

Plant Species Evaluation Form

Oenothera wolfii (Munz) P.H. Raven, W. Dietr. & Stubbe

WOLF'S EVENING-PRIMROSE

Family: Onagraceae
(CNPS 2018)

PLANTS Symbol: OEWO
(USDA 2018)

Calif. Endemic: No
(CNPS 2018)

Synonyms/Other Names: Originally published as a subspecies of *O. hookeri* in 1949. This taxon was later elevated to species rank in 1979, assuming the name that is in use today (Tropicos 2018).

Identification Issues: *Oenothera wolfii* is a member of *Oenothera* sect. *Oenothera* subsect. *Oenothera* alongside *O. biennis*, *O. elata*, *O. glazioviana*, *O. grandiflora*, *O. longissima*, *O. nutans*, *O. villosa*, and others (Wagner et al. 2007). Hybridization of *O. glazioviana* with *O. wolfii* is well documented (Imper 1997; Carlson and Meinke 2008; DeWoody et al. 2008; NatureServe 2018). A range of intermediate forms have been measured (Carlson and Meinke 2008). Pure *O. wolfii* is distinguished from pure *O. glazioviana* in having a stigma that does not exceed anthers, and flowers that are smaller than 25 mm. In contrast, *O. glazioviana* stigmatic tissue well exceeds anthers and has petals greater than 25 mm (Wagner 2018).

Taxonomy:

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Species In Genus: 145 species: America, some widely naturalized. Etymology: (Greek: wine-scented).

Genus Description – Habit: Annual to perennial herb, generally from taproot, occasionally rhizomed. Leaf: basal or cauline, alternate, generally pinnately toothed to lobed, generally sessile. Inflorescence: spike, raceme-like, or flowers in axils of distal, reduced leaves. Flower: radial or (sect. *Gaura*) bilateral, generally opening at dusk; sepals 4, reflexed in flower (sometimes 2--3 remaining adherent); petals 4, yellow, white, rose, or +- purple, generally fading +- orange to +- purple, tip notched or toothed; stamens 8, filaments sometimes (sect. *Gaura*) with paired teeth at base, anthers attached at middle; ovary chambers 4, stigma generally deeply lobed, generally > anthers and cross-pollinated (or +- = anthers and self-pollinated). Fruit: generally dehiscent, cylindrical to ovoid or obovoid, cylindrical to 4-winged or -angled, straight to curved, generally sessile (base sometimes seedless, stalk-like). Seed: in generally 2(1--3) rows per chamber, or clustered or reduced to 1--4 per fruit.

Species Description – Habit: Biennial, rosetted, densely minutely strigose; many hairs also with red, blister-like base, some glandular. Stem: erect, 5--10 dm. Leaf: cauline 5--18 cm, narrowly lanceolate to elliptic, wavy-dentate, distal dentate. Inflorescence: spike. Flower: hypanthium 30--46 mm; sepals 17--28 mm, free tips in bud erect, 1--3 mm; petals 13--23 mm, yellow fading red-orange. Fruit: 30--48 mm, 5--8 mm wide, +- cylindrical, +- straight. Seed: 1--2 mm, angled, irregularly pitted. Chromosomes: 2n=14. eFlora Treatment Author: Warren L. Wagner.

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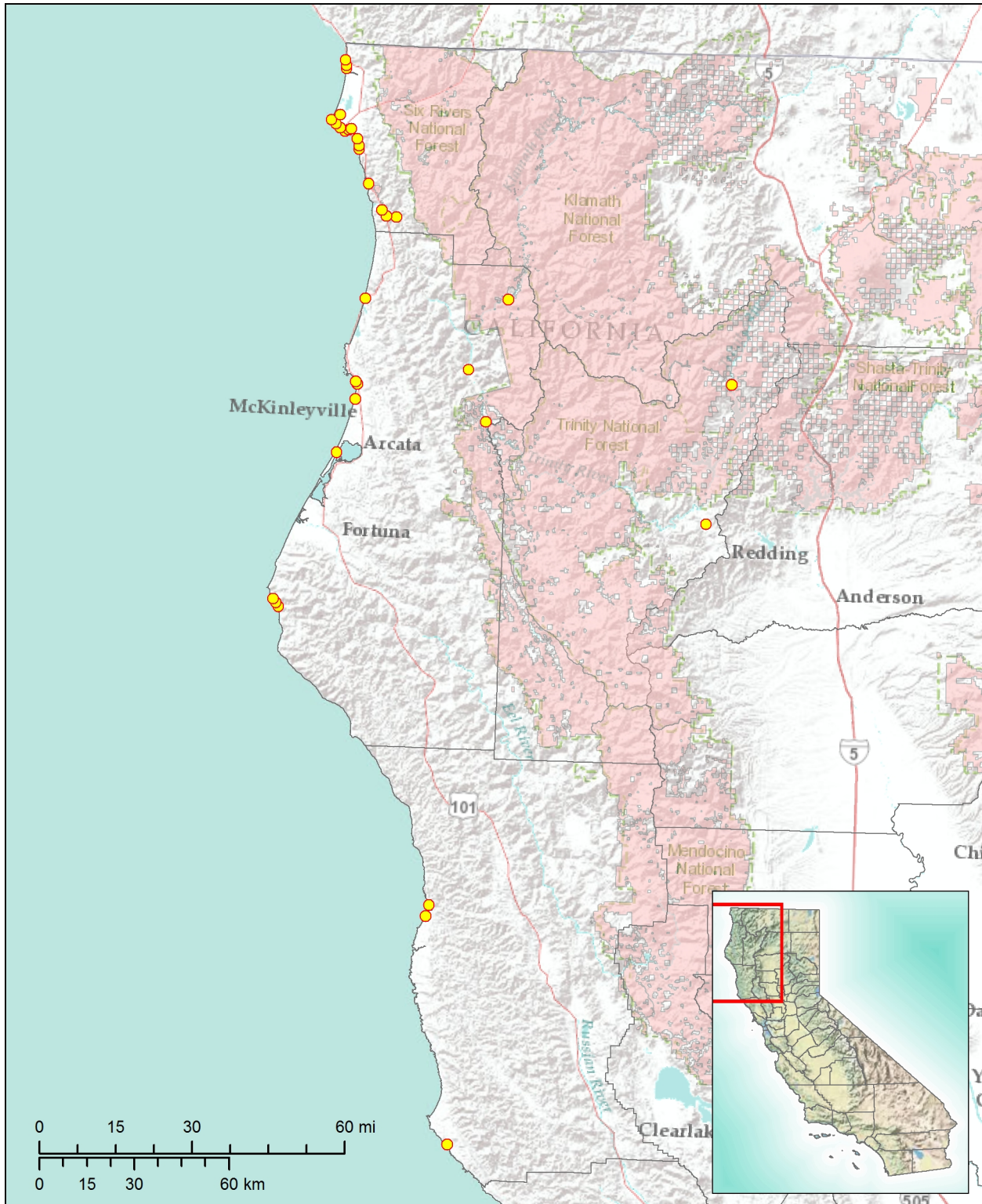
Status:

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

State Listing	G-rank	S-rank	CRPR	R5 FSS	NFP SM	CA BLM
CA: Not listed NV: Not listed OR: LT	G2	CA: S1 NV: Not listed OR: S1	1B.1	Not listed	Not listed	Sensitive
SWAP: Strategy Species	NNHP: Not listed	NNPS: Not listed	ORBIC: 1: Threatened or Endangered Throughout Range		OCS: Strategy Species	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: Western North America, where plants are restricted to coastal regions of northwest California and southeast Oregon. Most Oregon records are within Curry County, with several additional records in Klickitat and Hood River counties (CPNWH 2018). California occurrences are located in Mendocino, Humboldt, Trinity, and Del Norte counties. Exactly ten occurrence records are found within five miles of National Forest System (NFS) lands, with seven of these being associated with Six Rivers NF, two near Shasta-Trinity NF, and one within five miles of Klamath NF (Calflora 2017; CCH 2017; CNDDDB 2017). Just two occurrences are located on NFS lands and are within Six Rivers NF (CNDDDB 2017). One occurrence (EO 6) is based on plants that were incorrectly identified (keyed to *O. villosa* subsp. *strigosa* in 1985, 1988, and 1994). The second of the two Six Rivers NF occurrences (EO 28) is associated with Willow Creek. A longtime resident and biologist, David Imper (pers. comm. 2018), is not familiar with any *O. wolfii* occurrences near Willow Creek, and has extensively researched *O. wolfii* and lived in the region for over 20 years. Both element occurrences (EO 6 and 28) are historic, with plants that were last seen over 65 years ago (CNDDDB 2017).



Sources: *Distribution:* Calflora 2017, CCH 2017, CNDDDB 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).

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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 (CNDDDB 2017) definition of Element Occurrences (EOs) in California. Official EO numbers for plants in California are determined solely by the CNDDDB and are included within the Reference (Source) column for CNDDDB 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	STATE HIGHWAY 1, 3 MILES SOUTH OF POINT ARENA.	Mendocino	Point Arena (3812386)	CNDDDB, May 2017 (EO 26)	30-Jul-1964	ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1964 MYRICK COLLECTION. NEEDS FIELDWORK. ID SHOULD BE CONFIRMED; THIS OCCURRENCE IS THE FURTHEST SOUTH.		Unknown	100
1	St Hwy 1, ca. 3 mi S of Pt Arena	Mendocino	Saunders Reef (3812376)	CCH, Jan 2017 (SBBG217 93)	30-Jul-1964				98

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
2	INGLENOOK FEN-TEN MILE DUNES NATURAL PRESERVE, MACKERRICHER STATE PARK.	Mendocino	Inglenook (3912357)	CNDDDB, May 2017 (EO 25)	15-Feb-2014	15 PLANTS OBSERVED IN A PORTION OF SITE IN 2008. UNKNOWN NUMBER OBSERVED DURING 2011 SURVEYS; <100 PLANTS MAY BE AFFECTED BY CULVERT REMOVAL. 10 PLANTS OBSERVED IN 2014.	INVASIVE PLANTS (PARENTUCELLIA, LOTUS CORNICULATUS, AMMOPHILA). REMOVAL OF ROADBED/CULVERT, FOOT TRAFFIC, ALTERED HYDRO.	DPR-Mackerricher SP	10
3	ACROSS ROUTE 1 FROM SEASIDE BEACH JUST NORTH OF TEN-MILE BRIDGE.	Mendocino	Inglenook (3912357)	CNDDDB, May 2017 (EO 27)	30-Jul-1981	ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1981 SMITH COLLECTION. NEEDS FIELDWORK.		Unknown	0
3	Growing in meadow across Rte. 1 from Seaside Beach just north of Ten-Mile Bridge	Mendocino	Inglenook (3912357)	CCH, Jan 2017 (CAS910098)	30-Jul-1981				0

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
4	JUST NORTH OF MOUTH OF DAVIS CREEK ON HIGHWAY 1, ABOUT 2 MILES SOUTH OF DEVILS GATE, SOUTH OF CAMP MENDOCINO.	Humboldt	Capetown (4012443)	CNDDDB, May 2017 (EO 8)	13-May-1993	MORE THAN 300 PLANTS OBSERVED IN 1993. IT APPEARS THAT THE CAPE MENDOCINO POPULATION (OCCURRENCE #5) IS EXPANDING; THIS SITE WAS NOT NOTICED BY IMPER A FEW YEARS AGO DURING SURVEYS OF THIS AREA.	COUNTY PUBLIC WORKS WILL REPLACE AND MOVE BRIDGE (1993); WILL IMPACT AT LEAST 75 PLANTS DIRECTLY.	Humboldt County	15
4	North Coast Lost Coast Road c. 4 miles south of Cape Mendocino at Davis Creek Bridge, from bridge along road c. 300 ft. to north	Humboldt	Capetown (4012443)	CCH, Jan 2017 (UCR111734)	13-May-1993				20
5	3 mi s point of cape (sw slopes fronting ocean); Northern Coast Ranges, Cape Mendocino	Humboldt	Cape Mendocino (4012444)	CCH, Jan 2017 (UC1196944)	24-Jul-1927				0

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
5	moist bluff Northern Coast Ranges, Cape Mendocino (three miles of point of cape)	Humboldt	Cape Mendocino (4012444)	CCH, Jan 2017 (UC203546)	1-Jul-1918				0
5	moist bluff Northern Coast Ranges, Cape Mendocino (three miles of point of cape)	Humboldt	Cape Mendocino (4012444)	CCH, Jan 2017 (UC203990)	1-Jul-1918				0
6	0.15 MILE SOUTH OF DURR CREEK ON HIGHWAY 1 JUST SOUTH OF DEVILS GATE, 2 MILES S OF CAPE MENDOCINO, SOUTH OF FERNDAL.	Humboldt Pacific Ocean	Cape Mendocino (4012444)	CNDDDB, May 2017 (EO 5)	26-Jul-1987	30-40 PLANTS OBSERVED IN 1975. 400-1000 PLANTS OBSERVED IN 1987; NO SIGNS OF HYBRIDIZATION WITH O. GLAZIOVIANA. SITE IS IMPORTANT SINCE IT APPEARS TO BE ISOLATED BY SOME DISTANCE FROM OTHER POPULATIONS OF O. GLAZIOVIANA AND O. WOLFII.	COUNTY MAINTENANCE CREWS SHOULD BE INFORMED OF THIS SITE. WEEDS MAY ALSO BE A THREAT.	PVT	10

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
6	2 mi. south of Cape Mendocino, next to Hwy 1, south side of Point called or near to Devils Gate. Along road	Humboldt	Cape Mendocino (4012444)	CCH, Jan 2017 (CHSC70156)	26-Jul-1987				16
6	Coast, 2 mi. so. of Cape Mendocino	Humboldt	Cape Mendocino (4012444)	CCH, Jan 2017 (DS340693)	9-Sep-1937				20
6	2 miles S of Cape Mendocino.	Humboldt	Cape Mendocino (4012444)	CCH, Jan 2017 (RSA21623)	9-Sep-1937				20
7	Gravel bank ca. 10 miles east of Douglas City.	Trinity	Lewiston (4012267)	CCH, Jan 2017 (DS271333)	10-Jul-1939				2999
7	10 miles East of Douglas City.	Trinity	Lewiston (4012267)	CCH, Jan 2017 (POM249777)	10-Jul-1939			BLM	299
7	ca 10 mi e Douglas City (gravel bank)	Trinity	Lewiston (4012267)	CCH, Jan 2017 (UC722120)	10-Jul-1939				2999

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
8	NORTH SPIT OF SAMOA PENINSULA, 0.5 MILE NORTH OF HWY 255 BRIDGE OVER HUMBOLDT BAY.	Humboldt	Eureka (4012472)	CNDDB, May 2017 (EO 24)	8-Jul-2001	SITE BASED ON A 2001 HELMKAMP & HELMKAMP COLLECTION. NEEDS FIELDWORK TO DETERMINE EXACT LOCATION. A 1926 WIESENDANGER COLLECTION FROM ""NEAR ARCATA"" IS ALSO ATTRIBUTED TO THIS SITE.		Unknown	10
8	North Coast north spit of Samoa Peninsula, 0.5 mi north of CA Hwy 255 bridge over Humboldt Bay	Humboldt	Eureka (4012472)	CCH, Jan 2017 (UCR1223 79)	8-Jul-2001				20

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
9	WILLOW CREEK.	Humboldt Trinity	Salyer (4012385)	CNDDDB, May 2017 (EO 28)	8-Aug-1949	SITE BASED ON 1918 ABRAMS COLLECTION, 1934 TRACY COLLECTION, & 1949 TRACY COLLECTION. RAVEN (1980) MENTIONS THIS SITE AS NEEDING FURTHER INVESTIGATION. SITE IS PRETTY FAR INLAND FOR THIS SPECIES AND MAY BE ERRONEOUS; ID NEEDS CONFIRMATION.		Six Rivers NF	0
9	Willow Creek	Humboldt	Willow Creek (4012386)	CCH, Jan 2017 (DS89879)	16-Jun-1918				0
9	Willow Creek Trinity River Valley	Humboldt	Willow Creek (4012386)	CCH, Jan 2017 (UC1196945)	24-Aug-1934				499
9	Willow Creek Trinity River Valley	Humboldt	Willow Creek (4012386)	CCH, Jan 2017 (UC902173)	8-Aug-1949				499

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
10	HIGHWAY 101, ACROSS FROM CLAM BEACH AND 1 MILE SOUTH OF CLAM BEACH EXIT.	Humboldt	Arcata North (4012481)	CNDDDB, May 2017 (EO 29)	1-Sep-1986	SITE BASED ON TWO 1986 IMPER COLLECTIONS FROM "HWY 101 ACROSS FROM CLAM BEACH" AND "HWY 101, 1 MILE S OF CLAM BEACH EXIT." NEEDS FIELDWORK.		Humboldt County?	25
10	1 mi. S of Clam Beach exit, Hwy. 101, 6 mi. S of Trinidad	Humboldt	Arcata North (4012481)	CCH, Jan 2017 (HSC9270 2)	1-Sep-1986				39
10	S of Trinidad, Hwy. 101, across from Clam Beach	Humboldt	Arcata North (4012481)	CCH, Jan 2017 (HSC9544 3)	1-Sep-1986			Clam Beach County Park	16
11	MOONSTONE BEACH, JUST SOUTH OF WESTHAVEN, SOUTH OF TRINIDAD.	Humboldt	Crannell (4112411)	CNDDDB, May 2017 (EO 9)	23-Jun-1905	ARTIFICIALLY GROWN SEED SOWN IN 1991. FEWER THAN 40 PLANTS IN 1992-1996, 60-80 IN 1997, FEWER THAN 50 PLANTS IN 1998-2001.	SEVERE WINTER BEACH EROSION AND TEMPORARY REMOVAL OF WILLOW THICKETS HAVE HAMPERED ESTABLISHMENT.	Unknown	10

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
11	Roadside along the Redwood Highway, just south of Trinidad.	Humboldt	Trinidad (4112412)	CCH, Jan 2017 (NY23356 2)	11-Oct-1934				0
11	Redwood Highway just south of Trinidad. Altitude 100 ft.	Humboldt	Trinidad (4112412)	CCH, Jan 2017 (POM2125 17)	11-Dec-1934			Baker Beach	98
11	Redwood Highway just south of Trinidad. Altitude 100 ft.	Humboldt	Trinidad (4112412)	CCH, Jan 2017 (RSA1270 6)	11-Dec-1934			Baker Beach	98
12	SOUTH END OF LUFFENHOLTZ BEACH COUNTY PARK, SCENIC DRIVE AND HOUDA POINT TRAIL, SOUTH OF TRINIDAD.	Humboldt	Crannell (4112411)	CNDDDB, May 2017 (EO 4)	2-Jul-2013	TYPE COLL "ALONG REDWOOD HWY, JUST S OF TRINIDAD" ATTRIB HERE. LARGE POP PRIOR TO DEVELOPMENT. 6 IN 1987, TRANSPLANTED TO SURROUNDING AREAS IN 1989. DRASTIC DECLINE IN 1990. SEED PLANTED IN 1991. 200+ IN 1997 & 2001, UNK # IN 2013.	ROADSIDE MAINTENANCE, LANDSLIDES. SOME IMPACT FROM HIKERS.	Humboldt County, PVT	100

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12	Luffenholtz	Humboldt	Crannell (4112411)	CCH, Jan 2017 (HSC16488)	5-Jul-1962			Luffenholtz Creek FA	0
12	Houda Pt -- Trinidad	Humboldt	Crannell (4112411)	Calflora, May 2017 (wb1194-2407)	2-Jul-2013	1+ individuals			115
13	CARRVILLE.	Trinity	Carrville (4112216)	CNDDDB, May 2017 (EO 31)	30-Jun-1931	ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1931 VAN DYKE COLLECTION. THIS SITE IS PRETTY FAR INLAND FOR THIS SPECIES BUT IT IS MENTIONED IN THE JEPSON MANUAL AS OENOTHERA WOLFII.		Unknown	0
13	Carville	Trinity	Carrville (4112216)	CCH, Jan 2017 (CAS189674)	30-Jun-1931				0
14	Grown in Eureka garden. Parents collected at junc. Hwy 299 and Big Hill Rd, Hoopa Square	Humboldt	Hoopa (4112316)	CCH, Jan 2017 (CHSC70160)	4-Sep-1991				299

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14	Hoopa Square, just n of junction Hwy 299 & Big Hill Rd., E side of 299, S of Sawdust Burner. Roadside	Humboldt	Hoopa (4112316)	CCH, Jan 2017 (CHSC700 28)	15-Aug-1988				499
15	FRESHWATER LAGOON BEACH, BETWEEN LOOKOUT POINT AND FRESHWATER ROCKS.	Humboldt	Orick (4112431)	CNDDB, May 2017 (EO 10)	20-Jul-2015	160 PLANTS IN 1989, 275 IN 1990, 2497 IN '92, 4423 IN '93, 5115 IN '94, 4757 IN '95, UNKNOWN NUMBER IN 2000, 110 IN '02, 146 IN '03, 251 IN '04, 287 IN '07, 370 IN '08, 426 IN '09, 441 IN '10, 530 IN '12, 296 IN '13, 700 IN '14, 566 IN '15.	MOWING, SPRAYING, TRAMPLING, OHVS, RECREATION, EXOTICS, VEG ENCROACHMENT. POSSIBLE HYBRIDIZATION WITH O. GLAZIOVIANA.	CalTrans, DPR-Redwood NP	40
16	BETWEEN ORLEANS & CAMP CREEK, KLAMATH RIVER CANYON.	Humboldt	Orleans (4112335)	CNDDB, May 2017 (EO 6)	xx-Aug-1945	ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1945 POLLARD COLLECTION. NEEDS FIELDWORK.		Six Rivers NF	400
16	Six Rivers NF	Del Norte	Cant Hook Mtn. (4112368)	CCH, Jan 2017 (HSC6143 0)	7-Jul-1963			Six Rivers NF	0

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
17	ALONG RD FROM KLAMATH GLEN RESORT TRAILOR PARK; GOING W TOWARD KLAMATH RIVER & FOLLOWING RIVER SW TOWARDS MCGARVEY CRK.	Del Norte	Klamath Glen (4112358)	CNDDDB, May 2017 (EO 30)	26-Jul-1961	ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1961 SAGER COLLECTION. NEEDS FIELDWORK.		Unknown	30
17	Along road from Klamath Glen Resort Traylor Park; going west towards Klamath River and following river southwest towards McGavey Creek	Del Norte	Klamath Glen (4112358)	CCH, Jan 2017 (UCSB722 43)	26-Jul-1961				30

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18	WEST OF HIGHWAY 101 SOUTHBOUND EXIT TO KLAMATH RIVER. 0.25-0.50 MILE SOUTH OF HIGHWAY 101 KLAMATH RIVER BRIDGE.	Del Norte	Requa (4112451)	CNDDDB, May 2017 (EO 1)	8-Jul-2014	7000+ PLANTS IN 1984. IN 1987, UNKNOWN NUMBER SEEN AS WELL AS OVER 1000 PLANTS THAT APPEARED TO BE HYBRIDS WITH O. GLAZOVIANA. MANY HUNDREDS ESTIMATED IN 2014; ONLY BASAL ROSETTES APPARENT, COULD NOT TELL O. WOLFII FROM O. GLAZOVIANA.	WEEDS, HYBRIDIZATION, ROAD MAINTENANCE/ RECONSTRUCTION (IF PROPOSED) MAY BE THREATS.	CalTrans	80
18	Adj. to onramp, US 101, south side Klamath River, west side freeway	Del Norte	Requa (4112451)	CCH, Jan 2017 (CHSC701 61)	3-Jul-1987				79
18	Adjacent to onramp, Hwy. 101 S, S side of Klamath River, S of Klamath	Humboldt	Requa (4112451)	CCH, Jan 2017 (HSC9379 1)	5-Jun-1986				39
19	3 miles up Klamath R., Requa and vicinity	Del Norte	Requa (4112451)	CCH, Jan 2017 (DS137814)	8-Aug-1921				0

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20	FALSE KLAMATH COVE AT HIGHWAY 101, ABOUT 4 MILES NORTH OF THE TOWN OF KLAMATH.	Del Norte	Requa (4112451)	CNDDDB, May 2017 (EO 11)	14-Jul-2015	50+ IN 1987, 600 IN '89, 711 IN '90, 5,029 IN '92, 4533 IN '93, 3500 IN '94, 2819 IN '95, 1115 IN '03, 701 IN '04, 3679 IN '07, 3350 IN '08, 2701 IN '09, 2425 IN '10, 1249 IN '12, 782 IN '13, 458 IN '14, AND 662 IN '15.	ROADSIDE POPULATION. ROAD MAINTENANCE, MOWING, BRUSH CLEARING, TRAMPLING, EXOTICS, LANDSLIDES, HYBRIDIZATION.	CalTrans	50
20	North Coast False Klamath Cove adjacent to Wilson Creek, US Hwy 101, eastside, c. 15 mi. south of Crescent City	Del Norte	Requa (4112451)	CCH, Jan 2017 (UCR1117 31)	29-Jul-1987			Del Norte Coast Redwoods SP	16
20	Del Norte Coast Redwoods SP	Del Norte	Requa (4112451)	Calflora, May 2017 (wb1767-995)	23-Jul-2014	individuals		Del Norte Coast Redwoods SP	0

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21	ENDERTS BEACH, JUST SOUTH OF MOUTH OF NICKEL CREEK, SOUTH OF CRESCENT CITY.	Del Norte Pacific Ocean	Sister Rocks (4112462)	CNDDDB, May 2017 (EO 3)	17-Jul-1995	BETWEEN THIS SITE AND OCCURRENCES #12 & 14: 485 PLANTS SEEN IN 1992, 466 IN 1993, 557 IN 1994, AND 553 IN 1995. 1937 TRACY COLLECTION FROM "6 MILES SOUTH OF CRESCENT CITY" ATTRIBUTED TO THIS OCCURRENCE.	THREATS IN AREA: VISITOR DISTURBANCE, EROSION & HYBRIDIZATION WITH O. GLAZIOVIANA (UNCLEAR IF THREATS SPECIFIC TO EO).	NPS-Redwood NP	20
21	6 mi s Crescent City; North Coast Ranges	Del Norte	Sister Rocks (4112462)	CCH, Jan 2017 (JEPS31554)	1-Aug-1937				499
21	coast bluffs 6 mi s Crescent City; North Coast Ranges	Del Norte	Sister Rocks (4112462)	CCH, Jan 2017 (UC668283)	1-Aug-1937				499
21	coast bluffs 6 mi s Crescent City; North Coast Ranges	Del Norte	Sister Rocks (4112462)	CCH, Jan 2017 (UC668284)	1-Aug-1937				499

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
22	BETWEEN CUSHING CREEK AND NICKEL CREEK; ENDERTS BEACH TRAILHEAD, CRESCENT BEACH OVERLOOK, SOUTH OF CRESCENT CITY.	Del Norte	Sister Rocks (4112462)	CNDDDB, May 2017 (EO 14)	20-Jul-2014	550+ IN 1984, 325 IN '89, 150 IN '90. POP #S BTWN EO #3, #12 & #14: 485 IN '92, 466 IN '93, 557 IN '94, 553 IN '95. POP #S NEAR WHITE KNOB: 7 IN '02, 11 IN '03, 4 IN '07, 7 IN '08 & '09, 0 IN '10, 22 IN '12, 41 IN '13, 12 IN '14, 0 IN '15.	EROSION, MOWING AND TRAMPLING, TRAIL MAINTENANCE. HYBRIDIZATION WITH O. GLAZIOVIANA IS A MINOR THREAT.	NPS-Redwood NP	100
23	CRESCENT BEACH, NORTH OF CUSHING CREEK, SOUTH OF CRESCENT CITY AND HIGHWAY 101.	Del Norte	Sister Rocks (4112462)	CNDDDB, May 2017 (EO 12)	20-Jul-2015	POP #S BETWEEN EO #3, #12 & #14: 485 IN 1992, 466 IN '93, 557 IN '94, 553 IN '95. POP #S NEAR CRESCENT BEACH PARKING LOT: 122 IN '02, 17 IN '03, 95 IN '07, 36 IN '08, 112 IN '09, 76 IN '10, 550 IN '12, 833 IN '13, 548 IN '14, 257 IN '15.	MOWING, TRAMPLING, WEEDING, HYBRIDIZATION WITH O. GLAZIOVIANA, TRAIL MAINTENANCE, COMPETITION, EROSION, CLIMATE CHANGE.	NPS-Redwood NP, DFG	0
23	1 mi. S. of Crescent City, at margin of swamp.	Del Norte	Sister Rocks (4112462)	CCH, Jan 2017 (DS683304)	4-Jul-1946				0

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
23	S of Crescent City, both sides of Hwy. 101 along stretch close to beach	Del Norte	Sister Rocks (4112462)	CCH, Jan 2017 (HSC92723)	29-Jul-1987				30
23	1 mile south of Crescent City	Del Norte	Sister Rocks (4112462)	CCH, Jan 2017 (RSA88205)	29-Jun-1951				0
23	Crescent City. Crescent City Beach Motel. Collections along beach south of motel.	Del Norte	Sister Rocks (4112462)	CCH, Jan 2017 (SEINET6093617)	18-Jul-2014				0
24	SW END OF BEACHFRONT PARK, CRESCENT CITY.	Del Norte	Sister Rocks (4112462)	CNDDDB, May 2017 (EO 2)	24-Apr-1991	ABOUT 80 PLANTS SEEN IN 1991.		City of Crescent City	10

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
25	SOUTH SIDE OF ELK VALLEY ROAD NEAR ITS JUNCTION WITH US 101, EAST OF TRAILER PARK, SOUTH EDGE OF CRESCENT CITY.	Del Norte	Crescent City (4112472)	CNDDDB, May 2017 (EO 19)	5-May-2011	20 PLANTS AND SOME HYBRIDS SEEN IN 1987. FEWER THAN 50 PLANTS SEEN IN 1991. 41 PLANTS SEEN IN NE-MOST POLYGON IN 2002. WEST POLYGON: 24 PLANTS IN 2008, UNKNOWN NUMBER OBSERVED IN 2011. SOME OF THESE PLANTS APPEARED TO BE HYBRIDS.	PLANNED ROAD EXPANSION WILL ELIMNATE POP IN NE POLYGON. HYBRIDIZATION, VEHICLES, PEOPLE, INVASIVES, TRASH ARE THREATS.	PVT?	10
26	ON THE NORTH SIDE OF ELK VALLEY ROAD, FROM 90' WEST OF MINNESOTA AVENUE TO 50' EAST OF MICHIGAN AVENUE.	Del Norte	Crescent City (4112472)	CNDDDB, May 2017 (EO 20)	9-Aug-2002	41 PLANTS SEEN IN 2002. 3 PLANTS WERE IDENTIFIED AS PROBABLY HYBRIDS.	PLANNED WIDENING OF ROAD WOULD ELIMINATE OCCURRENCES.	PVT	15

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
27	WEST EDGE OF CRESCENT CITY, FROM SOUTH END OF PEBBLE BEACH TO ABOUT 0.14 MILE SOUTH OF PRESTON ISLAND.	Del Norte Pacific Ocean	Crescent City (4112472)	CNDDDB, May 2017 (EO 18)	3-Jul-1987	235+ PLANTS SEEN IN 6 COLONIES IN 1987.		Unknown	10
27	Crescent City, south end Pebble Beach near Preston Island access, and south of jetty	Del Norte	Crescent City (4112472)	CCH, Jan 2017 (CHSC97975)	3-Jul-1987				26
27	Crescent City, S side of Main Jetty	Del Norte	Sister Rocks (4112462)	CCH, Jan 2017 (HSC92721)	3-Jul-1987				16
27	Crescent City weedlot between Blue Aquarium and beach on street parallel to US 101, south side Crescent City. 300 feet east of beach	Del Norte	Crescent City (4112472)	CCH, Jan 2017 (CHSC70159)	3-Jul-1987				30
27	Crescent City	Del Norte	Crescent City (4112472)	CCH, Jan 2017 (DS149309)	16-Aug-1925				0

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
27	Beach Mts. Crescent City	Del Norte	Crescent City (4112472)	CCH, Jan 2017 (JEPS43983)	8-Aug-1923				0
27	on beach Crescent City	Del Norte	Crescent City (4112472)	CCH, Jan 2017 (UC1007122)	13-Aug-1936				0
27	Crescent City	Del Norte	Crescent City (4112472)	CCH, Jan 2017 (UC278988)	19-Jun-1925				0
28	PEBBLE BEACH DRIVE JUST SOUTH OF W WASHINGTON BLVD, NORTH OF CRESCENT CITY.	Del Norte	Crescent City (4112472)	CNDDB, May 2017 (EO 17)	18-Jul-2013	UNKNOWN NUMBER OF PLANTS SEEN IN 1987. ABOUT 30 PLANTS SEEN IN 1992. ABOUT 450 PLANTS OBSERVED DURING 2013 ROADSIDE SURVEYS. THE RARE PHACELIA ARGENTEA ALSO OCCURS AT THIS SITE.	ROADSIDE VEGETATION MANAGEMENT. HYBRIDIZATION.	DNT County?	10

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
28	North of Crescent City along Pebble Beach Drive, and bluffs just S. of Pt. Saint George, above coves	Del Norte	Crescent City (4112472)	CCH, Jan 2017 (CHSC70158)	3-Jul-1987			Point St. George	36
28	NW of Crescent City, along Radio Road going out to Pt. Saint George	Del Norte	Crescent City (4112472)	CCH, Jan 2017 (CHSC70157)	3-Jul-1987				89
28	S side of Crescent City adjacent to Hwy. 101, next to beach	Del Norte	Crescent City (4112472)	CCH, Jan 2017 (HSC92722)	30-Jun-1986				16
28	Crescent City	Del Norte	Crescent City (4112472)	CCH, Jan 2017 (POM225153)	13-Aug-1936				0
28	Crescent City	Del Norte	Crescent City (4112472)	CCH, Jan 2017 (POM225155)	13-Aug-1936				0
28	Crescent City area	Del Norte	Crescent City (4112472)	CCH, Jan 2017 (HSC61092)	12-Jul-1939				0

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
29	POINT ST. GEORGE, BLUFFS WEST OF RADIO ROAD, NORTHWEST OF CRESCENT CITY.	Del Norte Pacific Ocean	Crescent City (4112472)	CNDDDB, May 2017 (EO 16)	11-Jul-1991	500-1000 PLANTS SEEN IN 1987, UNKNOWN NUMBER IN 1989, FEWER THAN 10,000 IN 1991. 1987 IMPER COLLECTION FROM "ALONG RADIO RD GOING OUT TO PT. SAINT GEORGE" ATTRIBUTED TO THIS SITE. MINOR INFLUENCE OF O. GLAZIOVIANA IN PLANTS ALONG ROAD.	DEVELOPMENT. SOME ROAD FAILURES AND INCREASING ORV TRAFFIC. POSSIBLE HYBRIDIZATION THREAT.	Del Norte - Parks Department, County of	20
30	CRESCENT CITY LANDFILL, 1.5 MILES NORTHWEST OF CRESCENT CITY.	Del Norte	Crescent City (4112472)	CNDDDB, May 2017 (EO 15)	4-Jul-1995	16 PLANTS SEEN IN 1995.	MECHANICAL IMPACTS FROM MACHINERY AND SAND REMOVAL. HYBRIDIZATION AT NORTHERN COLONIES.	DNT County	40

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
31	SOUTH SPIT AT MOUTH OF SMITH RIVER, ABOUT 1.2 AIR MILES NORTH OF YONTOCKET (SITE), NORTH OF CRESCENT CITY.	Del Norte	Smith River (4112482)	CNDDDB, May 2017 (EO 23)	2-Jul-1987	ABOUT 50 PLANTS SEEN IN 1987, SCATTERED OVER A 50' BY 20' AREA.		Unknown	0
31	North Coast south spit at mouth of Smith River, river side, on S bank where river widens out and turns north, c. 1/2 mile inland from mouth	Del Norte	Smith River (4112482)	CCH, Jan 2017 (UCR1117 33)	2-Jul-1987			Tolowa Dunes SP	16
32	ALONG THE SMITH RIVER SPIT, ABOUT 2 AIR MILES NORTH OF YONTOCKET (SITE), NORTH OF CRESCENT CITY.	Del Norte Pacific Ocean	Smith River (4112482)	CNDDDB, May 2017 (EO 22)	16-Jul-2003	NUMEROUS SUB-POPULATIONS SEEN IN 2003.	ORV TRACKS THROUGHOUT HABITAT. INVASION BY AMMOPHILA ARENARIA.	PVT	0

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
33	PYRAMID POINT, EAST OF PRINCE ISLAND, ABOUT 3 MILES WEST OF SMITH RIVER, NORTH OF CRESCENT CITY.	Del Norte Pacific Ocean	Smith River (4112482)	CNDDDB, May 2017 (EO 21)	27-Jun-2003	300-500 PLANTS SEEN IN 1987. 778 PLANTS SEEN IN 2003; NO EVIDENCE OF HYBRIDS HERE.	COASTAL DEVELOPMENT. EXOTIC SPECIES. HYBRIDS COMMON ALONG HWY 101 NORTH INTO OREGON.	PVT	15
33	N of Smith River at N end of bay, by apartment building, adjacent to beach access off of S Indian Rd.	Del Norte	Smith River (4112482)	CCH, Jan 2017 (HSC92720)	1-Jul-1987				10
33	N of Smith River, across from S entrance to S Indian Rd. from Hwy. 101	Del Norte	Smith River (4112482)	CCH, Jan 2017 (HSC92717)	1-Jul-1987				75

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)	CNDDDB EOs	Non-CNDDDB 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:	-	-	-	-	-	-	-	0
Los Padres:	-	-	-	-	-	-	-	0
Mendocino:	-	-	-	-	-	-	-	0
Modoc:	-	-	-	-	-	-	-	0
Plumas:	-	-	-	-	-	-	-	0
San Bernardino:	-	-	-	-	-	-	-	0
Sequoia:	-	-	-	-	-	-	-	0
Shasta-Trinity:	-	-	-	-	-	-	2	0
Sierra:	-	-	-	-	-	-	-	0
Six Rivers:	9,16	2	-	-	2	7-Jul-1963	7	2
Stanislaus:	-	-	-	-	-	-	-	0
Tahoe:	-	-	-	-	-	-	-	0
Totals:	N/A	2	0	0	2	N/A	10	2

Demographic and Population Trends: Total number of occurrences for this taxon were estimated using GIS tools and methods described by Green and Sims (2018). Over half (19/33; ~58%) of all occurrence records have population count and size estimate information. These 19 occurrences range in observed size between 15 and 10,000 plants, with an average of 1,702 observed plants per occurrence and a median value of 450. Most (10/19; ~53%) of these occurrences were observed to have 500 plants or less, and roughly one-quarter (5/19; ~26%) had between 500 and 1,000 observed plants. Exactly four occurrences (4/19; ~21%) were, at one point in time, observed to have 5,000 plants or more (Calflora 2017; CCH 2017; CNDDDB 2017). Rapid expansion of the species is possible. Sites associated with Freshwater Lagoon and Wilson

Creek expanded from several plants to nearly 4,000 individuals within a five-year period (Imper 1997).

Oenothera wolfii has been well documented through the years. At least five California sites have declining population trends (NatureServe 2018). Further, a majority (20/33; ~61%) of occurrences are historic, including the only two occurrences on NFS lands, within Six Rivers NF (CNDDDB 2017). Hybridization of *O. wolfii* with the European cultivar, *O. glazioviana*, has posed measurable impacts on population dynamics. Genetic “swamping” (i.e. introgression) of *O. wolfii* from *O. glazioviana* is widely suggested (Dietrich et al. 1997; Imper 1997; DeWoody et al. 2008), and *O. glazioviana* alleles in morphologically pure *O. wolfii* has been detected (DeWoody et al. 2008). Further, hybrid genotypes are reported as more aggressive (Dietrich et al. 1997) and show signs of greater fitness (Imper 1997) than *O. wolfii* alone. It remains unknown if it is the displacement of pure *O. wolfii* with aggressive hybrids, or direct introgression (via “genetic swamping”) from *O. glazioviana* that is driving observed declines in *O. wolfii*. Albeit, field observations indicate that hybrid plants associate with habitat that is distinct from that preferred by *O. wolfii* (Imper 1987; Imper 1997). Frequent hybrid sites are known across Six Rivers NF (Imper pers. comm. 2018).

Life History: *Oenothera wolfii* is a perennial herb that blooms from May through October (CNPS 2018). Plants typically behave like most biennials, producing 2-5 dm rosettes during the first season, followed by flowering and death during the second year. Some plants appear to behave like facultative perennials, as individuals growing in stressful conditions may take several years to bolt. Bolting begins around April, and flowering generally begins by May or June. The behavior of *O. wolfii* is similar to that of an “opportunist” species. A single trial with 600 seeds from 10 plants observed a near 100% germination rate. Post-germination mortality is high – roughly 300,000 seeds were sown in 1991, resulting in 26 flowering and vegetative plants the following year in 1992 (Imper 1997).

Diversity: *Oenothera wolfii* is a member of *Oenothera* sect. *Oenothera* subsect. *Oenothera*. This group has been the focus of hundreds of research papers and several books focused on experimental studies in genetics and evolution, beginning with Hugo de Vries’ foundational work on *O. lamarckiana* (= *O. glazioviana*), from which he coined the term “mutation,” triggering an era of scientific inquiry into speciation and leading the way to modern evolutionary theory. This group is well known for its unique genetic system defined by permanent translocation heterozygosity (PTH), through the buildup of reciprocal translocations between nonhomologous chromosomes. This system results in circular meiotic configurations that behave like single linkage groups, and, as a result, a 50% reduction in viable gametes. Successful offspring are nearly identical to parental genotypes. The PTH system may have emerged as a mechanism to limit recombination among homologous chromosomes. Selfing is common, but hybridization events that take place are thought to result in immediate and permanent novel genetic combinations. Hybrid plants often exploit habitat that is marginal with respect to progenitors. Hugo de Vries’ *O. glazioviana* (syn. *O. lamarckiana*) with near certainty formed in Europe from hybridization of two escaped cultivars of North American origin. *Oenothera glazioviana* is a triumphant weed that now assumes a global distribution and poses measurable

threats to *O. wolfii* (Dietrich et al. 1997; Imper 1997; Wagner et al. 2007). *Oenothera wolfii* appears to have arisen in recent times from the more southerly *O. elata* subsp. *hookeri* via the accumulation of reciprocal translocations and other genomic artifacts (Wasmund and Stubbe 1986; Dietrich et al. 1997).

Habitat: Generally mesic and sandy conditions in coastal bluff scrub, coastal dunes, coastal prairie, and lower montane coniferous forests (CNPS 2018). Specific records associated with CNDDDB element occurrences indicate that *O. wolfii* is associated with *Abronia umbellata*, *Achillea millefolium*, *Alnus rubra*, *Ammophila arenaria*, *Angelia* sp., *Baccharis pilularis* ssp. *consanguinea*, *Bromus diandrus*, *Cardionema ramosissimum*, *Camissoniopsis cheiranthifolia*, *Elymus mollis*, *Eriophyllum staechadifolium*, *Fragaria chiloensis*, *Gaultheria shallon*, *Glehnia littoralis*, *Grindelia stricta*, *Juncus lesueurii*, *Lathyrus japonicus*, *Layia carnosa*, *Leucanthemum vulgare*, *Linum perenne*, *Lupinus bicolor*, *Melilotus indicus*, *Parentucellia viscosa*, *Phacelia purshiana*, *Pinus contorta*, *Polygonum paronychia*, *Potentilla anserina*, *Raphanus sativus*, *Rhamnus purshiana*, *Rubus ursinus*, *Rumex salicifolius*, *Salix sitchensis*, *Schoenoplectus pungens*, *Sedum spathulifolium*, and *Solidago spathulata* (CNDDDB 2018).

Habitat Status or Trend: Early reports indicate that some occurrences are in sites unlikely to be developed (Imper 1987). Development projects are associated with at least one occurrence (CNDDDB 2018).

Capacity for the Species to Disperse: Direct information on dispersal mechanisms are unknown. The related and morphologically similar *O. glazioviana* assumes a global distribution. Based on this widespread taxon, dispersal limitation within this group is unapparent (Dietrich et al. 1997). In contrast, *O. wolfii* seeds lack specialized mechanisms to aid in dispersal. Potential habitat may be unreachable (Carlson et al. 2001).

Threats: Hybridization with *O. glazioviana* is the most substantial threat to *O. wolfii* (Imper 1997; DeWoody et al. 2008; CNPS 2018). Other threats include road maintenance, development, foot traffic, and other non-native plants (CNPS 2018).

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Reviewer(s) and Date:

David Magney, Rare Plant Program Manager, California Native Plant Society, (916) 447-2677 ext. 205, dmagney@cnps.org. July 9, 2018.

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.