

## Plant Species Evaluation Form

### *Thelypodium howellii* Wats. subsp. *howellii*

#### HOWELL'S THELYPODIUM

**Family:** Brassicaceae  
(CNPS 2018)

**PLANTS Symbol:** THHOH  
(USDA 2018)

**Calif. Endemic:** No  
(CNPS 2018)

**Synonyms/Other Names:** *Thelypodium howellii* S. Watson subsp. *howellii* was originally described in 1886. It was later changed to *Streptanthus howellii* M.E. Jones in 1895. Five years later, in 1900, the name was changed to *Thelypodium simplex* Greene. Thirty-one years later, in 1931, it was then changed to *Streptanthus coombsiae* Eastw. In 1933 this taxon became *Thelypodopsis howellii* O.E. Schulz. The original and current name was later readopted (Tropicos 2017, IPNI 2017).

**Identification Issues:** The *Jepson eFlora* key to Brassicaceae is broken into four separate groups. *Thelypodium* falls within Group 1 based on its simple hairs and basally lobed to clasping leaves. Group 1 also contains many allied genera (tribe Thelypodieae) with similar growth forms, habitat, and morphology. *Thelypodium* is distinguished from these allied genera (*Caulanthus*, *Streptanthus*, *Thysanocarpus*, etc.) by its exserted stamens that extend well beyond the petals. Many allied genera of Group 1 have at least some included stamens (Al-Shehbaz 2017).

#### **Taxonomy:**

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Species In Genus: 16 species: western North America. Etymology: (Greek: female foot, from fruit stalk above receptacle).

Genus Description – Habit: Annual to perennial herb; hairs 0 or simple. Leaf: basal rosetted, petioled, entire to pinnately lobed; mid-cauline petioled or sessile, base lobed to sagittate or wedge-shaped. Flower: sepals erect to reflexed, bases sac-like or not; petals linear to oblanceolate, spoon-shaped, or obovate, clawed or not, white to lavender or purple; stamens free (+- fused). Fruit: silique, dehiscent, linear, unsegmented, +- narrowed between seeds, cylindrical or +- flat parallel to septum, stalked above receptacle; stigma entire. Seed: 1 row per chamber, +- flat; wing generally 0.

Species Description – Habit: Biennial, glaucous; hairs 0 except on petiole. Stem: 1--9 dm, simple or branched distally. Leaf: basal blade 2--10(13.5) cm, lyre-shaped (dentate or entire), withered by fruit time, petiole ciliate; mid-cauline sessile, sagittate to clasping, entire. Inflorescence: open, much expanded in fruit. Flower: petals 5--8(12) mm, 0.5--1.2(3) mm wide, narrowly oblanceolate, lavender to purple, not crinkled; paired filaments partly to completely fused. Fruit: 1.5--4.5(7) cm, cylindrical, narrowed between seeds; stalk above receptacle 0.5--1(3.5) mm; style

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(0.5)1--2.7(4) mm; pedicel ascending, 3--8(14.5) mm, stout, straight or +- curved. Seed: 22--40, 1--1.7(2) mm, plump. Chromosomes:2n=26. eFlora Treatment Author: Ihsan A. Al-Shehbaz.

**Status:**

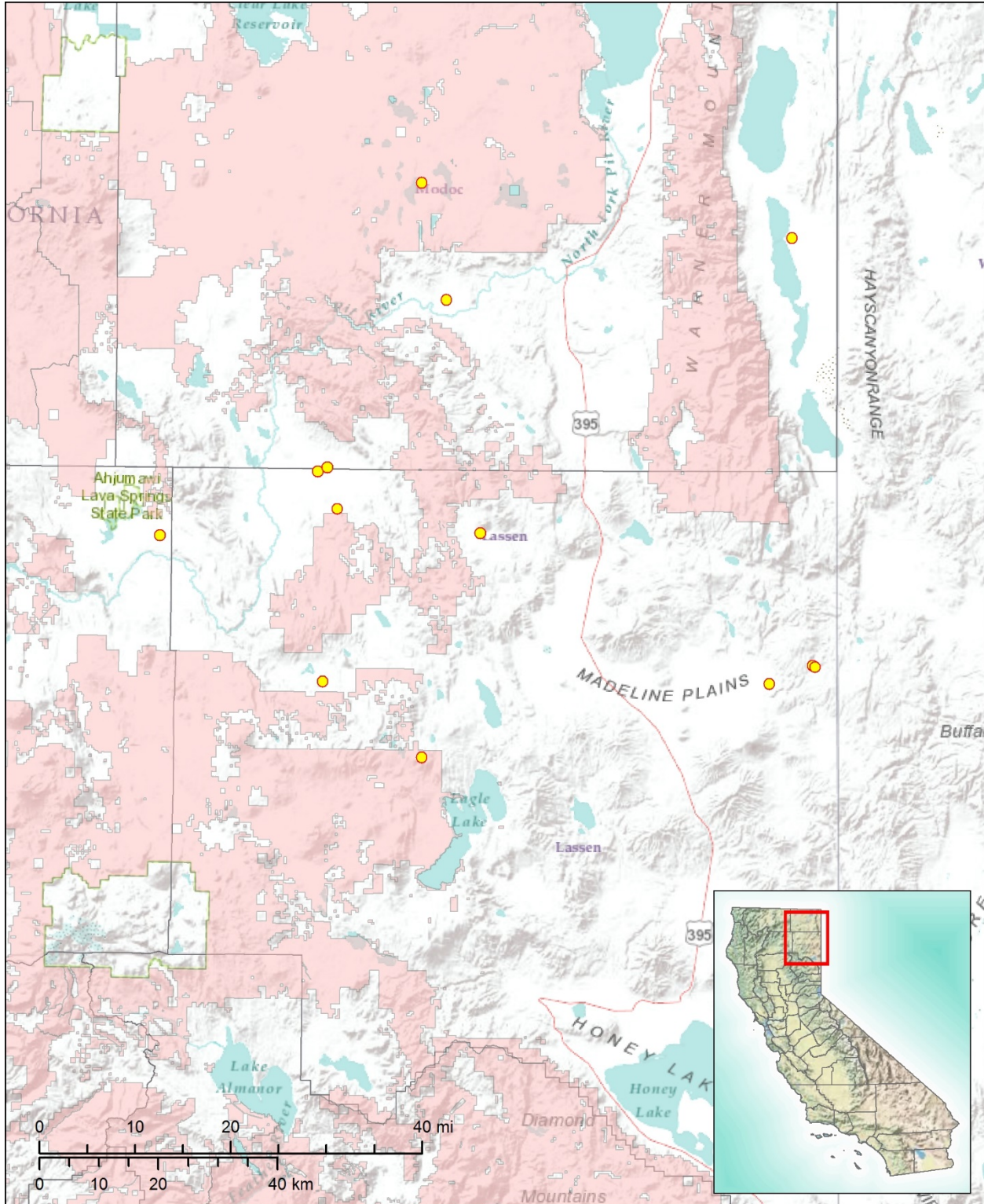
Note: Federally recognized Endangered, Threatened, Proposed, or Candidate species under the Endangered Species Act are omitted as they do not meet the definition of a Species of Conservation Concern (FSH 1909.12 § 12.52).

State Listing	G-rank	S-rank	CRPR	R5 FSS	NFP SM	CA BLM
CA: Not listed NV: Not listed OR: Not listed	G2T2	CA: S1 NV: Not listed OR: S1	1B.2	Sensitive	Not listed	Sensitive
SWAP: Not listed	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, from northeastern California to Washington (Al-Shehbaz 2017). All occurrences are found east of the crest of the Cascade Range (CPNWH 2018). Plants in California are restricted to Modoc, Lassen, and Shasta counties. Just two occurrences are found on NFS lands, within Modoc and Lassen National Forests. A total of eight occurrences are located within five miles of NFS lands (CNDDDB 2017; NRIS 2017).

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

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**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 (CNDDDB) definition of Element Occurrences in California). Official Element Occurrence (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 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	PASTURE NEAR TULE MARSH, GATES RANCH, ABOUT 3 MILES NORTHEAST OF MACARTHUR (SIC).	Shasta	Pittville (4112113)	CNDDDB, May 2017 (EO 1)	7-Jul-1983	ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1983 COLLECTION BY R. ROLLINS, K. ROLLINS, D. GATES AND A. ROADS.		PVT	3300
1	Gates Ranch, c. 3 mi. NE of MacArthur	Shasta	Pittville (4112113)	CCH, Jan 2017 (UCR51811)	7-Jul-1983				3320
2	ABOUT 1.5 MILES NORTH OF THE PIT RIVER WEST OF CLOVER SWALE CREEK, WARM SPRINGS VALLEY.	Modoc	Canby (4112047)	CNDDDB, May 2017 (EO 2)	29-Jun-1995	504 PLANTS WITHIN THE RIGHT OF WAY AND 356 OUTSIDE THE R-O-W IN 1995. SITE IS ALONG THE PROPOSED TUSCARORA PIPELINE ROUTE.	WITHIN PIPELINE RIGHT OF WAY. SITE IS GRAZED.	PVT	4310
3	DIXIE VALLEY, ADOBE MEADOWS.	Lassen	Straylor Lake (4012171)	CNDDDB, May 2017 (EO 3)	6-Jul-1894	ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1894 COLLECTION BY BAKER AND NUTTING.		BLM	4500

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
4	RODEO FLAT.	Lassen	Buckhorn Lake (4012081)	CNDDB, May 2017 (EO 4)	10-Jul-2002	SITE KNOWN FROM TWO COLLECTIONS: TIEHM ET AL IN 1984 AND SCHOOLCRAFT IN 1985. APPROXIMATELY 100 INDIVIDUALS OBSERVED IN 2002.		BLM	6000
4	BLM	Lassen	Buckhorn Lake (4012081)	NRIS, Dec 2016 (050900E_THHOH_BLM2)	10-Jul-2002	100 individuals		(Modoc NF)	
4	BLM	Lassen	Buckhorn Lake (4012081)	NRIS, Dec 2016 (050900E_THHOH_BLM1)	25-Jun-1984	100 individuals		(Modoc NF)	
4	Rodeo Flat., T35N R17 E sec22	Lassen	Buckhorn Lake (4012081)	Calflora, May 2017 (xr85291)	22-Jul-1985	1+ individuals		BLM	6283
4	Rodeo Flat, 2.7 road miles west of the state line on Buckhorn road from Ravendale to highway 81.	Lassen	Buckhorn Lake (4012081)	CCH, Jan 2017 (NY21547 2)	25-Jun-1984			BLM	6001

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
4	Rodeo Flat, 2.7 road miles west of the state line on Buckhorn road from Ravendale to Highway 81.	Lassen	Buckhorn Lake (4012081)	CCH, Jan 2017 (CAS7275 59)	25-Jun-1984			BLM	6001
5	ALONG BUCKHORN RD NEAR EAST EDGE OF MADELINE PLAINS.	Lassen	Observation Peak (4012072)	CNDDB, May 2017 (EO 5)	11-Jun-1986	UNKNOWN NUMBER OF PLANTS OBSERVED IN 1986.		PVT	5400
5	Along Buckhorn road near east edge of Madeline Plains., T35N R16 E sec26	Lassen	Observation Peak (4012072)	Calflora, May 2017 (xr86367)	11-Jun-1986	1+ individuals		BLM	5449
5	Along Buckhorn road near E edge of Madeline Plains.	Lassen	Buckhorn Canyon (4012071)	CCH, Jan 2017 (NY21549 7)	11-Jun-1986			BLM	5400
5	Along Buckhorn road near East edge of Madeline Plalins.	Lassen	Buckhorn Canyon (4012071)	CCH, Jan 2017 (CAS8345 19)	11-Jun-1986			BLM	5400
6	NORTH OF BIG VALLEY CANAL, ASH CREEK STATE WILDLIFE AREA.	Lassen	Big Swamp (4112121)	CNDDB, May 2017 (EO 6)	Unknown	ONLY SOURCE OF INFORMATION IS A 1998 LETTER FROM GUARDINO. NEED MORE INFORMATION.		DFG-ASH CREEK WA	4000

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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
6	About 100 yards southwest of where the levee road crosses Big Valley Canal, in Big Valley, about 4 miles (air) northeast of the Headquarters at Ash Creek State Wildlife Area, about 7.0 miles (air) northeast of Bieber	Lassen	Big Swamp (4112121)	CCH, Jan 2017 (CHSC997 28)	20-Jun-2008			Ash Creek Wildlife Area	4144
6	Big Valley	Modoc	Bieber (4112112)	CCH, Jan 2017 (JEPS5406 7)	29-Jun-1894				
7	EAGLE LAKE. DOW BUTTE.	Lassen	Spalding Tract (4012067)	CNDDB, May 2017 (EO 7)	9-Jul-1944	ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 1944 COLLECTION FROM AN UNKNOWN COLLECTOR. NEEDS FIELDWORK.		Lassen NF	6700
8	ASH VALLEY, ALONG ASH CREEK AT THE CROSSING OF ROAD 527 (USFS ROAD 39N08).	Lassen	Ash Valley (4112016)	CNDDB, May 2017 (EO 8)	12-Jun-1990	ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 1990 COLLECTION BY TAYLOR & CLIFTON.		Unknown	5100



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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
8	Ash Valley, along Ash Creek, at the crossing of Road 527 (Forest Road 39N08)	Lassen	Ash Valley (4112016)	Calflora, May 2017 (gr4862)	12-Jun-1990	1+ individuals			5036
9	SURPRISE VALLEY, MODOC COUNTY RD 299, 4.3 MILES EAST OF DOWNTOWN CEDARVILLE.	Modoc	Leonards Hot Springs (4112051)	CNDDDB, May 2017 (EO 9)	30-May-1998	ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 1998 COLLECTION BY HOLMGREN & HOLMGREN.		Unknown	4500
9	Surprise Valley, Modoc County Road 299, 6.9 km (4.3 mi) east of downtown Cedarville, at a turnoff to some hot springs.	Modoc	Leonards Hot Springs (4112051)	CCH, Jan 2017 (SEINET2 47878)	30-May-1998			BLM	
10	BOWLES MEADOW.	Modoc	Jacks Butte (4112057)	CNDDDB, May 2017 (EO 10)	10-Jul-1979	ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 1979 COLLECTION BY SAVAGE.		Modoc NF	4900
10	Bowles Meadow, Devils Garden District, Modoc National Forest	Modoc	Boles Meadows West (4112068)	CCH, Jan 2017 (SJSU9671 )	10-Jul-1979			Modoc NF	4902



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Rec. #	Locality	County	Quad	Reference (Source)	Date Last Observed	Population Info	Threats	Land Manager	Elev. (ft.)
11	ASH CREEK WILDLIFE AREA, 7.7 AIR MI NE OF BIEBER, 4.0 AIR MI WSW OF ADIN, 5.0 AIR MI ESE OF PILOT BUTTE SUMMIT.	Modoc	Big Swamp (4112121)	CNDDB, May 2017 (EO 11)	21-Jul-1991			DFG-ASH CREEK WA	4170
11	Modoc Plateau; Big Valley; Ash Creek Wildlife Area; ca. 7.7 air-miles northeast of Bieber, ca. 4.0 air-miles west by southwest of Adin, ca. 5.0 air-mile east by southeast of Pilot Butte summit, ca. 0.6 mile east of Walters Road and Owl Barn; meadow at sou	Modoc	Big Swamp (4112121)	CCH, Jan 2017 (CHSC85174)	21-Jul-1991			Ash Creek Wildlife Area	4170
12	7.3 miles east of Bieber.	Lassen	Letterbox Hill (4112018)	CCH, Jan 2017 (CAS310243)	31-May-1940				
12	7.3 miles east of Bieber.	Lassen	Letterbox Hill (4112018)	CCH, Jan 2017 (CAS350563)	31-May-1940				

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<b>Rec. #</b>	<b>Locality</b>	<b>County</b>	<b>Quad</b>	<b>Reference (Source)</b>	<b>Date Last Observed</b>	<b>Population Info</b>	<b>Threats</b>	<b>Land Manager</b>	<b>Elev. (ft.)</b>
12	7.3 miles east of Bieber.	Lassen	Letterbox Hill (4112018)	CCH, Jan 2017 (DS298481)	31-May-1940				

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**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:	-	-	-	-	-	-	-	0
Lake Tahoe Basin MU:	-	-	-	-	-	-	-	0
Lassen:	7	1	-	-	1	9-Jul-1944	2	1
Los Padres:	-	-	-	-	-	-	-	0
Mendocino:	-	-	-	-	-	-	-	0
Modoc:	10	1	-	-	1	10-Jul-1979	6	1
Plumas:	-	-	-	-	-	-	-	0
San Bernardino:	-	-	-	-	-	-	-	0
Sequoia:	-	-	-	-	-	-	-	0
Shasta-Trinity:	-	-	-	-	-	-	-	0
Sierra:	-	-	-	-	-	-	-	0
Six Rivers:	-	-	-	-	-	-	-	0
Stanislaus:	-	-	-	-	-	-	-	0
Tahoe:	-	-	-	-	-	-	-	0
<b>Totals:</b>	N/A	2	0	0	2	N/A	8	2

**Demographic and Population Trends:** Demographic and population trends are largely unknown for the 12 California occurrences of this taxon. A single occurrence (EO 2) was estimated to have over 850 plants in 1995 (CNDDDB 2017; NRIS 2017). *Thelypodium howellii* subsp. *howellii* is a biennial. Population sizes of plants with shorter life spans are known to be more variable among years than longer lived plants (Garcia et al. 2008).

**Life History:** *Thelypodium howellii* subsp. *howellii* is an herbaceous biennial that blooms from May through August (Al-Shehbaz 2017; CNPS 2017). Photoperiodism has little impact on the induction of flowering in *Thelypodium*. Exposure to cold temperatures is suspected to induce

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flowering in biennial and perennial species of *Thelypodium*. Species of *Thelypodium*, including *T. howellii* subsp. *howellii*, have colorful and showy flowers that produce nectar and are grouped into a dense inflorescence. *Thelypodium* species are commonly visited by *Bombus* and *Apis*. Observations of *T. integrifolium* indicate visitation from *Xylocopa* as well. Species of butterfly in Lycaenidae have been observed on *T. rollinsii*. Additionally, butterflies in the Pieridae are known to visit flowers of *T. rollinsii*, *T. integrifolium*, *T. laciniatum*, and *T. wrightii* (Al-Shehbaz 1973).

Species of *Thelypodium* have characters that reduce the chances of selfing and appear to increase opportunities for outcrossing. Many species, including *T. howellii* subsp. *howellii*, have exerted anthers that remain out of contact with the stigmatic surface. The filaments coil and spread away from the stigma as the anthers dehisce, further reducing the opportunity for autogamy. Species of *Thelypodium* are largely allopatric. Species boundaries are considered well defined, as taxa remain isolated via seasonal, ecological, geographic, and reproductive barriers. Albeit, seasonal isolation is facultative (Al-Shehbaz 1973).

**Diversity:** *Thelypodium howellii* subsp. *howellii* is a member of the large and globally distributed family Brassicaceae. Formerly known as Cruciferae, most members of this family bear flowers with a four-merous, cross-like (cruciate) perianth with six tetradynamous (four long, two short) stamens and two carpels. Brassicaceae contains numerous taxa important to agriculture (*Brassica*, *Nasturtium*, *Raphanus*, *Armoracia*, *Eutrema*, *Sinapis*) scientific research (*Arabidopsis thaliana*) and horticulture (*Alyssum*, *Arabis*, *Aubrieta*, *Aurinia*, *Erysimum*, *Hesperis*, *Iberis*, *Malcolmia*) (Al-Shehbaz 2017).

Brassicaceae is split into 51 tribes, 340 genera, and 3,840 species (Chen et al. 2016). The genus *Thelypodium* is a member of the Thelypodieae along with other prominent western North American genera such as *Caulanthus*, *Stanleya*, *Streptanthus*, and *Thysanocarpus*. Thelypodieae is a monophyletic tribe of 27 genera and 215 species that are restricted to America (Warwick et al. 2010, Al-Shehbaz 2017). *Thelypodium* represents 16 species that are restricted to western and central North America (incl. n. Mexico). It is considered a group that is somewhat heterogeneous (Al-Shehbaz 2017). The association between *Thelypodium* and alkaline soils is considerable. Including *T. howellii* subsp. *howellii*, at least eight taxa are known to tolerate alkaline soils, three of which are documented in extremely alkaline substrates. Most taxa are adapted to arid and semi-arid conditions (Al-Shehbaz 1973).

**Habitat:** *Thelypodium howellii* subsp. *howellii* is adapted to arid and semi-arid conditions, often occurring in alkaline substrate in meadows and seeps. It is also known to occur in Great Basin scrub. *Thelypodium howellii* subsp. *howellii* is known to grow alongside *Lepidium perfoliatum*, *Juncus balticus*, *Sysimbrium altissimum*, *Carex simulata*, *Poa secunda*, *Artemisia cana*, *Chrysothamnus nauseosus* subsp. *consimilis*, *Aster campestris*, *Elymus smithii*, *Cirsium scariosum*, *Carex douglasii*, *Lycium* sp., and *Distichlis* sp. (CNDDDB 2017).

**Habitat Status or Trend:** *Thelypodium howellii* subsp. *howellii* is known from few than 20 occurrences in California. Many California records are historical and not revisited. The most recent documented occurrence is from 2008 in Lassen County, within the Ash Creek State

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Wildlife Area (CCH 2017). One account suggests that *T. howellii* subsp. *howellii* tolerates disturbance (D. Taylor pers. comm. 2017).

**Capacity for the Species to Disperse:** Species of *Thelypodium* have small and lightweight seeds that are conducive to free dispersal. Wind is likely a contributor to the distribution of their seeds, especially into open habitats with limited vegetation (Al-Shehbaz 1973). Fruit are long and slender siliques that dehisce at maturity (Al-Shehbaz 2017).

**Threats:** Many species grow in open areas where cattle graze. According to one source, observations indicate that livestock avoid consuming *Thelypodium* species, and that occasional consumption may be accidental (Al-Shehbaz 1973). One occurrence record for *T. howellii* subsp. *howellii* indicates that a known location is grazed and is in the right-of-way of the Tuscarora Gas Pipeline (CNDDDB 2017).

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**Persons Contacted:**

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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](mailto:dmagney@cnps.org). April 20, 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.