Species: *Anomobryum julaceum* (Schrad. ex G. Gaertn., B. Mey. & Scherb.) Schimp., slender silver-moss

Image Sources: *Bryologia europaea* (Bruch and Schimper 1839); British Bryological Society (2021).

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Status

Table 1 summarizes the current status of this species or subspecies/variety by various ranking entities and defines the meaning of the status.

Table 1. Current status of slender silver-moss.		
Entity	**Status**	**Status Definition**
NatureServe CA[a]	G5? S2	G5: Secure — Common; widespread and abundant. ?: Inexact Numeric Rank — A question mark represents a rank qualifier, denoting an inexact or uncertain numeric rank. S2: Imperiled — Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation.

California Rare Plant Rank[b]	4.2	4: Watch List: Plants of limited distribution. 0.2: Moderately threatened in California (20–80% occurrences threatened / moderate degree and immediacy of threat) This species was added to the *CNPS Inventory* in 2001 and was changed from CRPR 2B.2 to 4.2 on 02 Sept. 2014.
California State Listing[c]	Not listed	
USDA Forest Service[d]	Not listed	
USDI FWS[e]	Not listed	
USDI BLM[f]	Not listed	
NatureServe OR[g]	S1 List 3	S1: Critically imperiled in Oregon because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences. List 3: Species for which more information is needed before status can be determined, but that may be threatened or endangered in Oregon or throughout their range.
Oregon State Listing[h]	Not listed	
NatureServe NV[i]	Not present	
Nevada State Listing[j]	Not present	

[a] California Natural Diversity Database, California Dept. of Fish & Wildlife [CNDDB 2021, 2021a]
[b] California Native Plant Society [CNPS 2021]
[c] California Department of Fish and Wildlife [CDFW 2021]
[d] US Forest Service Region 5 Forester's List [USFS 2013] and Pacific NW Survey and Manage [USFS & BLM 2014]
[e] US Department of Interior Fish and Wildlife Service [USFWS 2021]
[f] US Department of Interior Bureau of Land Management [BLM 2020]
[g] Oregon Biodiversity Information Center [ORBIC 2019]
[h] Oregon Department of Agriculture [ODA 2018]
[i] Nevada Natural Heritage Program [NNHP 2021]
[j] Nevada Division of Forestry [NDF 2012]
Note: Individual State Heritage Programs (CNDDB, ORBIC, NNHP) represent NatureServe and contain more up-to-date ranks for their state than NatureServe Explorer.

Distribution, abundance, and population trend on the planning unit[1]

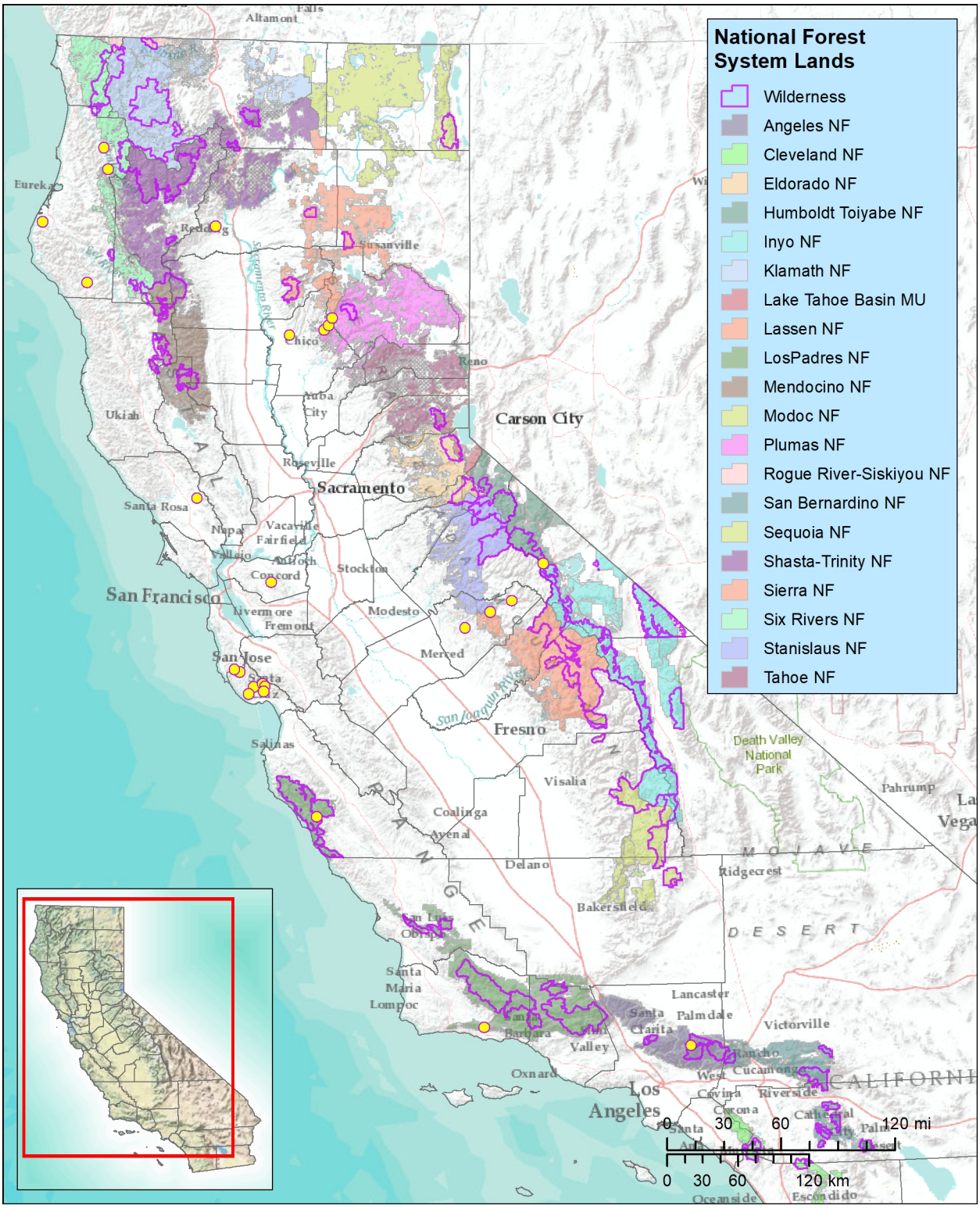
Table 2 summarizes the distribution and frequency of this species or subspecies/variety within National Forest System Lands in California. Table 4 in Appendix 1 lists all known occurrences of this species or subspecies/variety within California. Individual occurrences are defined as sites

[1] 1909.12 Chapter 10, Section 12.53, components 2, 3, and 4.

that contain an individual, population, or groups of populations of the plant that are located more than 1/4 (0.25) of a mile apart from each other as defined by the CNDDB.

Table 2. Known occurrence frequency of slender silver-moss within the planning area.

National Forest System (NFS) lands in California	Record #s (from Table 4)	CNDDB EOs	Non-CNDDB Records	Recent (seen in past 20 years)	Historical (not seen in past 20 years)	Most Recent Obs. Date	Total Records on NFS lands
Angeles:	6	1	-	-	1	2-Jun-1946	1
Humboldt-Toiyabe:	17	-	1	1	-	4-Aug-2012	1
Los Padres:	11, 20	1	1	2	-	26-Mar-2006	2
Plumas:	9, 13, 14	2	1	2	1	10-Jul-2017	3
Six Rivers:	15	-	1	-	1	16-Feb-1985	1
Totals:	N/A	4	4	5	3	N/A	8



Sources: *Distribution*: Norris and Shevock (2004a), NRIS (2020), Calflora (2021), CNDDB (2021), CCH2 (2021), CNABH (2021). *Baselayers*: 2013 National Geographic Society, i-cubed, Esri, Garmin, NOAA, NPS, USGS.

Slender silver-moss was last updated in the CNDDB on 01 July 2014 (CNDDB 2021). Of the 25 locality records reported here, the first 13 records are from the CNDDB. The remaining 12 records are from other sources (Calflora 2021, CCH2 2021, CNABH 2021) and have older dates, yet they are presumably valid even though not yet entered in the CNDDB.

Slender silver-moss is widely distributed in boreal and temperate regions of the Northern and Southern Hemispheres. In the tropics, it is restricted to high elevations in the mountains. In western North America, it is uncommon to rare in Alaska, the Northwest Territories, the Yukon, British Columbia, Alberta, Oregon, California, and Colorado (Harpel 2008, Holyoak and Köckinger 2010, Spence 2014, Exeter et al. 2016). The Californian distribution of this species comprises scattered locations in the Northwestern (NW), Cascade Range Foothills (CaRF), Sierra Nevada (SN), Central Western (CW), and Transverse Ranges (TR) bioregions (JEPS 2021) of Humboldt, Shasta, Sonoma, Butte, Plumas, Mariposa, Mono, Contra Costa, San Mateo, Santa Cruz, Monterey, Santa Barbara, and Los Angeles counties (see distribution map and Table 4).

Eight of the locality records for slender silver-moss in California are on National Forest lands, including one record on the Six Rivers National Forest (Table 2). One Californian record (# 17) is in a federally designated Wilderness Area, the Hoover Wilderness (Humboldt-Toiyabe NF). Other occurrences are protected in Yosemite National Park (record #s 1 and 19), the Whiskeytown unit of the Whiskeytown–Shasta–Trinity National Recreation Area (record # 10, administered by USDI National Park Service), Big Basin Redwoods and Mount Diablo State Parks (record #s 3 and 7, managed by Calif. Dept. of Parks & Recreation), Bidwell Park (record # 16, managed by the City of Chico), and Quail Hollow Ranch Park (record #2, managed by the Santa Cruz Co. Parks Dept.). The remaining 10 occurrences are on the Hoopa Reservation (record # 5) or of unknown ownership.

Most records of this species in California are based on herbarium collections, and population data are almost completely lacking. However, one record (# 9) on the Plumas NF was noted as having ten individuals in 2004, and another record (# 13) also on the Plumas NF had approx. 100,000 plants in 2006 or "too many to count" in 2017 (NRIS 2020, CNDDB 2021). It may occur with greater frequency than collections would indicate (Harpel 2008).

Brief description of natural history and key ecological functions[2]

Anomobryum julaceum is a small, acrocarpous moss in the family Bryaceae. The stems are generally 0.5–1.5 (–7) cm tall; the leaves are costate (the costa generally ending in mid leaf, not extending to the apex), ± ovate and 0.5–1.5 mm long, strongly concave and somewhat glossy; and the inclined to nodding capsules are borne on slender setae 1–2 (–3) cm long. The capsules mature in late fall and through the spring. The closely overlapping leaves are diagnostic and give the stems a smoothly cylindric (i.e., string-like or caterpillar-like) appearance, although this

[2] Basis for other 1909.12 Chapter 10, Section 12.53 components.

character is also seen in some other species of Bryaceae (Norris and Shevock 2004b, Harpel 2008, Holyoak and Köckinger 2010, Spence 2014, Exeter et al. 2016).

The habitat of slender silver-moss is in thin soil of cliff ledges and rock crevices, on old roadcuts and steep soil banks at elevations from near sea level to 5,500 (–10,700) feet. It has been found in several different community types including cismontane woodland, chaparral, broadleaved upland forest, lower montane coniferous forest, and North Coast coniferous forest. It is generally associated with acidic substrates (mostly sandstone or granite) or metamorphics. Sites are ephemerally or seasonally moist (e.g., seeps, streamlets, late snowmelt areas) and are on various aspects (fully exposed and sunny to partially or well-shaded). Associates in California include the trees *Pinus ponderosa*, *Pseudotsuga menziesii*, *Quercus* spp. (e.g., *Q. agrifolia*, *Q. chrysolepis*), *Arbutus menziesii*, and *Notholithocarpus densiflorus*; and shrubs *Adenostoma fasciculatum*, *Arctostaphylos* spp., and *Toxicodendron diversilobum*. At one locality in Yosemite (record #19), it was noted as growing with the spike-moss *Selaginella hansenii* and the liverwort *Asterella bolanderi* (Norris and Shevock 2004b, Spence 2014, CNPS 2021, CNDDB 2021, CCH2 2021, CNABH 2021).

Anomobryum was treated by Spence (2014) as a widespread, temperate to alpine genus of c. 30 species of which two, namely *A. julaceum* and *A. concinnatum*, occur in North America. Both of these species have also been reported from California (Spence 2014) even though the earlier treatment by Norris and Shevock (2004a, 2004b) cited only *A. julaceum*. The name *A. concinnatum* has been applied to at least one recent collection from California, i.e. *Shevock 40629* (CAS1216403) which appeared in the CCH2 (2021) data query for *A. julaceum* (see record # 17 in Tables 2 and 4). The two species are separated by several morphological characters, although *A. concinnatum* may be difficult to identify since it is rarely found with capsules (Holyoak and Köckinger 2010, Spence 2014, Exeter et al. 2016). Critical re-examination of the Californian collections previously identified as *A. julaceum* may reveal that some of them should be assigned to *A. concinnatum*. Another Californian species, *Bryum argenteum*, might also be confused with *A. julaceum* since it shares the feature of julaceous stems with ovate, closely imbricated leaves. However, *B. argenteum* differs by several characters including its unbranched stems and the shape of the capsule (Holyoak and Köckinger 2010, Exeter et al. 2016). Morphological and molecular analyses of the Bryaceae have suggested that genus *Bryum* as previously circumscribed is not monophyletic, with *Anomobryum* and several other named segregates phylogenetically nested inside of it (Spence 1987; Cox and Hedderson 2003; Pedersen et al. 2003, 2007; Pedersen and Hedenäs 2003; Holyoak and Pederson 2007). Unfortunately, however, no diagnostic morphological features have yet been found for many of the subgroups of Bryaceae that are well-supported by molecular results. *Anomobryum julaceum* is the currently accepted scientific name for this species, though several other names were used by previous authors. If it were to be returned to *Bryum*, then *B. filiforme* Dicks. has priority and would be the correct name (Holyoak and Köckinger 2010).

Specialized asexual reproduction is absent in slender silver-moss, and this is one of the characters used to distinguish it from *Anomobryum concinnatum* which has bulbils (gemmae) in the leaf axils (Holyoak and Köckinger 2010, Spence 2014). On the label of one collection from

Santa Cruz County (*Kellman 2835*, CAS; locality record # 23), the presence of "caducous brood buds" was noted, perhaps indicating that this material was misidentified. The sexual condition is dioicous (i.e., having archegonia and antheridia on separate plants). Although this ensures cross-fertilization, abundant free water is required for the sperm to swim to the archegonia, and this means that the male and female gametophytes must be in close proximity for fertilization to take place (Mishler 2003, Haig 2016). Sexual reproduction in mosses is generally rare but may lead to long-distance dispersal through the release of spores (Norris 2003, Haig 2016). Spore-bearing capsules are seen very rarely in slender silver-moss, at least in North America (Spence 2014), although they are often present in material from southern Europe (Holyoak and Köckinger 2010).

Unlike vascular plants, mosses lack well-developed water-conducting tissues and must absorb most or all of their water and nutrients through their leaves (Norris 2003). They also have a remarkable ability to tolerate desiccation, which may help to explain their persistence over the last 400 million years (Proctor 2000, Oliver et al. 2005, Liu et al. 2019).

Overview of ecological conditions for recovery, conservation, and viability[3] including Threats and Risk Factors

Slender silver-moss is widely distributed in the Northern and Southern Hemispheres but is reportedly uncommon to rare in western North America. There are eight known occurrences on National Forest lands in California, including one occurrence on the Six Rivers National Forest. Of the 13 locality records in the CNDDB (2021), the majority have occurrence rank unknown, but two are ranked "good" (EOs 9 and 13). Threats listed for this species include road widening or road maintenance activities (CNDDB 2021). Mosses in California are also generally threatened by loss of often small and highly isolated populations, which are vulnerable to extirpation by alteration of habitat or loss of their specific microenvironments (Shevock 2003). In many cases, natural recolonization from such losses would be extremely unlikely since available spore or plant fragments are so far away.

Taxonomy[4]

Table 3 summarizes this species or subspecies/variety's name status in key literature.

Table 3. Name status of slender silver-moss.

Entity	Name Status
CNDDB and CNPS	*Anomobryum julaceum* (Schrad. ex P. Gaertn., B. Mey. & Scherb.) Schimp.
Norris and Shevock (2004a, 2004b)	*Anomobryum julaceum* (Schrader ex P. G. Gärtner, B. Meyer & Scherbius) W. P. Schimper
California Moss eFlora	*Anomobryum julaceum* (Schrader ex P. G. Gärtner, B. Meyer & Scherbius) W. P. Schimper

[3] 1909.12 Chapter 10, Section 12.53, components 7, 9, 10, 11 and 12, as appropriate.
[4] 1909.12, Chapter 10, Section 12.53, component 1.

Flora of North America	*Anomobryum julaceum* (Schrader ex P. Gaertner, B. Meyer & Scherbius) Schimper
USDA NRCS[a] PLANTS	*Anomobryum filiforme* (Dicks.) Solms
[a] Natural Resources Conservation Service [NRCS 2021]	

Synonymy: *Bryum filiforme* Dicks., *Bryum julaceum* Schrad. ex G. Gaertn., B. Mey. & Scherb., *Anomobryum filiforme* (Dicks.) Husn. (illegitimate name), *Pohlia filiformis* (Dicks.) A.L. Andrews (Norris and Shevock 2004a, Holyoak and Köckinger 2010, Spence 2014).

California Moss eFlora link: https://ucjeps.berkeley.edu/CA_moss_eflora/moss_eflora_display_sql.php?name=Anomobryum%20julaceum

Type locality: EUROPE: "Auf Dächern, Mauern und Balken, jedoch selten" (Gärtner et al. 1802). According to *TL-2*, some of Philipp Gottfried Gaertner's herbarium material is kept in W. No specimens were cited in the protologue, and whether a lectotype has been designated remains uncertain.

Key literature

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Aaron E. Sims, California Native Plant Society, Rare Plant Program Director, 29 September 2021

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.

Appendix 1: Known Occurrences

Table 4. Known occurrences of slender silver-moss within California (NRIS, CNDDB, Calflora/CCH databases).

Duplicate records from the same site are given the same record number and are included in red. Rows containing questionable records are highlighted in pink.

Rec. #	Locality	County	Quad	Ref. (Source)	Date Last Obs'd	Population Info	Threats	Land Mgr.	Elev. (ft.)
1	YOSEMITE FALLS, YOSEMITE NP.	Mariposa	Yosemite Falls (3711975)	CNDDB, Jan. 2021 (EO 1)	1950	NEEDS FIELDWORK.		Yosemite NP	4800
2	QUAIL HOLLOW RANCH COUNTY PARK.	Santa Cruz	Felton (3712211)	CNDDB, Jan. 2021 (EO 2)	29-Apr-2000	SITE BASED ON A 2000 KELLMAN COLLECTION.		Quail Hollow Ranch Park (Santa Cruz County Parks Dept.)	560
2	seepspring; Double-slide Gulch. Quail Hollow Ranch County Park	Santa Cruz	Felton (3712211)	CNABH, Aug. 2021 (CAS1017794)	29-Apr-2000			Quail Hollow Ranch Park (Santa Cruz County Parks Dept.)	
3	BIG BASIN REDWOODS STATE PARK, NEAR CHINA GRADE RD AND HIGHWAY 236.	Santa Cruz	Big Basin (3712222)	CNDDB, Jan. 2021 (EO 3)	17-Feb-2001	MAIN SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 2001 KELLMAN COLLECTION. SCHOFIELD COLLECTION WITH A LOCATION GIVEN ONLY AS BIG BASIN STATE PARK ALSO ATTRIBUTED HERE.		Big Basin Redwoods SP (Calif. Dept. of Parks & Rec.)	
3	Santa Cruz Mts., Big Basin Park, north entrance; 4000 ft alt.	Santa Cruz	Big Basin (3712222)	CNABH, Aug. 2021 (COLO-B-0043192)	24-Aug-1957			Big Basin Redwoods SP (Calif. Dept. of Parks & Rec.)	

Duplicate records from the same site are given the same record number and are included in red. Rows containing questionable records are highlighted in pink.									
Rec. #	**Locality**	**County**	**Quad**	**Ref. (Source)**	**Date Last Obs'd**	**Population Info**	**Threats**	**Land Mgr.**	**Elev. (ft.)**
3	Big Basin Redwoods State Park. Off SR 236, mm 12.58	Santa Cruz	Big Basin (3712222)	CNABH, Aug. 2021 (CAS1018591)	17-Feb-2001			Big Basin Redwoods SP (Calif. Dept. of Parks & Rec.)	
3	along roadside ditch. SR 236 at mm 12.58, near China Grade. Big Basin Redwoods State Park	Santa Cruz	Big Basin (3712222)	CNABH, Aug. 2021 (CAS718681)	17-Feb-2001			Big Basin Redwoods SP (Calif. Dept. of Parks & Rec.)	
3	On sandstone rock on the bank of Hwy 236 between China Grade and Hwy 236. Big Basin Redwoods State Park	Santa Cruz	Big Basin (3712222)	CNABH, Aug. 2021 (CAS1109791)	15-May-2011			Big Basin Redwoods SP (Calif. Dept. of Parks & Rec.)	
3	Above the Basin trail below China Grade at a point 1.45 miles from SR 236. Big Basin Redwoods State Park	Santa Cruz	Big Basin (3712222)	CNABH, Aug. 2021 (CAS1109313)	17-Aug-2008			Big Basin Redwoods SP (Calif. Dept. of Parks & Rec.)	
4	ROAD TO PETROLIA, 0.5 MI ABOVE FERNDALE.	Humboldt	Ferndale (4012453)	CNDDB, Jan. 2021 (EO 4)	s.d.	NEEDS FIELDWORK.		unknown	320
5	HWY 96 NEAR SKUNK CREEK, 3 MI S OF WEITCHPEC.	Humboldt	Weitchpec (4112326)	CNDDB, Jan. 2021 (EO 5)	s.d.	NEEDS FIELDWORK.		Hoopa Valley Reservation	880

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Rec. #	**Locality**	**County**	**Quad**	**Ref. (Source)**	**Date Last Obs'd**	**Population Info**	**Threats**	**Land Mgr.**	**Elev. (ft.)**
6	3 MILES ABOVE NEWCOMB'S RANCH, HIGHWAY 2, SAN GABRIEL MOUNTAINS.	Los Angeles	Waterman Mtn. (3411738)	CNDDB, Jan. 2021 (EO 6)	2-Jun-1946	ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 1946 COLLECTION BY HABEEB. NEEDS FIELDWORK.		Angeles NF	5500
6	3 miles above Newcomb's Ranch, Highway No. 2, San Gabriel Mts.		Waterman Mtn. (3411738)	CNABH, Aug. 2021 (TENN-B-0043419)	2-Jun-1946			Angeles NF	
7	MOUNT DIABLO STATE PARK.	Contra Costa	Clayton (3712188)	CNDDB, Jan. 2021 (EO 7)	3-Dec-2000	ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 2000 COLLECTION BY NORRIS. NEEDS FIELDWORK.		Mount Diablo SP (Calif. Dept. of Parks & Rec.)	
7	On moist, rather shaded vertical face of sandstone outcrop in Adenostoma chaparral in Quercus agrifolia forest along West Fork Sycamore Canyon near trail from Lower Rock City, Mt. Diablo State Park.	Contra Costa	Clayton (3712188)	CNABH, Aug. 2021 (UC1756716)	3-Dec-2000			Mount Diablo SP (Calif. Dept. of Parks & Rec.)	

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Rec. #	**Locality**	**County**	**Quad**	**Ref. (Source)**	**Date Last Obs'd**	**Population Info**	**Threats**	**Land Mgr.**	**Elev. (ft.)**
7	along West Fork Sycamore Canyon near trail from Lower Rock City, Mt. Diablo State Park.	Contra Costa	Clayton (3712188)	CNABH, Aug. 2021 (CAS1018064)	3-Dec-2000			Mount Diablo SP (Calif. Dept. of Parks & Rec.)	
7	along West Fork Sycamore Canyon near trail from Lower Rock City, Mt. Diablo State Park	Contra Costa	Clayton (3712188)	CNABH, Aug. 2021 (CAS1175365)	3-Dec-2000			Mount Diablo SP (Calif. Dept. of Parks & Rec.)	
8	CALISTOGA ROAD NEAR INTERSECTION WITH SAINT HELENA ROAD, ABOUT 3 MILES NORTH OF HWY 12, NEAR SANTA ROSA.	Sonoma	Mark West Springs (3812256)	CNDDB, Jan. 2021 (EO 8)	s.d.	ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A COLLECTION BY ROBERTSON. NEEDS FIELDWORK.		unknown	
8	Near Santa Rosa, Calistoga Road near intersection with St. Helena Road. About 3 mi. north of Hwy 12.	Sonoma	Mark West Springs (3812256)	CNABH, Aug. 2021 (CAS1040046)	5-Jan-2002			unknown	
9	ALONG PULGA ROAD (CAMP CREEK ROAD), 0.7 ROAD MILE NE OF PULGA.	Butte	Pulga (3912174)	CNDDB, Jan. 2021 (EO 9)	16-Nov-2004	A 300 SQ CENTIMETER OCCURRENCE, WITH AN ESTIMATED 300 PLANTS, OBSERVED IN 2004.	POSSIBLE FUTURE ROAD WIDENING COULD THREATEN. SOME EROSION.	Plumas NF	1657

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Rec. #	**Locality**	**County**	**Quad**	**Ref. (Source)**	**Date Last Obs'd**	**Population Info**	**Threats**	**Land Mgr.**	**Elev. (ft.)**
9	Plumas National Forest. 18 miles east of Chico; 0.7 mile northeast of Pulga; on Camp Creek Road, 0.7 mile east of Pulga road junction with Camp Creek Road (map names this Pulga Road). Datum NAD 1927, UTM Zone 10 N-4407342, E-633606. T23N R05E S32 center	Butte	Pulga (3912174)	CCH2, Nov. 2020 (CHSC09 0323)	16-Nov-2004			Plumas NF	1608
9		Butte	Pulga (3912174)	NRIS polys, Nov. 2020 (051103_ ANJU4_0 01)	16-Nov-2004	10 individuals		Plumas NF	
10	NEAR WHISKEYTOWN ENVIRONMENT AL CAMP.	Shasta	Igo (4012255)	CNDDB, Jan. 2021 (EO 10)	23-Mar-2003	ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 2003 COLLECTION BY SHEVOCK & TOREN. NEEDS FIELDWORK.		Whiskeytown -Shasta-Trinity NRA (National Park Service)	

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Rec. #	**Locality**	**County**	**Quad**	**Ref. (Source)**	**Date Last Obs'd**	**Population Info**	**Threats**	**Land Mgr.**	**Elev. (ft.)**
10	Whiskeytown National Recreation Area, Along east of side of Clear Creek across stream from the Whiskeytown Environmental Camp	Shasta	Igo (4012255)	CNABH, Aug. 2021 (CAS1045599)	23-Mar-2003			Whiskeytown-Shasta-Trinity NRA (National Park Service)	
10	Whiskeytown National Recreation Area. Along east side of Clear Creek up stream from the Whiskeytown Environmental Camp and below the Clear Creek bridge	Shasta	Igo (4012255)	CNABH, Aug. 2021 (CAS1045600)	23-Mar-2003			Whiskeytown-Shasta-Trinity NRA (National Park Service)	
10	Whiskeytown National Recreation Area, Along east side of Clear Creek up stream from the Whiskeytown Environmental Camp and below the Clear Creek bridge. R6W, T32N, section 33	Shasta	Igo (4012255)	CNABH, Aug. 2021 (MO 100657478)	23-Mar-2003			Whiskeytown-Shasta-Trinity NRA (National Park Service)	

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Rec. #	**Locality**	**County**	**Quad**	**Ref. (Source)**	**Date Last Obs'd**	**Population Info**	**Threats**	**Land Mgr.**	**Elev. (ft.)**
11	W OF SAN MARCOS PASS ALONG WEST CAMINO CIELO ROAD ADJACENT TO WINCHESTER GUN CLUB SITE.	Santa Barbara	San Marcos Pass (3411957)	CNDDB, Jan. 2021 (EO 11)	26-Mar-2006	ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS 2006 SHEVOCK COLLECTION. NEEDS FIELDWORK.		Los Padres NF	
11	W of San Marcos Pass along West Camino Cielo Road adjacent to the Winchester Gun Club site; Santa Ynez Mts., Los Padres National Forest	Santa Barbara	San Marcos Pass (3411957)	CNABH, Aug. 2021 (NY899156)	26-Mar-2006			Los Padres NF	
11	SANTA YNEZ MTS., LOS PADRES NATIONAL FOREST. West of San Marcos Pass along West Camino Cielo Road adjacent to the Winchester Gun Club site. R29W, T5N, section 24. Lat/Long: 34°30'07.0"N, 119°51'56.3"W	Santa Barbara	San Marcos Pass (3411957)	CNABH, Aug. 2021 (CAS1083558)	26-Mar-2006			Los Padres NF	

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Rec. #	**Locality**	**County**	**Quad**	**Ref. (Source)**	**Date Last Obs'd**	**Population Info**	**Threats**	**Land Mgr.**	**Elev. (ft.)**
11	Santa Ynez Mountains: Los Padres National Forest, west of San Marcos Pass along West Camino Cielo Road adjacent to the Winchester Gun Club site.	Santa Barbara	San Marcos Pass (3411957)	CNABH, Aug. 2021 (NYSi25856)	26-Mar-2006			Los Padres NF	
11	Santa Ynez Mts., Los Padres National Forest: W of San Marcos Pass along West Camino Cielo Rd. adjacent to the Winchester Gun Club site	Santa Barbara	San Marcos Pass (3411957)	CNABH, Aug. 2021 (DUKE114202)	26-Mar-2006			Los Padres NF	
11	Santa Ynez Mts., Los Padres Nat'l Forest, W of San Marcos Pass along W. Camino Cielo Rd. adjacent to Winchester Gun Club	Santa Barbara	San Marcos Pass (3411957)	CNABH, Aug. 2021 (KE8988)	26-Mar-2006			Los Padres NF	
11	Santa Ynez Mts., Los Padres National Forest, West of San Marcos Pass along West Camino Cielo Road adjacent to the Winchester Gun Club site. R29W, T5N, section 24	Santa Barbara	San Marcos Pass (3411957)	CNABH, Aug. 2021 (MO 100657483)	26-Mar-2006			Los Padres NF	

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Rec. #	**Locality**	**County**	**Quad**	**Ref. (Source)**	**Date Last Obs'd**	**Population Info**	**Threats**	**Land Mgr.**	**Elev. (ft.)**
12	EMPIRE GRADE ABOUT 0.5 MILE UPHILL FROM SMITH GRADE, APPROX. 3 AIR MILES NW OF UC SANTA CRUZ.	Santa Cruz	Felton (3712211)	CNDDB, Jan. 2021 (EO 12)	8-Apr-2001	ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 2001 KELLMAN COLLECTION. NEEDS FIELDWORK.		unknown	
12	On south side of Empire Grade, about 0.5 mi uphill from Smith Grade	Santa Cruz	Felton (3712211)	CNABH, Aug. 2021 (CAS1018695)	8-Apr-2001			unknown	
13	UNNAMED DIRT ROAD OFF OF HWY 70 ACROSS FROM THE SHADY REST AREA, APPROX. 0.65 ROAD MILE NE OF CRESTA.	Butte	Pulga (3912174)	CNDDB, Jan. 2021 (EO 13)	3-Feb-2006	APPROX. 100,000 PLANTS OBSERVED IN 2006.	THE HABITAT COULD BE REMOVED WITH ROAD WIDEING, BUT OTHERWISE IS FAIRLY STABLE.	Plumas NF	1560
13		Butte	Pulga (3912174)	NRIS polys, Nov. 2020 (051103_ANJU4_002)	3-Feb-2006	99999 individuals		Plumas NF	

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Rec. #	**Locality**	**County**	**Quad**	**Ref. (Source)**	**Date Last Obs'd**	**Population Info**	**Threats**	**Land Mgr.**	**Elev. (ft.)**
13	On steep vertical rock on a cut bank of unnamed dirt road leading to adit adjacent to Bear Ranch Creek. Park at Shady Rest Area on Highway 70 and cross Hwy, heading about 300 ft. up the dirt road towards the creek.	Butte	Pulga (3912174)	NRIS polys, Nov. 2020 (051103_ANJU4_002_001)	10-Jul-2017	"too many to count"		Plumas NF	1560
13	Plumas National Forest. On the dirt road bank to Bear Ranch Creek. Just off Hwy 70 at Shady Rest Area south of Arch Rock tunnel	Butte	Pulga (3912174)	CNABH, Aug. 2021 (CAS1109717)	24-Mar-2011			Plumas NF	
13	Near the foot of the bank. Along Hwy 70 at Shady Rest Area, along dirt road Bear Ranch Creek. Plumas National Forest	Butte	Pulga (3912174)	CNABH, Aug. 2021 (CAS1073248)	29-Jul-2006			Plumas NF	
13	North Fork Feather River Watershed. Shady Rest. 23km SW from Beiden, across (east) of a major rest areas along Hw 70, up an old spur road.	Plumas	Pulga (3912174)	CNABH, Aug. 2021 (CAS1191349)	24-Mar-2011			Plumas NF	

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Rec. #	**Locality**	**County**	**Quad**	**Ref. (Source)**	**Date Last Obs'd**	**Population Info**	**Threats**	**Land Mgr.**	**Elev. (ft.)**
13	North Fork Feather River Watershed	Plumas	Pulga (3912174)	CNABH, Aug. 2021 (CAS1191348)	24-Mar-2011			Plumas NF	
13	Shady Rest Area on Highway 70, walk up dirt road towards Bear Ranch creek and Falls. USGS Quad: Pulga; 39.847639 -121.393611	Butte	Pulga (3912174)	CNABH, Aug. 2021 (CAS1259539)	24-Mar-2011			Plumas NF	
13	Plumas National Forest, Feather River Ranger District. Feather River Canyon, 100 yards up dirt road from Shady Rest Area on Hwy 70; on uphill cut slope of road.	Butte	Pulga (3912174)	CNABH, Aug. 2021 (CAS485132)	3-Feb-2006			Plumas NF	
14	Northwest side of canyon of North Fork Feather River, 0.1 mi north of mouth of Rock Creek. T24N R06E S30 SW1/4 of SW1/4 USGS Quadrangle: Storrie 1:24,000	Plumas	Storrie (3912183)	CCH2, Nov. 2020 (CHSC118514)	26-Mar-1998			Plumas NF	1821

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Rec. #	**Locality**	**County**	**Quad**	**Ref. (Source)**	**Date Last Obs'd**	**Population Info**	**Threats**	**Land Mgr.**	**Elev. (ft.)**
14	Northwest side of canyon of North Fork Feather river, 0.1 mi north of mouth of Rock Creek.	Plumas	Storrie (3912183)	CCH2, Nov. 2020 (CAS1263238)	26-Mar-1998			Plumas NF	1821
15	Along Highway 96 about 4 miles north of Willow Creek.	Humboldt	Willow Creek (4012386)	CCH2, Nov. 2020 (CHSC098491)	16-Feb-1985			Six Rivers NF	820
15	along Hwy 96 about 4 miles N of Willow Creek	Humboldt	Willow Creek (4012386)	CNABH, Aug. 2021 (NY966468)	16-Feb-1985			Six Rivers NF	
15	Along Highway 96 about 4 miles north of Willow Creek.	Humboldt	Willow Creek (4012386)	CNABH, Aug. 2021 (CAS1112175)	16-Feb-1985			Six Rivers NF	
15	along Highway 96 about 4 miles north of Willow Creek.	Humboldt	Willow Creek (4012386)	CNABH, Aug. 2021 (OSCB22425)	16-Feb-1985			Six Rivers NF	
15	Along Hwy. 96 ca. 4 mi N of Willow Creek	Humboldt	Willow Creek (4012386)	CNABH, Aug. 2021 (DUKE133887)	16-Feb-1985			Six Rivers NF	
15	Along Highway 96 about 4 miles north of Willow Creek.; Co:Humboldt	Humboldt	Willow Creek (4012386)	CNABH, Aug. 2021 (UBC B201925)	16-Feb-1985			Six Rivers NF	
15	Along Highway 96 about 4 miles north of Willow Creek.	Humboldt	Willow Creek (4012386)	CNABH, Aug. 2021 (SFV-20916)	16-Feb-1985			Six Rivers NF	

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Rec. #	**Locality**	**County**	**Quad**	**Ref. (Source)**	**Date Last Obs'd**	**Population Info**	**Threats**	**Land Mgr.**	**Elev. (ft.)**
15	USA: California, Humboldt County. Along Highway 96 about 4 miles north of Willow Creek. 40°59.5? N 123°38? W. Elev. ~ 250 m.	Humboldt	Willow Creek (4012386)	CNABH, Aug. 2021 (S B137110)	16-Feb-1985			Six Rivers NF	
16	South side of Big Chico Creek in Upper Bidwell Park, Chico; opposite the golf course. About 30 ft above the creek. T22N R02E S17 NE1/4 of NW1/4 USGS Quadrangle: RichardsonSprings	Butte	Richardson Springs (3912177)	CCH2, Nov. 2020 (CHSC11 9292)	19-Apr-1998			Bidwell Park (City of Chico)	322
17	Central Sierra Nevada, Toiyabe National Forest. Hoover Wilderness, Virginia Lakes Basin. Off of Trail 043 at small lake at headwaters below pass	Mono	Dunderberg Peak (3811913)	CCH2, Nov. 2020 (CAS1216 403)	4-Aug-2012			Humboldt-Toiyabe NF	10686
18	37.5508 -120.0427	Mariposa	Bear Valley (3712051)	Calflora, Jan. 2021 (mu29)	26-Feb-2013	1+ individuals		unknown	3494

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Rec. #	**Locality**	**County**	**Quad**	**Ref. (Source)**	**Date Last Obs'd**	**Population Info**	**Threats**	**Land Mgr.**	**Elev. (ft.)**
19	Central Sierra Nevada, Yosemite National Park. Foresta road just east of Rancheria Flat Park Housing Area at barium mine site	Mariposa	Bear Valley (3712051)	CNABH, Aug. 2021 (CAS1144951)	3-Apr-2011			Yosemite NP	
19	Merced River Watershed. East Barium Ridge. Collection area on south facing metamorphic ridge	Mariposa	Bear Valley (3712051)	CNABH, Aug. 2021 (CAS1191382)	1-Apr-2011			Yosemite NP	
20	Central Coast Ranges, Los Padres National Forest. Forest road north of boundary with Fort Hunter Liggett south of Indians Site and adjacent to bridge crossing, tributary of North Fork San Antoio river	Monterey	Cone Peak (3612114)	CNABH, Aug. 2021 (CAS1047931)	3-Apr-2004			Los Padres NF	
21	below Butano Fire road. Butano State Park	San Mateo	Big Basin (3712222)	CNABH, Aug. 2021 (CAS1109544)	21-Mar-2009			unknown	
22	In chaparral above Hwy 17 just north of Laurel Rd	Santa Cruz	Laurel (3712118)	CNABH, Aug. 2021 (CAS1045072)	26-Jan-2003			unknown	

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Rec. #	**Locality**	**County**	**Quad**	**Ref. (Source)**	**Date Last Obs'd**	**Population Info**	**Threats**	**Land Mgr.**	**Elev. (ft.)**
23	Above Soquel-San Jose Road	Santa Cruz	Laurel (3712118)	CNABH, Aug. 2021 (CAS1045246)	26-Apr-2003			unknown	
24	on the bank of North Rodeo Gulch Road near milemarker 0.56	Santa Cruz	Laurel (3712118)	CNABH, Aug. 2021 (CAS1171367)	15-Jun-2012			unknown	
24	Along Rodeo Gulch Road beyond milemarker 0.72	Santa Cruz	Laurel (3712118)	CNABH, Aug. 2021 (CAS1040642)	23-Feb-2002			unknown	
25	Physiographic Region: North Coast Ranges. Bluffs between Redway and Garberville, Evergreen Road.	Humboldt	Garberville (4012317)	CNABH, Aug. 2021 (SFV-21245)	18-Jul-2007			unknown	
	s. loc.	Mariposa		CNABH, Aug. 2021 (ILL00217516)					
	"California" (s. loc.)			CNABH, Aug. 2021 (NY52101)					

Appendix 2: Additional Considerations at the Forest Level

<This section, including the next 5 subheadings, would be filled out by **Forest Service botanists**.>

<Forest Name>

Geographic distribution within the Forest

A. Scarce or isolated
B. Patchy or gaps
C. Contiguous

<Select a geographic distribution rank and provide references or cite 'specialist expertise, <name>' where appropriate.>

Abundance of the species on the Forest

A. Rare – current abundance is low enough that stochastic and other factors could lead to potential imperilment.
B. Uncommon – current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.
C. Common – current abundance is large enough that species persistence is not threatened by demographic stochasticity in combination with environmental variation.
D. Insufficient information to draw inferences about criterion.

<Select a species abundance rank and provide references or cite 'specialist expertise, <name>' where appropriate.>

Population trend on the Forest

A. Significant downward or suspected downward population trend.
B. Stable population.
C. Upward population trend.
D. Insufficient information to draw inferences about criterion.

<Select a population trend rank and provide references or cite 'specialist expertise, <name>' where appropriate.>

Habitat trend on the Forest

A. Decline in habitat quality or quantity.
B. Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.
C. Improving habitat quality or increasing amounts of suitable or potential habitat.
D. Insufficient information to draw inferences about criterion.

<Select a habitat trend rank and provide references or cite 'specialist expertise, <name>'where appropriate.>

Vulnerability of habitat on the Forest

A. Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as drought, climate change, high intensity wildfire and wildfire suppression disturbances, loss of natural openings due to historical wildfire suppression, nonnative invasive species, water impoundments and diversions, and recreation, etc.
B. Habitat modification is likely to result in ecological patterns similar to the range of historical conditions, but is being impacted by modern stressors.
C. Habitat resilient, changes are similar in frequency and intensity to those expected from NRV, and modern stressors not significant.
D. Insufficient information to draw inferences about criterion.

<Select a habitat vulnerability rank and provide references or cite 'specialist expertise, <name>'where appropriate.>

Additional Forest specific information related to the SCC determination

<This section is provided for Forest botanists to add additional Forest specific information that is not captured in the section above, if necessary. Provide a narrative description here of the additional relevant information. State "No additional information" if this section is not used.>