Species: *Arctostaphylos klamathensis*
S.W. Edwards, Keeler-Wolf & W. Knight, Klamath manzanita

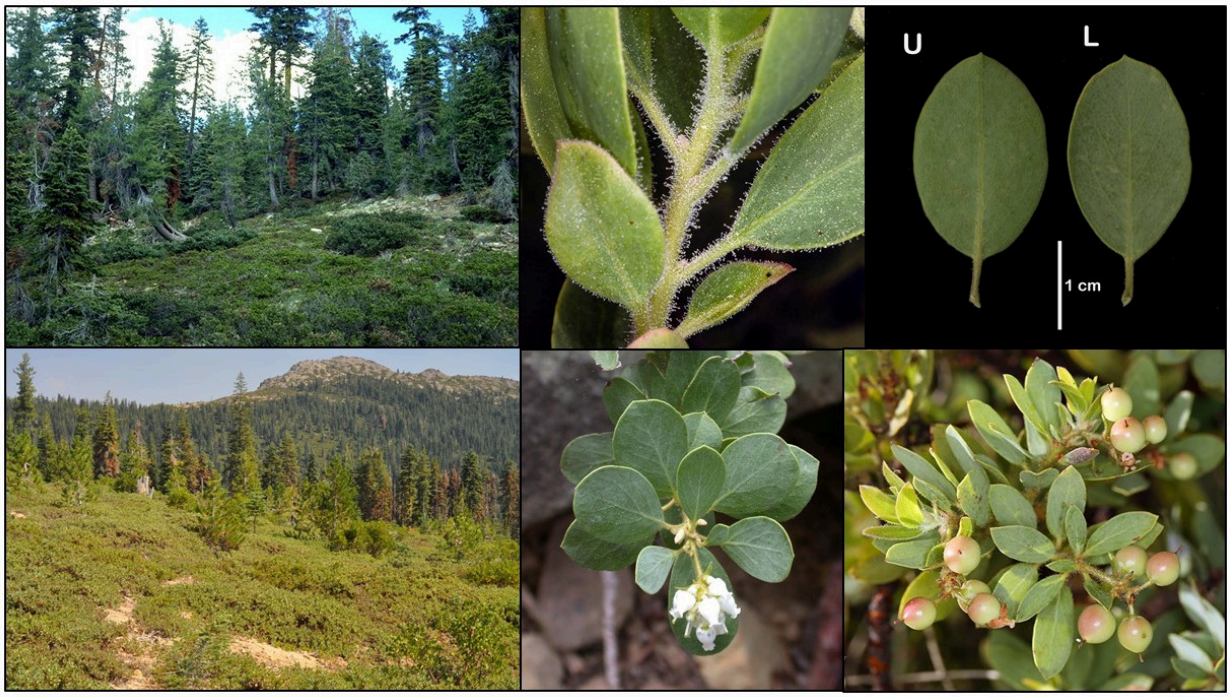


Photo Source: CalPhotos

Photo Credits: Julie Kierstead (top left); John Game (top center); Dean Wm. Taylor (top right, bottom left & bottom center); Steve Matson (bottom right).

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 Klamath manzanita.		
Entity	**Status**	**Status Definition**
NatureServe CA[a]	G2G3 S2S3	G2: Imperiled — At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors. G3: Vulnerable — At moderate risk of extinction or elimination due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors. 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 from the nation or state. S3: Vulnerable — Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation. Range Rank — A numeric range rank (i.e., G2G3 S2S3) is used to indicate the range of uncertainty about the exact status of this species.
California Rare Plant Rank[b]	1B.2	1B: Plants rare, threatened, or endangered in California and elsewhere. 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 1984 and has not undergone any recent status changes.
California State Listing[c]	Not listed	
USDA Forest Service[d]	Not listed	*Arctostaphylos klamathensis* was removed from the Forest Service Sensitive list in 2006.
USDI FWS[e]	Not listed	
USDI BLM[f]	S	Sensitive
NatureServe OR[g]	Not present	
Oregon State Listing[h]	Not present	
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.

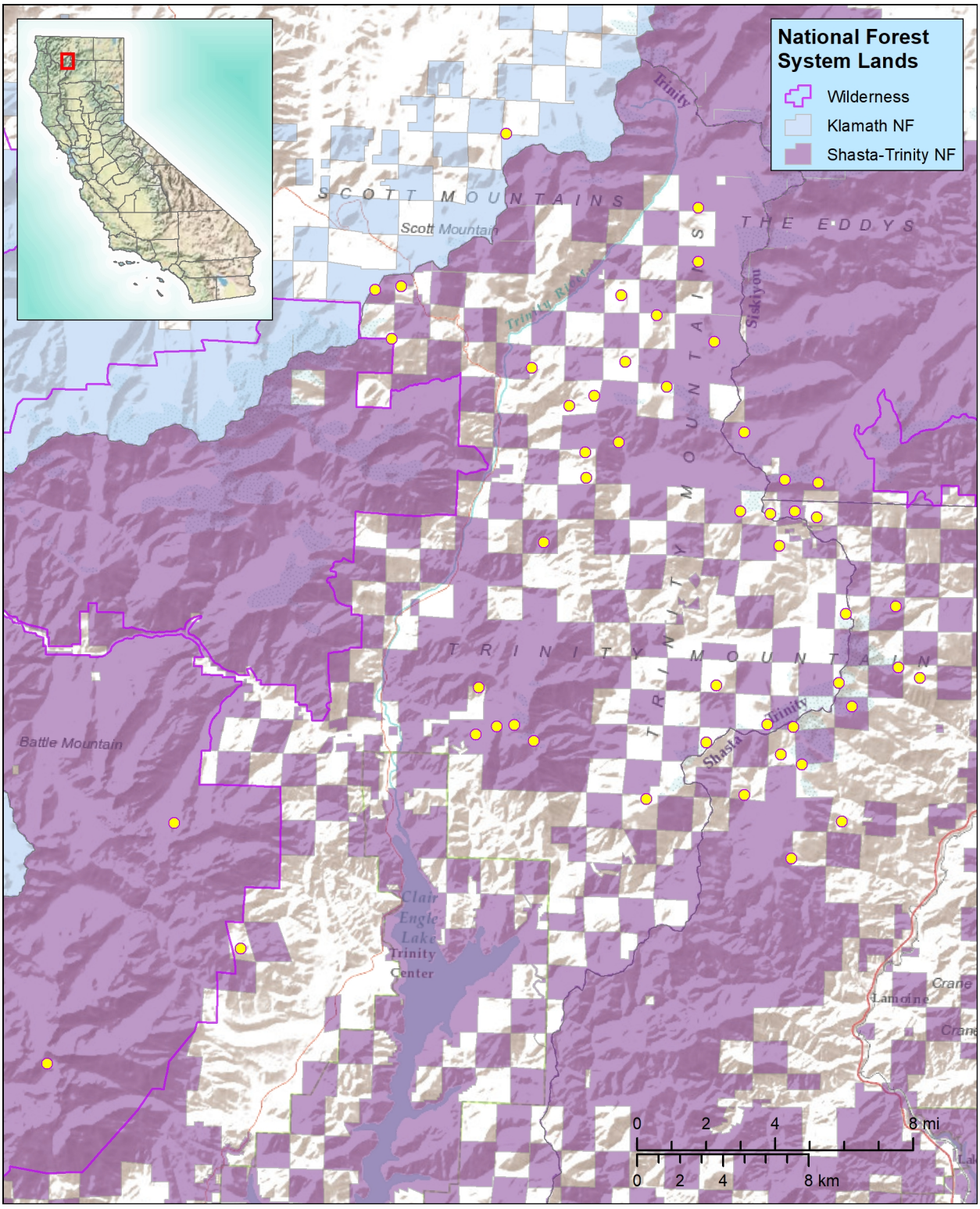
Distribution, abundance, and population trend on the planning unit[1]

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 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 Klamath manzanita within the planning area (NRIS, CNDDB, Calflora/CCH databases).

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
Klamath:	2	1	-	1	-	4-Jun-2015	1
Shasta-Trinity:	1, (2), 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 15, 17, 18, 19, 20, 22, 24, 25, 29, 31, 36, 41, 46, 47, 49, 50	25 (1)	2	20 (1)	7	18-Jul-2020	27
Totals:	N/A	26	2	21	7	N/A	28

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



Sources: *Distribution*: CCH2 2020, Calflora 2021, CNDDB 2021. *Baselayers*: 2013 National Geographic Society, i-cubed, Esri, Garmin, NOAA, NPS, USGS.

Klamath manzanita was last updated in the CNDDB on April 24, 2018 (CNDDB 2021), and therefore all Calflora, CCH, and/or NRIS records prior to this date are assumed to have already been reviewed and entered into the CNDDB for this plant. Accordingly, only records from Calflora, CCH, and/or NRIS reported after this date have been reviewed for potential new or updated occurrence information and are included in Table 4 in Appendix 1 as applicable.

Klamath manzanita is endemic to California and restricted to the Klamath Ranges (KR) bioregion where it is found from the Trinity Divide southwestward through the Trinity and Scott mountains to the easternmost part of the Trinity Alps (northern Trinity, northwestern Shasta, and south-central Siskiyou counties) (CCH2 2020, Calflora 2021, CNDDB 2021). Its distribution more-or-less coincides with a geologic feature known as the Trinity Ultramafic Sheet (Irwin and Lipman 1962, Irwin 1966; J. Kierstead 2020, pers. comm.). Using GeoCAT (Bachman et al. 2011), the estimated total extent of occurrence is 371 square miles, but because of habitat patchiness the area of occupancy is smaller (conservatively estimated at 68 square miles but likely to be much less).

Of the 50 known occurrences of this species, 28 (56%) are located at least partly on Shasta-Trinity National Forest land, with CNDDB EO #2 occupying both sides of a ridgeline forming the boundary between the Shasta-Trinity and Klamath National Forests (Table 2). Two occurrences (CNDDB EO #s 18 & 21) are located in the Trinity Alps Wilderness, and another occurrence (EO #1) may receive protection within the Cedar Basin botanical Special Interest Area, previously recommended as a Research Natural Area (Cheng 2004). The remaining 22 occurrences are generally on privately owned timberland (mostly held by Sierra Pacific Industries or Roseburg Resources Co.), although one is of unknown ownership (based on a 2002 observation with imprecise locality data). The large proportion of occurrences on private land is the result of a "checkerboard" land ownership pattern created by railroad land grants in the 19th century.

Abundance of *A. klamathensis* on a per occurrence basis ranges from one to nearly 30,000 plants. Three occurrences had > 20,000 plants, 15 had 1,000–10,000 plants, nine had 100–500 plants, 11 had < 100 plants, and 12 have no data or only qualitative observations (CNDDB 2021). The species was described as locally dominant in the Terrace Lake basin of Siskiyou County (EO #1) (Keeler-Wolf 1982) and on the ridge south of Mumbo Lake in Trinity County (EO #7). In other localities it has sometimes been described as abundant or common (EO #s 6 & 19). The three largest occurrences are on land wholly or partly owned by Sierra Pacific Industries (EO #s 15, 23, & 35); this might be an artifact of higher intensity of survey effort in these areas but could also indicate that *A. klamathensis* tends to increase in abundance under intensive timber management. Many seedlings were noted in disturbed areas at one locality ca. 2 miles southwest of Deadfall Lakes in Trinity County (EO #3); the presence of seedlings was also recorded in three other localities (EO #s 4, 26, & 27).

Two new locality records of Klamath manzanita (#s 49 & 50) are located approximately 0.75 air mile southeast and 2.0 air mile northeast of CNDDB EO #s 20 and 1, respectively. These non-CNDDB records should perhaps be evaluated for inclusion in the CNDDB.

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

Klamath manzanita is a low-growing (0.1–0.5 m high), gray-green shrub with decumbent branches that form adventitious roots with soil contact; its blooming period is from May to July (Edwards et al. 1983, JEPS 2021). It generally inhabits montane chaparral and openings in montane to subalpine coniferous forest on dry, rocky slopes and ridgelines at elevations of 4,275–7,380 feet (CNDDB 2021). It mainly occurs on ultramafic substrates (peridotite and serpentinized peridotite) but also on gabbroic or granitic rocks. Frequently associated plant species include trees *Abies magnifica* var. *shastensis*, *A. concolor*, *Calocedrus decurrens*, *Pinus contorta*, *P. jeffreyi*, *P. lambertiana*, *P. monticola*, *P. ponderosa*, *Pseudotsuga menziesii*, and *Tsuga mertensiana*; shrubs *Arctostaphylos nevadensis*, *A. patula*, *Quercus vacciniifolia*, *Ceanothus cordulatus*, and *C. prostratus*; and herbs *Xerophyllum tenax*, *Elymus* spp., and *Howellanthus dalesianus* (CRPR 4.3).

The manzanita genus *Arctostaphylos* with about 62 species and 34 subspecies is the most diverse group of woody plants in the California flora (JEPS 2021). Hybridization and polyploidization are driving evolution and speciation in *Arctostaphylos* (Parker et al. 2020). Klamath manzanita is reportedly a diploid species (Parker et al. 2009, 2020; JEPS 2021), but the primary source of this chromosome count could not be traced. If correct, then *A. klamathensis* may have arisen through homoploid hybrid speciation, with one of the presumed parents being *A. nevadensis* with which it shares its low-growing habit and ability to spread vegetatively by adventitious roots (Edwards et al. 1983). However, *A. nevadensis* has nonglandular-hairy twigs and dark-green leaves while *A. klamathensis* has glandular-hairy twigs and gray-green leaves, characters that it may have inherited from *A. viscida* which infrequently co-occurs with *A. klamathensis* in the lower part of its elevational range (CNDDB 2021, EO #s 27 & 44). Apparent hybrids or introgression products between *A. klamathensis* and either *A. nevadensis* or *A. patula* have been reported occasionally [see Edwards 1985; *D.W. Taylor 18,132* on 11 June 2002 (JEPS); J. Kierstead 2020, pers. comm.]. More than half of the element occurrence records in CNDDB (2021) document that *A. patula* and *A. nevadensis* co-occur with *A. klamathensis*; several additional occurrence records mention only *A. nevadensis*.

Unlike some other species of *Arctostaphylos* that resprout after fire or other disturbance, Klamath manzanita lacks a basal burl (enlarged, woody root-crown) and is likely killed by fire (Edwards et al. 1983, JEPS 2021). Reproduction in this species is therefore mainly by layering or from seed. The seeds of *A. nevadense* and other *Arctostaphylos* species persist in the soil seed bank and only germinate after soil heating from fire has cracked the hard, outer seed coat (Wilken and Burgher 2009, Parker 2015). Germination and seedling establishment take place during the first post-fire growing season, as seen in *A. nevadensis* or forms of *A. patula* without a basal burl (Howard 1993, Hauser 2007).

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

The reproductive biology of *A. klamathensis* has not been studied, but bees, syrphid flies, the bee-fly *Bombylius major*, and hummingbirds have been noted as pollinators of other *Arctostaphylos* species or of *Arctostaphylos* in general (Moldenke 1976, Fulton and Carpenter 1979). Some species of manzanita may also be self-compatible and thereby increase their seed set by not being obligately cross-pollinated (Mosquin 1971). The fruit is a drupe (consisting of a leathery exocarp and mealy mesocarp surrounding the woody nutlets). In an experimental study of *A. patula* (Moore and Vander Wall 2015), frugivorous birds and omnivorous mammals were found to have limited or no role in seed dispersal, even though certain mammals (e.g. bears, coyotes) had been widely reported to consume ripe *Arctostaphylos* fruits, and their scat had often been observed laden with *Arctostaphylos* seeds. Moore and Vander Wall (2015) instead found evidence that scatter-hoarding rodents are the primary dispersers of *A. patula* seeds. A recent study of other non-sprouting *Arctostaphylos* species yielded similar findings and suggested that scatter-hoarding rodents may play a crucial role in burying the seeds to sufficient depth (2–5 cm) that they may escape being killed by wildfire (Parker 2015). Many species of *Arctostaphylos* in northern California are known to form mycorrhizal associations with fungi (Largent et al. 1980); further study is needed to determine if these associations might aid in seedling establishment.

In addition to being a fire-follower, Klamath manzanita colonizes disturbed areas such as roadsides, old timber skid trails and landings, and commercial forest plantations (CNDDB 2021). At one site on SPI's Flume Creek plantation in Shasta County (CNDDB EO #35), high seedling density (ca. 6,000 seedlings per hectare) was recorded in an area where heavy dozers had been used to pile woody debris, while an adjacent undisturbed area had mature shrubs of *A. klamathensis* but no seedlings (Taylor 2012, Taylor et al. 2014). A similar response has been documented in *A. patula* where soil disturbance e.g. from logging activities scarifies the seeds (Hauser 2007).

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

Klamath manzanita is endemic to California where its distribution is more-or-less restricted to high-elevation forest on the Trinity Ultramafic Sheet. Due to a checkerboard land ownership pattern, its 50 known occurrences are divided between Shasta-Trinity NF and privately owned timber lands. Only two occurrences are located in a protected area (Trinity Alps Wilderness). In some areas the species is reportedly common to locally dominant in the forest understory. Twenty-four of the 48 EOs in the CNDDB (2021) have been assigned a rank, including 11 ranked as excellent, 19 ranked as good, and four ranked as fair. The species was previously placed on the USFS Region 5 Sensitive list but removed in 2006, in part due to its relative abundance and large number of occurrences but also because of a lack of significant threats on National Forest lands following implementation of the *Northwest Forest Plan* (Taylor et al. 2014; J. Kierstead 2020, pers. comm.).

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

The main threat to *A. klamathensis* is active suppression on privately owned timber lands (J. Kierstead 2020, pers. comm.). Herbicide applications appear to be the most effective treatment (D. Taylor 2020, pers. comm.). The species is known to inhibit the growth and establishment of conifer seedlings on commercial timber plantations, in the same way as has been documented for *A. patula* (Shainsky and Radosevich 1986, Hauser 2007). On the other hand, it evidently responds favorably to fire and mechanical soil disturbance, and the three largest occurrences are on private land, suggesting it may increase in abundance under intensive timber management.

Taxonomy[4]

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

Table 3. Name status of Klamath manzanita.

Entity	Name Status
CNDDB and CNPS	*Arctostaphylos klamathensis* Edwards, Keeler-Wolf & Knight
Jepson eFlora	*Arctostaphylos klamathensis* S.W. Edwards, Keeler-Wolf & W. Knight
Jepson Manual (1993)	*Arctostaphylos klamathensis* S.W. Edwards, Keeler-Wolf & W. Knight
Flora of North America	*Arctostaphylos klamathensis* S. W. Edwards, Keeler-Wolf & W. Knight
USDA NRCS[a] PLANTS	*Arctostaphylos klamathensis* S.W. Edwards, Keeler-Wolf & W. Knight

[a] Natural Resources Conservation Service [NRCS 2021]

Synonymy: None (JEPS 2021, Tropicos 2021).

Jepson eFlora link (JEPS 2021): https://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=13939

Type locality: California, Siskiyou Co., trail between Cliff Lake and Terrace Lake, T39N, R5E, Section 31, Shasta-Trinity National Forest, elev. 1884 m (holotype *T. Keeler-Wolf 685*, CAS).

Key literature

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Edwards, S.W., T. Keeler-Wolf, and W. Knight. 1983. A new *Arctostaphylos* (Ericaceae) from Siskiyou County, California: part I. *Four Seasons* 6(4): 17–21.

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[4] 1909.12, Chapter 10, Section 12.53, component 1.

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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 Klamath manzanita 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 red.

Rec. #	Locality	County	Quad	Ref. (Source)	Date Last Obs'd	Population Info	Threats	Land Mgr.	Elev. (ft.)
1	JUST SOUTH OF CLIFF LAKE AND TERRACE LAKE, NORTH OF SEVEN LAKES BASIN.	Siskiyou	Seven Lakes Basin (4112224)	CNDDB, Jan. 2021 (EO 1)	6-Aug-1984	TYPE LOCATION. INCLUDES FORMER OCCURRENCE #17.		Shasta-Trinity NF	6500
2	SOUTHWEST OF TOWN OF SCOTT MOUNTAIN SUMMIT ON RIDGES BETWEEN SCOTT MOUNTAIN CREEK AND BIG MILL CREEK.	Siskiyou	Scott Mountain (4112236)	CNDDB, Jan. 2021 (EO 2)	4-Jun-2015	MORE THAN 1000 PLANTS SEEN IN TWO NORTHERNMOST POLYGONS IN 1990. FOLLOWING DATA FROM 2002: EASTERNMOST POLYGON HAD 100 PLANTS, 3 POLYGONS IN N 1/2 OF SEC 7 HAD 6000 PLANTS COMBINED, AND SOUTHERNMOST POLYGON HAD 200. PORTION SEEN IN 2015.	LOGGING COULD BE A SHORT TERM THREAT, BUT POSSIBLY BENEFICIAL OVER TIME. CAN OCCUPY SKID TRAILS, RDSIDES AND OPENINGS.	Klamath NF, Shasta-Trinity NF, private (Sierra Pacific Industries)	

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3	NORTH OF CEDAR CREEK, APPROXIMATELY TWO MILES SOUTHWEST OF DEADFALL LAKES, TRINITY MOUNTAINS.	Trinity	South China Mtn. (4112235)	CNDDB, Jan. 2021 (EO 3)	7-Sep-1990	UNKNOWN NUMBER OF PLANTS SEEN BY RAICHE IN DRIVE-BY SURVEY IN 1990. MANY SEEDLINGS NOTED IN DISTURBED AREAS. CEDAR CREEK LOCATION GIVEN BY CALLAHAN (1988) ATTRIBUTED TO THIS SITE.	LOGGING, CLEARING, BURNING.	Shasta-Trinity NF, private?	6600
4	SOUTH OF CEDAR CREEK, ABOUT 2.5 MILES SOUTHWEST OF DEADFALL LAKES, TRINITY MOUNTAINS.	Trinity	South China Mtn. (4112235)	CNDDB, Jan. 2021 (EO 4)	13-Sep-1990	MORE THAN 100 PLANTS SEEN BY NELSON IN 1990. UNKNOWN NUMBER OF PLANTS SEEN BY RAICHE IN DRIVE-BY SURVEY IN 1990.	ROAD CUTS THROUGH COLONY; SEEDLINGS FOUND ON ROAD SHOULDER. LOGGING, CLEARING, BURNING.	Shasta-Trinity NF, private?	6500
5	PICAYUNE CREEK DRAINAGE, VICINITY OF BLUE DIVIDE, TRINITY MOUNTAINS.	Trinity	Mumbo Basin (4112225)	CNDDB, Jan. 2021 (EO 5)	200508XX	UNKNOWN NUMBER OF PLANTS SEEN BY RAICHE IN NE POLYGON IN 1990; NEED MORE SPECIFIC MAP DETAIL. 10,000+ PLANTS OBSERVED IN SECTION 21 IN 2005. PICAYUNE CREEK LOCATION GIVEN BY CALLAHAN (1988) ATTRIBUTED TO THIS SITE.	LOGGING, CLEARING, BURNING ARE POSSIBLE THREATS (1990).	Shasta-Trinity NF, private	6000

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6	BIG BEAR GULCH NEAR FOREST SERVICE ROAD CROSSING, ABOUT 3.5 MILES WEST OF GUMBOOT LAKE, SHASTA-TRINITY NATIONAL FOREST.	Trinity	Mumbo Basin (4112225)	CNDDB, Jan. 2021 (EO 6)	7-Sep-1990	UNKNOWN NUMBER OF PLANTS SEEN BY RAICHE IN 1990. QUALITY VARIES FROM EXCELLENT TO POOR.	LOGGING, CLEARING, BURNING ARE POSSIBLE THREATS (1990).	Shasta-Trinity NF	6500
7	SOUTH & SOUTHWEST OF MUMBO LAKES, ALONG RIDGE WEST OF LAKE HELEN, TRINITY MOUNTAINS.	Trinity	Mumbo Basin (4112225)	CNDDB, Jan. 2021 (EO 7)	5-Oct-2015	500 PLANTS OBSERVED IN EAST POLYGON IN 2002; MAY EXTEND OUTSIDE OF MAPPED AREA. ABOUT 4693 CLUMPS OBSERVED IN REST OF SITE IN 2015. 1979, 1988 & 1990 OBSERVATIONS FROM "MUMBO BASIN" AND "S OF MUMBO LAKE" ATTRIBUTED HERE.	LOGGING, CLEARING, BURNING ARE POSSIBLE THREATS (1990).	private (Sierra Pacific Industries), Shasta-Trinity NF	6400
8	NORTH FORK RAMSHORN CREEK, ABOUT 2.5 MILES EAST OF THE TRINITY RIVER, SHASTA-TRINITY NATIONAL FOREST.	Trinity	Mumbo Basin (4112225)	CNDDB, Jan. 2021 (EO 8)	7-Sep-1990	UNKNOWN NUMBER OF PLANTS SEEN BY RAICHE IN 1990.	LOGGING, CLEARING, BURNING ARE POSSIBLE THREATS (1990).	Shasta-Trinity NF, private?	

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9	JUST WEST OF ECHO LAKE, ABOUT 0.3 MILE NORTHWEST OF BOULDER PEAK SUMMIT, TRINITY MOUNTAINS.	Shasta	Seven Lakes Basin (4112224)	CNDDB, Jan. 2021 (EO 9)	26-Jun-1997	FEWER THAN 50 PLANTS OBSERVED BY CLIFTON ET AL. IN 1997.	LOGGING, POSSIBLY FIRE.	Shasta-Trinity NF	6000
10	NORTHWEST OF GREY ROCKS, 1.7 MILES WSW OF CONFLUENCE OF SOUTH FORK CASTLE CREEK AND CASTLE CREEK, TRINITY MOUNTAINS.	Shasta	Seven Lakes Basin (4112224)	CNDDB, Jan. 2021 (EO 10)	24-Jun-1997	LARGE NUMBER OF PLANTS SEEN BY DWERLKOTTE AND DEWIT IN 1997.	FIRE.	Shasta-Trinity NF	5200
11	SLOPES SOUTH OF DEVILS LAKE, ~0.6 AIR MILE WEST AND 0.5 AIR MILE WSW OF RED MOUNTAIN SUMMIT.	Trinity	Whisky Bill Peak (4112215)	CNDDB, Jan. 2021 (EO 11)	5-Sep-2017	NORTH POLYGON: ABOUT 500 PLANTS OBSERVED IN 2002 & 2017. ABOUT 14 SHRUBS IN SOUTH POLYGON IN 2017. CALAHAN OBSERVATION FROM "RED MOUNTAIN" ALSO ATTRIBUTED TO THIS SITE.		private (Sierra Pacific Industries)	6225

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12	MEARS RIDGE, 0.5 MILE SOUTH OF GREY ROCK LAKE, TRINITY MOUNTAINS.	Shasta	Chicken Hawk Hill (4112214)	CNDDB, Jan. 2021 (EO 12)	13-Aug-2003	UNKNOWN NUMBER OF PLANTS OBSERVED BY DWERLKOTTE IN SOUTHERN POLYGON IN 1997. 1000 PLANTS OBSERVED IN NORTHERN POLYGON IN 2003.	INFREQUENT TIMBER HARVEST; MOSTLY NON-COMMERCIAL, LOW INTENSITY RECREATIONAL USE LANDS (2003).	Shasta-Trinity NF, private	5800
13	APPROXIMATELY 0.2 TO 1 AIR MILE NE OF TAMARACK LAKE, ON THE SHASTA/TRINITY COUNTY LINE, TRINITY MOUNTAINS.	Trinity	Chicken Hawk Hill (4112214)	CNDDB, Jan. 2021 (EO 13)	9-Aug-2012	UNKNOWN NUMBER OF PLANTS SEEN IN 1991 ON THE "EAST SLOPE OF TAMARACK LAKE, NW 1/4 SEC 4"; COLONY SIZE IS AT LEAST 10 ACRES. 1000+ PLANTS OBSERVED IN SOUTHERN POLYGON AND 1000+ PLANTS IN NORTHERN POLYGON IN 2012.	JEEP TRAIL, RECREATION, WOODCUTTING (1991). TIMBER HARVEST (2012).	private (Roseburg Resources), Shasta-Trinity NF	6100
14	BETWEEN SOUTH FORK SHOTGUN CREEK AND BOULDER CREEK, ABOUT 1 MILE SE OF RATTLESNAKE HILL, SHASTA-TRINITY NATIONAL FOREST.	Shasta	Chicken Hawk Hill (4112214)	CNDDB, Jan. 2021 (EO 14)	6-Oct-1997	ABOUT 30 PLANTS SEEN BY GUARDINO AND CLIFTON IN 1997.	HEAVILY LOGGED, ROAD CONSTRUCTION.	private	5160

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15	VICINITY OF POND LILY LAKE, ABOUT 1.3 TO 2.7 AIR MILES NE OF RED MOUNTAIN, TRINITY MOUNTAINS.	Trinity	Whisky Bill Peak (4112215)	CNDDB, Jan. 2021 (EO 15)	2013XXXX	29,429+ PLANTS OBSERVED IN 2012/2013.	SURROUNDING LAND USE IS TIMBER MANAGEMENT. FOUND IN AREAS OF PAST DISTURBANCE. SOME PLANTS SPRAYED WITH HERBICIDE.	private (Sierra Pacific Industries), Shasta-Trinity NF	5900
16	HEADWATERS OF SMITH CREEK; ABOUT 0.6 AIR MILE EAST OF HIGHLAND LAKES, TRINITY MOUNTAINS.	Trinity	Chicken Hawk Hill (4112214)	CNDDB, Jan. 2021 (EO 16)	14-Sep-2012	113 PLANTS OBSERVED IN 2012. INFORMATION IN A 1988 LETTER FROM CALLAHAN FROM "SOUTH OF HIGHLAND LAKES, ABOUT 1.5 MILES SE OF WHISKEY BILL PEAK" ALSO ATTRIBUTED TO THIS SITE.	SURROUNDING LAND USE IS TIMBER MANAGEMENT. PLANT APPEARS TO BE GROWING WELL WITHIN PREVIOUSLY HARVESTED AREA.	private (Sierra Pacific Industries)	5900
17	UPPER END OF SILIGO MEADOWS, ABOUT 0.4 AIR MILES SOUTHEAST OF DEER LAKE.	Trinity	Siligo Peak (4012288)	CNDDB, Jan. 2021 (EO 18)	27-Aug-2004	SMALL 15' X 20' PATCH/MAT OF PLANTS OBSERVED IN 2004.	NO VISIBLE DISTURBANCES.	Shasta-Trinity NF	7380

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18	SCORPION LAKE, WESTERLY UPPER FLANK OF BONANZA KING, TRINITY MOUNTAINS.	Trinity	Carrville (4112216)	CNDDB, Jan. 2021 (EO 19)	27-Jun-2015	1000 PLANTS OBSERVED IN 2002. DESCRIBED AS "COMMON" IN 2015.	SUBJECT TO MINOR ORV USE.	Shasta-Trinity NF	5900
19	ADJACENT TO USFS ROAD 38N85 TO BONANZA KING LOOKOUT, ABOUT 0.5 AIR MILE EAST OF SCORPION LAKE.	Trinity	Carrville (4112216)	CNDDB, Jan. 2021 (EO 20)	15-Oct-2012	500 PLANTS OBSERVED IN 2002. A 2010 SMITH COLLECTION FROM "ALONG FS RD 38N85 TO THE BONANZA KING LOOKOUT, ~6500 FT" AND 2012 NELSON PHOTOS FROM "W SLOPE OF THE EDDYS; NEAR CEDAR CREEK, CA. 6500 FT" ARE ALSO ATTRIBUTED HERE.	IN 2002: SUBJECT TO MINOR ORV USE, NO ACTIVE OR RECENT LOGGING ACTIVITY.	Shasta-Trinity NF	6500
20	NORTHWEST SIDE OF FOUND LAKE, TRIBUTARY TO BOULDER CREEK.	Trinity	Ycatapom Peak (4112217)	CNDDB, Jan. 2021 (EO 21)	11-Aug-2004	UNKNOWN NUMBER OF PLANTS GROWING IN MAT-LIKE FASHION. OBSERVED IN SMALL AREA (~0.10 ACRE), BUT MAY BE ADDITIONAL PLANTS PRESENT.	NO DISTURBANCES OR THREATS SEEN.	Shasta-Trinity NF	6880

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21	HEADWATERS OF CASTLE CREEK, ABOUT 0.5 MILE EAST AND SE OF ECHO LAKE.	Shasta	Seven Lakes Basin (4112224)	CNDDB, Jan. 2021 (EO 22)	21-Jul-2011	1000 PLANTS OBSERVED IN NORTHERN POLYGON IN 2002. 239 CLUMPS OBSERVED IN TWO SOUTHERN POLYGONS IN 2011; LIKELY MORE PLANTS TOWARD ECHO LAKE BUT AREA NOT SURVEYED.	SURROUNDING LAND USE IS TIMBERLAND.	private (Sierra Pacific Industries)	5900
22	VICINITY OF PANTHER ROCK EXTENDING SOUTH TO PEAK 6537, HEADWATERS OF TAMARACK CREEK, TRINITY MOUNTAINS.	Trinity	Seven Lakes Basin (4112224)	CNDDB, Jan. 2021 (EO 23)	12-Sep-2012	MANY PLANTS OBSERVED AT THE SOUTH END OF OCCURRENCE IN 2005. 20,049 PLANTS OBSERVED THROUGHOUT OCCURRENCE IN 2010. 5000 PLANTS OBSERVED IN NORTHERN POLYGON AND 1000+ PLANTS IN 2 SOUTHERN POLYGONS IN 2012.	TIMBERLAND/ PLANTATION SURROUNDS BUT THIS SPECIES APPEARS TO RESPOND WELL TO DISTURBANCE.	private (Sierra Pacific Industries), Shasta-Trinity NF	6400

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23	APPROXIMATELY 0.7 TO 1.5 AIR MILES SOUTHEAST OF WHALAN STATION, NORTHEAST AND NORTHWEST SLOPES OF GREY ROCKS.	Trinity	Seven Lakes Basin (4112224)	CNDDB, Jan. 2021 (EO 24)	11-Jul-2012	MANY PLANTS OVER 105 ACRES OBSERVED IN NORTHERN POLYGON IN 2007. 500+ PLANTS OBSERVED IN CENTER PORTION OF NORTHERN POLYGON IN 2009. 1000+ PLANTS OBSERVED IN TWO SOUTHERN POLYGONS IN 2012.	TIMBER HARVEST BUT HARVESTABLE TIMBER IS LOW ON THIS SITE. ROAD BUILDING MAY ALSO THREATEN.	private (Roseburg Resources)	6200
24	GUMBOOT LAKE CAMPGROUND, BELOW USFS ROAD 40N37 JUST NORTH OF PARKING AREA. JUST NORTH OF GUMBOOK LAKE, TRINITY MTNS.	Siskiyou	Mumbo Basin (4112225)	CNDDB, Jan. 2021 (EO 25)	29-Jul-2002	1000 PLANTS SEEN IN 2002.	RECREATIONAL IMPACTS ARE MINOR BUT EVIDENT.	Shasta-Trinity NF	6070
25	ABOUT 2.5 AIR MILES EAST OF THE CONFLUENCE OF GRAVES CREEK INTO THE TRINITY RIVER (JUST SOUTH OF SUNFLOWER FLAT).	Trinity	Mumbo Basin (4112225)	CNDDB, Jan. 2021 (EO 26)	30-Sep-2014	5000 PLANTS OBSERVED IN MAJORITY OF POLYGON IN 2005. 32 PLANTS OBSERVED IN WEST PORTION OF POLYGON IN 2014. PLANTATION HAS BEEN SPRAYED WITH HERBICIDE BUT NEW A. KLAMATHENSIS SEEDLINGS WERE OBSERVED IN THESE AREAS.	MOST ON NON-TIMBER GROWING SITE; LARGE PART TO BE PROTECTED (2005). PLANTS IN AREA OF PAST TIMBER/RD DISTURBANCE (2014).	private (Sierra Pacific Industries), Shasta-Trinity NF	5800

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26	ABOUT 2.6 AIR MILES ESE OF THE CONFLUENCE OF GRAVES CREEK INTO THE TRINITY RIVER (JUST SOUTH OF SUNFLOWER FLAT).	Trinity	Mumbo Basin (4112225)	CNDDB, Jan. 2021 (EO 27)	28-Jul-2017	1200 PLANTS SEEN IN 2005. 835 PLANTS SEEN IN 2014. PLANTATION HAS BEEN SPRAYED WITH HERBICIDE BUT NEW A. KLAMATHENSIS SEEDLINGS WERE OBSERVED IN THESE AREAS (2014). 15+ PLANTS IN PORTION OF SITE IN 2017.	PLANTS FOUND ALONG ROADS AND IN CLUMPS THROUGH THP 31A. POSSIBLY SOME THREAT FROM TIMBER HARVEST, ROAD DISTURBANCE.	private (Sierra Pacific Industries)	5500
27	~1.3 AIR MILES SW OF CONFLUENCE OF MILLER CREEK AND SCOTT MOUNTAIN CREEK, ~2 AIR MILES SSW OF SCOTT MOUNTAIN CAMPGROUND.	Trinity	Tangle Blue Lake (4112226)	CNDDB, Jan. 2021 (EO 28)	13-Sep-2002	POPULATION NUMBERS IN 2002: WESTERNMOST POLYGON HAD 70 PLANTS, NORTHERNMOST POLYGON HAD 2 PLANTS, AND THE SOUTHEASTERN POLYGON HAD 3 PLANTS.	SURROUNDING LAND USE IS TIMBER HARVEST; PLANTS IN SKID TRAILS AND IN SERPENTINE POCKETS.	private (Sierra Pacific Industries)	6000

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28	ABOUT 0.5 AIR MILE SSW OF SCOTT MOUNTAIN CAMPGROUND, ALONG LOGGING ROAD INTO MILLER CREEK WATERSHED.	Trinity	Scott Mountain (4112236)	CNDDB, Jan. 2021 (EO 29)	14-Aug-2002	300 PLANTS SEEN IN 2002.	SURROUNDING LAND USE IS TIMBER HARVEST.	private (Sierra Pacific Industries)	5400
29	HEADWATERS OF MEERS CREEK, TRINITY MOUNTAINS.	Shasta	Chicken Hawk Hill (4112214)	CNDDB, Jan. 2021 (EO 30)	7-Aug-2002	5000 PLANTS OBSERVED IN 2002.		Shasta-Trinity NF	5900
30	WEST AND NW OF LAKE ELEANOR, ABOUT 2.4-3.0 AIR MILES SSE OF YCATAPOM PEAK.	Trinity	Covington Mill (4012287)	CNDDB, Jan. 2021 (EO 31)	1-Sep-2016	SOUTHERN FOUR POLYGONS: 994 PLANTS OBSERVED IN 2014; PREDOMINATELY VEGETATIVE; POSSIBLY MORE IN AREA, SURVEY DID NOT EXTEND TOO FAR OUTSIDE PLANTATION DUE TO LACK OF TIME. NORTHERN FOUR POLYGONS: 167 PLANTS IN 2016.	PLANTS IN SOUTHERN POLYGONS OBSERVED WITHIN A PLANTATION.	private (Sierra Pacific Industries)	5400

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31	LOGGING ROAD APPROXIMATELY 0.3 MILE NORTH OF COLD SPRING, HEADWATERS OF BOULDER CREEK, TRINITY MOUNTAINS.	Shasta	Chicken Hawk Hill (4112214)	CNDDB, Jan. 2021 (EO 32)	22-Aug-2012	SITE BASED ON A 2012 TAYLOR COLLECTION.		Shasta-Trinity NF	5290
32	VICINITY OF CHICKEN HAWK HILL, TRINITY MOUNTAINS.	Shasta	Chicken Hawk Hill (4112214)	CNDDB, Jan. 2021 (EO 33)	14-Aug-2009	1000+ PLANTS OBSERVED IN 2009.		private (Roseburg Resources)	6200
33	ROADSIDES WEST OF CHICKEN HAWK HILL ABOVE SLATE CREEK, ABOUT 1.5 AIR MILES NNW OF RATTLESNAKE HILL.	Shasta	Chicken Hawk Hill (4112214)	CNDDB, Jan. 2021 (EO 34)	22-Aug-2012	25+ PLANTS OBSERVED IN 2012.	NO THREATS OBSERVED. PLANTS GROWING WITHIN TIMBER PLANTATIONS.	private (Sierra Pacific Industries)	5600
34	MEARS RIDGE; JUST WEST OF PEAKS 5633 AND 5657, FLUME CREEK WATERSHED, TRINITY MOUNTAINS.	Shasta	Chicken Hawk Hill (4112214)	CNDDB, Jan. 2021 (EO 35)	21-Aug-2012	1100 PLANTS OBSERVED IN 2003. 25,000 PLANTS OBSERVED IN 2012.	COMMERCIAL TIMBERLANDS. AREA HEAVILY DISTURBED BY LOGGING ACTIVITIES (INCLUDING HERBICIDE) BUT PLANTS DOING WELL (2012).	private (Sierra Pacific Industries)	5500

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35	NORTH SLOPE OF WHISKY BILL PEAK, TRINITY MOUNTAINS.	Trinity	Whisky Bill Peak (4112215)	CNDDB, Jan. 2021 (EO 36)	27-May-2014	ABOUT 1552+ PATCHES OBSERVED IN 2012. AN ADDITIONAL 124 PLANTS OBSERVED IN 2014.	PORTIONS OF OCCURRENCE FALL WITHIN A PROPOSED TIMBER HARVEST UNIT.	private (Sierra Pacific Industries)	5800
36	ALONG FOREST SERVICE ROAD 38N85 TO THE BONANZA KING LOOKOUT.	Trinity	Carrville (4112216)	CNDDB, Jan. 2021 (EO 37)	9-Jul-2010	SITE BASED ON TWO 2010 SMITH COLLECTIONS.		Shasta-Trinity NF	4990
37	APPROXIMATELY 1.3 AIR MILES NW OF SCORPION LAKE AND APPROXIMATELY 2.2 AIR MILES NW OF THE BONANZA KING LOOKOUT.	Trinity	Carrville (4112216)	CNDDB, Jan. 2021 (EO 38)	28-May-2014	19 PLANTS OBSERVED IN 2014; THERE MAY BE MORE PLANTS FURTHER NORTH ON USFS LAND BUT THIS AREA WAS NOT SURVEYED.	SURROUNDING LAND USE IS TIMBERLAND. OCCURRENCE WILL BE PROTECTED WITHIN AN EQUIPMENT EXCLUSION ZONE.	private (Sierra Pacific Industries)	5119
38	NORTH SIDE OF FOREST SERVICE ROAD 39N18, WEST OF THE NORTH END OF SHERER RIDGE.	Trinity	Tangle Blue Lake (4112226)	CNDDB, Jan. 2021 (EO 39)	200507XX	35-50 PLANTS OBSERVED IN 2005.		private (Timber Products Co.)	4700

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39	NORTH SIDE OF FOREST SERVICE ROAD 39N15, APPROXIMATELY 1 AIR MILE SSE OF THE MOUTH OF PICAYUNE CREEK.	Trinity	South China Mtn. (4112235)	CNDDB, Jan. 2021 (EO 40)	200507XX	1 PLANT OBSERVED IN 2005.		private	5400
40	LILY PAD LAKE, TRINITY MOUNTAINS.	Siskiyou	Scott Mountain (4112236)	CNDDB, Jan. 2021 (EO 41)	28-Jun-2002	SITE BASED ON 2002 TAYLOR PHOTOS.		unknown	
41	RIDGELINE ABOUT 0.5 AIR MILE SOUTH OF BAKER HOLLOW, ~1.2 AND 1.5 AIR MILES EAST OF HIGHLAND LAKES.	Shasta	Chicken Hawk Hill (4112214)	CNDDB, Jan. 2021 (EO 42)	30-May-2013	39 PLANTS OBSERVED IN TWO EASTERN POLYGONS, AND 56 PLANTS IN TWO WESTERN POLYGONS IN 2013.	NONE. PLANTS GROWING IN AREA OF PAST DISTURBANCE. A COUPLE PLANTS WERE SPRAYED BUT ARE PUTTING ON NEW GROWTH.	private (Sierra Pacific Industries), Shasta-Trinity NF	6310

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42	WEST OF SLATE CREEK, ABOUT 1.8 AIR MILES SW OF CHICKEN HAWK HILL AND 2.3 AIR MILES EAST OF RED MOUNTAIN, TRINITY MTNS.	Shasta	Whisky Bill Peak (4112215)	CNDDB, Jan. 2021 (EO 43)	29-Jul-2016	ABOUT 22 CLUMPS OBSERVED IN 2016.	FORESTER IS AWARE OF OCCURRENCE AND WILL IMPLEMENT PROTECTION MEASURES. LOGGING NOT ANTICIPATED TO BE A DIRECT THREAT.	private (Sierra Pacific Industries)	4775
43	SOUTH SLOPE OF SUNFLOWER CREEK, ABOUT 2.75 AIR MILES WSW OF BLUE DIVIDE, SW OF SHERER RIDGE.	Trinity	Mumbo Basin (4112225)	CNDDB, Jan. 2021 (EO 44)	26-May-2015	2 PLANTS OBSERVED IN WEST POLYGON, 8 PLANTS IN NE POLYGON, AND 15 PLANTS IN SE POLYGON IN 2016.	PRESENT IN AREAS OF PAST DISTURBANCE ALONG ACTIVE ROAD AND ON LANDING. SOME PLANTS GROWING IN PROPOSED HARVEST AREA.	private (Sierra Pacific Industries)	4535
44	SHERER RIDGE, 2 AIR MILES WEST OF BLUE DIVIDE ABOVE SOUTH FORK OF SHERER CREEK.	Trinity	Mumbo Basin (4112225)	CNDDB, Jan. 2021 (EO 45)	25-Sep-2015	308 PLANTS OBSERVED IN 2015.	LOCATED WITHIN AREA PROPOSED FOR TIMBER HARVEST.	private (Sierra Pacific Industries)	5550

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Rec. #	**Locality**	**County**	**Quad**	**Ref. (Source)**	**Date Last Obs'd**	**Population Info**	**Threats**	**Land Mgr.**	**Elev. (ft.)**
45	NORTH OF HEAD OF SHERER CREEK, ABOUT 1.45 AIR MILES NW OF BLUE DIVIDE.	Trinity	Mumbo Basin (4112225)	CNDDB, Jan. 2021 (EO 46)	21-Sep-2012	5 PLANTS OBSERVED IN 2012.		private	5800
46	BETWEEN PICAYUNE CREEK AND LITTLE PICAYUNE CREEK, 2.0-2.3 AIR MILES NE OF BLUE DIVIDE.	Trinity	South China Mtn. (4112235)	CNDDB, Jan. 2021 (EO 47)	21-Sep-2012	190 PLANTS OBSERVED IN 2012.		private, Shasta-Trinity NF	6450
47	SOUTH OF PICAYUNE CREEK, ALONG FOREST RD 39N18, 2.3 AIR MILES NORTH OF BLUE DIVIDE.	Trinity	South China Mtn. (4112235)	CNDDB, Jan. 2021 (EO 48)	21-Sep-2012	6 PLANTS IN WEST POLYGON AND 38 PLANTS IN EAST POLYGON IN 2012.		private, Shasta-Trinity NF	5810
48	SLOPES ABOVE LAKE HELEN, 0.8 AIR MILE NNW OF PANTHER ROCK, SEVEN LAKES BASIN.	Shasta	Seven Lakes Basin (4112224)	CNDDB, Jan. 2021 (EO 49)	29-Jul-2002	100 PLANTS OBSERVED IN 2002. VERY GENERALIZED LOCATION OF "THROUGHOUT SEVEN LAKES BASIN" GIVEN BY RAICHE IN 1990 ATTRIBUTED HERE.	SURROUNDING LAND USE IS COMMERCIAL TIMBERLAND; SITE HAS BEEN SELECTIVELY LOGGED IN THE PAST.	private (Sierra Pacific Industries)	6700

Duplicate records from the same site are given the same record number and are included in red. Rows containing questionable records are highlighted in red.									
Rec. #	**Locality**	**County**	**Quad**	**Ref. (Source)**	**Date Last Obs'd**	**Population Info**	**Threats**	**Land Mgr.**	**Elev. (ft.)**
49	Weaverville District. Growing near Bonanza King Lookout. Growing on rocky ridge. Whisky Bill Peak Quadrangle	Trinity	Whisky Bill Peak (4112215)	CCH2, Nov. 2020 (SPIF02139)	19-Sep-2018			Shasta-Trinity NF	6742
50	Rocky opening in subalpine coniferous forest along a side trail to spring off of PCT.	Siskiyou	Seven Lakes Basin (4112224)	Calflora, Jan. 2021 (mg120219)	18-Jul-2020	individuals		Shasta-Trinity NF	5315

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.>