listed OR: Not listed	G4G5	CA: S3 NV: Not listed OR: S4	2B.2	Not listed	Not listed	Not listed

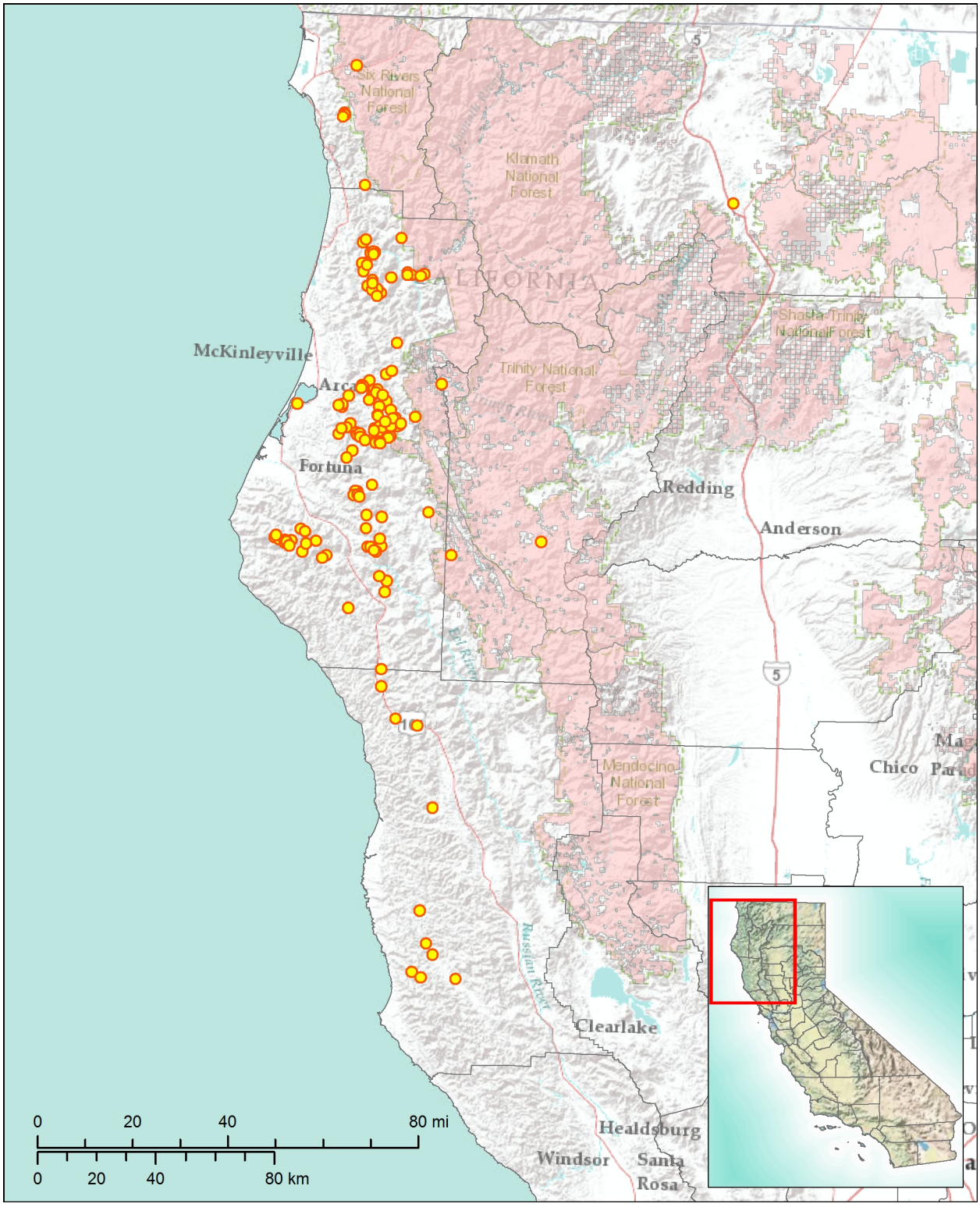
SWAP:	NNHP:	NNPS:	ORBIC:	OCS:	IUCN:
Not listed	Not listed	Not listed	4: Watch	Not listed	Not listed

Expanded abbreviations and citations: State Listing=California Endangered Species Act Listing (CDFW 2018b), Nevada Division of Forestry Fully Protected Plant Species (NAC 527) (NDF 2012), Oregon Department of Agriculture Listed Plants (ODA 2014); G-rank=Global Conservation Status (CDFW 2018a; NatureServe 2018); S-rank=Subnational (state or province-level) Conservation Status (CDFW 2018a; NatureServe 2018; NNHP 2017; ORBIC 2016); CRPR=California Rare Plant Rank (CNPS 2018); R5 FSS=USDA Forest Service Region 5 Regional Forester Sensitive Plant Species List (USDA 2013); NFP SM=Forest Service and Bureau of Land Management Northwest Forest Plan Survey and Manage Species (USDA 2001); CA BLM=California Bureau of Land Management Designated Sensitive Species (BLM 2010); SWAP=California State Wildlife Action Plan Status (CDFW 2015); NNHP=Nevada Natural Heritage Program Status (NNHP 2017); NNPS=Nevada Native Plant Society Status (NNHP 2017); ORBIC=Oregon Biological Information Center Status (ORBIC 2016); OCS=Oregon Conservation Strategy Species (ODFW 2016); IUCN=International Union for Conservation of Nature Red List Status (IUCN 2017).

This species is on the conservation watch list in Oregon (ORBIC 2016), is classified as Vulnerable (S3) in Washington state, and considered to be Apparently Secure (S4) in British Columbia, Canada (NatureServe 2018).

There is some evidence that *E. revolutum* is hybridizing with *E. oregonum* and *E. californicum* in parts of its range; this could result in genetic dilution, and renders accurate census-taking more difficult (CNDDB 2017). Because of its relatively large number of occurrences reported in California, *E. revolutum* was proposed for downranking from California Rare Plant Rank (CRPR) 2B.2 to CRPR 4 (Watchlist) in March of 2017 (Taylor, D. pers. comm. 2017). However, it is suspected that a number of occurrences reported in the CNDDB could actually be misidentifications of *E. oregonum* subsp. *leucandrum*, *E. californicum*, or a hybrid thereof. Therefore a review of all data submitted to the CNDDB for proper identification is warranted prior to initiating a downrank of this species (Sanville, C. and B. Hayashi, pers. comm. 2017).

Distribution: *Erythronium revolutum* can be found along the western edge of North America, from southern British Columbia through Washington and Oregon, to northwestern California. Within California, it occurs in the Klamath Ranges (KR), North Coast (NCo), and Outer North Coast Ranges (NCoRO) bioregions of Del Norte, Humboldt, Mendocino, Siskiyou, Sonoma, Tehama, and Trinity counties (Allen 2012, CNPS 2018). USDA Forest Service administered lands from which this species is known include Shasta-Trinity NF and Six Rivers NF, with 48 records falling with the latter forest's five-mile buffer (CNDDB 2017).



Sources: *Distribution*: CNDDB 2017. *Layers*: USDA Forest Service, Pacific Southwest National Forests: CPAD 2016. California counties: CDF 2009. *Basemaps*: California inset map: © 2013 National Geographic Society, i-cubed (Esri 2017a). Main map: Esri, DeLorme, USGS, NPS (Esri 2012) and Esri, USGS, NOAA (Esri 2017b).

Locations within California:

Record numbers indicate sites that contain an individual, population, or groups of populations located within ¼ mile of each other, per the California Natural Diversity Database (CNDDB 2017) definition of Element Occurrences (EOs) in California. Official EO numbers for plants in California are determined solely by the CNDDB and are included within the Reference (Source) column for CNDDB data. Duplicate records from the same site are given the same record number and included in red. The Population Info column includes total number of individuals and total number and size of populations/sub-populations when provided. Elevations provided in meters from source have been converted to feet. If not provided in original source, Land Manager information was obtained using the California Protected Areas Database (CPAD 2016) and Quad information was obtained using 24K Quads, SDE Feature Class (CDFG 2013). All other information is directly from the Reference (Source) unless additional citation is given.

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Distribution on National Forest System (NFS) Lands:

(Please see Reference column of Locations table above for references pertaining to Record Numbers indicated on NFS lands.)

National Forest System (NFS) lands	Record #s (from Locations table above)	CNDDB EOs	Non-CNDDB Records	Recent (seen in past 20 yrs.)	Historic (not seen in past 20 yrs.)	Most Recent Obs.	EOs/ Recs. (5 mile buffer)	Total Records on NFS lands
Angeles:	-	-	-	-	-	-	-	0
Cleveland:	-	-	-	-	-	-	-	0
Eldorado:	-	-	-	-	-	-	-	0
Inyo:	-	-	-	-	-	-	-	0
Klamath:	-	-	-	-	-	-	-	0
Lake Tahoe Basin MU:	-	-	-	-	-	-	-	0
Lassen:	-	-	-	-	-	-	-	0
Los Padres:	-	-	-	-	-	-	-	0
Mendocino:	-	-	-	-	-	-	-	0
Modoc:	-	-	-	-	-	-	-	0
Plumas:	-	-	-	-	-	-	-	0
San Bernardino:	-	-	-	-	-	-	-	0
Sequoia:	-	-	-	-	-	-	-	0
Shasta-Trinity:	42	1	0	0	1	11-May-85	2	1
Sierra:	-	-	-	-	-	-	-	0
Six Rivers:	32, 85	2	0	1	1	5-May-04	48	2
Stanislaus:	-	-	-	-	-	-	-	0
Tahoe:	-	-	-	-	-	-	-	0
Totals:	N/A	3	0	1	2	N/A	50	3

Demographic and Population Trends: *Erythronium revolutum* is known from 141 occurrences in California (CNDDB 2017). Of these 141 occurrences, 119 contain information related to population size/count estimates. Thirty-one of these include year-on-year data for individual occurrences. Including these inter-annual counts, a total of 171 tallies exist for this species. Of these 171, 59 record between 1-50 individuals, 33 have 51-100 individuals, 38 record 101-300 individuals, ten have 301-500, 14 have 501-1,000, eight record 1,001-2,000, and five have 2,001-5,000; there are no observations in the 5,001-10,000 population class, and three contain more than 10,000 individuals. The smallest number observed at a site was a single individual, and the largest was 14,932. A typical occurrence measures somewhere between a few dozen and a few hundred individuals (CNDDB 2017).

Of the 31 occurrences that provide inter-annual data, 17 (55%) show some notable increase in numbers across years, 11 (35%) show a decrease, and three (10%) do not change between years. Given the fragmentary nature of these data, inferences about species-wide trends should not be adduced, especially given the potential for mis-identification of hybrids in the field (CNDDB 2017).

Life History: *Erythronium revolutum* is a perennial bulbiferous herb that blooms from March through July, and sometimes extending into August (CNPS 2018). Bees are by far the most important pollinators for plants in the genus *Erythronium*. Confirmed pollinators include bumble bees (*Bombus*: Apidae), carpenter bees (*Xylocopa*: Apidae), and mining bees (*Andrena*: Andrenidae). Other floral visitors include cuckoo bees (*Nomada*: Apidae), honey bees (*Apis*: Apidae), leaf-cutting bees (*Osmia*: Megachilidae), sweat bees (*Augochlora*, *Augochlorella*, *Lasioglossum*: Halictidae), and one fly taxon: bee flies (*Bombylius*: Bombyliidae) (CPC 2018).

Diversity: The genus *Erythronium* consists of approximately 27 species (Allen 2012), which range from southern Europe and temperate Asia to both the east and west coasts of North America (Shevock et al. 1990). The genus comprises three principal clades, representing regional diversification events in western North America, eastern North America and Eurasia. The latter two form a larger clade, which diverged from the western North American assemblage before trans-Atlantic phylogenetic structure emerged. The western North American clade, to which *E. revolutum* belongs, exhibits exceptional morphological and genetic diversity, suggesting recent and ongoing speciation (Allen et al. 2003). Of 18 species recorded for North America, 13 are found in California, with the bulk of that diversity centered on the northwest portion of the California Floristic Province (Applegate 1935). Interspecific hybridization seems to occur readily in *Erythronium*; species boundaries are maintained largely via allopatry and differing ecological preferences, as has been shown in the case of *E. oregonum* and *E. revolutum* (Allen and Antos 1988).

Habitat: *Erythronium revolutum* occurs in mesic areas, favoring stream banks, bogs and fens, and other well-watered areas within broadleaf upland forest and North Coast coniferous forest (CNPS 2018).

Habitat Status or Trend: The Klamath Ranges (KR), and adjacent North Coast (NCo) and Outer North Coast Ranges (NCoRO) bioregions, have played host to a remarkable diversification in plant species, as a consequence of complex geology, habitat heterogeneity, and a long history of isolation (Whittaker 1960). The area is one of six globally important temperate forest biodiversity hotspots, having served as a climatic refugium during the Pleistocene. More than a century of land use (including logging, mining, grazing, and modification of fire regimes) has significantly altered much of the region. Only 28% of the old-growth forest remains, and ongoing human impacts continue to degrade wild communities, especially in mesic lowland and mid-elevation areas, encompassing the elevation range of *E. revolutum*. The scale and speed of anthropogenic climate change might exceed the capacity of the Klamath region to provide refugia for taxa of low mobility and narrow ecological requirements, though careful management may partially mitigate this risk (Olson et al. 2012).

Capacity for the Species to Disperse: The seeds of *Erythronium* are known to exhibit morphophysiological dormancy, requiring multi-week stratification to begin germination (Baskin et al. 1995). This serves to buffer against harsh environmental conditions by ensuring emergence within an optimal seasonal window, and also provides an extended period for aleatory dispersal. The principal mode of dispersal in congeners is via ants. While myrmecochory provides access to nutrients and protection from seed predators (Guitian et al. 2003), average dispersal distances are fairly short, averaging less than 2 m, and rarely exceeding 70 m (Gómez and Espadaler 1998).

Threats: *Erythronium revolutum* is threatened by habitat modification and disturbance associated with timber extraction and livestock grazing, as well as vehicle activity and road maintenance. Competition from non-native plants poses an additional challenge (CNDDB 2017; CNPS 2018).

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Aaron E. Sims, Rare Plant Botanist, California Native Plant Society, (916) 324-3816, asims@cnps.org. July 16, 2018.

Reviewer(s) and Date:

David Magney, Rare Plant Program Manager, California Native Plant Society, (916) 447-2677 ext. 205, dmagney@cnps.org. July 16, 2018.

Julie Ann Kierstead, USDA Forest Service Region 5 Ecosystem Planning, 6 January 2022.

Formatting: Form is set up as 508 compliant. Please use the "styles" if further formatting is necessary.

Purpose: This is to maintain the best available science on a species that could be used by the Forest Service in a variety of functions. Specifically, there would be additional steps and evaluations to determine whether or not this species would be considered a Species of

Conservation Concern under the 2012 Planning Rule or a Sensitive Species under the 1982 Planning Rule.

Additional Considerations at the Forest Level: Habitat amount and juxtaposition of both the species and habitat locations.