Plant Species Evaluation Form

Diplacus cusickioides Nesom

CUSICK'S MONKEYFLOWER

Family: Phrymaceae (CNPS 2017) | **PLANTS Symbol:** MICU2 (USDA 2017) | **Calif. Endemic:** No (CNPS 2017)

Synonyms/Other Names: There are no synonyms for this taxon. *Diplacus cusickioides* was described by Guy Nesom in 2013, after the division of Phrymaceae into 13 segregate genera (Barker et al. 2012; Nesom 2013; Tropicos 2017). This plant is regarded as *Mimulus cusickii* (*D. cusickii*) in *The Jepson Manual, 2nd Edition* (*TJM 2*, Thompson 2012) and the *Jepson eFlora* (Thompson 2017). It was in 2013 that *M. cusickii* (*D. cusickii*) was determined to be a localized endemic of Malheur County, Oregon (Nesom 2013). It was discovered that the name *Mimulus cusickii* (*D. cusickii*) had an associated description that corresponded only to this localized plant in Malheur County. Nesom's 2013 work clarified that *D. cusickii* is a localized entity, and the more widespread entity (regarded as *M. cusickii* sensu *TJM 2* and *Jepson eFlora*) is now treated as *D. cusickioides*.

Identification Issues: The biosystematic community has widely recognized the segregation of Phrymaceae into 13 segregate genera (Barker et al. 2012). These changes, and subsequent taxonomic insights have yet to be reflected in California's regularly updated and widely used *Jepson eFlora* (Thompson 2017). In addition, these changes were established after *TJM 2* was printed and released. It should be noted that mentioned floras use the name *Mimulus cusickii* to refer to plants in California that are formally regarded as *Diplacus cusickioides*. The original description of *M. cusickii* (*D. cusickii*) refers to individuals found in a localized region of Malheur Co., Oregon (Nesom 2013). The circumscription of *D. cusickioides* better reflects individuals that occur within California's border. For this reason, the *Jepson eFlora* (Thompson 2017) and its description of *M. cusickii* is included in addition to the description for *D. cusickioides*. *Diplacus cusickioides* is largely distinguished from *D. cusickii* (*M. cusickii*) by its densely villous-glandular stems and leaves (Nesom 2013).

Taxonomy:

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-Taxonomy (cf. *Mimulus cusickii*; sensu Thompson 2017):

Species In Genus: +- 100 species: North America, Chile, eastern Asia, southern Africa, New Zealand, Australia. Etymology: (Latin: little mime or comic actor, from face-like corolla of some species) Note: Limb width measured between most distant points across corolla face.

Genus Description Habit: Glabrous to hairy. Stem: generally erect. Leaf: opposite, generally +- sessile, generally toothed or entire, generally green or +- red. Inflorescence: raceme, bracted, or flowers generally 2 per axil. Flower:occasionally cleistogamous; calyx generally green, lobes 5, generally << tube, generally unequal; corolla generally deciduous, white to red, maroon, purple,

gold, or yellow, lower lip base occasionally swollen, +- closing mouth, tube-throat floor generally with 2 longitudinal folds; anther sacs spreading; placentas 2, axile or parietal; stigma lobes generally flat, generally included. Fruit: generally ovoid to fusiform, generally upcurved if elongate, generally +- fragile, loculicidal near tip (hard, indehiscent), chambers 1--2. Seed: many, generally < 1 mm, ovoid, +- yellow to dark brown.

Species Description Habit: Annual 3--24 cm, densely puberulent to hairy. Leaf: 15--45 mm, ovate to obovate, at least upper leaves sharply acuminate or sharp-tipped. Flower: pedicel 1--3 mm; calyx 10--17 mm, densely puberulent, lobes +- unequal, 1.5--5 mm, acuminate; corolla magenta, throat floor folds yellow at mouth, persistent, tube-throat 20--28 mm; stigma and generally lower anthers exserted; placentas parietal. Fruit: 10--17 mm. Chromosomes: 2n=16. eFlora Treatment Author: David M. Thompson.

-Taxonomy (cf. Diplacus cusickioides; sensu Nesom 2013):

"DIPLACUS CUSICKIOIDES Nesom, sp. nov. TYPE: USA. Oregon. Harney Co.: Diamond Craters, N end Steins Mountain, crater rim, lava soil, *Artemisia*, 4500 ft, 12 Aug 1935, *P. Train 107* (holotype: OSC!).

Similar to *Diplacus cusickii* Greene in its mostly ovate to obovate leaves with abruptly and sharply acuminate apices and strongly 2-lipped, magenta corollas; different in its densely villous-glandular stems and leaves. Annual herbs, taprooted. Stems erect to erect-ascending, (1–)3–24(–35) cm, usually simple or few-branched, densely villous-glandular with vitreous, gland-tipped hairs (0.2–)0.4–1.1 mm long. Leaves basal and cauline or mostly cauline, (10–)15–25(–35) mm x 4–16 mm, relatively even-sized or gradually larger distally, congested at crowded distal nodes, blades ovate to broadly elliptic-ovate, proximal with a short petiole-like base 1–5 mm, midstem and distal sessile, margins entire, villous- glandular, apex acuminate to a sharp point, both surfaces densely villous-glandular with vitreous, gland-tipped hairs (0.2–)0.4–1.1. mm long. Flowers (1–)2 per node, chasmogamous. Fruiting pedicels 1–1.5 mm. Calyces 7–12 mm, not inflated in fruit, glabrous to minutely (microscopically) stipitate-glandular, lobes triangular-acuminate, unequal, usually falcate-spreading, apices linear- acuminate, sharp-pointed. Corolla magenta or rose-purple, tube yellow, throat usually yellow, throat and distal tube red-spotted on floor, palate ridges yellow, densely villous, tube-throat 13–16(–19) mm, floor hairy with fine hairs, limb 14–26 mm wide, distinctly 2-lipped. Anthers included, glabrous to sparsely hirsutulous. Style pubescent, at least on distal half; stigma slightly exserted, lobes subequal, slightly longer than upper anthers (herkogamous), lobe margins densely short-ciliate. Capsules 10–17 mm, usually exceeding calyx."

Status:

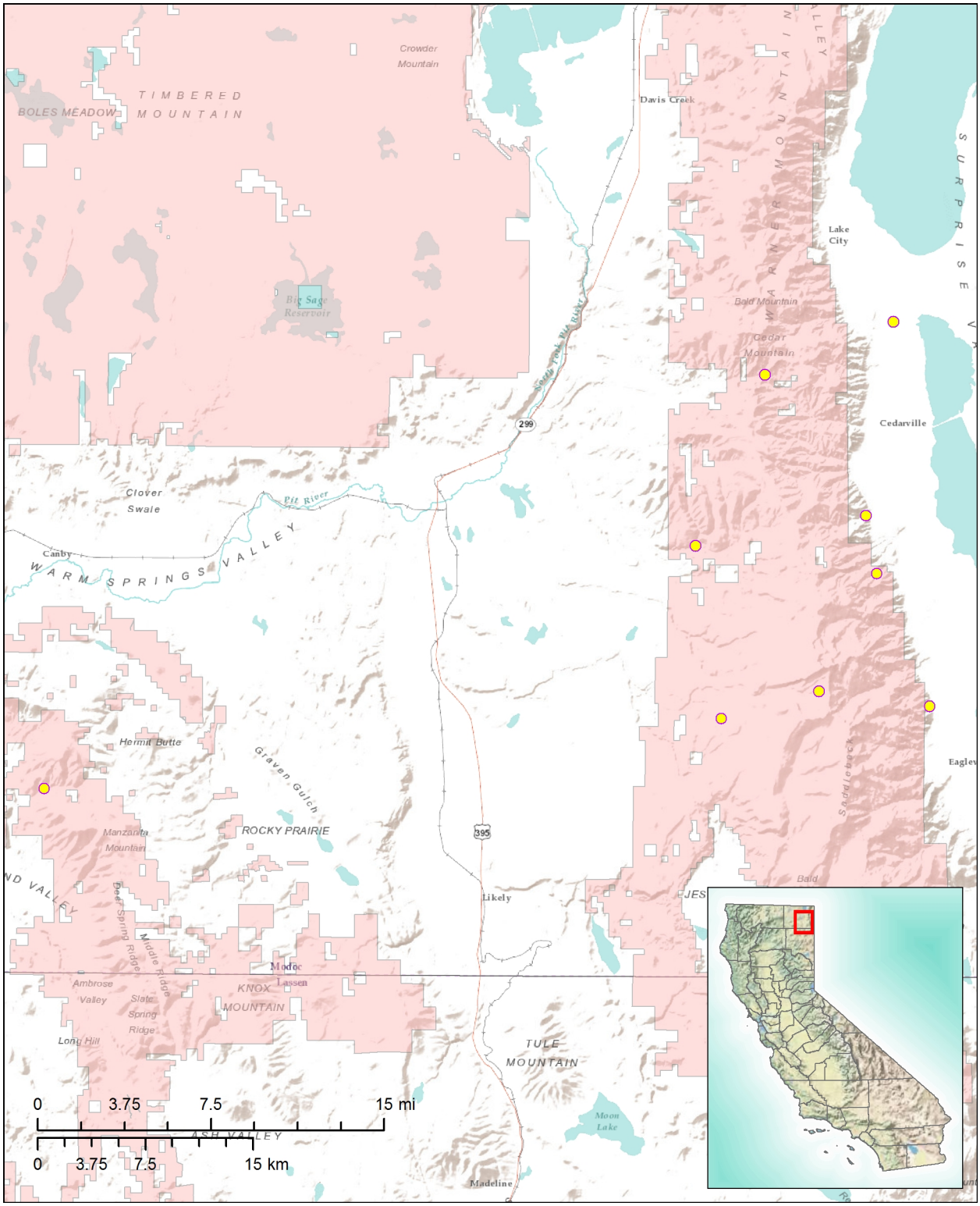
Note: Federally recognized Endangered, Threatened, Proposed, or Candidate species under the Endangered Species Act are omitted as they do not meet the definition of a Species of Conservation Concern (FSH 1909.12 § 12.52).

State Listing	G-rank	S-rank	CRPR	R5 FSS	NFP SM	CA BLM
CA: Not listed NV: Not listed OR: Not listed	G4G5	CA: S2 NV: SNR OR: Not listed	2B.3	Not listed	Not listed	Not listed

SWAP:	NNHP:	NNPS:	ORBIC:	OCS:	IUCN:
Not listed	Do not track	Not listed	Not listed	Not listed	Not listed

Expanded abbreviations and citations: State Listing=California Endangered Species Act Listing (CDFW 2017b), 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 2017a; NatureServe 2017); S-rank=Subnational (state or province-level) Conservation Status (CDFW 2017a; NatureServe 2017; NNHP 2017; ORBIC 2016); CRPR=California Rare Plant Rank (CNPS 2017); 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: Northeastern California, entirely within Modoc County at the southern end of the Warner Mountains. A single record is found to the northeast of the Ash Creek State Wildlife Area (CNPS 2017; CNDDB 2017; CCH 2017). Exactly six of nine (6/9; ~67%) occurrences are found within the boundaries of the Modoc NF. The remaining three (3/9; ~33%) occurrences are within 5 miles of the Modoc NF (CNDDB 2017; CCH 2017).



Basemap Sources: Main map: Esri, DeLorme, USGS, NOAA, NPS. California inset map: © 2013 National Geographic Society, i-cubed.

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 directly from the Reference (Source) column unless additional citation is given.)

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
1	CONKLIN CANYON, WARNER MOUNTAINS.	Modoc	Warren Peak (4112042)	CNDDB, May 2017 (EO 1)	20-Sep-1952	ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1952 HANNA COLLECTION. NEEDS FIELDWORK.		Modoc NF	
1	On Eocene sediments in Conklin Canyon, Warner Mts.	Modoc	Warren Peak (4112042)	CCH, Jan 2017 (CAS381047)	20-Sep-1952				
2	ABOUT 3 MILES N OF EAGLEVILLE, LOWER SLOPES OF WARNER MOUNTAINS.	Modoc	Eagle Peak (4112032)	CNDDB, May 2017 (EO 2)	13-Jul-1999	100 PLANTS SEEN IN 1999.	FLASH FLOODING.	BLM	4700
3	BETWEEN LOWER RUSH CREEK CAMPGROUND AND UPPER RUSH CREEK CAMPGROUND.	Modoc	Hermit Butte (4112037)	CNDDB, May 2017 (EO 3)	27-May-1987	ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1987 PYKALA COLLECTION. NEEDS FIELDWORK.		Modoc NF	4920

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
4	LOWER END OF GRANGER CANYON; ALONG GRANGER CANYON ROAD ABOUT 1.5 MILES W OF SURPRISE VALLEY ROAD.	Modoc	Warren Peak (4112042)	CNDDB, May 2017 (EO 4)	10-Jun-2001	UNKNOWN NUMBER OF PLANTS SEEN IN 1985. OVER 150 PLANTS SEEN IN 1988. ALSO INCLUDES COLLECTIONS AND OBSERVATIONS FROM 1989, 1991, 1998, AND 2001.		BLM	4900
4	Vicinity of Granger Creek, E side of Warner Mtns.	Modoc	Warren Peak (4112042)	CCH, Jan 2017 (CAS848220)	18-Jul-1989				4902
4	Granger Canyon, E side of Warner Mountains.	Modoc	Warren Peak (4112042)	CCH, Jan 2017 (CAS860076)	13-Jul-1991				4800
5	DRY CREEK, IN MOUTH OF CANYON.	Modoc	Shields Creek (4112043)	CNDDB, May 2017 (EO 5)	07-Aug-1910	ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1910 TAYLOR COLLECTION. NEEDS FIELDWORK.		Modoc NF	4750
6	UPPER SOUTH FORK PINE CREEK, SOUTH WARNER MOUNTAINS.	Modoc	Eagle Peak (4112032)	CNDDB, May 2017 (EO 6)	XX-Jul-1980	ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1980 RIEGEL COLLECTION. NEEDS FIELDWORK.		Modoc NF	

Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
7	TO W OF FOREST RD 5 (WEST WARNER RD) JUST S AND ON THE W SIDE OF JUNCTION WITH PINE CREEK TRAIL, WARNER MTNS.	Modoc	Soup Creek (4112033)	CNDDB, May 2017 (EO 7)	23-Jun-1999	UNKNOWN NUMBER OF PLANTS OBSERVED IN 1999.	GRAZING.	Modoc NF	6500
8	CEDAR PASS.	Modoc	Payne Peak (4112053)	CNDDB, May 2017 (EO 8)	23-Sep-1958	ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1958 HANNA COLLECTION. NEEDS FIELDWORK.		Modoc NF	
8	Cedar Pass.	Modoc	Payne Peak (4112053)	CCH, Jan 2017 (CAS514045)	23-Sep-1958			Modoc NF	
9	Surprise Valley.	Modoc	Cedarville (4112052)	CCH, Jan 2017 (DS273014)	10-Oct-1939				

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:	1,3,5,6,7, 8	6	0	1	5	23-Jun-1999	3	6
Plumas:	-	-	-	-	-	-	-	0
San Bernardino:	-	-	-	-	-	-	-	0
Sequoia:	-	-	-	-	-	-	-	0
Shasta-Trinity:	-	-	-	-	-	-	-	0
Sierra:	-	-	-	-	-	-	-	0
Six Rivers:	-	-	-	-	-	-	-	0
Stanislaus:	-	-	-	-	-	-	-	0
Tahoe:	-	-	-	-	-	-	-	0
Totals:	N/A	6	0	1	5	N/A	3	6

Demographic and Population Trends: A single occurrence (EO 1) was last documented in 1952. Another occurrence (EO 2) had 100 plants at its respective site in the year 1999. Element occurrence three (EO 3) was last witnessed in 1987. The site associated with element occurrence four (EO 4) was visited a total of five times (1985, 1988, 1989, 1991, 1998, and 2001), and had 150 plants in 1989. Three occurrences (EO 5, EO 8, and Rec. 9) have not been witnessed since 1910, 1958, and 1939 (respectively). Field work is needed in order to update records on the demographic and population trends associated with this taxon. Plants were last documented in 2001 (CNDDB 2017; CCH 2017).

Life History: *Diplacus cusickioides* is an herbaceous annual that blooms from May until August (CNPS 2017). Specific information is lacking regarding the life history of *D. cusickioides* and allied taxa that were formerly treated in *Mimulus* sect. Eunanus (*M. nanus, M. cusickii, M. clivicola, M. constrictus, M. whitneyi, M. leptaleus, M. torreyi*, et al.). Members of *Mimulus* s.l. have thigmotropic stigmas that close after being touched. This mechanism is thought to limit selfing, as pollinators are unable to deposit self-pollen as they exit the corolla. Stigmatic surfaces generally remain closed after pollen is deposited (Carlson 2002). The loss of bilateral corolla symmetry, reduced corolla length, and less-reflexed upper corolla lobes are correlated with a shift toward autogamy. *Diplacus cusickioides* has conspicuously zygomorphic and chasmagamous flowers, suggesting an allogamous mating system and a relationship with pollinators (Nesom 2013).

Diversity: The genus *Diplacus* is a member of the Phrymaceae, a group of unexpectedly related taxa in the Lamiales that were discovered, in recent decades, to all be related (Stevens 2001). At one time, the Phrymaceae was considered a monotypic family represented by the genus *Phryma*. The onset of the molecular era yielded insights demonstrating that a number of genera formerly in the Scrophulariaceae (*Mimulus, Glossostigma, Elacholoma, Peplidium, Uvedalia, Hemichaena*, and others) are aligned with *Phryma* and the Phrymaceae. The Phrymaceae was later modified to reflect these insights, creating a single family with thirteen genera and 188 species in total (Barker et al. 2012). During this taxonomic revision, California *Mimulus* s.l. were segregated into the genera *Diplacus* (46 species – short pedicels and parietal placentation) and *Erythranthe* (111 species – long pedicels and axile placentation). Both genera embody different clades within the former *Mimulus* s.l., representing entirely separate radiations within the Phrymaceae (Beardsley et al. 2004; Barker et al. 2012). The group formerly recognized as *Mimulus* sect. Eunanus contains a number of allied taxa (*D. cusickii, D. nanus, D. clivicola, D. jepsonii*, and others). Adequate sampling of *D. nanus* has revealed that it is paraphyletic, and that *D. cusickii, D. clivicola*, and *D. jepsonii* arise within its respective clade (Beardsley et al. 2004).

Habitat: California occurrences of *Diplacus cusickioides* are restricted to volcanic substrates, scree, and gravelly soils among Great Basin scrub and lower montane coniferous forests of Modoc County. There are individual occurrences associated with roadsides, lava fields, and seasonally wet meadows. Records associated with these California occurrences indicate that *D. cusickioides* is associated with *Arnica fulgens, Camassia quamash* subsp. *brevifolia*, *Ranunculus occidentalis, Lewisia nevadensis, Allium* sp., *Lomatium* sp., *Eleocharis pauciflora*, "big sagebrush", *Pinus ponderosa, Calocedrus decurrens*, and *Polanisia* sp. (CNDDB 2017). Records from outside California report that *D. cusickioides* grows in similar conditions and also occurs in sandstone and carbonate rock deposits. These records indicate that *D. cusickioides* occurs alongside *Amsinckia* sp., *Eriogonum* sp., *Poa bulbosa, Thelypodium laciniatum, Juniperus occidentalis, Artemisia tridentata, Stanleya pinnata, Atriplex confertifolia*, and *Sarcobatus* sp. (CPNWH 2017).

Habitat Status or Trend: *Diplacus cusickioides* occurs in Oregon, California, Idaho, and Washington (Nesom 2013). It has a limited distribution and is imperiled in Washington (S1) and in California (S2). It is not ranked in Oregon, Idaho, and Nevada (sensu *M. cusickii*)

(NatureServe 2017). Within California, it is restricted to eight element occurrences. One occurrence record indicates that flash flooding threatens plants at a single location due to altered hydrological regimes. An additional occurrence record indicates that grazing is a threat to plants at its location (CNDDB 2017).

Capacity for the Species to Disperse: Direct information on the dispersal capacity of *D. cusickioides* is unknown. *Mimulus* s.l. produces many seeded capsules that are often < 1mm (Thompson 2017).

Threats: Grazing and flash flooding are threats to some occurrences in California (CNDDB 2017).

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December 22, 2017

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.