2018-03-19, revised 2022-01-25

Plant Species Evaluation Form

Anisocarpus scabridus (Eastw.) B.G. Baldwin

SCABRID ALPINE TARPLANT

Family: Asteraceae (CNPS 2018) | **PLANTS Symbol:** ANSC14 (USDA 2018) | **Calif. Endemic:** Yes (CNPS 2018)

Synonyms/Other Names: Originally described as *Raillardella scabrida* Eastw. in 1905. Later changed to *Raillardiopsis scabrida* (Eastw.) Rydb. in 1927. Its current name was adopted in 1999 (Tropicos 2018).

Identification Issues: Identification issues are lacking for this taxon. The genus *Anisocarpus* is comprised of two morphologically and ecologically distinct taxa. These two taxa are the only perennial members of Madiinae with obvious cauline leaves, radiate heads, ellipsoid/spherical involucres, and yellow anthers (Baldwin 1999). *Anisocarpus scabridus* is distinguished by its blue-green foliage, absent-few (1-3) ray florets, 6-12 mm phyllaries, bisexual disk flowers, and 4-7 mm disk pappus (Baldwin 2018; Baldwin and Strother 2006).

Taxonomy:

Unless otherwise cited, the following description is taken directly from the *Jepson eFlora* and is used with permission from the Jepson Herbarium. Jepson Flora Project (eds.) 2018. *Jepson eFlora*, http://ucjeps.berkeley.edu/eflora/, accessed January 2018. Copyright © Regents of the University of California.

Species In Genus: 2 species. Etymology: (Greek: dissimilar fruits, from contrasting (fertile) ray and (sterile) disk ovaries of *Anisocarpus madioides*).

Genus Description – Habit: Perennial herb 1--8 dm. Stem: erect, branched from base or throughout. Leaf: basal and cauline, proximally opposite or in rosettes, distally alternate, +- sessile, oblong to linear, lance-linear, or oblanceolate, entire or toothed, coarsely to stiffly appressed-hairy or soft hairy, distal stalked-glandular. Inflorescence: heads radiate or discoid, 1 or in +- flat-topped or raceme-like clusters; involucre +- spheric or widely ellipsoid to bell-shaped, 4--6+ mm diam; phyllaries 0--3 or 7--15, lanceolate, elliptic, or oblanceolate, each +- 1/2 or fully enveloping a ray ovary, falling with fruit, minutely ciliate, stalked-glandular, minutely hairy or not; receptacle flat to convex, glabrous or minutely bristly; paleae in 1 series between ray and disk flowers, generally fused, phyllary-like, functionally an involucre in discoid heads, deciduous. Ray Flower: 0, 1--3, or 7--15; corolla yellow, ray fan-shaped, deeply 3-lobed. Disk Flower: 5--30, bisexual or staminate; corolla yellow, tube < throat, tube/throat often glabrous, lobes deltate, minutely bristly and glandular abaxially; anthers yellow, tips ovate; style glabrous proximal to branches, branches awl-shaped, densely hairy.; anther bases sagittate. Fruit: +- club-shaped, black or +- gray, ray fruit +- arched, compressed side-to-side or +- front-to-back, glabrous or hairy, beaked, beak 0.2--0.3 mm, offset adaxially, ray pappus 0 or crown-like; disk fruit if present +- straight, +- cylindric, hairy, disk pappus of 5--8 or 11--21 linear to lanceolate, +- square, or awl-shaped, fringed or ciliate to plumose, sometimes +- bristle-like scales.

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Species Description – Habit: Plant 1--5 dm. Leaf: 1--4 mm wide, tip acute or obtuse. Ray Flower: ray 3.5--11.5 mm. Disk Flower: 5--23. Fruit: ray fruit 6--8 mm; disk fruit 5--9 mm, +-cylindric. Chromosomes: 2n=14. eFlora Treatment Author: Bruce G. Baldwin.

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	NWFP SM	CA BLM
CA: Not listed NV: Not listed OR: Not listed	G3	CA: S3 NV: Not listed OR: Not listed	1B.3	Sensitive	Not listed	Sensitive

SWAP:	NNHP:	NNPS:	ORBIC:	OCS:	IUCN:
Not listed	Not listed	Not listed	Not listed	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 2001b); 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).

Distribution: Endemic to western United States, with a distribution entirely within the California Floristic Province in northern California. Occurrences are known from the North Coast Ranges, Klamath Range, and Cascade Range of Lake, Colusa, Mendocino, Tehama, Trinity, Shasta, and Humboldt counties (Baldwin 2018; CNDDB 2017). Most occurrences (18/19; ~95%) are located on National Forest System (NFS) lands with records in Mendocino, Shasta-Trinity, and Six Rivers National Forests. Mendocino National Forest is home to 13 of the 18 (~72%) known occurrences on NFS lands (CNDDB 2017; NRIS 2017; CCH 2017; Calflora 2017); “[t]he occurrences are scattered over peaks from the South Yolla Bolly, Solomon Peak, Castle Peak and Leech Lake Mountain in the north down to the east and west peaks of Snow Mountain at the southern end of the MNF.” (Johnson et al. 2012).

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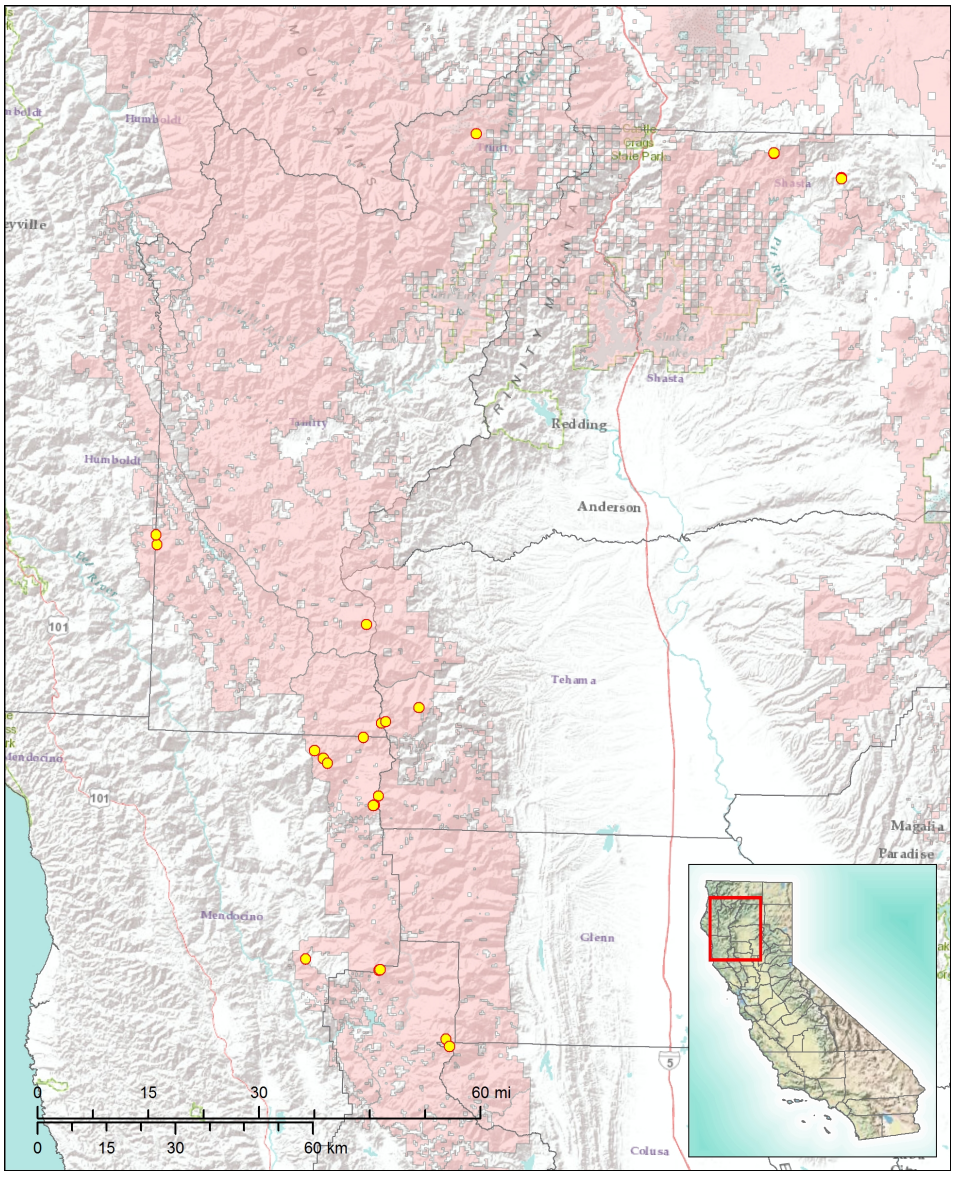

Sources: *Distribution*: Calflora 2017, CCH 2017, CNDDB 2017, NRIS 2017. *Layers*: USDA Forest Service, Pacific Southwest National Forests: CPAD 2016. California counties: CDF 2009. *Basemaps*: California inset map: © 2013 National Geographic Society, i-cubed (Esri 2017a). Main map: Esri, DeLorme, USGS,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

Locations within California:

Note: 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) definition of Element Occurrences in California). Official Element Occurrence (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 in meters from source were 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 verbatim from the original Reference (Source) unless additional citation is given.

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
1	ALONG THE RIDGELINE, SIGNAL PEAK.	Lake	Crockett Peak (3912247)	CNDDB, May 2017 (EO 1)	8-Aug-1980	ABOUT 315 PLANTS SEEN IN 1980. 1974 TROWBRIDGE COLLECTION FROM "TRAIL FROM MILK RANCH TO RIDGE BETW E AND W PEAKS, SNOW MTN, 6000 FT" IS ALSO ATTRIBUTED TO THIS SITE. POPULATION MAY EXTEND FURTHER SOUTH AND BE CONTIGUOUS WITH EO#2.		Mendocino NF	6000
1	North Coast Ranges. Near Signal Peak	Lake	Crockett Peak (3912247)	CCH, Jan 2017 (CHSC32189)	8-Aug-1980			Mendocino NF	
1	Trail from Milk Ranch to ridge between East and West peaks, Snow Mountain	Lake	Potato Hill (3912237)	CCH, Jan 2017 (CAS608139)	8-Jul-1974			Mendocino NF	6001

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
2	NEAR THE SUMMIT AND RIDGELINES OF SNOW MOUNTAIN EAST AND SNOW MOUNTAIN WEST.	Colusa | Lake	Crockett Peak (3912247)	CNDDB, May 2017 (EO 2)	1980	TYPE LOCALITY. IN 1980, ABOUT 210 PLANTS SEEN ON SNOW MTN W AND ABOUT 240 PLANTS SEEN ON SNOW MTN E. NUMEROUS COLLECTIONS FROM THE SUMMIT AND RIDGELINES OF SNOW MOUNTAIN EAST AND WEST ARE ATTRIBUTED TO THIS SITE. MAP DETAIL NEEDED.		Mendocino NF	6900
2	Snow Mt.	Lake	Crockett Peak (3912247)	CCH, Jan 2017 (UC91052)	25-Aug-1892			Mendocino NF	
2	Snow Mountain	Lake	Crockett Peak (3912247)	CCH, Jan 2017 (POM356088)	25-Aug-1892				
2	spur runnign se West Peak Snow Mt.	Lake	Fouts Springs (3912236)	CCH, Jan 2017 (JEPS734338)	8-Jul-1972			Mendocino NF	6699
2	se slope East Peak Snow Mt.	Colusa	St. John Mtn. (3912246)	CCH, Jan 2017 (JEPS758500)	10-Sep-1974			Mendocino NF	6900

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
2	West Peak, s spurs Snow Mt. Snow Mt.	Lake	Potato Hill (3912237)	CCH, Jan 2017 (JEPS80070)	15-Jun-1979			Mendocino NF	6900
2	West Peak Ridge, Snow Mt.	Lake	Crockett Peak (3912247)	CCH, Jan 2017 (CAS422555)	25-Jul-1956			Mendocino NF	6900
2	West Peak Ridge, Snow Mt.	Lake	Crockett Peak (3912247)	CCH, Jan 2017 (RSA111714)	25-Jul-1956			Mendocino NF	6900
2	Snow Mt.	Lake	Crockett Peak (3912247)	CCH, Jan 2017 (UC126434)	31-Dec-1894				
2	0.25 mi and w Snow Mt. summit (ridge forming s extension of Snow Mt., Lake-Colusa County boundary); Snow Mt.	Lake	Potato Hill (3912237)	CCH, Jan 2017 (JEPS15556)	25-Jul-1956			Mendocino NF	6900
2	Southern extension of Snow Mt. West and about one-fourth mile south of its summit	Lake	Crockett Peak (3912247)	CCH, Jan 2017 (CAS409503)	25-Jul-1956			Mendocino NF	6900

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
2	Mendocino National Forest	Colusa	St. John Mtn. (3912246)	Calflora, May 2017 (xr326261)	1-Jan-1985	1+ individuals		Mendocino NF	6972
3	HULL MOUNTAIN; RIDGES TO THE EAST, SOUTH, AND WEST OF SUMMIT.	Lake | Mendocino	Hull Mountain (3912258)	CNDDB, May 2017 (EO 3)	7-Jul-2012	ABOUT 1000 PLANTS SEEN IN 4 EASTERN POLYGONS IN 1980. UNKNOWN NUMBER SEEN IN SW POLYGON IN 1988. IN 2012, >500 PLANTS SEEN ON SOUTH AND EAST RIDGELINES AND 25 PLANTS SEEN ON WEST RIDGELINE (NW POLYGON).	POSSIBLE TRAMPLING BY HANG GLIDER ENTHUSIASTS .	Mendocino NF	6600
3	Hull Mt.;	Mendocino	Hull Mountain (3912258)	NRIS, Sep 2016 (050854RASC4002)	7-Jul-2012	1 individuals		Mendocino NF	
3	SE ofj Hull Mtn.Lookout on rocky, S Aspect	Lake	Hull Mountain (3912258)	CCH, Jan 2017 (CHSC111702)	26-May-1988			Mendocino NF	6601
3	North Coast Ranges. Near Hull Mountain	Lake	Hull Mountain (3912258)	CCH, Jan 2017 (CHSC32249)	5-Sep-1980			Mendocino NF	
3	Hull Mountain along Horse Ridge 200-400 m east of lookout station	Lake	Hull Mountain (3912258)	CCH, Jan 2017 (RSA299003)	26-Jul-1977			Mendocino NF	6808

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
3	Hull Mountain, on both side os hogback ridge in northesterly orientation from Hull Mountain summit, ca. 0.1 - 0.3 mile from lookout, Mendocino National Forest	Mendocino	Hull Mountain (3912258)	CCH, Jan 2017 (CAS1005511)	2-Jul-1987			Mendocino NF	
3	Hull Mountain, on both sides of hogback ridge in northeasterly orientation from Hull Mountain summit, ca. 0.1 - 0.3 mi from lookout Mendocino National Forest	Lake	Hull Mountain (3912258)	CCH, Jan 2017 (JEPS98940)	2-Jul-1987			Mendocino NF	
3	Mt. Hull, n Lake County Inner North Coast Ranges	Lake	Hull Mountain (3912258)	CCH, Jan 2017 (UC180114)	21-Jul-1913			Mendocino NF	6601

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
3	Lake County: Mendocino National Forest, Hull Mountain, on both sides of hogback ridge in northeasterly orientation from Hull Mountain summit, ca. 0.1-0.3 mile from lookout	Lake	Hull Mountain (3912258)	CCH, Jan 2017 (UCD135660)	12-Jul-1987			Mendocino NF	
4	NEAR UHL PEAK, ON THE NE SLOPE IMMEDIATELY BELOW THE SUMMIT.	Mendocino | Tehama	Mendocino Pass (3912278)	CNDDB, May 2017 (EO 4)	31-Jul-1980	ABOUT 80 PLANTS SEEN IN 1980.		Mendocino NF	6400
4	North Coast Ranges. Near Uhl Peak	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (CHSC32181)	31-Jul-1980			Mendocino NF	
5	SUMMIT OF ANTHONY PEAK.	Mendocino	Mendocino Pass (3912278)	CNDDB, May 2017 (EO 5)	27-Jun-2004	ABOUT 1120 PLANTS SEEN IN 1980. OVER 200 PLANTS SEEN IN 2004. NUMEROUS COLLECTIONS FROM THE VICINITY OF ANTHONY PEAK ATTRIBUTED TO THIS SITE.	HUMAN FOOT TRAFFIC, ROCKSLIDE POTENTIAL, PROPOSED SKI AREA DEVELOP-MENT.	Mendocino NF	6800

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
5	Anthony Peak;	Mendocino	Mendocino Pass (3912278)	NRIS, Sep 2016 (050856RASC4001)	9-Aug-2010	24 individuals		Mendocino NF	
5	Near Anthony Peak	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (CAS283879)	15-Aug-1940			Mendocino NF	
5	nw of Anthony Peak Lookout Station; Hogs Back	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (UC679526)	7-Jul-1942				
5	Hog's Back N.W. of Lookout Station Anthony Peak	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (CAS302777)	7-Jul-1942				
5	n of Anthony Peak Lookout Sta.; Hogback	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (UC728695)	8-Aug-1943			Mendocino NF	
5	ca. 0.25 mi N of Anthony Peak lookout tower Mendocino National Forest	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (JEPS98918)	23-Aug-1986			Mendocino NF	
5	Ca. 0.25 miles north of Anthony Peak lookout tower, Mendocino National Forest	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (CAS1014534)	23-Aug-1986			Mendocino NF	

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
5	Mendocino County: Mendocino National Forest, ca. 0.25 mile north of Anthony Peak lookout tower	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (UCD135679)	23-Aug-1986			Mendocino NF	
5	[no locality information provided]	Mendocino	Burbeck (3912344)	CCH, Jan 2017 (RSA672064)	24-Jul-1964				6962
5	Mendocino County: Exact location unknown	Mendocino	Burbeck (3912344)	CCH, Jan 2017 (UCD19379)	24-Jul-1964				6955
5	Anthony Peak, Tehama-Mendocino Co. Anthony Peak	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (UC710577)	8-Aug-1943			Mendocino NF	
5	Anthony Peak	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (CAS312398)	8-Aug-1943			Mendocino NF	
5	Anthony Peak	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (CAS414907)	8-Aug-1943			Mendocino NF	

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
5	Anthony Peak	Tehama	Mendocino Pass (3912278)	CCH, Jan 2017 (DS311569)	8-Aug-1943			Mendocino NF	
5	Anthony Peak	Tehama	Mendocino Pass (3912278)	CCH, Jan 2017 (POM303616)	8-Aug-1943			Mendocino NF	
5	Anthony Peak	Tehama	Mendocino Pass (3912278)	CCH, Jan 2017 (RSA401955)	8-Aug-1943			Mendocino NF	
5	Mendocino National Forest--North Coast Ranges. Upper Middle Fork Eel River Watershed. About 250 yards north of Anthony Peak lookout on east edge of ridgetop	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (CHSC91493)	3-Aug-1995			Mendocino NF	6759
5	North Coast Ranges. Near Anthony Peak	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (CHSC32174)	30-Jul-1980				

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
5	Northern Coast Ranges. Mendocino National Forest. Slopes about the north and west summit of Anthony Peak	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (CAS1126931)	22-Jun-1985				6900
5	along ridge ca 500 m w Anthony Peak look-out tower; Anthony Peak	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (UC1505937)	18-Jul-1983			Mendocino NF	6562
5	3/4 mile up grade from Wells Cabin Campgroun don road to Anthony Peak, Mendocino National Forest	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (CAS746519)	10-Jul-1980			Mendocino NF	6401
5	Mendocino National Forest, 0.75 mi. up grade from Wells Cabin Campground on road to Anthony Peak	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (HSC83774)	10-Jul-1980			Mendocino NF	6401
5	Mendocino National Forest, 3/4 mile up grade from Wells Cabin Campground on road to Anthony Peak	Mendocino	Mendocino Pass (3912278)	CCH, Jan 2017 (RSA354279)	10-Jul-1980			Mendocino NF	6401

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
6	VICINITY OF HAMMERHORN MOUNTAIN; FROM SOLOMON PEAK SOUTH TO ABOUT 1 MILE SOUTH OF HAMMERHORN MOUNTAIN SUMMIT.	Tehama | Trinity	Solomon Peak (4012218)	CNDDB, May 2017 (EO 6)	19-Jul-1987	ABOUT 630 PLANTS SEEN IN 1980. THOUSANDS OF PLANTS OBSERVED IN 1987 BETWEEN THIS OCCURRENCE AND OCCURRENCE #13. INCLUDES FORMER OCCURRENCE #12.		Mendocino NF	7000
6	North Coast Ranges. Near Hammerhorn Mountain	Trinity	Buck Rock (3912288)	CCH, Jan 2017 (CHSC32233)	20-Aug-1980			Mendocino NF	1778
6	North Coast Ranges. Near Solomon Peak. [Latitude on label (22 degrees 46' 18" N) is very incorrect. Substituted value is for Solomon Peak on the Yolla Bolly SW quad.]	Trinity	Solomon Peak (4012218)	CCH, Jan 2017 (CHSC32236)	20-Aug-1980			Mendocino NF	

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
7	NORTH SIDE OF IMPASSABLE ROCK, ABOUT 2 MILES NW OF SANHEDRIN MOUNTAIN SUMMIT.	Mendocino	Sanhedrin Mtn. (3912351)	CNDDB, May 2017 (EO 7)	6-Sep-1980	1980 COLLECTIONS BY HULSE-STEPHENS AND HEMPHILL FROM "MT SANHEDRIN AT IMPASSABLE ROCK" ATTRIBUTED TO THIS SITE. ABOUT 100 PLANTS SEEN BY JOKERST IN 1980.		Mendocino NF	5900
7	North Coast Ranges. Near Impassable Rock	Mendocino	Sanhedrin Mtn. (3912351)	CCH, Jan 2017 (CHSC32245)	6-Sep-1980			Mendocino NF	
8	ON SCREE SLOPE OF HOGBACK RUNNING SOUTH OF THE CASTLE PEAK SUMMIT.	Mendocino	Leech Lake Mtn. (3912381)	CNDDB, May 2017 (EO 8)	1980	ABOUT 150 PLANTS SEEN IN 1980. A 1975 HECKARD COLLECTION IS ALSO ATTRIBUTED TO THIS SITE.		Mendocino NF	6000
8	ca 13 air mi ne Covello (on spur running s from Castle Peak); Castle Peak	Mendocino	Leech Lake Mtn. (3912381)	CCH, Jan 2017 (JEPS76734)	7-Sep-1975			Mendocino NF	6001

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
9	ABOUT 1 MILE NW OF LEECH LAKE MOUNTAIN.	Mendocino	Leech Lake Mtn. (3912381)	CNDDB, May 2017 (EO 9)	1980	ABOUT 175 PLANTS SEEN IN 1980 BETWEEN THIS OCCURRENCE AND OCCURRENCE #10. INCLUDES 1975 HECKARD COLLECTION FROM "ABOUT 1 MI NW LEECH LAKE MT, 6400 FT ELEV."		Mendocino NF	6400
9	about 1.0 mi nw Leech Lake Mt. (ne end of summit, ca 13.0 air mi ne of Covelo)	Mendocino	Leech Lake Mtn. (3912381)	CCH, Jan 2017 (JEPS76714)	7-Sep-1975			Mendocino NF	6401
9	about 1.0 mi nw Leech Lake Mt. (ne end of summit, ca 13.0 air mi ne of Covelo)	Mendocino	Leech Lake Mtn. (3912381)	CCH, Jan 2017 (JEPS76715)	7-Sep-1975			Mendocino NF	6401
10	ALONG RIDGES NORTH AND SOUTH OF LEECH LAKE MOUNTAIN SUMMIT.	Mendocino	Leech Lake Mtn. (3912381)	CNDDB, May 2017 (EO 10)	4-Sep-1980	ABOUT 175 PLANTS SEEN IN 1980 BETWEEN THIS OCCURRENCE AND OCCURRENCE #9. 1975 HECKARD COLLECTION IS ALSO ATTRIBUTED TO THIS SITE.		Mendocino NF	6500

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10	ca 13 air mi ne Covelo (w slope of Leech Lake Mt.); Leech Lake Mt.	Mendocino	Leech Lake Mtn. (3912381)	CCH, Jan 2017 (JEPS76700)	7-Sep-1975			Mendocino NF	6499
10	North Coast Ranges. Near Leech Lake Mountain	Mendocino	Leech Lake Mtn. (3912381)	CCH, Jan 2017 (CHSC32243)	4-Sep-1980			Mendocino NF	
11	VICINITY OF SUMMIT OF MT LIN, SOUTH YOLLA BOLLY MOUNTAINS.	Tehama	South Yolla Bolly (4012217)	CNDDB, May 2017 (EO 11)	2-Sep-1993	ABOUT 200 PLANTS SEEN IN 1980. INCLUDES SEVERAL COLLECTIONS FROM 1955 THROUGH 1993. MAP DETAIL IS NEEDED FOR THIS AREA.		Mendocino NF	7700
11	0.25 mi e and about 150 ft below Mt. Linn (summit of Yolla Bolly Mountain); South Yolla Bolly Mountain	Tehama	South Yolla Bolly (4012217)	CCH, Jan 2017 (JEPS13523)	16-Jul-1955			Mendocino NF	7900
11	South Yolla Bolly Mountain	Tehama	North Yolla Bolly (4012228)	CCH, Jan 2017 (CAS572768)	10-Aug-1971			Shasta-Trinity NF	7999
11	North Coast Ranges. Near Mt. Linn	Tehama	South Yolla Bolly (4012217)	CCH, Jan 2017 (CHSC32157)	22-Aug-1980			Mendocino NF	

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
11	South slope of South Yolla Bolly Pk.	Tehama	South Yolla Bolly (4012217)	CCH, Jan 2017 (CAS376355)	26-Jul-1951			Mendocino NF	7500
11	South slope of South Yolla Bolly Pk.	Tehama	South Yolla Bolly (4012217)	CCH, Jan 2017 (DS341131)	26-Jul-1951			Mendocino NF	7500
11	South Yolla Bolly Park.	Tehama	South Yolla Bolly (4012217)	CCH, Jan 2017 (RSA66627)	26-Jul-1951			Mendocino NF	7503
11	Ides Cove Loop Trail (9W04), South Yolla Bolly Mts, just e of the trail to Burnt Camp, ca. 1.5 mi w of the trailhead	Tehama	South Yolla Bolly (4012217)	CCH, Jan 2017 (CHSC44191)	12-Jul-1988			Mendocino NF	7060
11	ridge running e from Mt. Linn (ca 20 air mi nw of Paskenta); South Yolla Bolly Mtns.	Tehama	South Yolla Bolly (4012217)	CCH, Jan 2017 (UC1609302)	2-Sep-1993			Mendocino NF	7700
11	South Yolla Bolly Mountains, ca. 0.5 mi. E of summit	Tehama	South Yolla Bolly (4012217)	CCH, Jan 2017 (LA97410)	19-Jul-1959			Mendocino NF	7500

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
11	Ridge top ca. 1/2 mile east of summit of South Yolla Bolly Mountain.	Tehama	South Yolla Bolly (4012217)	CCH, Jan 2017 (RSA261518)	19-Jul-1959			Mendocino NF	7503
11	Tehama County: South Yolla Bolly Mountain, ca. 0.5 mile east of summit	Tehama	South Yolla Bolly (4012217)	CCH, Jan 2017 (UCD128900)	19-Jul-1959			Mendocino NF	7500
11	Ridge running E from Mt. Linn, Yolla Bolly Mtns., ca. 20 mi (air) NW of Paskenta	Tehama	South Yolla Bolly (4012217)	CCH, Jan 2017 (CHSC61772)	2-Sep-1993			Mendocino NF	7700
12	EAST OF THE RIDGELINE BETWEEN SOLOMON PEAK AND HAMMERHORN PEAK.	Tehama	Solomon Peak (4012218)	CNDDB, May 2017 (EO 13)	19-Jul-1987	THOUSANDS OF PLANTS OBSERVED IN 1987 BETWEEN THIS OCCURRENCE AND OCCURRENCE #6.		Mendocino NF	6880
13	BLACK LASSIC.	Trinity	Black Lassic (4012335)	CNDDB, May 2017 (EO 14)	11-Jul-2002	30-50 PLANTS SEEN IN NORTHENMOST AND SOUTHERNMOST COLONIES IN 1994; 358 PLANTS SEEN IN ALL 3 COLONIES IN 2002. INCLUDES COLLECTIONS AND OBSERVATIONS FROM 1976, 1977, AND 1990.	EROSION; SLIPPAGE, EARTH MOVEMENT.	Six Rivers NF	5600

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
13	Six Rivers NF	Trinity	Black Lassic (4012335)	NRIS, Feb 2017 (510470040)	27-Jul-1994	40 individuals		Six Rivers NF	
13	Six Rivers NF	Trinity	Black Lassic (4012335)	NRIS, Feb 2017 (510470040)	11-Jul-2002	350 individuals		Six Rivers NF	
13	The Lassics - Black Lassic	Trinity	Black Lassic (4012335)	Calflora, May 2017 (jgr16867)	24-Jun-1990	1+ individuals		Six Rivers NF	5869
13	Lower east slope of Black Lassic	Trinity	Black Lassic (4012335)	CCH, Jan 2017 (HSC40140)	4-Aug-1976			Six Rivers NF	5302
13	Lower east slope of Black Lassic.	Trinity	Black Lassic (4012335)	CCH, Jan 2017 (RSA273309)	4-Aug-1976			Six Rivers NF	5302
13	N slope of Black Lassic.	Trinity	Black Lassic (4012335)	CCH, Jan 2017 (RSA472468)	6-Aug-1977			Six Rivers NF	5502
13	N slope of Black Lassic	Trinity	Black Lassic (4012335)	CCH, Jan 2017 (UCR70755)	6-Aug-1977			Six Rivers NF	5502

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
13	N slope of Black Lassic	Trinity	Black Lassic (4012335)	CCH, Jan 2017 (HSC44091)	6-Aug-1977			Six Rivers NF	5502
13	along e slope Black Lassic	Trinity	Black Lassic (4012335)	CCH, Jan 2017 (UC1442639)	6-Aug-1977			Six Rivers NF	5499
13	E slope of Black Lassic	Trinity	Black Lassic (4012335)	CCH, Jan 2017 (HSC44093)	6-Aug-1977			Six Rivers NF	5502
14	RED MOUNTAIN.	Shasta	Skunk Ridge (4112117)	CNDDB, May 2017 (EO 15)	17-Sep-2013	2000 PLANTS SEEN IN 1988. 1,279 PLANTS SEEN IN 2013.	ORV ROAD TRAVERSES POPULATION. SUMMIT HAS RADIO INSTALLAT-ION, BUT NO LONGER APPEARS TO BE IN USE (2013).	PVT-SIERRA PACIFIC	5700
14	;	Shasta	Skunk Ridge (4112117)	NRIS, Apr 2017 (0514_ANSC14_05140002)	8-Aug-1988	individuals		Shasta-Trinity NF	

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
14	Red Mountain, Big Ben 15' quadrangle [680A], Pit River watershed Pit, River, Red Mountain	Shasta	Skunk Ridge (4112117)	CCH, Jan 2017 (UC1561099)	8-Aug-1988				5699
14	Red Mountain, Big Ben 15' quadrangle [680A], Pit River watershed Pit, River, Red Mountain	Shasta	Skunk Ridge (4112117)	CCH, Jan 2017 (UC1584596)	8-Aug-1988				5699
14	Red Mountain, Pit River Watershed	Shasta	Skunk Ridge (4112117)	CCH, Jan 2017 (CAS781515)	8-Aug-1988				5699
14	Red Mountain: (680A]	Shasta	Skunk Ridge (4112117)	CCH, Jan 2017 (RSA502384)	8-Aug-1988				5702
14	Red Mountain, open slopes on ridge	Shasta	Skunk Ridge (4112117)	Calflora, May 2017 (gr12479)	8-Aug-1988	1+ individuals			5643

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
15	SUMMIT OF GRIZZLY PEAK, ABOUT 450 FEET SE OF LOOKOUT TOWER.	Shasta	Grizzly Peak (4112128)	CNDDB, May 2017 (EO 16)	16-Sep-2013	FEWER THAN 50 PLANTS SEEN IN 1987. UNKNOWN NUMBER OF PLANTS SEEN IN 2012. 25-35 PLANTS OBSERVED IN 2013.	PORTION OF POPULATION AT SUMMIT ADJACENT TO ROAD GRADING. LOOKOUT SITE PREPARAT-ION.	Shasta-Trinity NF	6200
15	Shasta-Trinity NF	Shasta	Grizzly Peak (4112128)	NRIS, Apr 2017 (ANSC14_05140001)	28-Jun-1987	individuals		Shasta-Trinity NF	
15	summit of Grizzly Peak, dividing McCloud River and Pit River drainages Grizzly Peak	Shasta	Roaring Creek (4012188)	CCH, Jan 2017 (UC1576751)	28-Jun-1987				6201
15	Summit of Grizzley Peak, dividing McCloud River and Pit River drainages	Shasta	Grizzly Peak (4112128)	CCH, Jan 2017 (CAS781516)	28-Jun-1987				6201
15	summit of Grizzly Peak, dividing McCloud River and Pit River drainages	Shasta	Roaring Creek (4012188)	CCH, Jan 2017 (RSA407607)	28-Jun-1987				6201
15	summit of Grizzly Peak	Shasta	Grizzly Peak (4112128)	Calflora, May 2017 (gr12394)	5-Jun-1987	1+ individuals			6204

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
15	Grizzly Peak;	Shasta	Grizzly Peak (4112128)	NRIS, Apr 2017 (ANSC14_05140001)	16-Sep-2013	30 individuals	Recent fire-line clearing work along road to peak from 2012 Bagley Fire did not impact plant population.	Shasta-Trinity NF	
16	VICINITY OF UPPER ANT RIDGE, UPPER MIDDLE FORK EEL RIVER WATERSHED, MENDOCINO NATIONAL FOREST.	Mendocino | Trinity	Buck Rock (3912288)	CNDDB, May 2017 (EO 17)	26-Sep-1990	SITE IS BASED ON A 1990 ISLE COLLECTION. NEEDS FIELDWORK.		Mendocino NF	5480
17	RIDGETOP ABOUT 0.8 AIR MILE SOUTHEAST OF BLACK ROCK MOUNTAIN, WEST OF NORTH YOLLA BOLLY.	Trinity	North Yolla Bolly (4012228)	CNDDB, May 2017 (EO 18)	15-Jul-2015	VERY LOCAL POPULATION OF ABOUT 30 PLANTS, INCLUDING JUVENILES, OBSERVED IN 2015. NO OBVIOUS REASON WHY POPULATION IS SO SMALL AND LOCAL.		Shasta Trinity NF	7200
17	Yolla Bolly wilderness, Black Rock ridge;	Trinity	North Yolla Bolly (4012228)	NRIS, Apr 2017 (0514_ANSC14_51_002)	15-Jul-2015	30 individuals		Shasta-Trinity NF	

Commented [KJF1]: For some reason this record doesn't show on the map for this profile I have added the record in Calflora, and it also is JEPS123448.

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
17	Yolla Bolly Wilderness; gravelly ridgetop and north aspect upper slope 1 mile SE of Black Rock.	Trinity	North Yolla Bolly (4012228)	CCH, Jan 2017 (JEPS123448)	15-Jul-2015			Shasta-Trinity NF	7238
18	THE LASSICS, SENTENEY ROCK.	Humboldt | Trinity	Black Lassic (4012335)	CNDDB, May 2017 (EO 19)	17-Jul-1994	SITE IS BASED ON A 1994 GREENHOUSE OBSERVATION.		Six Rivers NF	5100
18	The Lassics - Senteney Rock	Trinity	Black Lassic (4012335)	Calflora, May 2017 (jgr16940)	17-Jul-1994	1+ individuals		Six Rivers NF	5151
18	Lassics Botanical Area Six Rivers National Forest	Trinity	Black Lassic (4012335)	Calflora, May 2017 (ce316)	4-Feb-1997	1+ individuals		Six Rivers NF	4386
19	STODDARD LAKE TRAIL, TRINITY ALPS WILDERNESS.	Trinity	Billys Peak (4112227)	CNDDB, May 2017 (EO 20)	2001	ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 2001 ERWIN REPORT REFERENCED IN A USFS DOCUMENT, POPULATION SIZE UNKNOWN.		Shasta-Trinity NF	

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:	-	-	-	-	-	-	1	0
Lake Tahoe Basin MU:	-	-	-	-	-	-	-	0
Lassen:	-	-	-	-	-	-	1	0
Los Padres:	-	-	-	-	-	-	-	0
Mendocino:	1,2,3,4,5, 6,7,8,9, 10,11,12, 16	13	-	2	11	7-Jul-2012	1	13
Modoc:	-	-	-	-	-	-	-	0
Plumas:	-	-	-	-	-	-	-	0
San Bernardino:	-	-	-	-	-	-	-	0
Sequoia:	-	-	-	-	-	-	-	0
Shasta-Trinity:	15,17,19	3	-	3	-	15-Jul-2015	4	3
Sierra:	-	-	-	-	-	-	-	0
Six Rivers:	13,18	2		1	1	11-Jul-2002	-	2
Stanislaus:	-	-	-	-	-	-	-	0
Tahoe:	-	-	-	-	-	-	-	0
Totals:	N/A	18	0	6	12	N/A	7	18

Demographic and Population Trends: *Anisocarpus scabridus* was inventoried by the USDA Forest Service in 1994 and 2002 with undetermined trends in population sizes (Hoover et al. pers. comm. 2017). In 2012, it was reported to have a static to declining trend (Johnson et al. 2012). At the time of its evaluation by the Forest Service (5 October 2012), 16 occurrences of *A. scabridus* were included in the CNDDB, and it is currently known from three additional occurrences (19 total) in the CNDDB (2017) today. At the time of its evaluation by the Forest Service, Mendocino National Forest had jurisdiction of 11 occurrences of *A. scabridus*, the Shasta-Trinity and Six-Rivers National Forests managed two of the three northern occurrences,

and a private occurrence in the vicinity of the Shasta-Trinity National Forest was not protected (Johnson et al. 2012).

One occurrence on the Shasta-Trinity National Forest is on an inaccessible vertical outcrop within a Special Interest Area, and is adjacent to a communications facility and a 50 KV power line. There is a second nearby peak on private land that also has a population of *A. scabridus* that is adjacent to the communications facility (Johnson et al. 2012).

In 1980, Jim Jokerst found approximately 315 individuals of *A. scabridus* on Signal Peak (EO 1), 240 and 210 on Snow Mountain east and west (EO 2), 1,000 on Hull Mountain (EO 3), 80 on Uhl Peak (EO 4), 1,120 on Anthony Peak (EO 5), 570 on Hammerhorn Mtn. and 60 on Solomon Peak (EO 6 and possibly also EO 13), 100 on Sanhedrin Mtn. (EO 7), 150 on Castle Peak (EO 8), 175 on Leech Lake Mtn. (EO 10), and 200 on South Yolla Bolly (EO 11), for a total of approximately 4,315 plants (Johnson et al. 2012).

A majority of occurrences (16/19; ~84%) currently have population count and size estimate information from the CNDDB (2017). These sixteen occurrences range in estimated size between 30 and 2,000 plants, with an average of approximately 498 plants, and a median value of roughly 258. The five smallest occurrences have estimated sizes between 30-80 plants, and the five largest occurrences range in estimated size between 1,000-2,000 individuals. The six remaining occurrences are estimated to have between 100 and 450 plants. As stated above, element occurrence five (EO 5) was observed to have 1,120 plants by Jokerst in 1980. Years later, in 2004, its observed occurrence size fell to 200 plants. In addition, 30-50 plants were seen at the site of element occurrence 14 (EO 14) in 1994. Nearly 360 plants were later observed at this site in 2002.

Almost one-third (6/19; ~32%) of all element occurrences are ranked in Excellent (A) condition. A single element occurrence is documented in Good (B) condition, and the remaining element occurrences are in Unknown (U) condition (CNDDB 2017).

Life History: *Anisocarpus scabridus* is a low growing herbaceous perennial that blooms mostly from July through August, and sometimes into September (CNPS 2018; Baldwin and Strother 2006). Little is known about life history traits associated with *A. scabridus*. Plants are small (10-50 cm) and have hirsute to stipitate-glandular stems. Plants develop blue-green herbage with a greyish hue. Heads have few (0-3) ray florets and produce 5-23 bisexual disc florets (Baldwin and Strother 2006). Plants in the subtribe that *A. scabridus* occurs in (subtribe Madiinae) are largely insect pollinated (CPC 2018).

Diversity: *Anisocarpus* is a member of a striking group of composites that have remained the source of meaningful evolutionary insight during much of the 20th century (Baldwin and Wessa 2000). This group is defined by a number of genera in the subtribe Madiinae (Asteroideae – Madieae) and includes familiar alliances such as the tarweeds (incl. *Hemizonia*, *Calycadenia*, *Hemizonella*, *Centromadia*, *Deinandra*, *Holocarpha*, *Jensia*, *Madia, Blepharizonia, Anisocarpus*, *Carlquistia*, and others) and the Hawaiian silverswords (*Debautia, Argyroxiphium*, and *Wilkesia*). Other genera within subtribe Madiinae include *Lagophylla, Holozonia, Achyrachaena, Blepharipappus*, and *Layia*. (Baldwin and Wessa 2000).

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Anisocarpus is a western North American genus with two morphologically and ecologically distinct species that are allopatric throughout their respective ranges. *Anisocarpus madioides* is generally found in understories of low-mid elevation evergreen forests, whereas *A. scabridus* is restricted to rocky and exposed slopes on ridgelines. Botanists have at one time placed taxa in separate genera within different tribes, unbeknownst to their close relationship (Baldwin 1999; Baldwin and Strother 2006).

Habitat: Plants occur in rocky and metamorphic substrates on higher elevation open ridges or scree slopes in upper montane coniferous (red fir) forests (Baldwin and Strother 2006; Baldwin 2018; CNPS 2018; NatureServe 2018). At the time of its evaluation by the Forest Service in 2012, *A. scabridus* was reported to be associated with *Allium falcifolium, Chrysothamnus nauseosus* subsp. *albicaulis, Elymus elymoides, Eriogonum umbellatum* var. *furcosum, Haplopappus greenei, Holodiscus discolor, Lomatium macrocarpum, Minuartia nuttallii* subsp. *gregaria*, and *Penstemon purpusii* (and also near *Lupinus antoninus*) (Johnson et al. 2012).

Specific element occurrences in the CNDDB (2017) report an association of *A. scabridus* with gabbro, fragmented mudstone, volcanic-cobble, and talus deposits. These element occurrences also report that *A. scabridus* occurs alongside *Abies magnifica, Allium falcifolium, Anemone drummondii, Calyptridium umbellatum, Ceanothus cordulatus, Chaenactis douglasii, Chrysothamnus nauseosus, Crepis monticola, Delphinium nudicaule, Elymus hystrix, Epilobium* sp., *Ericameria greenei, Eriogonum lobbii, E. nudum, E. strictum, E. umbellatum, Galium grayanum, Holodiscus microphyllus, Lomatium macrocarpon, Lupinus sellulus, Monardella odoratissima, Penstemon purpusii, P. rupicola*, and *Purshia tridentata*.

Habitat Status or Trend: *Anisocarpus scabridus* is restricted to Black Lassic mudstone on Six Rivers National Forest (Hoover et al. pers. comm. 2017). Overall, it tends to occur at the tops and leeward slopes of hogback ridges, and plants on leeward slopes are usually within 25 meters of the ridgetop. Populations are occassionally found on steep, rocky faces of mountains where they are usually in protected drainages of slopes and ravines (Johnson et al. 2012). Habitat for plants found in rocky and exposed areas are vulnerable to climate change, forest encroachment, and altered fire regimes (Imper 2016; USDA 2001a).

Capacity for the Species to Disperse: This species develops achenes on disk florets that have a pappus; a feature that is known to increase dispersal distance (Baldwin 2018; Sheldon and Burrows 1973). However, the capacity for *A. scabridus* to disperse is reported to be low overall due to naturally fragmented habitat (Hoover et al. pers. comm. 2017).

Threats: Erosion, road grading, trampling, and OHV activities are general threats reported to this species (CNDDB 2017). Most occurrences of *A. scabridus* are on summits, and are vulnerable to activities associated with development and maintenance of radio facilities (Taylor, D. W. pers. comm. 2017). It is also possibly threatened by climate change (Hoover et al. pers. comm. 2017).

A primary documented threat to *A. scabridus* is fireline or fuel break construction. “During the 1987 Mendenhall Fire, tractor firelines were constructed down the ridgeline from Hull Mountain, the second largest known occurrence [EO 3].” (Johnson et al. 2012). Hang gliders are reported to

utilize Hull Mountain for their launch site, so vehicle and human foot traffic pose risks there in addition to the potential for non-native plant introductions (Johnson et al. 2012).

The Anthony Peak occurrence (EO 5) has a jeep road that bisects it. During the 2012 North Pass Fire, a wide fireline was bulldozed along the Anthoney Peak ridgeline; the possible impacts of this distrurbance on *A. scabridus* was not determined (Johnson et al. 2012).

The Fork Fire of 1996 resulted in the construction of a secondary fireline on the top of Goat Mountain, running from the Lookout south for at least ¼ mile. So long as there are wild fires, the occurrences of *A. scabridus* along ridgetops could be affected by the construction of fire lines (Johnson et al. 2012).

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Molly S. Wiebush, Rare Plant Botanist Coordinator, California Native Plant Society, revised 25 January 2022

Reviewer(s) and Date:

David Magney, Rare Plant Program Manager, California Native Plant Society, (916) 447-2677 ext. 205, dmagney@cnps.org. March 19, 2018; Julie Ann Kierstead, R5 Ecosystem Planning, 15 October 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.

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