Plant Species Evaluation Form

Bensoniella oregona (Abrams & Bacig.) Morton

BENSONIELLA

Family: Saxifragaceae (CNPS 2018) | **PLANTS Symbol:** BEOR (USDA 2018) | **Calif. Endemic:** No (CNPS 2018)

Synonyms/Other Names: This taxon was originally described by L.R. Abrams and R.C.F. Bacigalupi in 1929, with the name *Bensonia oregana*. But this genus name had been assigned to a fossil taxon described by J. Buckman in 1845, rendering the new description invalid. In deference to priority, C.V. Morton (1965) provided a new description, coining the monotypic genus *Bensoniella*. *Bensoniella oregana* remains the universally accepted name (Tropicos 2018); the older combination will be observed only in antique literature.

Identification Issues: *Bensoniella* is a monotypic genus, characterized by zygomorphic flowers with just two petals and five stamens. No other member of Saxifragaceae conforms to this pattern. Provided that the specimen is flowering, identification should be straightforward (Park et al. 2012).

Taxonomy:

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Species In Genus: 1 sp. Etymology: (G.T. Benson, Stanford botanist, 1896--1928).

Habit: Plant 20--40 cm; rhizome scaly; bulblets 0. Leaf: basal; petiole 2--15 cm, hairs dense, long, brown; blade 4--20 cm, round-ovate, base cordate, unevenly crenate, +- glabrous adaxially, veins hairy abaxially. Inflorescence: spike-like raceme, glandular; bracts 0; pedicel < 1 mm. Flower: strongly bilateral, hypanthium free of ovary; calyx lobes 1.5--2.5 mm, obovate; petals 2, alternate upper sepals, > calyx lobes, narrowly awl-like, recurved; stamens 5, opposite and > calyx lobes; pistil 1, ovary superior, chamber 1, placentas 2, parietal, styles 1.5--2.5 mm, stigmas +- unlobed, disk-like to head-like. Fruit: capsule, opening before seeds mature, becoming widely dehiscent, forming splash cup. Seed: red-brown to black. eFlora Treatment Author: Michael S. Park, Gerald D. Carr & Patrick E. Elvander.

Status:

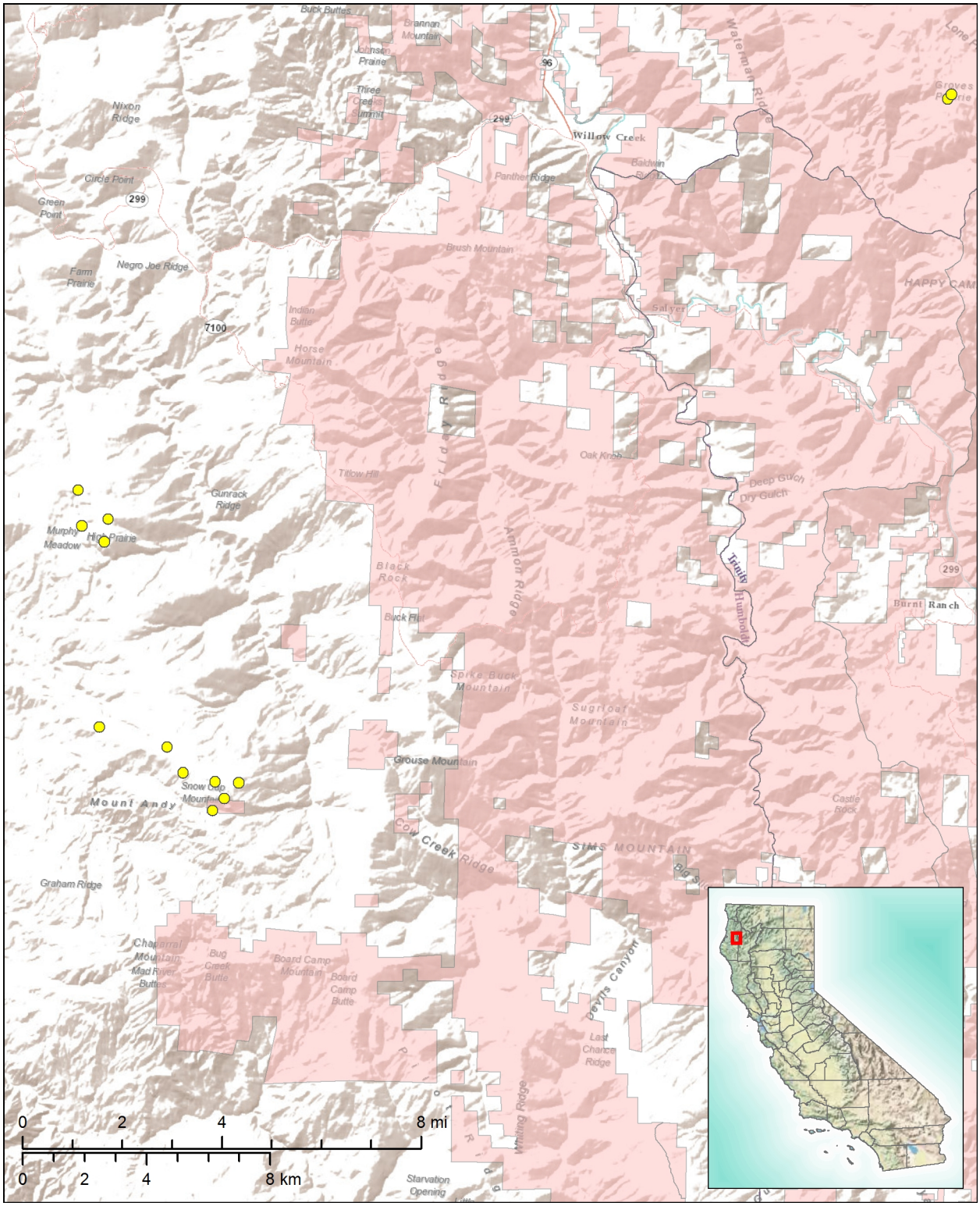
Note: Federally recognized Endangered, Threatened, Proposed, or Candidate species under the Endangered Species Act are omitted as they do not meet the definition of a Species of Conservation Concern (FSH 1909.12 § 12.52).

State Listing	G-rank	S-rank	CRPR	R5 FSS	NFP SM	CA BLM
CA: Rare NV: Not listed OR: Candidate	G3	CA: S2 NV: Not listed OR: S3	1B.1	Sensitive	Category A	Not listed

SWAP: Strategy Species	NNHP: Not listed	NNPS: Not listed	ORBIC: 1: Threatened or Endangered Throughout Range	OCS: Not listed	IUCN: Not listed

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

Distribution: This species occurs only on the west coast of North America, in southwestern Oregon and northwestern California. In California it is known from the Outer North Coast Ranges (NCoRO) bioregion within Humboldt County, but is expected to occur in the Klamath Ranges (KR) bioregion as well. Of the ten occurrences of *B. oregona*, two are from USDA Forest Service lands, both from Six Rivers National Forest. Another eight occurrences fall within a five-mile buffer of Six Rivers National Forest (Calflora 2017, CCH 2017, CNDDB 2017, NRIS 2017).



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:

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

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
1	ALONG SNOW CAMP CREEK JUST SOUTH OF SNOW CAMP LAKE AND ALONG ROAD JUST WEST OF ROOSTER ROCK, SOUTH END OF SNOW CAMP MTN.	Humboldt	Mad River Buttes (4012367)	CNDDB, May 2017 (EO 1)	1-Jun-2010	N COLONY: POPULATION ESTIMATED AT 2000+ (COULD BE AS HIGH AS 5000) IN 1981, 1000 PLANTS IN 2004 & 2006, 500-1000 IN 2008, 1000+ IN 2009, 100 IN 2010. S COLONY: APPROXIMATELY 250 PLANTS IN 1981, 1000+ IN 1994. INCLUDES FORMER OCC #6.	SIGNS OF HERBIVORY & DUMPING, ATV USE, TRAMPLING, COMPETITION WITH GRASSES, BANK EROSION. MANAGED TIMBER LAND SURROUNDS.	PVT-GREEN DIAMOND, USFS	4500
1	Snow Camp Bald Mountain Ridge (ridge between Mad River and Redwood Creek, Bald Mountain Ridge); Bald Mountain ridge, btw Mad River and Redwood Creek	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (UC1046538)	14-Jun-1951				4701

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
1	Bald Mountain ridge - Under forest at edge of Snow Camp Meadow, near base of Snow Camp Mt., at head of high long ridge between Mad River and Redwood Creek	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (DS365753)	14-Jun-1951				4701
1	Near Snow Camp Mtn.	Humboldt	Mad River Buttes (4012367)	CCH, Jan 2017 (HSC75815)	2-Jul-1980			Six Rivers NF	4301
1	Near Snow Camp Mtn.	Humboldt	Mad River Buttes (4012367)	CCH, Jan 2017 (HSC75816)	2-Jul-1980			Six Rivers NF	4301
1	Near Snow Camp Mtn., close to the town of Willow Creek.	Humboldt	Mad River Buttes (4012367)	CCH, Jan 2017 (HSC53890)	11-Jul-1979			Six Rivers NF	4331
1	Six Rivers National Forest - Near Snow Camp Lake, Smokehouse Creek.	Humboldt	Mad River Buttes (4012367)	CCH, Jan 2017 (CAS981275)					
1	Snow Camp	Humboldt	Mad River Buttes (4012367)	CCH, Jan 2017 (GH363340)	9-Jul-1939				

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
1	Snow Camp in moist ground around meadow.	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (DS382903)	9-Jul-1939				4600
1	Snow Camp	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (UC1051580)	9-Jul-1939				4600
1	Snow Camp	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (JEPS26214)	9-Jul-1939				4600
1	Snow Camp	Humboldt	Mad River Buttes (4012367)	CCH, Jan 2017 (UC902073)	11-Aug-1949				4701
1	edge Snow Camp Meadow (("Snow Camp and Twin Lakes Trip")); edge of Snow Camp Meadow	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (UC1222392)	26-Jun-1951				
1	e side Snow Camp Meadows; e side of Snow Camp Meadows	Humboldt	Mad River Buttes (4012367)	CCH, Jan 2017 (UC1222393)	14-Jun-1951				
1	East side of Snow Camp Meadows	Humboldt	Mad River Buttes (4012367)	CCH, Jan 2017 (RSA167308)	14-Jun-1951				

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
1	close to the base Snow Camp Mt. (at Snow Camp, near summit of long high ridge (Bald Mt. ridge) between Mad River and Redwood Creek); nr summit Bald Mt. Snow Camp Mt, btw Mad River and Redwood C	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (JEPS3738)	14-Jun-1951				4701
1	edge of meadow at Snow Camp High Prairie (ridge between Mad River and Redwood Creek (Bald Mountain ridge)); btw Mad River and Redwood Crk (Bald Mountain), High Prairie	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (JEPS8443)	14-Jun-1951				4701
1	Snow Camp Bald Mountain Ridge (ridge between Mad River and Redwood Creek, Bald Mountain Ridge); Bald Mountain ridge, btw Mad River and Redwood Creek	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (UC1046538)	14-Jun-1951				4701

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
1	Bald Mountain in cold wet meadow near high prairie	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (CAS402954)	24-Jun-1923				3501
1	Bald Mountain - in cold wet meadow near high prairie	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (DS382902)	24-Jun-1923				3501
1	Bald Mountain in meadow near High Prairie; Northern Coast Ranges, Bald Mountain, nr High Prairie	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (JEPS26215)	24-Jun-1923				3501
1	Bald Mountain in meadow near High Prairie; Northern Coast Ranges, Bald Mountain, nr High Prairie	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (UC1051579)	24-Jun-1923				3501
1	Bald Mountain ridge - in bog, edge of forest at High Prairie, on long high ridge between Mad River and Redwood Creek	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (DS365752)	14-Jun-1951				3501

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
1	Bald Mountain ridge - in bog, edge of forest at High Prairie, on long high ridge between Mad River and Redwood Creek	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (DS382984)	14-Jun-1951				3501
1	on long high ridge between Mad River and Redwood Creek (Bald Mountain ridge) (edge of forest at High Prairie); btw Mad River and Redwood Creek (Bald Mountain ridge)	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (JEPS3739)	14-Jun-1951				3501
1	long high ridge between Mad River and Redwood Creek (Bald Mountain ridge) High Prairie; btw Mad River and Redwood Crk (Bald Mountain ridge), High Pr	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (JEPS8437)	14-Jun-1951				3501

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
1	High Prairie, on long high ridge between Mad River and Redwood Creek (Bald Mountain ridge)	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (RSA114084)	14-Jun-1951				3501
1	on long high ridge between Mad River and Redwood Creek (Bald Mountain ridge) High Prairie; Bald Mountain ridge, btw Mad River and Redwood Creek	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (UC1046539)	14-Jun-1951				3501
1	Murphy Meadow; on Bald Mt., Murphy Meadow	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (UC1198850)	26-Jun-1920				3501
1	Murphy Meadows	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (UC1198854)	26-May-1923				3501
1	Six Rivers NF	Humboldt	Mad River Buttes (4012367)	NRIS, Feb 2017 (0510_BEOR_510420001)	1-Jan-1903	individuals		Six Rivers NF	

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
1	;	Humboldt	Mad River Buttes (4012367)	NRIS, Feb 2017 (0510_BEOR_510420002)	1-Jan-1903	individuals		Six Rivers NF	
2	NE END OF MURPHY MEADOW; 0.65 AIR MILE NE TO 0.75 AIR MILE EAST OF RUSS RANCH.	Humboldt	Maple Creek (4012377)	CNDDB, May 2017 (EO 2)	1997	FEWER THAN 1000 PLANTS OBSERVED IN A SINGLE COLONY IN 1980. TWO POCKETS OF 60 PLANTS & 1000 PLANTS OBSERVED SOMETIME PRIOR TO 1981. SEVERAL HUNDRED PLANTS OBSERVED IN 1997. INCLUDES FORMER OCCURRENCE #4.	GRAZING THREATENS. POSSIBLE THREAT FROM LOGGING.	PVT	3100
2	Near Murphy Meadow	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (HSC75814)	26-Jun-1980				2999

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
3	NORTHWEST OF SNOW CAMP LAKE JUST S & SW OF SNOW CAMP MOUNTAIN PEAK (PEAK 4637), BETWEEN MAD RIVER & REDWOOD CREEK.	Humboldt	Maple Creek (4012377)	CNDDB, May 2017 (EO 3)	4-Sep-2014	E-MOST POLYGON: HEALTHY POPULATION OBSERVED IN 1980. 2ND E-MOST POLYGON: 3 PLANTS SEEN IN 2012, 4 IN 2014. 2ND W-MOST POLYGON: 2 PLANTS IN 2012 (PLANTS TRANSPLANTED TO PREVIOUS COLONY). W-MOST POLYGON: ~12 PLANTS IN 2012, 30 IN 2014.	LAND IS MANAGED FOR TIMBER. SOME PLANTS ARE IN ROAD BED, DRIVING/ TRAMPLING A POSSIBILITY.	PVT-Green Diamond Resource Co.	4560
3	Snow Camp Mtn.	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (HSC62831)	16-Oct-1980				4560
3	Snow Camp Mtn.	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (HSC62832)	16-Oct-1980				4560

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
4	GROVES PRAIRIE.	Humboldt	Denny (4012384)	CNDDB, May 2017 (EO 7)	Unknown	SITE BASED ON A 1990 FIELD GUIDE AND KEY TO SENSITIVE PLANTS OF SIX RIVERS NATIONAL FOREST AND A 1998 DFG REPORT. THIS IS AN EXPERIMENTAL POPULATION ESTABLISHED USING 52 INDIVIDUALS TRANSPLANTED FROM A PORTION OF ROOSTER ROCK SITE (OCC #1).		Six Rivers NF	
4	Six Rivers NF	Humboldt	Denny (4012384)	NRIS, Feb 2017 (0510_BEOR_50200826)	1-Jan-1903	individuals		Six Rivers NF	

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
5	UPPER MAPLE CREEK DRAINAGE, NORTH OF POWERLINES, 1.9 TO 2.3 AIR MILES WNW OF THE SUMMIT OF SNOW CAMP MOUNTAIN.	Humboldt	Maple Creek (4012377)	CNDDB, May 2017 (EO 11)	4-Sep-2014	2,800+ SEEN IN NW-MOST & SE-MOST POLYGONS IN 2001. NW POLY: 30 PLANTS IN 2011, TRANSPLANTED TO TWO MIDDLE POLYS IN 2012. TWO MIDDLE POLYS: 25 TRANSPLANTED PLANTS IN 2012, 39 IN 2013, 19 IN 2014. SE-MOST POLY: 1000 PLANTS IN 2012 AND 2013.	TIMBER HARVEST ACTIVITIES, GRAZING, HYDROLOGY CHANGES, TRAMPLING, HERBIVORY. ROAD WORK ASSOCIATED WITH THP IS A THREAT.	PVT-Green Diamond Resource Co.	3250
5	Bald Mountain ridge - in bog, edge of forest at High Prairie, on long high ridge between Mad River and Redwood Creek	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (CAS402958)	14-Jun-1951				3501
6	APPROXIMATELY 1.3 AIR MILES NW OF SNOW CAMP LAKE AND 2.8 AIR MILES ESE OF ROCK RANCH.	Humboldt	Maple Creek (4012377)	CNDDB, May 2017 (EO 12)	1-Jun-2009	APPROXIMATELY 97 PLANTS OBSERVED IN EASTERN POLYGON IN 2001. APPROXIMATELY 100 PLANTS OBSERVED IN THE WESTERN POLYGON IN 2009.	TIMBER HARVEST ACTIVITIES; NO-CUT BUFFER AROUND POPULATION.	PVT-Green Diamond Resource Co.	4350

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
7	NORTH END OF MURPHY MEADOW, APPROXIMATE-LY 1 AIR MILE NE OF RUSS RANCH.	Humboldt	Maple Creek (4012377)	CNDDB, May 2017 (EO 13)	21-Jun-2006	IN 1997, 200+ PLANTS WERE OBSERVED IN THE WESTERN POLYGON AND 4 PLANTS WERE OBSERVED IN THE EASTERN POLYGON. A 2006 TAYLOR COLLECTION FROM THE SW 1/4 OF THE NW 1/4 OF SECTION 11 IS ALSO ATTRIBUTED TO THIS SITE.		PVT	3200
7	Murphy Meadow; 1.5 air mi NE of Rush Ranch, northwest end of Murphy Meadow area	Humboldt	Maple Creek (4012377)	CCH, Jan 2017 (JEPS109857)	21-Jun-2006				3199
7	Murphy Meadow; 1.5 air mi NE of Rush Ranch, northwest end of Murphy Meadow area	Humboldt	Maple Creek (4012377)	Calflora, May 2017 (xr168795)	21-Jun-2006	1+ individuals			3202

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
8	NORTH END OF HIGH PRAIRIE, EAST OF MURPHY MEADOW, APPROXIMATE-LY 1.2 AIR MILES ENE OF RUSS RANCH.	Humboldt	Maple Creek (4012377)	CNDDB, May 2017 (EO 14)	27-Jun-2005	5000+ PLANTS OBSERVED THOUGHOUT OCCURRENCE IN 1997. SCATTERED PLANTS OBSERVED IN SOUTHERNMOST POLYGON IN 2005.	SURROUND-ING AREA IS USED FOR TIMBER HARVEST. SOME PLANTS OCCUR WITHIN A REBAR-PROTECTED ROADSIDE RETENTION AREA.	PVT	3320
9	SW END OF HIGH PRAIRIE, EAST OF MURPHY MEADOW, APPROXIMATE-LY 1 AIR MILE ESE OF RUSS RANCH.	Humboldt	Maple Creek (4012377)	CNDDB, May 2017 (EO 15)	1997	200+ PLANTS OBSERVED IN 1997.	SURROUND-ING AREA IS USED FOR TIMBER HARVEST.	PVT	3200
10	APPROXIMATEL Y 0.5 AIR MILE EAST OF SNOW CAMP LAKE AND APPROXIMATE-LY 0.5 AIR MILE NNE OF ROOSTER ROCK.	Humboldt	Board Camp Mtn. (4012366)	CNDDB, May 2017 (EO 16)	22-May-2012	2 PLANTS OBSERVED IN 2012.	INVASIVE GRASS SPECIES, CHANNEL CHANGES FROM NEW WATER CROSSING. LAND IS MANAGED FOR TIMBER.	PVT-Green Diamond Resource Co.	4400

Distribution on National Forest System (NFS) Lands:

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

National Forest System (NFS) lands	Record #s (from Locations table above)	CNDDB EOs	Non-CNDDB Records	Recent (seen in past 20 yrs.)	Historic (not seen in past 20 yrs.)	Most Recent Obs.	EOs/ Recs. (5 mile buffer)	Total Records on NFS lands
Angeles:	-	-	-	-	-	-	-	0
Cleveland:	-	-	-	-	-	-	-	0
Eldorado:	-	-	-	-	-	-	-	0
Inyo:	-	-	-	-	-	-	-	0
Klamath:	-	-	-	-	-	-	-	0
Lake Tahoe Basin MU:	-	-	-	-	-	-	-	0
Lassen:	-	-	-	-	-	-	-	0
Los Padres:	-	-	-	-	-	-	-	0
Mendocino:	-	-	-	-	-	-	-	0
Modoc:	-	-	-	-	-	-	-	0
Plumas:	-	-	-	-	-	-	-	0
San Bernardino:	-	-	-	-	-	-	-	0
Sequoia:	-	-	-	-	-	-	-	0
Shasta-Trinity:	-	-	-	-	-	-	1	0
Sierra:	-	-	-	-	-	-	-	0
Six Rivers:	1, 4	2	0	1	1 (unknown)	1-Jun-2010	8	2
Stanislaus:	-	-	-	-	-	-	-	0
Tahoe:	-	-	-	-	-	-	-	0
Totals:	N/A	2	0	1	0	N/A	9	2

Demographic and Population Trends: All ten occurrences of *B. oregona* contain some population information, with three offering year-on-year data. Including the multiple measurement from single sites implied by inter-annual censuses, five observations had 1-100 individuals, four had 101-500 individuals, five had 501-1,000 individuals, and three had 1,000-5,000 individuals. The smallest occurrence contained two plants, and the largest about 5,000. All sites with year-on-year data show declines: record number one dropped almost monotonically from 2,000 plants seen in 1984 to only 100 seen in 2010, record number two dropped from 1,000 to 300 between 1980 and 1997, and record number five dropped from 2,800 to 1,000 between 2001 and 2013 (Calflora 2017, CCH 2017, CNDDB 2017, NRIS 2017). It is unknown whether

this signifies a pattern of broad decline in this species, but the evidence is suggestive. CNDDB (2017) assigns an occurrence rank of "Good" to five occurrences; one occurrence received a rank of "Fair," and another "Poor." The remaining three have unknown occurrence ranks.

Life History: *Bensoniella oregana* is a perennial, rhizomatous herb that flowers between May and July (CNPS 2018). It is often found at low to middling densities, but can form a dense carpet under favorable conditions (CNDDB 2017). Taxa within Saxifragaceae exhibit a range of pollination syndromes, some involving fungus gnats or seed-predatory moths, but most achieve pollen transfer via an array of Hymenoptera (CPC 2018). The pollination biology of *Bensoniella* remains unexplored.

Diversity: The family Saxifragaceae originated approximately 38 million years ago, and comprises about 600 species (Stevens 2001). Of the 30 or so genera in this family, half are monotypic and just nine have more than three species, a phenomenon thought to reflect rapid radiation corresponding to orogenies in western North America (Soltis et al. 1990). *Bensoniella oregana* is the only member of its genus. Though a modest-sized family, taxa within Saxifragaceae have given important insights into autopolyploid speciation, coevolution, and speciation. The majority of species are found in North America, but there are centers of diversity in both western North America and the mountains of Eurasia, and a few disjunct species occur in South America.

Generic relationships within Saxifragaceae have long vexed systematists, largely because vegetative morphology is remarkably consistent across the family; taxa are usually distinguished by a handful of obvious fruit or floral traits (Soltis et al. 2001). Molecular phylogenetic analyses have clarified relationships within Saxifragaceae considerably, grouping the genera into the arctic and northern montane Saxifragoideae, and the mostly north temperate Heucheroideae, of which *B. oregana* is a member. Both groups originated about 30 million years ago. As evidenced by large-scale interspecific recombination in chloroplast and nuclear genomes, there is a long history of introgressive hybridization in Heucheroideae; this is likely ongoing, and may have adaptive significance.

A sizeable fraction of total diversity in Saxifragaceae (about 100 species) consists of cushion plants adapted to cold, dry conditions at high altitudes (Stevens 2001). Adaptation to wet environments, as in *B. oregana*, is comparatively uncommon.

Habitat: *Bensoniella oregana* favors open, wet areas within lower montane coniferous forests, at elevations between 915 and 1,400 meters. It can be found in riparian areas, around seeps in meadow environments, and in bogs and fens (CNPS 2018). This species tolerates a variety of substrates, from silt to mesic loams, provided sufficient water content. Woody overstory species often encountered with *B. oregana* include: *Abies californica, A. concolor, Arbutus menziesii, Calocedrus decurrens, Cornus nuttallii, Corylus cornuta* var. *californica, Notholithocarpus densiflorus, Pseudotsuga menziesii*, and *Umbellularia californica*. Understory associates include: *Achlys* spp., *Athyrium felix-femina*, *Berberis nervosa, Claytonia sibirica, Erythronium revolutum, Fragaria vesca, Lycopodium clavatum, Ribes bracteosum*, *Rosa* spp., and *Rubus* spp. (CNDDB 2017).

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

Capacity for the Species to Disperse: The seeds of several forest-dwelling Saxifragaceae are dispersed by rain, some via a ballistic mechanism triggered by raindrops, as in *Heuchera*; others via a splash-cup mechanism, as in *Mitella* and *Chrysosplenium*. *Bensoniella oregana* bears a peculiar, saucer-shaped capsule reminiscent of that seen in *Mitella*, and almost certainly shares the associated splash-cup dispersal mode. Despite small seed size in this and allied genera, splash-mediated dispersal is unlikely to carry diaspores any great distance (Soltis et al. 1990, Stevens 2001). Rather, strong short-distance dispersal and the rhizomatous habit work to bolster local persistence, while jump dispersal events are relegated to chance.

Threats: *Bensoniella oregana* is threatened by direct and indirect disturbance associated with logging, grazing, and road maintenance. Off-road vehicle use may have a significant impact on local persistence, and competition from invasive grasses poses a ubiquitous challenge (CNDDB 2017, CNPS 2018). This species is known from just a few occurrences in both California and Oregon, meaning that localized impacts may be of real conservation significance.

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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.

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