Staff Summary for December 10-11, 2025

8. Bear Lake Buckwheat

Today's Item **Information ☐** **Action ☒**

Consider and potentially act on the petition, the Department's status review report, and comments received to determine whether listing Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*) as endangered under the California Endangered Species Act (CESA) is warranted.

Summary of Previous/Future Actions

• Received petition	July 16, 2024
• Published notice of receipt of petition	August 9, 2024
• Public receipt of petition	August 14-15, 2024
• Determined petitioned action may be warranted, initiating Department's one-year status review	October 9-10, 2024
• Public receipt of Department's one-year status review	October 8-9, 2025
• **Today potentially determine if listing is warranted**	**December 10-11, 2025**

Background

California Fish and Game Code Section 2072.7 states that the Department may, in the absence of an interested party, recommend to the Commission that it add a species to, or remove a species from, either the list of endangered species or the list of threatened species. If the Department makes a recommendation under this section, it must include the information specified in Fish and Game Code Section 2072.3 and the recommendation shall be considered by the Commission as a petition with a Departmental recommendation to accept and consider as described in Fish and Game Code Section 2073.5.

On July 16, 2024, the Commission received a petition and recommendation from the Department to list Bear Lake buckwheat as an endangered species under CESA. At its October 2024 meeting, the Commission determined that the listing may be warranted and subsequently provided notice of that determination. The notice prompted the Department's status review of the species, as required by Fish and Game Code Section 2074.6.

The Commission received the Department's status review report on September 5, 2025, and highlighted receipt of the report on the October 8-9, 2025 Commission meeting agenda for public awareness. The status review report represents the Department's final written review of the status of Bear Lake buckwheat. Based on the information provided, possessed, and received, the Department has concluded that the petitioned action to list Bear Lake buckwheat as endangered under CESA is warranted, and further recommends implementing the management recommendations and recovery measures described in the status review report.

At today's meeting, the Commission may consider the petition, the Department's written evaluation and status review report, written and oral comments received, and the remainder of the administrative record, to determine if listing Bear Lake buckwheat as endangered under CESA is warranted. Findings will be adopted at a future meeting.

Significant Public Comments (N/A)

Recommendation

Commission staff: Determine that listing Bear Lake buckwheat as endangered is warranted, as recommended by the Department.

Department: List Bear Lake buckwheat as endangered under CESA.

Exhibits

1. Petition, received July 16, 2024
2. Department transmittal memo, received September 5, 2025
3. Department status review report, dated August 2025
4. Department presentation

Motion

Moved by _____ and seconded by _____ that the Commission, pursuant to Section 2075.5 of the California Fish and Game Code, finds the information contained in the petition to list Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*), and the other information in the record before the Commission, **warrants** listing Bear lake buckwheat as an endangered species under the California Endangered Species Act, consistent with the staff and Department recommendations. Findings will be adopted at a future meeting.

OR

Moved by _____ and seconded by _____ that the Commission, pursuant to Section 2075.5 of the California Fish and Game Code, finds the information contained in the petition to list Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*), and the other information in the record before the Commission, **does not warrant** listing Bear Lake buckwheat as an endangered species under the California Endangered Species Act.

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

California Endangered Species Act

PETITION AND RECOMMENDATION TO LIST BEAR LAKE BUCKWHEAT (*ERIOGONUM MICROTHECA* VAR. *LACUS-URSI*) AS AN ENDANGERED SPECIES UNDER THE CALIFORNIA ENDANGERED SPECIES ACT

Report to the Fish and Game Commission

July 2024

Cover photo of Bear Lake buckwheat by Duncan Bell (2023).

Suggested citation:

California Department of Fish and Wildlife (CDFW). 2024. Petition and recommendation to list Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*) as endangered under the California Endangered Species Act. Report to the Fish and Game Commission. California Department of Fish and Wildlife, P.O. Box 944209, Sacramento CA 94244-2090. 28 pp.

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LIST OF ABBREVIATIONS, ACRONYMS, AND TERMS

CAL FIRE – California Department of Forestry and Fire Protection
CEQA – California Environmental Quality Act
CESA – California Endangered Species Act
CNDDB – California Natural Diversity Database
Commission – California Fish and Game Commission
CRPR – California Rare Plant Rank
Department – California Department of Fish and Wildlife
ESA – Federal Endangered Species Act
PRISM – Parameter-elevation Regression on Independent Slopes Model
SBNF – San Bernardino National Forest
USFS – United States Forest Service

et al. – "and others"
id. – "the same"
pers. comm. – personal communication
ssp. – subspecies
var. – variety

FGC – 670.1 (3/94)

PETITION AND RECOMMENDATION TO THE CALIFORNIA FISH AND GAME COMMISSION

For action pursuant to Section 670.1, Title 14, California Code of Regulations (CCR) and Sections 2072 and 2073 of the Fish and Game Code relating to listing and delisting endangered and threatened species of plants and animals.

I. Species Being Petitioned:

Common Name: Bear Lake buckwheat
Scientific Name: *Eriogonum microtheca* var. *lacus-ursi*

II. Recommended Action:

List as Endangered

III. Author of Petition:

Name: Native Plant Program, Habitat Conservation Planning Branch, California Department of Fish and Wildlife
Staff Contact: Kristi Lazar, Senior Environmental Scientist (Specialist)
Work Address: P.O. Box 944209, Sacramento, CA 94244-2090
Work Phone Number: (916) 594-5425

I hereby certify that, to the best of my knowledge, all statements made in this petition are true and complete.

Name: Jeff Drongesen
Title: Branch Manager, Habitat Conservation Planning Branch

Signature:

Date: 7/2/2024

EXECUTIVE SUMMARY

The California Department of Fish and Wildlife's (Department) Native Plant Program hereby submits this petition and recommendation to the California Fish and Game Commission (Commission) to list Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*) as endangered pursuant to the California Endangered Species Act (CESA). CESA allows the Department to make a recommendation to the Commission to add a species to, or remove a species from, either the list of endangered species or the list of threatened species in the absence of a listing petition from an interested party (Fish & G. Code, § 2072.7). This report is both a Department-prepared petition and a recommendation to the Commission to accept and consider the petition (*id.*).

Bear Lake buckwheat is a subshrub in the buckwheat family with only a single known occurrence on the south shore of Big Bear Lake in San Bernardino County, California. Bear Lake buckwheat grows on a unique substrate of gray, silty, clay soil in a Jeffrey pine and juniper woodland. Bear Lake buckwheat occupies an area of less than 1.5 acres with 150 plants estimated in 2023. While Bear Lake buckwheat has been visited periodically over the years, no formal monitoring or research studies have been conducted on the species.

Bear Lake buckwheat is primarily threatened by habitat modification or destruction from the potential development of the private property where the species occurs. The property is owned by the Bear Valley Mutual Water Company and is being leased to the City of Big Bear Lake, who is exploring opportunities to further develop the property. Other significant threats to Bear Lake buckwheat include human disturbances (from off-road vehicle use, footpaths/trampling, and trash dumping), effects of small population size, and fire and fuel reduction activities. In addition, Bear Lake buckwheat is threatened by climate change, non-native plants, and overexploitation which could become increasingly significant in the future if the species is not monitored or adequately managed.

This petition and recommendation to list Bear Lake buckwheat as endangered under CESA meets the requirements set forth in Fish and Game Code sections 2072.3 and 2072.7 and the California Code of Regulations, title 14, section 670.1, subdivision (d)(1). The Department has determined that there is sufficient scientific information to indicate that the petitioned action may be warranted. Therefore, the Department recommends that the Commission accept the petition for further consideration pursuant to CESA (Fish & G. Code, § 2073.5, subd. (a)(2)).

INTRODUCTION

This report, prepared and submitted by the California Department of Fish and Wildlife's (Department) Native Plant Program, constitutes a petition and recommendation to the California Fish and Game Commission (Commission) to list Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*) as endangered pursuant to the California Endangered Species Act (CESA).

CESA Listing Petition Overview

CESA allows the Department to make a recommendation to the Commission to add a species to, or remove a species from, either the list of threatened species or the list of endangered species in the absence of a listing petition from an interested party (Fish & G. Code, § 2072.7). This report is both a Department-prepared petition and a recommendation to the Commission to accept and consider the petition (*id*.).

For the Commission to accept a petition, the petition must include sufficient scientific information to indicate that the petitioned action may be warranted. The petition must contain "information regarding the population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce, the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, and the availability and sources of information. The petition shall also include information regarding the kind of habitat necessary for species survival, a detailed distribution map, and any other factors that the petitioner deems relevant" (Fish & G. Code, § 2072.3). Department-prepared petitions also include a recommendation to the Commission on whether the petition provides sufficient scientific information to indicate that the petitioned action may be warranted (Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)). Once the Department submits its petition and recommendation to the Commission, the Commission shall schedule the petition for consideration at its next available public meeting, but not sooner than 30 days after the Commission's receipt and public release of the petition (Fish & G. Code, § 2074). If the Commission finds that the petition provides sufficient information to indicate the petitioned action may be warranted, the Commission shall publish a notice of finding that the petition is accepted for consideration. The Commission shall include in the notice that the petitioned species is a candidate species under CESA (Fish & G. Code, § 2074.2, subd. (e)(2)).

The Department must produce, within 12 months of the Commission's acceptance of the petition, a peer-reviewed report based upon the best scientific information available that advises the Commission on whether the petitioned action is warranted (Fish & G. Code, § 2074.6). Based on that report and other information in the

administrative record, the Commission then determines whether the petitioned action is warranted (Fish & G. Code, § 2075.5).

Species Taxonomy and Description

The Commission has the authority to list certain "species or subspecies" as endangered or threatened under CESA (Fish & G. Code, §§ 2062, 2067, 2068, 2070). The listing process is the same for species and subspecies (Fish & G. Code, §§ 2070-2079.1). Bear Lake buckwheat is a variety of the species *Eriogonum microtheca*; however, for convenience, the term "species" is used herein to refer to Bear Lake buckwheat.

Species Taxonomy

Bear Lake buckwheat (*Eriogonum microtheca* Nutt. var. *lacus-ursi* Reveal & A. Sanders) was first collected as *E. microthecum* in Bear Valley, California by Samuel Bonsall Parish and William Fletcher Parish in August of 1882 (Reveal 2004); however, the species may have been known to Native Americans before that time. Bear Lake buckwheat was not formally described as a variety of *E. microthecum* until December of 2004 when James Reveal published several new species and varieties in *Eriogonum*, including Bear Lake buckwheat (*E. microthecum* var. *lacus-ursi*) (Reveal 2004).

There is some confusion as to the correct spelling of Bear Lake buckwheat's scientific name. *E. microtheca* was first published as a species by Thomas Nuttall in 1848 (Nuttall 1848). The spelling of *E. microtheca* was maintained by several additional publications in 1853 and 1856 before *E. microthecum* began to be used in 1857 (Williamson Expedition 1857, Reveal and Gandhi 2014). The change in spelling may have been a result of correcting what many believed to be a grammatical mistake. The usual practice for Latin scientific names is to have the genus and specific epithet endings agree in gender. *Eriogonum* is gender neuter suggesting the specific epithet should be the gender neuter *microthecum*, not the feminine *microtheca*. While E. *microthecum* is the most common spelling used in publications since 1858 and is still widely used today, recent publications and floras have reverted back to using *E. microtheca* (Reveal 2005, Reveal and Rosatti 2012, Reveal and Gandhi 2014). *E. microtheca* var. *lacus-ursi* is the currently accepted spelling for Bear Lake buckwheat based on the spelling published in recent floras and is the name used in this report (Reveal 2005, Reveal and Rosatti 2012).

Species Description

Bear Lake buckwheat is a member of the buckwheat family (Polygonaceae). It is a subshrub with a woody stem at the base of the plant and herbaceous (i.e., non-woody) stems that die back seasonally (Reveal 2005, Baldwin et al. 2012, Reveal and Rosatti 2012). Bear Lake buckwheat is typically 15 to 20 cm (5.9 to 7.9 in) tall and 40 to 60 cm (15.7 to 23.6 in) in diameter (Reveal and Rosatti 2012). Leaf blades are narrowly elliptic measuring 0.7 to 1.5 cm (0.3 to 0.6 in) long and 0.07 to 0.3 cm (0.03 to 0.12 in) wide (Reveal 2005, Reveal and Rosatti 2012). Leaf margins are usually rolled under, with white, densely matted hairs on the lower surface of the leaves and no hairs on the upper surface of the leaves (Figure 1) (Reveal and Rosatti 2012).

Bear Lake buckwheat has groupings of flowers (inflorescences) that are 1 to 3 cm (0.4 to 1.2 in) long (Figure 1) (Reveal 2005, Baldwin et al. 2012, Reveal and Rosatti 2012). Flowering stems are 4 to 8 cm (1.6 to 3.1 in) long and generally hairless but may have some sparse hairs on them (Reveal 2004, 2005, Reveal and Rosatti 2012). Like most members of the buckwheat family, Bear Lake buckwheat has involucres (structures that grow under the flower or grouping of flowers, holding them together as a unit) (Baldwin et al. 2012). Involucres in Bear Lake buckwheat are 3 to 4 mm (0.12 to 0.16 in) long and generally hairless (Reveal and Rosatti 2012). Individual flowers are 2 to 2.5 mm (0.08 to 0.10 in) long and are cream colored (Reveal 2005, Reveal and Rosatti 2012). Bear Lake buckwheat produces dry one-seeded fruits called achenes that are 2 to 2.5 mm (0.08 to 0.10 in) long (Reveal 2005, Baldwin et al. 2012).

Figure 1. Photos of Bear Lake buckwheat including flowers (left), leaves (middle), and plants in their natural habitat (right). Photo credit for left and right photos: Duncan Bell 2023. Photo credit for middle photo: R.A. Chasey 2022.

Similar Taxa

Bear Lake buckwheat is one of ten varieties of *E. microtheca* in California (Reveal and Rosatti 2012). In addition to Bear Lake buckwheat, three other varieties of *E. microtheca* have been documented to occur in the San Bernardino Mountains of California and are similar in appearance to Bear Lake buckwheat (Figure 2) (Reveal 2004, CCH 2024). Johnston's buckwheat (*E. m.* var. *johnstonii*), San Bernardino buckwheat (*E. m.* var. *corymbosoides*), and Simpson's buckwheat (*E. m.* var. *simpsonii*)[1] have all been reported as occurring in the same mountain range as Bear Lake buckwheat; however, Bear Lake buckwheat has a highly restricted distribution within the San Bernardino Mountains and does not directly co-occur with any other *E. microtheca* variety (CCH 2024).

Bear Lake buckwheat, Johnston's buckwheat, San Bernardino buckwheat, and Simpson's buckwheat can be distinguished from each other through a combination of characteristics related to plant size, leaf attributes, and stem hairs (Table 1). Bear Lake buckwheat can most easily be identified by its rolled-under leaf blade margins, no hairs on the upper surface of the leaf, and white, densely matted hairs on the lower surface of the leaf. These leaf characteristics, taken together, are not shared by any other variety of *E. microtheca* in the San Bernardino Mountains.

[1] The Jepson eflora indicates Simpson's buckwheat does not occur in the San Bernardino Mountains and is restricted to the eastern Sierra Nevada and eastern Mojave Desert in California (Reveal and Rosatti 2012). However, several herbarium collections from the San Bernardino Mountains have been identified as Simpson's buckwheat, so that variety is included in this section (CCH 2024).

Table 1. Key traits to distinguish between *Eriogonum microtheca* varieties that grow in the San Bernardino Mountains (Reveal 2005, Reveal and Rosatti 2012).

	Bear Lake buckwheat	Johnston's buckwheat	San Bernardino buckwheat	Simpson's buckwheat
Variety	*lacus-ursi*	*johnstonii*	*corymbosoides*	*simpsonii*
Height	15-20 cm (5.9-7.9 in)	6-13 cm (2.4-5.1 in)	30-60 cm (11.8- 23.6 in)	10-150 cm (3.9-59 in)
Width	40-60 cm (15.7-23.6 in)	20-50 cm (7.9- 19.7 in)	60-150 cm (23.6-59 in)	40-160 cm (15.7-63 in)
Leaf shape	Narrowly elliptic	Elliptic to ovate	Elliptic to obovate	Narrowly elliptic
Leaf margins	Rolled-under	flat	flat	Rolled-under
Leaf hairs (upper surface /lower surface)	No hairs/ dense white hairs	Hairy or not/ dense white hairs	Hairy or not/ dense white hairs	Hairy/ dense white hairs
Stem hairs	Sparse hairs or no hairs	Hairy or not	Dense white hairs	Dense white hairs

Figure 2. Photos of *Eriogonum microtheca* varieties from the San Bernardino Mountains. Upper left photo is Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi)*. Upper right photo is Johnston's buckwheat (*E. m.* var. *johnstonii*). Lower left photo is San Bernardino buckwheat (*E. m.* var. *corymbosoides*). Lower right photo is Simpson's buckwheat (*E. m.* var. *simpsonii*). Photo credit: Duncan Bell 2023.

PETITION TO LIST BEAR LAKE BUCKWHEAT AS ENDANGERED UNDER CESA

This petition includes discussion of each of the required components of a complete listing petition, as well as the Department's recommendation to the Commission on whether the petition provides sufficient scientific information to indicate that the petitioned action may be warranted (Fish & G. Code, §§ 2072.3, 2072.7, 2073.5; Cal. Code Regs., tit. 14, § 670.1, subds. (b), (d)(1)). A petition to list a species under CESA must include "information regarding the population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce, the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, and the availability and sources of information. The petition shall also include information regarding the kind of habitat necessary for species survival, a detailed distribution map, and any other factors that the petitioner deems relevant" (Fish & G. Code, § 2072.3). The Department's recommendation to the Commission must contain an evaluation of whether the petition provides such information (Fish & G. Code, § 2072.5, subd. (a); Cal. Code Regs., tit. 14, § 670.1, subds. (b), (d)(1)). To create a more cohesive and readable document, the Department has, in some instances, grouped similar components together and renamed components in this report.

Life History

Bear Lake buckwheat has bisexual flowers that bloom between July and October, with fruiting likely lasting into November (Reveal 2005, Reveal and Rosatti 2012, Bell 2023). There have not been any studies specific to the life history of Bear Lake buckwheat, but some assumptions can be made based on characteristics shared by most buckwheat species. Buckwheat flowers tend to have an open flower morphology with easily accessible nectar and pollen, which has been shown to be the type of flower visited more often by generalist insect pollinators (McCall and Primack 1992, Ollerton et al. 2007). Therefore, while Bear Lake buckwheat may be pollinated by generalist insect pollinators based on its flower morphology, studies are needed to determine what kind of pollinators visit Bear Lake buckwheat and whether the species is dependent on certain pollinators to reproduce.

Observations of Bear Lake buckwheat in 2023 noted that nearly all the plants were in flower in July with abundant seeds produced in October (Bell pers. comm. 2024). In 2008, about 10% of the plants were presumed to be seedlings (not woody, and generally unbranched) (USFS 2008). No seedlings were observed in 2023 (Bell pers. comm. 2024). Several rare perennial buckwheat species that have very restricted ranges in other parts of California and other states, have been shown to have low seed set and high seedling mortality (Kaye et al. 1990, Morefield 1996, Dunwiddie et al. 2001,

Caplow 2005). Based on observations from 2023, Bear Lake buckwheat appears to have ample seed set with seeds viable when tested in a lab setting (Bell pers. comm. 2024, Birker pers. comm. 2024). Seedlings were observed on site in 2008 but no seedlings were observed in 2023. Additional data on presence or absence of seedlings over time is needed.

Dispersal of Bear Lake buckwheat seeds is likely similar to observed dispersal of other buckwheat species, with seeds dispersing through gravity, wind, and animals (such as ants) (Dunwiddie et al. 2001). Buckwheat seeds fall from the plant enclosed by light, papery flower parts, suggesting that wind may play an important role in seed dispersal (Morefield 1996). Ants have been shown to move seeds for other buckwheat species, but it is unclear if this plays a role for Bear Lake buckwheat seed dispersal (Dunwiddie et al. 2001).

No information is available on the typical growth rate and life span of Bear Lake buckwheat, which is a perennial species. In addition, studies are needed on ecological relationships with other organisms and the presence of seedlings, juveniles, reproductive adults, and senesced plants to better assess the long-term health and viability of Bear Lake buckwheat.

Range, Distribution, and Detailed Distribution Map

A species' range for the purposes of CESA is the geographical area where the species occurs within California (*Cal. Forestry Assn. v. Cal. Fish and Game Com.* (2007) 156 Cal. App. 4th 1535, 1551).

As documented in the Department's California Natural Diversity Database (CNDDB), Bear Lake buckwheat is a species that has only ever been known from a single occurrence along Alden Road on the south shore of Big Bear Lake at the northeast end of the San Bernardino Mountains in San Bernardino County, California (Figure 3) (CNDDB 2024). This occurrence is at an elevation of about 2,063 meters (6,770 feet) (CCH 2024). It is unknown if the species was once more common in the Big Bear Lake area, but it is likely that the species has always had a very restricted range, given that no other Bear Lake buckwheat occurrences have been reported.

Figure 3. Map of Bear Lake buckwheat's range. Detailed location information is available through the California Natural Diversity Database (CNDDB). This figure shows the Bear Lake buckwheat occurrence as a more general shape (orange star) to adhere to the CNDDB license agreement and to protect the species from harm.

The Bear Lake buckwheat occurrence is bisected by Alden Road, and for the purposes of this listing petition, the portions of this occurrence on the west side of Alden Road and on the east side of Alden Road are sometimes discussed as separate populations. The population on the west side of Alden Road has been extirpated (CNDDB 2024). The population on the east side of Alden Road is extant. The current area occupied by Bear Lake buckwheat is less than 1.5 acres (CNDDB 2024). The Big Bear Lake area has been surveyed extensively over many years and no other populations of Bear Lake buckwheat have been found. This single occurrence is therefore thought to be the only occurrence of the species in existence and constitutes the entire distribution of Bear Lake buckwheat.

Habitat

This section discusses the best available scientific information regarding the kind of habitat necessary for Bear Lake buckwheat's survival as a species (Fish & G. Code, § 2072.3; see also Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)).

Bear Lake buckwheat is endemic to the south shore of Big Bear Lake in the San Bernardino Mountains. Climatic patterns in this area have been modeled by the Parameter-elevation Regression on Independent Slopes Model (PRISM) Climate Group and provide a good indication of the type of weather conditions Bear Lake buckwheat experiences (Daly et al. 1994, PRISM Climate Group 2024). According to PRISM output from 1991 through 2020, daily maximum temperatures were highest in the month of July with an average high of 27°C (80.6°F), and lowest in the month of December with an average low of -5°C (23°F) (PRISM Climate Group 2024). Precipitation averaged 56.9 cm (22.4 inches) a year with most of the precipitation occurring in February (PRISM Climate Group 2024).

Bear Lake buckwheat occurs on a geologic formation classified as Quarternary alluvium and is adjacent to Quarternary clay (Dibblee 1964). Soils at the site are part of the Garloaf-Urban land complex soil series with four to nine percent slopes (Soil Survey Staff 2024). Garloaf soils are described as well drained, very cobbly, clay, loam soils that are comprised of alluvium derived from granitoid parent material (Soil Survey Staff 2024). While these types of soils are reported all along the south side of Big Bear Lake, Bear Lake buckwheat appears to be restricted to an outcrop of unique substrate that is not reflected in available soil surveys. In 2003, Michael Denslow reported that no other substrate like the kind Bear Lake buckwheat grows on has been seen in the area (CCH 2024). The unique substrate Bear Lake buckwheat grows on is a fine, gray, silty, clay soil with a dispersed scattering of quartzite rocks (Bell pers. comm. 2024, CCH 2024, Krantz pers. comm. 2024). Detailed studies are needed on the chemical and physical properties of this soil.

Bear Lake buckwheat grows in openings within a conifer woodland of Jeffrey pine (*Pinus jeffreyi*) and juniper (*Juniperus grandis*) (CCH 2024). Associates include Utah service-berry (*Amelanchier utahensis*), big sagebrush (*Artemisia tridentata*), June grass (*Koeleria macrantha*), bottlebrush squirreltail (*Elymus elymoides*), creeping wild rye (*Leymus triticoides*), blue sage (*Salvia pachyphylla*), Parish's umbrellawort (*Tauschia parishii*), fineleaf hymenopappus (*Hymenopappus filifolius*), broom snakeweed (*Gutierrezia sarothrae*), Indian rice grass (*Oryzopsis hymenoides*), yellow salsify (*Tragopogon dubius*), cheatgrass (*Bromus tectorum*), prickly lettuce (*Lactuca serriola*), spreading groundsmoke (*Gayophytum diffusum*), plain mariposa lily (*Calochortus invenustus*), southern mountain phlox (*Phlox austromontana*), Parry's fringed onion (*Allium parryi*), Mojave lomatium (*Lomatium mohavensis*), hawksbeard (*Crepis* sp.), birds beak (*Cordylanthus* sp.), knotweed (*Polygonum* sp.), and buttercup (*Ranunculus* sp.) (USFS 2008, CCH 2024).

Bear Lake buckwheat also occurs with several plant species of conservation concern. These include the federally threatened ash-gray paintbrush (*Castilleja cinerea*) and two plants listed by the California Native Plant Society as plants that are rare, threatened, or endangered in California and elsewhere (California Rare Plant Rank [CRPR] 1B plant species): Big Bear milkvetch (*Astragalus lentiginosus* var. *sierrae*) and Bear Valley pyrrocoma (*Pyrrocoma uniflora* var. *gossypina*) (CCH 2024, CNDDB 2024). In addition, the federally threatened southern mountain buckwheat (*Eriogonum kennedyi* var. *austromontanum*) is reported to occur about 50 meters (164 feet) northeast of Bear Lake buckwheat (Bell pers. comm. 2024, CNDDB 2024). Southern mountain buckwheat also reportedly occurred with Bear Lake buckwheat on the west side of Alden Road before both species were extirpated from that site by the late 1990s (Krantz pers. comm. 2024).

Abundance and Population Trend

The abundance of Bear Lake buckwheat is very low. Only a single occurrence of Bear Lake buckwheat has ever been documented. The abundance of Bear Lake buckwheat in 2023 was about 150 individuals, all of them on the east side of Alden Road (Reveal 2004, Krantz pers. comm. 2023, CCH 2024, CNDDB 2024). While there has not been any formal population monitoring conducted for Bear Lake buckwheat, the available information indicates that this species is experiencing a downward population trend.

The natural habitat in the Big Bear Lake area has been drastically altered by humans since the late 1800s, beginning with the installation of a dam and creation of Big Bear Lake, followed by an increase in development and recreation throughout the area. Given how close Bear Lake buckwheat grows to the lakeshore, it appears likely that the

species may have been more extensive in the area prior to the creation of Big Bear Lake and the addition of a dam in 1912 that was 20 feet taller than the original dam, which resulted in inundation of additional land around the lake (Holmes 1956, Hinckley 1983, Bellamy and Keller 2006).

The area has also been a popular tourist destination since the early 1900s when roads were constructed, leading to additional development and increased recreation (Holmes 1956, Bellamy and Keller 2006). The property that contains Bear Lake buckwheat's entire distribution has been heavily impacted over the years by the construction of restaurants, homes, roads, and parking lots, which have destroyed or disturbed much of the natural habitat. It is possible that Bear Lake buckwheat once occurred throughout the property and is now restricted to the only remaining habitat on the site.

Immediately south of the property containing Bear Lake buckwheat is a mobile home park (LandVision 2024b). The currently extant population of Bear Lake buckwheat is within 15 meters (49 feet) of the mobile home park; however, there is no appropriate habitat remaining for Bear Lake buckwheat on the mobile home park parcel (CNDDB 2024, LandVision 2024b). The mobile home park has been located on the parcel since at least 1959 and it is possible the parcel once contained habitat for, or populations of, Bear Lake buckwheat.

The west side of Alden Road had a small population of about 25 Bear Lake buckwheat plants in 1986 but the species was extirpated from that site by 1998 or 1999 (CCH 2024, CNDDB 2024, Krantz pers. comm. 2024). Bear Lake buckwheat plants were reportedly extirpated from the west side of Alden Road when soils were scraped and removed for expansion of the adjacent marina in 1998 and 1999 (Roberts 2008). This area is undeveloped and it is unknown if any habitat appropriate for Bear Lake buckwheat remains (Krantz pers. comm. 2024).

Rough estimates of population size on the east side of Alden Road have been noted by several collectors and observers over the years, with about 300 individuals in 2001, about 200 individuals in 2003, 310 individuals in 2008, about 100 individuals in 2022, and about 150 individuals in 2023 (Reveal 2004, USFS 2008, Krantz pers. comm. 2023, CCH 2024, CNDDB 2024, USFS 2024). Since there has not been any formal population monitoring, it is unknown if these reported population sizes are for the entire Bear Lake buckwheat population or if they represent just a portion of the population.

Bear Lake buckwheat is experiencing a downward population trend as evidenced by the extirpation of all plants on the west side of Alden Road in the late 1990s. The population has likely experienced an even larger downward population trend given

the habitat destruction and disturbances that have occurred throughout the Big Bear Lake area since the late 1800s (CCH 2024, CNDDB 2024).

Threats

This section discusses the factors affecting the ability of the only known Bear Lake buckwheat population to survive and reproduce, and the degree and immediacy of threat (Fish & G. Code, § 2072.3; see also Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)).

Present or Threatened Modification or Destruction of Habitat

The most significant and immediate threat to Bear Lake buckwheat is habitat modification and destruction. The species currently occupies a small area of undeveloped habitat on private property on the east side of Alden Road in the City of Big Bear Lake (CNDDB 2024). The property is owned by the Bear Valley Mutual Water Company and the portion of the property containing Bear Lake buckwheat is zoned for commercial visitor use (City of Big Bear Lake 1999). While Bear Lake buckwheat occupies a small undeveloped area of the property (less than 1.5 acres), other portions of the property have experienced habitat destruction and modification from two restaurants (The Pines Lakefront and The Pines Tavern on The Lake), two single-family rental homes, paved and dirt roads, parking lots, and boat storage (City of Big Bear Lake 2021, LandVision 2024a).

In November of 2021, the City of Big Bear Lake announced it would be leasing a 19-acre area from the Bear Valley Mutual Water Company, including the property containing the Bear Lake buckwheat population, for 99 years with an option to extend for up to 30 additional years (City of Big Bear Lake 2021). The City of Big Bear Lake also announced plans to develop at least 10 acres of the 19-acre area into a new park for residents and visitors to Big Bear Lake (City of Big Bear Lake 2021, LandVision 2024a). The City of Big Bear Lake indicates that in addition to a park, they plan to explore development opportunities in the 19-acre area, including construction of new workforce housing units and commercial development (City of Big Bear Lake 2021). As of October 2023, the City of Big Bear Lake was preparing a master plan and engaging in assessment efforts to determine plans for the leased area moving forward (Sullivan pers. comm. 2023).

Since this area contains the only known population of Bear Lake buckwheat, development of, and disturbances to, the area could be detrimental to the population and could cause the species' extinction.

Other Human Disturbances

Bear Lake buckwheat is significantly and immediately threatened by human disturbance from off-road vehicle (ORV) activities, footpaths, and trash dumping. The property containing Bear Lake buckwheat also has two restaurants and is easily accessible to the public, resulting in vehicular and foot traffic on the site. There is a chain link fence separating the property containing Bear Lake buckwheat from the mobile home park to the south, but the Bear Lake buckwheat population is not completely fenced off, making it relatively easy for people and vehicles to access and potentially harm the species.

Trespass ORV activity from dirt bikes, motorcycles, and other recreational vehicles is currently impacting the portion of the property that contains Bear Lake buckwheat (Bell pers. comm. 2024, Krantz pers. comm. 2024). ORV tracks have been observed to be within just a few yards of Bear Lake buckwheat plants (Bell pers. comm. 2024). ORVs are negatively impacting the quality of the site and could lead to a decline in the Bear Lake buckwheat population by crushing and uprooting individual plants. ORV activity has a high likelihood of destroying Bear Lake buckwheat plants and leading to the decline of the species if barriers are not installed to prevent vehicular access to the part of the property containing the population. Several unofficial foot paths have also been observed through the Bear Lake buckwheat population that could negatively impact the species through direct trampling or destruction of plants (Krantz pers. comm. 2024). In addition to direct impacts, both ORV activity and unofficial foot paths can have indirect negative impacts on Bear Lake buckwheat due to soil disturbance and compaction, reduced vegetative cover, and overall degradation of the habitat (Weaver and Dale 1978, Cole 1987).

Another human disturbance threatening Bear Lake buckwheat plants is trash dumping. Miscellaneous items such as spray paint cans, broken bottles, glass, and other plastic items have been seen among Bear Lake buckwheat plants (Bell pers. comm. 2024). Items dumped on top of plants could harm or kill Bear Lake buckwheat plants and lead to a further decline in the population.

Small Population Size

Bear Lake buckwheat is extremely rare and has very low abundance, which makes it highly vulnerable to extinction from human activities, natural catastrophes, and environmental and genetic chance events (Shaffer 1981, Shaffer 1987, Menges 1991,

Matthies et al. 2004). The inherent vulnerability of such a small population is a significant and ongoing threat to Bear Lake buckwheat.

Genetic drift, inbreeding depression, and a reduced ability to adapt to changing environmental factors are some of the risks of small population size, and these could be affecting Bear Lake buckwheat, however no genetic or demographic studies on the population have yet been conducted.

Fire and Fuel Reduction

No wildfires have been documented on the property containing Bear Lake buckwheat but that may change as the climate changes (CAL FIRE 2023a). It is unknown if Bear Lake buckwheat can survive fire or if fire would offer any benefits to the species. Other *Eriogonum* species with a subshrub growth form have been studied and shown to be negatively affected by fire with low rates of resprouting and a decrease in seed viability and germination (Keeley 2006, Shank 2019).

The California Department of Forestry and Fire Protection (CAL FIRE) uses fire hazard severity zones to identify which areas of the state have a moderate, high, or very high fire hazard severity. These fire hazard severity zones reflect areas that have similar burn probabilities and fire behavior characteristics (CAL FIRE 2023b). The property with Bear Lake buckwheat is outside of the fire hazard severity zone area designated by the state and is considered an area of local responsibility. In 2008, CAL FIRE recommended that local government designate most of the City of Big Bear Lake as a zone of very high fire hazard severity (CAL FIRE 2008). The property with Bear Lake buckwheat is outside of the very high fire hazard severity zone area recommended by CAL FIRE; however, properties adjacent to the Bear Lake buckwheat population are within the very high fire hazard severity zone. This could increase the likelihood that fuel reduction activities will be prioritized on the property with Bear Lake buckwheat, given that it is adjacent to an area that is very susceptible to wildfire.

Big Bear Lake City Ordinance 2008-379 (Native Brush and Shrub Ordinance) requires private property owners to reduce fire fuel dangers posed by native brush and vegetation by minimizing fuel materials. While the ordinance provides exceptions to activities that would result in the taking of rare, threatened, or endangered plant species, Bear Lake buckwheat does not currently receive any state or federal protections. Bear Lake buckwheat could therefore be impacted by brush clearing for fuel reduction if vegetation on the property is deemed a fire hazard.

Fire and fuel reduction are significant and immediate threats to Bear Lake buckwheat since the surrounding area is considered a very high fire hazard severity zone. In addition, fuel reduction activities could be a high priority to protect the restaurants and

homes on the property. Fire and fuel reduction could significantly reduce the population of Bear Lake buckwheat or cause the extinction of the species.

Climate Change

California is already experiencing the effects of climate change and those effects are anticipated to increase over the coming decades (Bedsworth et al. 2018). Predictions for California include rising temperatures, greater year to year variability in total precipitation, and reduced snowpack (Berg and Hall 2015, Polade et al. 2017, Bedsworth et al. 2018, Pierce et al. 2018). While some species may be able to adjust to a changing climate by migrating to more favorable conditions, it is unlikely that Bear Lake buckwheat will be able to do this. It is a perennial species with a longer generation time, meaning it likely takes longer to reach reproductive age, making it slower to migrate and adapt to changing climate conditions (Jump and Peñuelas 2005, Bisbing et al. 2021). In addition, since Bear Lake buckwheat appears to be a habitat specialist, migrating to more suitable conditions in the face of climate change is not likely if similar habitat and soil types are not available nearby. Further studies are needed to determine how strict of a habitat specialist Bear Lake buckwheat is, but all evidence points to it being restricted to a specialized soil type that is not found anywhere else in the Big Bear Lake area.

While climate change is not considered an immediate threat to Bear Lake buckwheat, it is a long-term threat that should be taken into consideration when developing management guidelines for the site and species.

Non-native Plants

Non-native plants are not currently considered a significant or immediate threat to Bear Lake buckwheat. There are some non-native plants on the same site as Bear Lake buckwheat, including intermediate wheatgrass (*Elymus hispidus*) and common soapwort (*Saponaria officinalis*), but these non-native plants are not currently impacting the species (Bell pers. comm. 2024). Intermediate wheatgrass could become an issue in the future if it spreads on the site since it is a rhizomatous grass that can create a monoculture under the right conditions (Bell pers. comm. 2024). The occurrence of common soapwort on site is likely the result of a garden escape from the adjacent mobile home park and could easily be removed from the site before it becomes an issue (Bell pers. comm. 2024). It is possible the lack of a large number of non-native plant species on the site is due to the unique soils Bear Lake buckwheat grows on.

Habitats with harsh or unusual soils have been shown to be less invaded by non-native plants than more hospitable habitats and soils (Zefferman et al. 2015).

Overexploitation

Bear Lake buckwheat is not currently known to be in the horticultural trade; however, buckwheat species are popular plants for rock gardens. Bear Lake buckwheat was mentioned in a 2003 article titled "*Eriogonum* as a Rock Garden Plant" as an "attractive plant to the garden," but the article noted that it might not be as sought after as other buckwheat species (Reveal 2003). The Department is not aware of any Bear Lake buckwheat plants in the horticultural trade and overexploitation is not currently a significant or immediate threat to Bear Lake buckwheat, but this could change in the future.

Existing Management Efforts

This section discusses the impact of existing management efforts on the species (Fish & G. Code, § 2072.3).

No existing regulatory mechanisms are currently in place at the federal, state, or local level that adequately protect Bear Lake buckwheat. As of October 2023, the City of Big Bear Lake is in the conceptual planning stages for developing the property that contains the only known occurrence of Bear Lake buckwheat (Sullivan pers. comm. 2023). The Department met with the City of Big Bear Lake in January of 2024 to discuss possible conservation measures for the species.

Bear Lake buckwheat co-occurs with one federally threatened species, ash-gray paintbrush (*Castilleja cinerea*). If Federal Endangered Species Act (ESA) protections are afforded to ash-gray paintbrush on the property due to its status as a federally threatened species, Bear Lake buckwheat may gain some protection due to its proximity to ash-gray paintbrush. However, ash-gray paintbrush only co-occurs with Bear Lake buckwheat in a small portion of the Bear Lake buckwheat population, so protections for ash-gray paintbrush may not benefit the entire Bear Lake buckwheat population (Roberts 2008). In addition, the full protections afforded to plants listed under the ESA are not always provided to plants on private land (ESA §9(a)(2)(B), 16 U.S.C. §1538(a)(2)(B)).

Seed collection is an important component to managing rare species, as collected seeds can be used for future research and restoration activities. Seed collections also provide insurance in case something happens to the natural population causing the species to go extinct in the wild. In September of 2003, 4,258 seeds were collected from 65 Bear Lake buckwheat individuals (Birker pers. comm. 2024). In 2023, a 20-year follow-

up germination test was run on the seeds and there was a 50% germination rate (Birker pers. comm. 2024). In October of 2023, 1,083 seeds were collected from 43 Bear Lake buckwheat individuals and germination tests are underway (Birker pers. comm. 2024).

SUFFICIENCY OF SCIENTIFIC INFORMATION TO INDICATE THE PETITIONED ACTION MAY BE WARRANTED

Bear Lake buckwheat is a subshrub in the buckwheat family with only a single known occurrence on the south shore of Big Bear Lake in San Bernardino County, California. Bear Lake buckwheat grows on a unique substrate of gray, silty, clay soil in a Jeffrey pine and juniper woodland. Bear Lake buckwheat occupies an area of less than 1.5 acres with 150 plants estimated in 2023. While Bear Lake buckwheat has been visited periodically over the years, no formal monitoring or research studies have been conducted on the species.

Bear Lake buckwheat is primarily threatened by habitat modification or destruction from the potential development of the private property where the species occurs. The property is owned by the Bear Valley Mutual Water Company and is being leased to the City of Big Bear Lake, who is exploring opportunities to further develop the property. Other significant threats to Bear Lake buckwheat include human disturbances (from off-road vehicle use, footpaths/trampling, and trash dumping), effects of small population size, and fire and fuel reduction activities. In addition, Bear Lake buckwheat is threatened by climate change, non-native plants, and overexploitation which could become increasingly significant in the future if the species is not monitored or adequately managed.

Pursuant to Fish and Game Code section 2073.5, the Department evaluated in this report the available information for each of the petition components and has determined that the petition includes sufficient scientific information to indicate that the petitioned action to list Bear Lake buckwheat as endangered may be warranted.

RECOMMENDATION TO THE COMMISSION

The Department recommends the Commission accept the petition for further consideration under CESA. If the Commission accepts the petition for further

consideration under CESA, the Department will commence a review of the status of the species at that time (Fish & G. Code, § 2074.6).

FUTURE MANAGEMENT

No management activities are currently being implemented for Bear Lake buckwheat. Below are some recommended future management actions to benefit Bear Lake buckwheat.

- Preserve existing occurrence and habitat. Bear Lake buckwheat is restricted to a single occurrence on private property. Every effort should be made to preserve all Bear Lake buckwheat plants and to protect Bear Lake buckwheat habitat from any disturbances that may occur on the property.
- Survey the west side of Alden Road to determine if any Bear Lake buckwheat plants or habitat remain. Plants are thought to have been extirpated from the west side of Alden Road but if habitat remains, this area could be used for potential outplanting efforts to expand the population.
- Establish baseline quantitative data. Very little is known about Bear Lake buckwheat's life history, genetics, soil preferences, or population size and trends. Collecting baseline data and implementing a demographic monitoring program are essential in order to assess the health of the population, understand the current status of the species, and inform best management strategies and conservation measures to ensure its continued existence.
- Research the feasibility of enhancing the existing population and establishing additional populations. Studies are needed to determine if it is appropriate and feasible to enhance the current population of Bear Lake buckwheat through outplanting efforts. Research is also needed to determine if Bear Lake buckwheat is a strict endemic to the unique substrate it grows on or whether it could grow on other substrates. This information can be used to inform the likelihood of success of transplanting activities.
- Collect additional seeds for long-term conservation storage and for potential use in future projects to increase Bear Lake buckwheat populations.
- Educate the public about the need to protect Bear Lake buckwheat.

LITERATURE CITED

A petition shall include information regarding the availability and sources of information (Fish & G. Code, § 2072.3). Below are all of the sources of information used in this report. These sources will be provided to the Fish and Game Commission.

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State of California
Department of Fish and Wildlife

Signed original on file,
received September 5, 2025

Memorandum

Date: September 4, 2025

To: Melissa Miller-Henson
Executive Director
Fish and Game Commission

From: Charlton H. Bonham
Director

Subject: **Status Review Report for Bear Lake Buckwheat (*Eriogonum microtheca* var. *lacus-ursi*)**

The California Department of Fish and Wildlife (Department) has prepared the attached status review report for Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*) for the California Fish and Game Commission (Commission) pursuant to the California Endangered Species Act, Fish and Game Code section 2050 et seq. The Commission published the Notice of Candidacy Findings on October 24, 2024, directing the Department to prepare a status review report.

The Department completed the attached status review report as required by Fish and Game Code section 2074.6. The status review report contains the Department's review of the best scientific information available to the Department on the status of Bear Lake buckwheat and serves as the basis for the Department's recommendation to the Commission that the petitioned action to list Bear Lake buckwheat as endangered is warranted. The Department finds that Bear Lake buckwheat is in danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease.

If you have any questions or need additional information, please contact Isabel Baer, acting Branch Manager, Habitat Conservation Planning Branch at (916) 203-3193 or by email at NativePlants@wildlife.ca.gov.

Attachment

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CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

California Endangered Species Act

Status Review for Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*)

Report to the Fish and Game Commission
August 2025

Cover page photo credit: Kristi Lazar (2024)

Suggested citation: California Department of Fish and Wildlife (CDFW). 2025. Status review for Bear Lake buckwheat (*Eriogonum microthecum* var. *lacus-ursi*). A report to the Fish and Game Commission, California Natural Resources Agency, Sacramento, CA, USA.

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LIST OF ABBREVIATIONS, ACRONYMS, AND TERMS

CAL FIRE – California Department of Forestry and Fire Protection
CEQA – California Environmental Quality Act
CESA – California Endangered Species Act
CNDDB – California Natural Diversity Database
CNPS – California Native Plant Society
Commission – California Fish and Game Commission
CRPR – California Rare Plant Rank
Department – California Department of Fish and Wildlife
ESA – Federal Endangered Species Act
et al. – "and others"
et seq. – "and the following"
ORV – Off-road vehicle
sp. – species
TEK – Traditional Ecological Knowledge
USFWS – United States Fish and Wildlife Service
var. – variety

EXECUTIVE SUMMARY

This status review for Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*) has been prepared by the California Department of Fish and Wildlife (Department) for the California Fish and Game Commission (Commission) pursuant to the requirements of the California Endangered Species Act (CESA; Fish & G. Code, § 2050 et seq.). This status review is based on the best scientific information currently available to the Department regarding each of the components listed under section 2072.3 of the Fish and Game Code and section 670.1 of title 14 of the California Code of Regulations. In addition, this status review includes a preliminary identification of habitat that may be essential to the continued existence of the species and the Department's recommendations for management activities and other recommendations for recovery of the species (Fish & G. Code, § 2074.6). This status review has been independently reviewed by scientific peers (Fish & G. Code, § 2074.6).

Bear Lake buckwheat is a subshrub in the buckwheat family with only one known occurrence on the south shore of Big Bear Lake in San Bernardino County, California. Bear Lake buckwheat grows on a unique substrate of gray, silty, clay soil in Jeffrey pine and juniper woodland habitat. Bear Lake buckwheat occupies an area of less than one acre with 836 plants counted in July 2024.

The primary threat to Bear Lake buckwheat is habitat modification or destruction from potential development of the private property where the species occurs. The City of Big Bear Lake leases the property from the Bear Valley Mutual Water Company and is exploring development opportunities. Other significant threats to Bear Lake buckwheat include human disturbances (from off-road vehicle use, footpaths/trampling, and trash dumping/littering), effects of small population size, and potential fire and fuel reduction activities. In addition, Bear Lake buckwheat may be threatened by climate change, non-native plant competition, and potential overexploitation, which could become increasingly significant in the future if the species is not monitored or adequately protected.

Based on the criteria described above and the best scientific information available, the Department has determined that listing Bear Lake buckwheat as endangered under CESA is warranted at this time. The Department further recommends implementation of the management recommendations and recovery measures described in this status review.

1 INTRODUCTION

1.1 Status Review Overview

This status review serves as the basis for the California Department of Fish and Wildlife's (Department) recommendation to the California Fish and Game Commission (Commission) on whether the petitioned action to list Bear Lake buckwheat (*Eriogonum microtheca* Nutt. var. *lacus-ursi* Reveal & A. Sanders) as endangered under the California Endangered Species Act (CESA) is warranted. This status review is based upon the best scientific information available to the Department. It is not intended to be an exhaustive review of all published scientific literature on Bear Lake buckwheat; rather, this status review is intended to summarize key points relevant to the status of the species and address regulatory report requirements.

Each of the petition components and listing factors that the Commission must consider in making its determination are included and addressed in this status review (Fish & G. Code, §§ 2072.3 & 2074.6; Cal. Code Regs., tit. 14, § 670.1). A petition to list a species under CESA must include "information regarding the population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce, the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, and the availability and sources of information. The petition shall also include information regarding the kind of habitat necessary for species survival, a detailed distribution map, and any other factors that the petitioner deems relevant" (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)). A status review must include a preliminary identification of the habitat that may be essential to the continued existence of the species and recommend management activities and other recommendations for recovery of the species (Fish & G. Code, § 2074.6; Cal. Code Regs., tit. 14, § 670.1, subd. (f)(1)). Additionally, the status review addresses the following required factors: "present or threatened modification or destruction of its habitat, overexploitation, predation, competition, disease, or other natural occurrences or human-related activities" (Cal. Code Regs., tit. 14, § 670.1, subd. (i)(1)(A)). In some instances, the Department has grouped similar components together and renamed components, described where applicable, to create a more cohesive and readable report.

In addition to addressing each of the petition components and listing factors, the Department must make a recommendation to the Commission as to whether the petitioned action to list Bear Lake buckwheat as endangered is warranted. An endangered species is defined under CESA as one "which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease" (Fish & G. Code, § 2062). A threatened species under CESA is

one that "although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by [CESA]" (Fish & G. Code, § 2067).

Receipt of this status review is to be placed on the agenda for the next available meeting of the Commission after delivery. At that time, the report will be made available to the public for a 30-day public comment period prior to the Commission taking any action on the petition.

1.2 CESA Petition History

On July 16, 2024, the Commission received a petition and recommendation from the Department to list Bear Lake buckwheat as endangered pursuant to CESA (Fish & G. Code, § 2050 et seq.).

On July 30, 2024, the Commission published its notice of receipt of the Department's petition and recommendation in the California Regulatory Notice Register (Fish & G. Code, § 2073.3; Cal. Code Regs., tit. 14, § 670.1, subd. (c); Cal. Reg. Notice Register 2024, No. 32-Z, p. 1017).

On October 10, 2024, at its public meeting, the Commission considered the Department's petition and recommendation, comments received, and oral testimony (Fish & G. Code, §§ 2074 & 2074.2). The Commission found that sufficient information exists to indicate the petitioned action may be warranted and accepted the petition for consideration (Fish & G. Code, § 2074.2; Cal. Code Regs., tit. 14, § 670.1, subd. (e)).

On October 25, 2024, the Commission published its notice of findings in the California Regulatory Notice Register, designating Bear Lake buckwheat a candidate species (Fish & G. Code, § 2074.2; Cal. Code Regs., tit. 14, § 670.1, subd. (e); Cal. Reg. Notice Register 2024, No. 43-Z, p. 1396). The Department subsequently initiated this status review (Fish & G. Code, § 2074.6; Cal. Code Regs., tit. 14, § 670.1, subd. (f)).

1.3 Federal Endangered Species Act Petition History

Bear Lake buckwheat is not currently listed under the federal Endangered Species Act (ESA) (16 U.S.C. § 1531 et seq.). In 2008, a recommendation was made to the United States Fish and Wildlife Service (USFWS) by Fred Roberts, Jr. with the San Bernardino/Riverside chapter of the California Native Plant Society (CNPS) to add Bear Lake buckwheat to the federal candidate list for threatened and endangered species (Roberts 2008). The USFWS considered the recommendation but did not move forward with ESA candidate listing because there was no proposed project for the site in 2008 and the USFWS was considering opportunities for a conservation agreement with the landowner (M. Crawford, personal communication, March 12, 2024).

1.4 Additional Species Status Designations

1.4.1 NatureServe Conservation Status Ranks

NatureServe's conservation status ranks are one way to assess the conservation status of a species across geographic scales using standard methods. These conservation status ranks are typically assigned by natural heritage programs. There is a nationwide network of natural heritage programs, with more than 80 programs throughout the western hemisphere, overseen by an organization called NatureServe (CNDDB 2020). The California Natural Diversity Database (CNDDB) is California's natural heritage program.

All natural heritage programs use the same ranking methodology originally developed by The Nature Conservancy, and subsequently revised and maintained by NatureServe, to assign conservation status ranks (Master et al. 2012). For subspecies and varieties, these conservation status ranks consist of three components: 1) a global conservation status rank (global rank, G rank) describing the status of a given species over its entire distribution; 2) a trinomial conservation status rank (trinomial rank, T rank) describing the status of a given subspecies or variety over its entire distribution; and 3) a subnational conservation status rank (subnational rank, S rank) describing the status of a given subspecies or variety within a state (Master et al. 2012). Global, trinomial, and subnational ranks are calculated using NatureServe's rank calculator, which uses a combination of rarity, threats, and trends to assign a conservation status rank for the taxon in question (Master et al. 2012). CNDDB has assigned Bear Lake buckwheat a global rank of G5, a trinomial rank of T1, and a subnational rank of S1, indicating that the full species, *Eriogonum microtheca*, is common globally, whereas the variety *lacus-ursi* is critically imperiled both globally and within California due to one or more of the following: very high risk of extinction due to a very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors (CNDDB 2020, 2024).

1.4.2 California Rare Plant Rank

CNPS works in collaboration with botanical experts throughout the state, including Department biologists, to assign rare plants a California Rare Plant Rank (CRPR) reflective of their rarity status (CNDDB and CNPS 2020). Bear Lake buckwheat has been assigned a CRPR of 1B.1 (CNPS 2025). Plants with a CRPR of 1B are considered rare, threatened, or endangered throughout their range with the majority endemic to California (CNDDB and CNPS 2020). The threat code extension of ".1" indicates that the species is seriously threatened in California with over 80% of occurrences threatened and a high degree and immediacy of threat (CNDDB and CNPS 2020).

1.5 California Native People and Traditional Ecological Knowledge

Since time immemorial, California Native American tribes have lived alongside the fish, wildlife, and native plants of California, including Bear Lake buckwheat. California Native American people have acquired knowledge of the environment over thousands of years; this is often referred to as Traditional Ecological Knowledge (TEK) and encompasses the world view where ecology, spirituality, human-animal relationships, and more should be in balance and are all interconnected. TEK and related practices support a deeper understanding of a species' life history and informs its management.

Through our tribal engagement process, the Department sought to understand how tribes would like to engage with the development of this status review and how TEK and tribal practices of stewardship, restoration, and conservation relate to and affect Bear Lake buckwheat and its habitat. The Department ensures permission is received from tribes before including any shared information in a status review. While the Department did not receive any tribal comments or information to be included in this status review, the Department is committed to providing opportunities for tribes to engage in future conservation discussions related to Bear Lake buckwheat, and to promoting collaborative management of California's natural resources. The tribal engagement summary for Bear Lake buckwheat is further described in Appendix A.

1.6 Notifications, Information Received, and Peer Review

Following the Commission's action to designate Bear Lake buckwheat as a candidate species for endangered status, the Department notified affected and interested parties and solicited data and comments on the petitioned action pursuant to Fish and Game Code section 2074.4 (see also Cal. Code Regs., tit. 14, § 670.1, subd. (f)(2)).

Tribal notifications were distributed by letter and email to tribes identified by the Native American Heritage Commission as having a cultural or traditional affiliation within the geographic area of Bear Lake buckwheat. The Department did not receive any comments in response to the tribal notifications. See Appendix A for additional details.

Public notifications were distributed to affected and interested parties and sent to email distribution lists maintained by the Department and the Commission. A press release was also distributed through the Department's website. The Department received six comments in response to public notifications. See Appendix B for additional details.

The draft status review was independently peer reviewed by three experts external to the Department (Fish & G. Code, § 2074.6; Cal. Code Regs., tit. 14, § 670.1, subd. (f)(2)). The Department evaluated the input received and amended the status review as

appropriate. See Appendix C for additional details and the Department's written response to peer review.

2 SPECIES DESCRIPTION AND TAXONOMY

The Commission has the authority to list "species or subspecies" as endangered or threatened under CESA (Fish & G. Code, §§ 2062, 2067, 2068, 2070). The listing process is the same for species and subspecies (Fish & G. Code, §§ 2070–2079.1). Conservation of infraspecific taxa (i.e. subspecies and varieties) is important for preserving the biological diversity of a species; there are currently 28 varieties and 33 subspecies of plants listed as rare, threatened, or endangered under CESA (Cal. Code Regs., tit. 14, § 670.2). Bear Lake buckwheat is a variety of the species *Eriogonum microtheca*; however, for convenience, the term "species" is used herein to refer to Bear Lake buckwheat.

2.1 Species Description

Bear Lake buckwheat is a perennial member of the buckwheat family (Polygonaceae). It is a subshrub with a woody stem at the base of the plant and herbaceous (i.e., non-woody) stems that die back seasonally (Figure 1) (Reveal 2005; Baldwin et al. 2012; Reveal and Rosatti 2012). Bear Lake buckwheat is typically 15–20 cm (5.9–7.9 in) tall and 40–60 cm (15.7–23.6 in) in diameter (Reveal and Rosatti 2012). Leaf blades are narrowly elliptic measuring 0.7–1.5 cm (0.3–0.6 in) long and 0.07–0.3 cm (0.03–0.12 in) wide (Reveal 2005; Reveal and Rosatti 2012). Leaf margins are usually rolled under, with white, densely matted hairs on the lower surface of the leaves and no hairs on the upper surface of the leaves (Figure 1) (Reveal and Rosatti 2012).

Bear Lake buckwheat has groupings of flowers (inflorescences) that are 1–3 cm (0.4–1.2 in) long (Figure 1) (Reveal 2005; Baldwin et al. 2012; Reveal and Rosatti 2012). Flowering stems are 4–8 cm (1.6–3.1 in) long and are generally hairless but may have some sparse hairs (Reveal 2004, 2005; Reveal and Rosatti 2012). Like most members of the buckwheat family, Bear Lake buckwheat has involucres, which are structures that grow under the flower or grouping of flowers that hold them together as a unit (Baldwin et al. 2012). Involucres in Bear Lake buckwheat are 3–4 mm (0.12–0.16 in) long and are generally hairless (Reveal and Rosatti 2012). Individual flowers are 2–2.5 mm (0.08–0.10 in) long and are cream colored (Reveal 2005; Reveal and Rosatti 2012). Bear Lake buckwheat produces dry one-seeded fruits called achenes that are 2–2.5 mm (0.08–0.10 in) long (Reveal 2005; Baldwin et al. 2012).

Figure 1. Photographs of Bear Lake buckwheat showing general growth form (left), leaves (middle), and inflorescences (right). Photo credit: Kristi Lazar (2024).

2.2 Species Taxonomy

Bear Lake buckwheat was first collected as *E. microthecum* in Bear Valley, San Bernardino County, California by Samuel Bonsall Parish and William Fletcher Parish in August of 1882 (Reveal 2004; CCH 2024); however, the species may have been known to Native Americans before that time. Bear Lake buckwheat was not formally described as a variety of *E. microthecum* until December 2004 when James Reveal published several new *Eriogonum* species and varieties including Bear Lake buckwheat (*E. microthecum* var. *lacus-ursi*) (Reveal 2004). The Department is not aware of molecular studies specific to *E. microthecum*; however, all current evidence supports the recognition of Bear Lake buckwheat as distinct from other varieties of *E. microthecum* based on morphological features and unique habitat requirements (Reveal 2004, 2005; Reveal and Rosatti 2012).

There is some confusion as to the correct spelling of Bear Lake buckwheat's scientific name. *E. microtheca* was first published as a species by Thomas Nuttall in 1848 (Nuttall 1848). The spelling of *E. microtheca* was maintained by several additional publications in 1853 and 1856 before *E. microthecum* began to be used in 1857 (Newberry et al. 1857; Reveal and Gandhi 2014). The change in spelling may have been a result of correcting what many believed to be a grammatical mistake. The usual practice for Latin scientific names is to have the genus and specific epithet endings agree in grammatical gender (e.g., masculine, feminine, or neuter). *Eriogonum* is of the neuter gender, so the matching specific epithet would be *microthecum*, and not the feminine *microtheca*. While E. *microthecum* is the most common spelling used in publications since 1858 and is still widely used today, recent publications and floras have reverted back to using *E.*

microtheca (Reveal 2005; Reveal and Rosatti 2012; Reveal and Gandhi 2014). *E. microtheca* var. *lacus-ursi* is the currently accepted spelling for Bear Lake buckwheat based on the spelling published in recent floras and is the name used in this status review (Reveal 2005; Reveal and Rosatti 2012).

2.3 Similar Taxa

Bear Lake buckwheat is one of ten varieties of *E. microtheca* in California (Reveal and Rosatti 2012). In addition to Bear Lake buckwheat, three other varieties of *E. microtheca* have been documented to occur in the San Bernardino Mountains of California and are similar in appearance to Bear Lake buckwheat (Figure 2) (Reveal 2004; CCH 2024). Johnston's buckwheat (*E. m.* var. *johnstonii*), San Bernardino buckwheat (*E. m.* var. *corymbosoides*), and Simpson's buckwheat (*E. m.* var. *simpsonii*)[1] have all been reported as occurring in the same mountain range as Bear Lake buckwheat; however, Bear Lake buckwheat has a highly restricted distribution within the San Bernardino Mountains and does not directly co-occur with any other *E. microtheca* variety (CCH 2024). The nearest known population of *E. microtheca* to Bear Lake buckwheat is a population of San Bernardino buckwheat that occurs on the north side of Big Bear Lake, about 2.4–3.2 km (1.5–2 mi) from Bear Lake buckwheat (T. Krantz, personal communication, July 7, 2025).

Bear Lake buckwheat, Johnston's buckwheat, San Bernardino buckwheat, and Simpson's buckwheat can be distinguished from each other through a combination of characteristics related to plant size, leaf attributes, and stem hairs (Table 1). Bear Lake buckwheat can most easily be identified by its rolled-under leaf blade margins, hairless upper leaf surfaces, and generally hairless stems. These characteristics, taken together, are not shared by any other variety of *E. microtheca* in the San Bernardino Mountains. In addition, Bear Lake buckwheat is restricted to a unique fine, gray, silty, clay soil while the other varieties of *E. microtheca* are strongly associated with carbonate soils.

[1] The Jepson eFlora indicates Simpson's buckwheat does not occur in the San Bernardino Mountains and is restricted to the eastern Sierra Nevada and eastern Mojave Desert in California (Reveal and Rosatti 2012). However, several herbarium collections from the San Bernardino Mountains have been identified as Simpson's buckwheat, so that variety is included in this section (CCH 2024).

Figure 2. Photographs of Eriogonum microtheca varieties from the San Bernardino Mountains. Upper left photo is Bear Lake buckwheat (E. m. var. lacus-ursi). Upper right photo is Johnston's buckwheat (E. m. var. johnstonii). Lower left photo is San Bernardino buckwheat (E. m. var. corymbosoides). Lower right photo is Simpson's buckwheat (E. m. var. simpsonii). Photo credit: Duncan Bell (2023).

Table 1. Key traits to distinguish between Eriogonum microtheca varieties that grow in the San Bernardino Mountains (Reveal 2005; Reveal and Rosatti 2012).

	Bear Lake buckwheat	Johnston's buckwheat	San Bernardino buckwheat	Simpson's buckwheat
Variety	*lacus-ursi*	*johnstonii*	*corymbosoides*	*simpsonii*
Height	15–20 cm (5.9–7.9 in)	6–13 cm (2.4–5.1 in)	30–60 cm (11.8–23.6 in)	10–150 cm (3.9–59 in)
Width	40–60 cm (15.7–23.6 in)	20–50 cm (7.9–19.7 in)	60–150 cm (23.6–59 in)	40–160 cm (15.7–63 in)
Leaf shape	Narrowly elliptic	Elliptic to ovate	Elliptic to obovate	Narrowly elliptic
Leaf margins	Rolled-under	Flat	Flat	Rolled-under
Upper leaf surface	No hairs	Hairy or not	Hairy or not	Hairy
Stem hairs	Sparse hairs or no hairs	Hairy or not	Dense white hairs	Dense white hairs

3 LIFE HISTORY

This section considers the best available scientific information regarding the species' life history (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)).

Bear Lake buckwheat has bisexual flowers that bloom between July and October, with fruiting likely lasting into November (Reveal 2005; Reveal and Rosatti 2012; Bell 2023). There have not been any studies specific to the life history of Bear Lake buckwheat, but some assumptions can be made based on characteristics shared by most buckwheat species and based on Department staff observations. Buckwheat flowers tend to have an open flower morphology with easily accessible nectar and pollen, which has been shown to attract generalist insect pollinators (McCall and Primack 1992; Ollerton et al. 2007).

In 2024, Department staff observed a variety of insects visiting Bear Lake buckwheat flowers, including common grass skimmers (*Paragus haemorrhous*), bristle flies in the family Tachinidae, digger bees in the genus *Anthophora*, and ants (likely California harvester ants, *Pogonomyrmex californicus*). While Bear Lake buckwheat appears to be

visited by a variety of generalist insect pollinators, studies are needed to determine the effectiveness of the insects at pollinating Bear Lake buckwheat.

Observations of Bear Lake buckwheat in 2023 noted that nearly all the plants were in flower in July (D. Bell, personal communication, February 12, 2024). This aligns with Department staff observations made in July 2024, in which 89% of the plants were reproductive (in bud, flower, or fruit) and 11% were vegetative. In 2008, about 10% of the plants observed were presumed to be seedlings (USFS 2008). No seedlings were observed in 2023 (D. Bell, personal communication, February 12, 2024). In 2024, Department staff looked for seedlings and observed them at both the west and east ends of the Bear Lake buckwheat population (Figure 3); however, a complete census of all seedlings was not performed. Seedlings were difficult to find unless specifically searching for them, which may account for the lack of seedlings observed in 2023.

Several rare perennial buckwheat species that have very restricted ranges in other parts of California and other states have been shown to have low seed set and high seedling mortality (Kaye et al. 1990; Morefield 1996; Dunwiddie et al. 2001; Caplow 2005). Based on observations from 2023, Bear Lake buckwheat appears to have ample seed set with seeds viable when tested in a lab setting (D. Bell, personal communication, February 12, 2024; C. Birker, personal communication, February 15, 2024 and February 10, 2025). Seedlings were observed on site in 2008 and 2024, but it is unknown what proportion of seedlings survive to adulthood. Additional data on Bear Lake buckwheat seedling survival over time is needed.

Dispersal of Bear Lake buckwheat seeds is likely similar to observed dispersal of other buckwheat species, occurring primarily via gravity, wind, and movement by animals (e.g., ants) (Dunwiddie et al. 2001). Buckwheat seeds fall from the plant enclosed by light, papery flower parts, suggesting that wind could play an important role in seed dispersal (Morefield 1996). Ants have been shown to move seeds of other buckwheat species, but methods of seed dispersal by insects have not been specifically studied for Bear Lake buckwheat (Dunwiddie et al. 2001). In 2024, Department staff observed ants around Bear Lake buckwheat plants that appeared to be carrying flower parts of an unidentified plant. Thus, ants may play a role in Bear Lake buckwheat seed dispersal as well.

Other species of perennial buckwheat have been observed to produce adventitious roots (roots formed by non-root tissue) from decumbent stems (Little 1981; Anderson 2004). Adventitious roots can serve several functions including to increase root surface area, establish asexual vegetative reproduction, and increase stability of the plant in an unstable, eroding environment (Little 1981). Some Bear Lake buckwheat plants have been observed by Department staff to have decumbent stems just under the soil surface connecting two plants that appear to be separately rooted (Figure 3). This indicates that

Bear Lake buckwheat may be a species that produces adventitious roots as a survival adaptation, but further study is needed.

Figure 3. Photograph of what appears to be two separate Bear Lake buckwheat plants connected by a stem just under the soil surface (indicated in photograph with white arrow). Photo credit: Kristi Lazar (2024).

No information is available on the typical growth rate and life span of Bear Lake buckwheat. In 2024, Department staff observed some Bear Lake buckwheat individuals with large woody stems, suggesting there are plants in the population that are quite old (Figure 4). In addition, studies are needed on Bear Lake buckwheat's ecological relationships with other organisms, and the presence of seedlings, juveniles, reproductive adults, and senesced plants, to better assess the long-term health and viability of the species.

Figure 4. Photographs of a Bear Lake buckwheat seedling (left) and an older Bear Lake buckwheat plant with a large, sprawling woody stem (right). Photo credit: Kristi Lazar (2024).

4 RANGE AND DISTRIBUTION

This section considers the species' range and distribution and provides a detailed distribution map (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)). A species' range for the purposes of CESA and this status review is the species' California range (Cal. Forestry Assn. v. Cal. Fish and Game Com. (2007) 156 Cal.App.4th 1535, 1551). Range describes the general geographical area in which a species occurs. Distribution describes the actual sites where individuals and populations of the species occur within the species' range.

As documented in the Department's CNDDB, Bear Lake buckwheat is a species that has only ever been known from a single occurrence along Alden Road on the south shore of Big Bear Lake at the northeast end of the San Bernardino Mountains in San Bernardino County, California (Figure 5) (CNDDB 2024). This occurrence is at an elevation of about 2,063 m (6,770 ft) (CCH 2024). It is unknown if the species was once more common in the Big Bear Lake area prior to the creation of Big Bear Lake in 1884, and installation of a taller dam in 1912, which resulted in inundation of additional land around the lake (Holmes 1956; Hinckley 1983; Bellamy and Keller 2006). It is likely that the species has always had a very restricted range, given that no other Bear Lake buckwheat occurrences have been reported.

Figure 5. Map of Bear Lake buckwheat's range. Detailed location information is available through the California Natural Diversity Database (CNDDB). This figure shows the Bear Lake buckwheat occurrence as a more general shape (orange star) to adhere to the CNDDB license agreement and to protect the species from harm.

The Bear Lake buckwheat occurrence is bisected by Alden Road, and for the purposes of this status review, the portions of the occurrence on the west and east side of Alden Road are sometimes discussed as separate populations. The population on the west side of Alden Road has been extirpated (CNDDB 2024). The population on the east side of Alden Road is extant. Based on data collected by Department staff in 2024, the current area occupied by Bear Lake buckwheat is less than one acre. The Big Bear Lake area has been surveyed extensively over many years and no other populations of Bear Lake buckwheat have been found (T. Krantz, personal communication, February 9, 2025). This single occurrence is therefore thought to be the only occurrence of the species in existence and constitutes the entire distribution of Bear Lake buckwheat.

5 HABITAT

This section considers the best available scientific information regarding the kind of habitat necessary for the species survival (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)), and a preliminary identification of the habitat that may be essential to the continued existence of the species (Fish & G. Code, § 2074.6; Cal. Code Regs., tit. 14, § 670.1, subd. (f)(1)).

Bear Lake buckwheat is endemic to the south shore of Big Bear Lake in the San Bernardino Mountains. A weather station located less than 2.4 km (1.5 mi) from Bear Lake buckwheat has been recording climatic data since 1960, providing a good indication of the type of weather conditions Bear Lake buckwheat experiences (WRCC 2025). From 1960 through 2024, daily maximum temperatures recorded at the weather station were highest in the month of July with an average high of 27.1°C (80.8°F), and lowest in the month of January with an average low of -6°C (21.1°F) (WRCC 2025). Precipitation (rain and melted snow) averaged 54.9 cm (21.6 in) per year and snowfall averaged 154.9 cm (61 in) per year, with most of the precipitation and snowfall occurring in January (WRCC 2025).

Bear Lake buckwheat occurs on a geologic formation classified as Quarternary alluvium and is adjacent to Quarternary clay (Dibblee 1964). Soil at the Bear Lake buckwheat site is part of the Garloaf-Urban land complex soil series with four to nine percent slopes (Soil Survey Staff 2024). Garloaf soils are described as well drained, very cobbly, clay, loam soils that are comprised of alluvium derived from granitoid parent material (Soil Survey Staff 2024). While these types of soils are common along the south side of Big Bear Lake, Bear Lake buckwheat appears to be restricted to an outcrop of unique substrate that is not reflected in available soil surveys. In 2003, Michael Denslow reported that no other substrate like the kind Bear Lake buckwheat grows on has been seen in the area (CCH 2024). The unique substrate Bear Lake buckwheat grows on is a fine, gray, silty, clay soil with a dispersed scattering of quartzite rocks (Figure 6) (D. Bell, personal communication, February 12, 2024; CCH 2024; T. Krantz, personal

communication, February 12, 2024). This soil is similar in appearance to the gray soils found around Baldwin Lake, located several miles to the east; however, no Bear Lake buckwheat plants have been discovered beyond the immediate vicinity of Alden Road despite decades of botanical surveys throughout the San Bernardino Mountains, suggesting that the soil at this location may be uniquely suitable for Bear Lake buckwheat (T. Krantz, personal communication, February 12, 2024 and February 9, 2025). Detailed studies are needed on the chemical and physical properties of this soil.

Figure 6. Photographs of the fine, gray, silty, clay soil with a dispersed scattering of quartzite rocks, which is the substrate that Bear Lake buckwheat is restricted to. Photo credit: Kristi Lazar (2024).

This unique soil is restricted to a small hill on the east side of Alden Road. The very top of the hill contains pebble plain-like soil (reddish soil with a higher clay content and a loose pebble-rich layer near the surface), whereas the lower slopes of the hill contain the fine, gray, silty, clay soil characteristic of Bear Lake buckwheat habitat (Derby and Wilson 1978; Burge et al. 2017; Department observation 2024). Bear Lake buckwheat is restricted to the south side of the hill, despite the soil and habitat being very similar on the west, east, and north sides of the hill. In addition, Bear Lake buckwheat occurs on the lower slopes of the hill but not further up the hill. This preference for the lower slopes may be because the lower slopes gather more moisture than the upper slopes, or may be a result of Bear Lake buckwheat plants being unable to establish on upper slopes where there is more erosion. Studies are needed to better understand Bear Lake buckwheat habitat preferences.

Bear Lake buckwheat grows in openings within a conifer woodland of Jeffrey pine (*Pinus jeffreyi*) and juniper (*Juniperus grandis*) (CCH 2024). Associates include Parry's fringed onion (*Allium parryi*), Utah service-berry (*Amelanchier utahensis*), big sagebrush (*Artemisia tridentata*), cheatgrass (*Bromus tectorum*), plain mariposa lily (*Calochortus invenustus*), Nevin's bird's-beak (*Cordylanthus nevinii*), western hawksbeard (*Crepis occidentalis*), bottlebrush squirreltail (*Elymus elymoides*),

spreading groundsmoke (*Gayophytum diffusum*), broom snakeweed (*Gutierrezia sarothrae*), fineleaf hymenopappus (*Hymenopappus filifolius*), June grass (*Koeleria macrantha*), prickly lettuce (*Lactuca serriola*), creeping wild rye (*Leymus triticoides*), Parish's biscuitroot (*Lomatium nevadense* var. *parishii*), Indian rice grass (*Oryzopsis hymenoides*), southern mountain phlox (*Phlox austromontana*), knotweed (*Polygonum* sp.), curveseed butterwort (*Ranunculus testiculatus*), blue sage (*Salvia pachyphylla*), Parish's umbrellawort (*Tauschia parishii*), and yellow salsify (*Tragopogon dubius*) (USFS 2008; CCH 2024; Department observation 2024).

Bear Lake buckwheat also occurs near several rare plant species that are federally listed under the ESA, state-listed under CESA, and/or have a CRPR designation (Table 2). Big Bear Valley milkvetch (*Astragalus lentiginosus* var. *sierrae*), ash-gray paintbrush (*Castilleja cinerea*), silver-haired ivesia (*Ivesia argyrocoma* var. *argyrocoma*), and Bear Valley pyrrocoma (*Pyrrocoma uniflora* var. *gossypina*) are rare plant species that grow immediately adjacent to, and in the same unique soils as, Bear Lake buckwheat (Department observation 2024). Other rare plant species that occur near Bear Lake buckwheat (within 100 m/300 ft) include crested milkvetch (*Astragalus bicristatus*), Heckard's paintbrush (*Castilleja montigena*), Big Bear Valley sandwort (*Eremogone ursina*), southern mountain buckwheat (*Eriogonum kennedyi* var. *austromontanum*), and bird-foot checkerbloom (*Sidalcea pedata*) (Department observation 2024). Additional rare plant species that occur near Bear Lake buckwheat may be discovered if a detailed floristic survey of the area is conducted.

6 ABUNDANCE AND POPULATION TREND

This section considers the species' abundance and population trends (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)).

The abundance of Bear Lake buckwheat is very low. Only one occurrence of Bear Lake buckwheat has been documented to date. In 2024, Department staff performed a detailed population census of Bear Lake buckwheat. To the Department's knowledge, a full census had not previously been performed at the site and without regular population monitoring it can be difficult to determine population trends. However, as described below, the available information indicates that the species is experiencing a downward population trend when historic land use and known extirpations of Bear Lake buckwheat are considered.

Table 2. Rare plant species observed within 100 m (328 ft) of Bear Lake buckwheat in 2024. Rare plant species include those that are federally listed under the federal Endangered Species Act (ESA), state-listed under the California Endangered Species Act (CESA), and/or have a California Rare Plant Rank (CRPR) designation (CNDDB 2020, 2024; Department observation 2024; CNPS 2025).

Scientific Name	Common Name	Status*
Astragalus bicristatus	crested milkvetch	CRPR 4.3
Astragalus lentiginosus var. *sierrae*	Big Bear Valley milkvetch	CRPR 1B.2
Castilleja cinerea	ash-gray paintbrush	Threatened (ESA) CRPR 1B.2
Castilleja montigena	Heckard's paintbrush	CRPR 4.3
Eremogone ursina	Big Bear Valley sandwort	Threatened (ESA) CRPR 1B.2
Eriogonum kennedyi var. *austromontanum*	southern mountain buckwheat	Threatened (ESA) CRPR 1B.2
Ivesia argyrocoma var. *argyrocoma*	silver-haired ivesia	CRPR 1B.2
Pyrrocoma uniflora var. *gossypina*	Bear Valley pyrrocoma	CRPR 1B.2
Sidalcea pedata	bird-foot checkerbloom	Endangered (ESA) Endangered (CESA) CRPR 1B.1

*CRPR 1B.1: Plants designated as rare, threatened, or endangered in California and elsewhere; seriously threatened in California.
CRPR 1B.2: Plants designated as rare, threatened, or endangered in California and elsewhere; moderately threatened in California.
CRPR 2B.2: Plants designated as rare, threatened, or endangered in California but common elsewhere; moderately threatened in California.
CRPR 4.3: Plants of limited distribution; not very threatened in California.

The natural habitat in the Big Bear Lake area has been drastically altered by humans since the late 1800s, beginning with the installation of a dam and flooding of the valley to create Big Bear Lake (Bellamy and Keller 2006). The area has also been a popular tourist destination since the early 1900s when roads were constructed, leading to additional development and increased recreation (Holmes 1956; Bellamy and Keller 2006). Given how close Bear Lake buckwheat grows to the lakeshore, it is possible that the species was once more extensive in the area prior to the creation of Big Bear Lake. The property that contains Bear Lake buckwheat's entire distribution has been heavily impacted over the years by the construction of restaurants, homes, roads, and parking lots, which have destroyed or disturbed much of the natural habitat. It is possible that Bear Lake buckwheat once occurred throughout the property but is now restricted to the only remaining natural habitat on the site.

Immediately south of the property containing Bear Lake buckwheat is a mobile home park that has been in place since at least 1959 (LandVision 2024b). The extant population of Bear Lake buckwheat grows less than 1 m (3.3 ft) from a fence separating the property from the adjacent mobile homes. It is likely the parcel with the mobile homes once contained habitat for, or populations of, Bear Lake buckwheat, given how close the extant population of Bear Lake buckwheat is to the parcel (LandVision 2024b). There is no appropriate habitat remaining for Bear Lake buckwheat on the mobile home park parcel.

The portion of the property with Bear Lake buckwheat on the west side of Alden Road had a small population of about 25 Bear Lake buckwheat plants in 1986 but the species was extirpated from that site by 1999 (CCH 2024; CNDDB 2024; T. Krantz, personal communication, February 12, 2024). Bear Lake buckwheat plants were reportedly extirpated when soils were scraped and removed for expansion of the adjacent marina in 1998 and 1999 (Roberts 2008). The west side of Alden Road remains undeveloped but Department staff surveys in 2024 confirmed that no Bear Lake buckwheat plants remain. The Department did find remnant patches of fine, gray, silty, clay soil on the west side of Alden Road that may be suitable for reintroductions of Bear Lake buckwheat in the future.

Estimates of population size on the east side of Alden Road have been noted by several collectors and observers over the years, with about 300 individuals in 2001, about 200 individuals in 2003, 310 individuals in 2008, about 100 individuals in 2022, and about 150 individuals in 2023 (Reveal 2004; USFS 2008; T. Krantz, personal communication, October 9, 2023; CCH 2024; CNDDB 2024; USFS 2024). It is unknown if these reported population sizes were for the entire Bear Lake buckwheat population or if they represent just a portion of the population. In July 2024, Department staff performed a detailed population survey of Bear Lake buckwheat and counted a total of 836 individuals. Both Tim Krantz, who originally discovered the population in 1986, and

Scott Eliason, who has visited the population periodically over the years, were with Department staff during the 2024 survey and report that the population on the east side of Alden Road is similar in size to previous years. This suggests that the 2024 population size is likely not an increase from previous years, as it appears, but that the population size documented in 2024 is just the first full census of the population. Previous population numbers were likely for small portions of the site or rough visual estimates. This also suggests that the population on the east side of Alden Road may have a stable population trend, but regular population monitoring is needed to confirm this anecdotal observation.

While 836 Bear Lake buckwheat individuals were counted in July 2024, this may be a high population estimate. Nineteen of the plants counted in 2024 were seedlings and may not survive to adulthood. In addition, conducting an accurate survey of the entire Bear Lake buckwheat population presents challenges. It can be difficult to differentiate a single individual of Bear Lake buckwheat from multiple individuals, since some plants have connecting stems just under the soil surface. Bear Lake buckwheat plants can also grow underneath and within sagebrush shrubs, making it difficult to trace the stem back to the soil surface to differentiate a single Bear Lake buckwheat individual from multiple individuals.

While population trend data is not currently available for Bear Lake buckwheat due to lack of regular population monitoring, the Department's 2024 population census can be used as a baseline for determining population trends in the future. Given the extirpation of all plants on the west side of Alden Road in the late 1990s, Bear Lake buckwheat has lost a portion of its population, suggesting the species has experienced, or may be experiencing, a downward population trend since its discovery in 1986. As discussed above, the species has likely experienced an even larger downward population trend given the habitat destruction and disturbances that have occurred throughout the Big Bear Lake area since the late 1800s.

7 THREATS

This section considers the factors affecting the ability of the species to survive and reproduce and the degree and immediacy of threat (Fish & G. Code, § 2072.3; see also Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)). In addition, this section addresses the six listing factors identified in title 14 of the California Code of Regulations, section 670.1, subdivision (i)(1)(A): present or threatened modification or destruction of habitat, overexploitation, predation, competition, disease, and other natural occurrences or human-related activities. This section reviews the best scientific information available, and assesses the degree of threat, for each factor. The sixth listing factor, "other natural occurrences or human-related activities," is addressed under the following subsections:

7.2 Other human disturbances, 7.3 small population size, 7.4 fire and fuel reduction, and 7.6 climate change.

7.1 Present or Threatened Modification or Destruction of Habitat

The most significant and immediate threat to Bear Lake buckwheat is habitat modification and destruction. The species currently occupies a small area of undeveloped habitat on private property on the east side of Alden Road in the City of Big Bear Lake (CNDDB 2024). The portion of the property containing Bear Lake buckwheat is zoned for commercial visitor use (City of Big Bear Lake 1999). While Bear Lake buckwheat occupies a small undeveloped area of the property (less than one acre), other portions of the property that may have contained suitable habitat have been developed with two restaurants, two single-family rental homes, paved and dirt roads, parking lots, and boat storage present on the property (City of Big Bear Lake 2021; LandVision 2024a).

In November 2021, the City of Big Bear Lake announced it would be leasing a 19-acre area from the Bear Valley Mutual Water Company, including the property containing the Bear Lake buckwheat population, for 99 years with an option to extend for up to 30 additional years (City of Big Bear Lake 2021). The City of Big Bear Lake also announced plans to develop at least 10 acres of the 19-acre area into a new park for residents and visitors to Big Bear Lake (City of Big Bear Lake 2021; LandVision 2024a). The City of Big Bear Lake indicates that in addition to a park, they plan to explore development opportunities within the 19-acre area, including construction of new workforce housing units and commercial development (City of Big Bear Lake 2021). As of July 2025, the City of Big Bear Lake was in the process of preparing a request for information to assess interest in developing the property with Bear Lake buckwheat as a city park (City of Big Bear Lake, personal communication, April 1, 2025 and July 11, 2025).

Since this area contains the only known population of Bear Lake buckwheat, development of, and disturbances to, the area could be detrimental to the population and could cause the species' extinction.

7.2 Other Human Disturbances

Bear Lake buckwheat is significantly and immediately threatened by human disturbance from off-road vehicle (ORV) activities, footpaths, and trash dumping/littering. The property containing Bear Lake buckwheat is easily accessible to the public, resulting in vehicular and foot traffic on the site. The Bear Lake buckwheat population is not completely fenced off, making it relatively easy for people and vehicles to access and potentially harm the species.

Trespass ORV activity from dirt bikes, bicycles, motorcycles, and other recreational vehicles is currently impacting the portion of the property that contains Bear Lake buckwheat (D. Bell, personal communication, February 12, 2024; Department observation 2024; T. Krantz, personal communication, February 12, 2024; T. Krantz, personal communication, July 7, 2025). ORVs and the creation of bike ramps on the hillside are negatively impacting the quality of the habitat on site by creating tracks and ruts in the soil and may be altering the surface hydrology of the site. ORVs and associated activities could lead to a decline in the Bear Lake buckwheat population by crushing and uprooting individual plants and making the soil and habitat conditions on the site no longer suitable for Bear Lake buckwheat. In 2024, ORV tracks were observed within Bear Lake buckwheat's current distribution, with some Bear Lake buckwheat plants damaged from the ORVs (Figure 7). The chain link fence that separates the property with Bear Lake buckwheat from the mobile home park property to the south has a gate that is sometimes left open and appears to be the main entry point for ORVs onto the property with Bear Lake buckwheat. In July 2024, the City of Big Bear Lake closed and locked the gate, but this has not prevented all trespass on the site as fresh ORV tracks were observed in July 2025 (T. Krantz, personal communication, July 7, 2025). ORV activity will continue to harm and destroy Bear Lake buckwheat plants, leading to the decline of the species, if permanent barriers are not installed to prevent vehicular access to the population.

Several unofficial foot paths have also been observed through the area containing Bear Lake buckwheat that could negatively impact the species through direct trampling or destruction of plants (T. Krantz, personal communication, February 12, 2024). In addition to direct impacts from human disturbances, both ORV activity and unofficial foot paths can have indirect negative impacts on Bear Lake buckwheat due to soil disturbance and compaction, reduced vegetative cover, altered surface hydrology, and overall degradation of the habitat (Weaver and Dale 1978; Cole 1987). The unique soil that Bear Lake buckwheat is restricted to is very susceptible to disturbance. When the soil is dry, it is loose, erodible, and easily disturbed by ORV activity and foot traffic. When the soil is wet, it is prone to forming deep ruts from ORV activity that can result in damage to vegetation and alteration of surface hydrology (Figure 7) (T. Krantz, personal communication, July 7, 2025).

Trash dumping and littering are additional human disturbances threatening Bear Lake buckwheat. Miscellaneous items such as spray paint cans, glass and plastic bottles, and other household items have been observed among Bear Lake buckwheat plants (Figure 7) (D. Bell, personal communication, February 12, 2024; Department observation 2024). Items dumped on top of Bear Lake buckwheat individuals could harm or kill the plants and lead to a further decline in the species' population.

Figure 7. Photographs of human disturbances impacting Bear Lake buckwheat. The photograph on the left shows tire tracks through the Bear Lake buckwheat population with white arrows indicating Bear Lake buckwheat plants. The photograph on the right shows trash lying on top of Bear Lake buckwheat plants. Photo credit: Kristi Lazar (2024).

7.3 Small Population Size

Bear Lake buckwheat is extremely rare and has low abundance, which makes it highly vulnerable to extinction from human activities, natural catastrophes, and environmental and genetic chance events (Shaffer 1981, 1987; Menges 1991; Matthies et al. 2004). While population surveys conducted by Department staff in 2024 indicate that the population size is larger than previously reported, Bear Lake buckwheat still has a very small global population size with fewer than 850 individuals in an area of less than one acre. The inherent vulnerability of such a small population is a significant and ongoing threat to Bear Lake buckwheat.

Genetic drift, inbreeding depression, and a reduced ability to adapt to changing environmental factors are some of the risks of small population size, and these could be affecting Bear Lake buckwheat, however no genetic or demographic studies on the population have yet been conducted.

7.4 Fire and Fuel Reduction

No wildfires have been documented on the property that contains the only known population of Bear Lake buckwheat, but that may change as the climate changes and wildfires become more frequent (CAL FIRE 2023a). It is unknown if Bear Lake buckwheat can survive fire or if fire would offer any benefits to the species. Other *Eriogonum* species with a subshrub growth form have been studied and shown to be negatively affected by fire with low rates of resprouting and a decrease in seed viability and germination (Keeley 2006; Shank 2019).

The California Department of Forestry and Fire Protection (CAL FIRE) uses fire hazard severity zones to identify which areas of the state have a moderate, high, or very high fire hazard severity. These fire hazard severity zones reflect areas that have similar burn probabilities and fire behavior characteristics (CAL FIRE 2023b). In 2008, CAL FIRE recommended that the local government designate most of the City of Big Bear Lake as a zone of very high fire hazard severity (CAL FIRE 2008). Currently, the property containing Bear Lake buckwheat is outside of the very high fire hazard severity zone area recommended by CAL FIRE; however, properties adjacent to the Bear Lake buckwheat population are within the very high fire hazard severity zone. This could increase the likelihood that fuel reduction activities will be prioritized on the property containing Bear Lake buckwheat, given that it is adjacent to an area that is considered very susceptible to wildfire. In 2023–2024, there was also legislation proposed that would have allowed the State Fire Marshal to alter fire hazard severity zone designations that may have impacted habitat along Alden Road (Assem. Bill No. 3150 (2023–2024 Reg. Sess.)). That particular Assembly bill was not passed in 2024, but other bills related to fire hazard management activities could impact Bear Lake buckwheat in the future.

Big Bear Lake City Ordinance 2008-379 (Native Brush and Shrub Ordinance) requires private property owners to reduce fire fuel dangers posed by native brush and vegetation by minimizing fuel materials. While the ordinance provides exceptions to activities that would result in the taking of rare, threatened, or endangered plant species, Bear Lake buckwheat does not currently receive any state or federal protections. Bear Lake buckwheat could therefore be impacted by brush clearing for fuel reduction if vegetation on the property is deemed a fire hazard. In 2025, the Governor of California issued a state of emergency proclamation that suspended environmental statues, rules, and regulations in order to expedite critical fuels reduction projects (Governor's Proc. (March 1, 2025)). The impact that this proclamation will have on Bear Lake buckwheat is unknown, but suspension of certain environmental regulations could negatively affect the species.

Fire and fuel reduction are significant and immediate threats to Bear Lake buckwheat since the surrounding area is considered a very high fire hazard severity zone. In addition, fuel reduction activities could be a high priority to protect the adjacent residential community. Fire and fuel reduction could significantly reduce the population of Bear Lake buckwheat or cause the extinction of the species.

7.5 Competition with Non-Native Plants

Non-native plants are not currently considered an immediate threat to Bear Lake buckwheat. The lack of a large number of non-native plant species and the low density of non-native plants present on the site is likely due to the unique soil Bear Lake buckwheat grows in. While analyses have not been conducted on Bear Lake buckwheat

soil, the chemical and physical properties of the unusual soil may make the habitat difficult for non-native plants to invade. Habitats with harsh soils have been shown to be less invaded by non-native plants as compared to areas with more hospitable habitats and soils (Zefferman et al. 2015).

While there are not a large number of non-native plants growing with Bear Lake buckwheat, there are some non-native plants present that may become serious threats in the future, including intermediate wheatgrass (*Elymus hispidus*), curveseed butterwort, and several horticultural plants that likely escaped from the gardens of adjacent residences. Intermediate wheatgrass is a rhizomatous grass that can create a monoculture under the right conditions so it could spread across the site (D. Bell, personal communication, February 12, 2024). Intermediate wheatgrass is prevalent in the disturbed areas at the eastern end of the Bear Lake buckwheat population and could become a larger issue if it is not controlled (Department observation 2024). Curveseed butterwort is an invasive plant that spreads rapidly and can form dense mats if actions are not taken to control the species (The University of Arizona and Arizona Native Plant Society 2024). Curveseed butterwort is currently growing immediately adjacent to Bear Lake buckwheat plants and may be reducing the resources available for Bear Lake buckwheat individuals to thrive on the site. The horticultural plants near Bear Lake buckwheat are not currently impacting the species directly but should also be removed from the site before they become established and start competing with Bear Lake buckwheat for resources.

A dense population of the highly invasive, non-native perennial pepperweed (*Lepidium latifolium*) is growing in a moist area less than 100 m (328 ft) east of Bear Lake buckwheat. This perennial pepperweed population is growing adjacent to and negatively impacting the federally and state endangered bird-foot checkerbloom but has not yet been found on the unique soil Bear Lake buckwheat is restricted to. The ability of perennial pepperweed to invade the immediate vicinity of Bear Lake buckwheat is unknown but may be low since perennial pepperweed generally prefers more mesic habitats (Zouhar 2004).

7.6 Climate Change

California is experiencing effects of climate change and those effects are anticipated to increase in frequency and magnitude over the coming decades (Bedsworth et al. 2018). Predictions for California include rising temperatures, greater year to year variability in total precipitation, and reduced snowpack (Berg and Hall 2015; Polade et al. 2017; Bedsworth et al. 2018; Pierce et al. 2018). While some species may be able to adjust to a changing climate by migrating to more favorable conditions, it is unlikely that Bear Lake buckwheat will be able to do this. Bear Lake buckwheat seeds are thought to disperse short distances via gravity, wind, and movement by animals (e.g., ants). Even if a long-

distance dispersal mechanism for Bear Lake buckwheat existed, the species is currently known to be restricted to an area with significant barriers to dispersal, including roads, development, and a lake, making long-distance dispersal unlikely. In addition, since Bear Lake buckwheat appears to be a habitat specialist, migrating to more suitable conditions in the face of climate change is not likely if similar habitat and soil types are not available nearby. Further studies are needed to determine how strict of a habitat specialist Bear Lake buckwheat is, but all evidence points to it being restricted to a specialized soil type that is not found anywhere else in the Big Bear Lake area.

Department staff assessed the vulnerability of Bear Lake buckwheat to climate change using the NatureServe Climate Change Vulnerability Index (CCVI) Version 4.0 (Lyons et al. 2024; CDFW 2025). The CCVI assesses a species' vulnerability to climate change by evaluating: 1) the species' exposure to projected climate change under a moderate emission scenario and a high emission scenario, and 2) the species' ability to adapt to climate change. The CCVI uses these components to separate species into four categories based on their vulnerability to climate change: less vulnerable, moderately vulnerable, highly vulnerable, and extremely vulnerable. Bear Lake buckwheat was assessed by the Department to be extremely vulnerable to climate change under both the moderate and high emission scenarios, and to have low adaptive capacity. The assessment of low adaptive capacity for Bear Lake buckwheat was based on several factors, including its: extremely small range extent and area of occupancy, restriction to a unique soil type, presumably long life span, anthropogenic barriers that restrict movement, and impacts from recreational use.

While climate change is not considered an immediate threat to Bear Lake buckwheat, it is a long-term threat that should be taken into consideration when developing management guidelines for the species and its habitat.

7.7 Overexploitation

Bear Lake buckwheat is not currently known to be in the horticultural trade; however, buckwheat species are popular plants for rock gardens. Bear Lake buckwheat was mentioned in a 2003 article titled "*Eriogonum* as a Rock Garden Plant" as an "attractive plant to the garden," but the article noted that it might not be as sought after as other buckwheat species (Reveal 2003). The Department is not aware of any Bear Lake buckwheat plants in the horticultural trade and overexploitation is not currently a significant or immediate threat to Bear Lake buckwheat, but this could change in the future.

7.8 Predation

There has been no documented herbivory of, or predation on, Bear Lake buckwheat plants or seeds. The Department therefore does not currently consider herbivory or predation to be a significant threat to the continued existence of Bear Lake buckwheat; however, further studies are needed on whether Bear Lake buckwheat experiences any negative impacts from herbivory or predation.

7.9 Disease

The Department does not have any information on diseases or parasites affecting Bear Lake buckwheat. The Department therefore does not currently consider disease or parasites to be a significant threat to the continued existence of Bear Lake buckwheat; however, further studies are needed on whether Bear Lake buckwheat experiences any negative impacts from disease.

8 EXISTING MANAGEMENT

This section considers the impact of existing management efforts on the species (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)).

No existing regulatory mechanisms are in place at the federal, state, or local level that adequately protect Bear Lake buckwheat. As of October 2023, the City of Big Bear Lake was in conceptual planning stages for developing the property that contains the only known occurrence of Bear Lake buckwheat (S. Sullivan, personal communication, October 29, 2023). The Department met with the City of Big Bear Lake in January, June, and November 2024, and in April 2025, to discuss Bear Lake buckwheat surveys and possible conservation measures for the species. The City of Big Bear Lake has represented it is receptive to excluding the Bear Lake buckwheat population from future development plans and to implementing management recommendations proposed by the Department. If the City of Big Bear Lake agrees to long-term protection and management of Bear Lake buckwheat, an improvement in the overall condition of the species could result, as up until recently, the species received no management or protection from adverse impacts. As of July 2025, the City of Big Bear Lake has begun to take management actions to benefit the sensitive plant species on the property with Bear Lake buckwheat by locking a gate that was an ORV entry point, removing boat trailers that were parked on sensitive habitat, and beginning herbicide treatment of the invasive perennial pepperweed. Future development of the property with Bear Lake buckwheat into a city park is anticipated in the next few years and absent formal regulatory protections from CESA, Bear Lake buckwheat remains vulnerable to extinction. As mentioned above, the lack of regulatory mechanisms to protect Bear Lake buckwheat contributed to the species becoming extirpated from the west side of Alden Road in the

late 1990s. If regulatory mechanisms continue to be absent, the east side of Alden Road may be developed or the habitat may be disturbed to the point that Bear Lake buckwheat could go extinct.

Bear Lake buckwheat co-occurs with one federally threatened species, ash-gray paintbrush (*Castilleja cinerea*). Bear Lake buckwheat could gain some protection due to its proximity to the ash-gray paintbrush; however, the full protections afforded to plants listed under the ESA are not always provided to plants on private land (ESA § 9(a)(2)(B), 16 U.S.C. § 1538(a)(2)(B)). Moreover, even if ESA protections are afforded to ash-gray paintbrush, the two species only occur together over a small area, so protections for ash-gray paintbrush may not benefit the entire Bear Lake buckwheat population.

Seed collection is an important component to managing and preserving rare plant species, as collected seeds can be used for future research and restoration activities. Seed collections also provide insurance in case something happens to the natural population causing the species to go extinct in the wild. Germination tests are often run on collected seeds to ensure they are viable. In September 2003, 4,258 seeds were collected from 65 Bear Lake buckwheat individuals (C. Birker, personal communication, February 15, 2024). In 2023, a 20-year follow-up germination test was run on the seeds and there was a 50% germination rate (C. Birker, personal communication, February 15, 2024). In October 2023, another 1,083 seeds were collected from 43 Bear Lake buckwheat individuals with follow-up germination tests of those seeds having a 92% germination rate (C. Birker, personal communication, February 15, 2024 and February 10, 2025).

9 RECOMMENDATION TO THE COMMISSION

CESA requires the Department to prepare this status review to: 1) assess the status of Bear Lake buckwheat in California based on the best scientific information available to the Department, and 2) indicate whether the petitioned action is warranted (Fish & G. Code, § 2074.6; Cal. Code Regs., tit. 14, § 670.1, subd. (f)).

Under CESA, an endangered species is defined as “a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease” (Fish & G. Code, § 2062). A threatened species is defined as “a native species or subspecies . . . that although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by [CESA]” (Fish and G. Code, § 2067).

Based on the criteria described above and the best scientific information available, the Department has determined that listing Bear Lake buckwheat as endangered under CESA is warranted at this time.

10 PROTECTION AFFORDED BY LISTING

It is the policy of the state to conserve, protect, restore, and enhance any endangered or threatened species and its habitat (Fish & G. Code, § 2052). If listed as an endangered or threatened species, unauthorized "take" of Bear Lake buckwheat will be prohibited, making the conservation, protection, and enhancement of the species and its habitat a statewide concern. As noted earlier, "take" is defined under CESA as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill" (Fish & G. Code, § 86). Any violation of the take prohibition would be punishable under state law. The Fish and Game Code provides the Department with related authority to permit "take" under certain circumstances (Fish & G. Code, §§ 2081, 2081.1, 2086, 2087, 2089.6, 2089.10, 2835).

Listed species receive additional considerations during environmental review under the California Environmental Quality Act (CEQA). CEQA requires public agencies to analyze and disclose project-related environmental effects before discretionary approval of a project. CEQA requires adoption of mitigation measures to reduce or eliminate any significant environmental impacts.

CESA listing may prompt increased interagency coordination specific to Bear Lake buckwheat conservation and protection. Listing may also increase the likelihood that state and federal land and resource management agencies will allocate additional funds toward monitoring, research, protection, and recovery actions.

11 FUTURE MANAGEMENT

This section includes suggestions for future management and other recommendations for recovery of the species (Fish & G. Code, §§ 2072.3 & 2074.6; Cal. Code Regs., tit. 14, § 670.1, subds. (d)(1) & (f)(1)). The following actions, generated by Department staff, are not a detailed conservation strategy; however, they outline major components of a plan to prevent the extinction of the species. The Department recommends that the following actions be conducted in coordination with partners and interested parties, consistent with California's goals of preventing the extinction of rare, threatened, and endangered species:

- Preserve the species' existing occurrence and habitat. Bear Lake buckwheat is restricted to one occurrence on private property. Every effort should be made to preserve all Bear Lake buckwheat plants and to protect Bear Lake buckwheat habitat from any disturbances.

- Establish and maintain deterrents to ORV activity in the vicinity of Bear Lake buckwheat. The gate at the southeast corner of the property should be checked regularly to make sure it remains closed and locked. Permanent barriers should also be established around the hill that contains Bear Lake buckwheat to prevent ORV disturbances to the species and its habitat. Signs should be installed to deter the public from entering the Bear Lake buckwheat area to minimize trampling and trash dumping/littering.
- Implement weed management activities for horticultural and invasive plant species on the portion of the property with Bear Lake buckwheat, especially for intermediate wheatgrass and curveseed butterwort. These actions may include hand pulling and/or careful application of herbicide by trained and certified field staff. As of July 2025, herbicide treatment has been initiated for perennial pepperweed. That treatment should be continued by a qualified applicator until perennial pepperweed is eradicated from the property.
- Conduct studies to increase knowledge of the life history and ecology of Bear Lake buckwheat, including pollination, reproduction, seedling establishment and survival, seed dispersal, growth rate, life span, and soil chemistry and composition. Genetic studies are also needed to determine if Bear Lake buckwheat is experiencing any genetic effects from its small population size.
- Implement a demographic monitoring program in order to assess the health of the Bear Lake buckwheat population, understand the current status of the species, and inform best management strategies and conservation measures to ensure its continued existence.
- Research the feasibility of enhancing the existing population and establishing additional populations. Studies are needed to determine if it is appropriate and feasible to enhance the current population of Bear Lake buckwheat through outplanting efforts. Research is also needed to determine if Bear Lake buckwheat is strictly endemic to the unique substrate it grows on or whether it could grow on other substrates. This information can be used to inform the likelihood of success of outplanting activities; however, outplanting activities should be done cautiously due to the extreme rarity of the species and low success rates of outplantings for other rare plant species (Fiedler 1991).
- Collect additional seeds (as needed) for long-term conservation storage and potential use in future efforts to increase the existing Bear Lake buckwheat population and/or establish new populations. All seed collections should follow Center for Plant Conservation's best practices (Center for Plant Conservation 2019). Because Bear Lake buckwheat seeds were collected in 2023, follow-up seed collections should not occur until 2033 (C. Birker, personal communication, February 10, 2025).

- Educate the public about the need to protect Bear Lake buckwheat and about ongoing protection efforts. An interpretive trail with informational signage on the periphery of the Bear Lake buckwheat population may be warranted as a way to engage and inform the public on this unique species and habitat.

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APPENDIX A. TRIBAL ENGAGEMENT SUMMARY

The Department communicated with tribes throughout the status review process for Bear Lake buckwheat. The Department reached out to tribes identified by the Native American Heritage Commission as having a cultural or traditional affiliation with the geographic area of Bear Lake buckwheat. Initial outreach was in the form of a tribal notification letter sent to tribes to notify them that Bear Lake buckwheat is a candidate for listing as endangered under CESA, to describe the status review and listing process, and to request input on the petitioned action. Additionally, the tribal notification letter provided opportunities for engagement in the form of direct communication with Department staff or formal consultation. Additional details on the tribal outreach conducted for Bear Lake buckwheat and a summary of the responses received are listed below and incorporated into this status review as appropriate.

Tribal Outreach Efforts:

- On November 7, 2024, the Department distributed by mail and email the attached tribal notification letter to 31 contacts from 15 tribes. On January 15, 2025, the Department sent follow-up emails to those tribes that had not yet responded.
- On March 13, 2025, the Department made phone calls to those tribes who had not yet responded to tribal outreach efforts via email.

Summary of Responses Received:

- The Department did not receive any responses specific to Bear Lake buckwheat as a result of the tribal notification letter, follow-up emails, or follow-up phone calls. The Department also did not receive any requests for consultation.

Tribal Notification Letter for Bear Lake Buckwheat

November 7, 2024

NOTIFICATION AND REQUEST FOR INPUT: BEAR LAKE BUCKWHEAT IS A CANDIDATE FOR LISTING UNDER THE CALIFORNIA ENDANGERED SPECIES ACT

Dear Honorable Tribal Leaders and Tribal Representatives:

The California Department of Fish and Wildlife (CDFW) would like to inform you that it has initiated a status review for Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*). We respectfully request your Tribe's engagement on the petitioned action to list this species as endangered under the California Endangered Species Act (CESA). We invite your participation through direct communication and/or consultations prior to the public review process.

Our goal is to understand tribal interests or impacts to cultural resources early in the process and incorporate tribal knowledge, perspectives, management recommendations, and data in the status review. CDFW is committed to working collaboratively through open communication with your Tribe under its Tribal Communication and Consultation Policy, which is available through CDFW's Tribal Affairs webpage at https://wildlife.ca.gov/Tribal-Affairs.

CESA Status Review Process

CDFW initiated this status review following the California Fish and Game Commission's (Commission) decision to list Bear Lake buckwheat as a candidate species under CESA (Cal. Reg. Notice Register 2024, No. 43-Z, p. 1396-1397). As a candidate species, Bear Lake buckwheat receives the same legal protection afforded to a threatened or endangered species (Fish & G. Code, §§ 2074.2 & 2085).

Within 12 months, CDFW will produce a report which will include a recommendation as to whether the petitioned action is warranted (Fish & G. Code, § 2074.6). The report will be made publicly available on CDFW's website at https://wildlife.ca.gov/Conservation/CESA/One-Year-Reviews for at least 30 days before the Commission considers acting on the petition.

Please note, the Commission—which is a legally separate entity from CDFW—is charged with making the final determination on whether to list a species as threatened or endangered under CESA (Fish & G. Code, § 2075.5). CDFW serves in a scientific advisory role to the Commission during this process. If you would like to provide input directly to the final decision makers or if you are interested in participating in Commission

meetings, the Commission's website (https://fgc.ca.gov/) provides details on how to reach out to Commission staff, provide comments directly to the Commission, and receive email alerts for upcoming Commission meetings.

Request for Input and Opportunity for Consultation

CDFW invites your Tribe to provide any tribal knowledge, perspectives, information, or input on Bear Lake buckwheat. CDFW requests input, comments, and/or consultation on scientific data, cultural or traditional relationships, or comments related to the species, such as, but not limited to:

- Life history
- Current or historical distribution and abundance
- Traditional and cultural uses and/or significance
- Habitat
- Ecology
- Genetics
- Threats
- Adequacy of existing management
- Recommendations for future management

CDFW respectfully requests your input or written comments on the petitioned action by **February 10, 2025,** to allow sufficient time to evaluate this information during the status review period. Please send submissions to CDFW by email at nativeplants@wildlife.ca.gov and include "Bear Lake buckwheat" in the subject line. Input may also be mailed to: California Department of Fish and Wildlife, Native Plant Program, Attn: Kristi Lazar, P.O. Box 944209, Sacramento, CA 94244-2090.

To request a consultation, please respond by **February 10, 2025** to CDFW's Habitat Conservation Planning Branch Tribal Coordinator, Ms. Isabel Baer, via email at hcpb.tribalengage@wildlife.ca.gov, with the subject line "Bear Lake Buckwheat Status Review: [Tribe Name] Tribal Consultation Response". Or you can submit a request by mail to the California Department of Fish and Wildlife, Attn: Isabel Baer, Habitat Conservation Planning Branch, P.O. Box 944209, Sacramento, CA 94244-2090. Please designate and provide contact information for the appropriate tribal lead person.

Thank you for your time and consideration. We look forward to your response and input on the status review for Bear Lake buckwheat.

Sincerely,

Jeff Drongesen
Branch Manager

ec: California Department of Fish and Wildlife

Sarah Fonseca, Department Tribal Liaison
Tribal.Liaison@wildlife.ca.gov

Isabel Baer, Habitat Conservation Planning Branch Tribal Coordinator
hcpb.tribalengage@wildlife.ca.gov

APPENDIX B. PUBLIC COMMENT SUMMARY

A public notification letter was distributed to affected and interested parties to notify them that Bear Lake buckwheat is a candidate for listing as endangered under CESA. The letter requested data and comments on the species, explained that take authorizations are required now that the species is a candidate for listing, and explained the upcoming steps in the listing process. Additional details on the public outreach conducted for Bear Lake buckwheat and a summary of the responses received are listed below.

Public Notification Efforts:

- On November 8, 2024, the Department distributed the attached public notification letter to 13 affected or interested parties, including Bear Valley Mutual Water Company, the City of Big Bear Lake, local botanists, and non-profit organizations with an interest in the area and/or species.
- On November 8, 2024, the Department distributed the attached press release to an email distribution list maintained by the Department's Office of Communication, Education, and Outreach and posted the attached press release to the Department's Newsroom website.

Summary of Responses Received:

- The Department received two public comments from private individuals in opposition to the listing of Bear Lake buckwheat as endangered, indicating that protection will impede planned development projects, cause more off-road vehicle restrictions, and strain the resources of the Department.
- The Department received one comment from a private individual in support of listing Bear Lake buckwheat as endangered.
- The Department received a comment letter from CNPS expressing support for listing Bear Lake buckwheat as endangered. CNPS also expressed concern regarding the use of transplantation of rare plant populations as compensatory mitigation since transplantations are often unsuccessful.
- The Department received a comment from Dr. Timothy Krantz expressing support for listing Bear Lake buckwheat as endangered. Dr. Krantz described his extensive experience with the flora of the San Bernardino Mountains and personal experience with discovering Bear Lake buckwheat. Dr. Krantz indicated that due to a restricted distribution, being surrounded by development, and recreational/development threats, the species meets the definition of endangered. Dr. Krantz also suggested beneficial conservation measures.
- The Department received a comment letter from Sean Sullivan, Assistant City Manager with the City of Big Bear Lake. The City of Big Bear Lake indicated that they are supportive of the current status review but would like there to be a rigorous and comprehensive review process that addresses the genetics of Bear

Lake buckwheat and assesses the distribution of the silty gray soil in the area. The City of Big Bear Lake would also like to work with the Department to identify and implement management actions to protect Bear Lake buckwheat and its habitat at Alden Road and to develop a long-term management plan if the species is listed.

All communications are on file with the Department and can be provided on request by emailing nativeplants@wildlife.ca.gov.

Public Notification Letter for Bear Lake Buckwheat

November 8, 2024

NOTICE: BEAR LAKE BUCKWHEAT IS A CANDIDATE FOR LISTING UNDER THE CALIFORNIA ENDANGERED SPECIES ACT

Dear Affected or Interested Party:

The California Department of Fish and Wildlife (Department) has initiated a status review for Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*) and hereby solicits data and comments on the petitioned action to list this species as endangered under the California Endangered Species Act (CESA) (Fish & G. Code, § 2074.4). Specifically, the Department requests data and comments regarding Bear Lake buckwheat's ecology, genetics, life history, distribution, abundance, habitat, the degree and immediacy of threats to its reproduction or survival, the adequacy of existing management, and recommendations for management of the species.

The Department has initiated this status review following the determination by the California Fish and Game Commission (Commission) on October 25, 2024, that the petition to list Bear Lake buckwheat as endangered under CESA may be warranted. Bear Lake buckwheat is now a candidate species under CESA (Cal. Reg. Notice Register 2024, No. 43-Z, p. 1396-1397) and as such, receives the same legal protection afforded to an endangered or threatened species (Fish & G. Code, §§ 2074.2 & 2085).

As of October 25, 2024, it is illegal to import, export, take (hunt, pursue, catch, capture, or kill, or attempt to do so), possess, purchase, or sell Bear Lake buckwheat or any part or product thereof (Fish & G. Code, §§ 86, 2080, 2085). However, the Department may authorize, through permits or memorandums of understanding, incidental take and take resulting from scientific, educational, or management activities such as research or restoration (Fish & G. Code, §§ 2081 subds. (a) & (b), 2080.1, 2089.2 et. seq., or 2086). For more information on take authorizations, visit https://wildlife.ca.gov/Conservation/CESA/Permitting or contact the CDFW Regional Office in the location of the proposed project (https://wildlife.ca.gov/Regions).

The Department respectfully requests that data and comments on the petitioned action be submitted before **February 10, 2025,** to allow sufficient time to evaluate this information during the status review period. Please submit such data and comments to the Department by email at NativePlants@wildlife.ca.gov and include "Bear Lake buckwheat" in the subject line. Such data or comments may also be submitted by mail to California Department of Fish and Wildlife, Native Plant Program, Attn: Kristi Lazar, P.O. Box 944209, Sacramento, CA 94244-2090.

As of October 25, 2024, the Department has 12 months to produce a peer reviewed report based on the best scientific information available, which will include a recommendation as to whether the petitioned action to list Bear Lake buckwheat as endangered under CESA is warranted (Fish & G. Code, § 2074.6). The report will be made publicly available on the Department's website at https://wildlife.ca.gov/Conservation/CESA/One-Year-Reviews for at least 30 days before the Commission considers acting on the petition.

Please note, the Commission—which is a legally separate entity from the Department—is charged with making the final determination on whether to list a species as endangered or threatened under CESA (Fish & G. Code, § 2075.5). The Department serves in a scientific advisory role to the Commission during this process. See the California Fish and Game Commission Home Page (https://fgc.ca.gov/) for details on submitting comments to the Commission and receiving email alerts for upcoming Commission meetings. The listing petition, the Department's petition evaluation report, and updates on the listing process are available at: https://fgc.ca.gov/CESA

If you have any questions regarding this notice, please contact the Department by email at: NativePlants@wildlife.ca.gov.

Press Release for Bear Lake Buckwheat

California Department of Fish and Wildlife News Release

November 7, 2024

Media Contacts:
Kristi Lazar, CDFW Native Plant Program, (916) 594-5425
Steve Gonzalez, CDFW Communications, (916) 804-1714

CDFW Seeks Public Comment Related to Bear Lake buckwheat

The California Department of Fish and Wildlife (CDFW) is seeking data and public comments on a petition to list Bear Lake buckwheat under the California Endangered Species Act (CESA).

Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*) is a subshrub in the buckwheat family with only a single known occurrence on the south shore of Big Bear Lake in San Bernardino County, California. Bear Lake buckwheat grows on a unique substrate of gray, silty, clay soil in a Jeffrey pine and juniper woodland. Bear Lake buckwheat occupies an area of less than 0.18 acre on a parcel of private property that is being leased to the City of Big Bear Lake. The main threats to Bear Lake buckwheat are habitat modification or destruction from development of the property where the species occurs, human disturbances (off-road vehicle use, littering/trash dumping, and footpaths/trampling), effects of small population size, and fire and fuel reduction activities.

On July 16, 2024, CDFW's Native Plant Program submitted a petition to the California Fish and Game Commission to list Bear Lake buckwheat as an endangered species under CESA. The Commission published findings of its decision to make the species a candidate for listing as an endangered species on October 25, 2024, and as such, Bear Lake buckwheat now receives the same legal protection afforded to an endangered or threatened species (Fish and Game Code sections 2074.2 and 2085).

As of October 25, 2024, CDFW has 12 months to conduct a status review that will inform the Commission's final decision on whether to list Bear Lake buckwheat as endangered under CESA. As part of the status review process, CDFW is soliciting information regarding the species' ecology, genetics, life history, distribution, abundance, habitat, the degree and immediacy of threats to its reproduction or survival, the adequacy of existing management and recommendations for management of the species.

CDFW respectfully requests that data and comments be submitted before **February 10, 2025,** to allow sufficient time to evaluate this information during the status review period. Please submit data and comments to CDFW by email at NativePlants@wildlife.ca.gov and include “Bear Lake buckwheat” in the subject line. Data or comments may also be submitted by mail to California Department of Fish and Wildlife, Native Plant Program, Attn: Kristi Lazar, P.O. Box 944209, Sacramento, CA 94244-2090.

CDFW will produce a peer reviewed report based upon the best scientific information available, which will include a recommendation as to whether the petitioned action to list Bear Lake buckwheat as endangered under CESA is warranted (Fish and Game Code section 2074.6). The report will be made publicly available on CDFW’s website for at least 30 days before the Commission considers acting on the petition. Please note, the Commission—which is a legally separate entity from CDFW—is charged with making the final determination on whether to list a species as endangered or threatened under CESA (Fish and Game Code section 2075.5). CDFW serves in a scientific advisory role to the Commission during this process. See the California Fish and Game Commission webpage for details on submitting comments to the Commission and receiving email alerts for upcoming Commission meetings.

The listing petition, CDFW’s petition evaluation report, and updates on the listing process are available on the Commission’s website.

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APPENDIX C. COMMENTS FROM PEER REVIEWERS

Pursuant to Fish and Game Code section 2074.6, the status review process included independent peer review by experts on Bear Lake buckwheat (Table C1). Reviewers were asked to evaluate the assessments and conclusions in the draft status review.

Table C1. Status review peer reviewers.

Name	Title and Affiliation
Duncan Bell	Senior Conservation Botanist, California Botanic Garden
Scott Eliason	Botanist with extensive knowledge of the flora of the San Bernardino Mountains
Dr. Timothy Krantz	Conservation Director, The Wildlands Conservancy

The following pages of this appendix contain the peer reviewer invitation letters and a table of consolidated peer reviewer comments (arranged by page and line number) with Department responses to those comments. At the end of this appendix is the draft version of this status review sent by the Department to peer reviewers.

Peer Reviewer Invitation Letters for Bear Lake Buckwheat

June 2, 2025

Duncan Bell
Senior Conservation Botanist
California Botanic Garden
1500 N. College Avenue
Claremont, CA 91711

Subject: PEER REVIEW OF THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE'S REPORT ON THE STATUS OF BEAR LAKE BUCKWHEAT

Dear Duncan Bell,

Thank you for agreeing to serve as a scientific peer reviewer for the California Department of Fish and Wildlife's (Department) draft status review report for Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*). The Department seeks your input regarding the assessments and conclusions in this draft status review report based on the best scientific information currently available. Please keep the enclosed report and your review of it confidential until the final report is made public upon receipt by the California Fish and Game Commission (Commission) as an agenda item at a public Commission meeting. Please note that your review will be appended to the final status review report and made public upon receipt by the Commission. **The Department requests your review on or before July 7, 2025.**

The Department seeks your scientific peer review as part of formal proceedings pending before the Commission under the California Endangered Species Act (CESA). The Commission is a constitutionally established entity distinct from the Department, exercising exclusive statutory authority under CESA to add species to or remove species from the endangered or threatened species lists (Fish & G. Code, § 2070). The Department serves in an advisory capacity during CESA listing proceedings, directed by the Fish and Game Code to evaluate the status of the species based on the best scientific information available to the Department and make a recommendation to the Commission as to whether the petitioned action is warranted (Fish & G. Code, § 2074.6).

The Commission received a petition and recommendation from the Department to list Bear Lake buckwheat as endangered under CESA on July 16, 2024. After considering the Department's petition and recommendation, the Commission formally accepted the petition for consideration on October 25, 2024, thereby designating Bear Lake buckwheat as a candidate for listing as endangered under CESA. As a candidate species, Bear Lake buckwheat currently receives the same protections under CESA as an

endangered or threatened species. Formal acceptance of the petition triggered the Department's initiation of the status review.

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The Department's preliminary recommendation is that the petitioned action to list Bear Lake buckwheat is warranted. However, we underscore that scientific peer review plays a critical role in the Department's analysis and effort to develop and finalize its recommendation to the Commission as required by the Fish and Game Code. Our analysis and expected recommendation to the Commission may change or be modified following peer review.

During your review, we ask that you assess whether the body of available information supports the Department's listing recommendation. We ask also that you consider CESA and its implementing regulations as summarized in the following paragraphs.

Under CESA, an endangered species is defined as "a native species or subspecies…which is in serious danger of becoming extinct throughout all, or a significant portion of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease" (Fish & G. Code, § 2062). A threatened species is defined as "a native species or subspecies…that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by [CESA]" (Fish & G. Code, § 2067).

CESA's implementing regulations state that a species shall be listed as endangered or threatened if the Commission determines that its continued existence is threatened by one or more of the following components: (1) present or threatened modification or destruction of its habitat, (2) overexploitation, (3) predation, (4) competition, (5) disease, or (6) other natural occurrences or human-related activities (Cal. Code Regs., tit. 14, § 670.1(i)(1)(A)).

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Thank you again for your contribution to the status review and this important step in the CESA listing process.

Sincerely,

Ryan Mathis
Acting Branch Manager

Enclosures: 1) Draft Bear Lake buckwheat status review, and 2) External review comments Excel table

ec: *California Department of Fish and Wildlife*

Josh Grover
Deputy Director, Ecosystem Conservation Division

Isabel Baer
Environmental Program Manager

Kristi Lazar
Senior Environmental Scientist (Specialist)

June 2, 2025

Scott Eliason
Botanist
botscotte@gmail.com

Subject: PEER REVIEW OF THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE'S REPORT ON THE STATUS OF BEAR LAKE BUCKWHEAT

Dear Scott Eliason,

Thank you for agreeing to serve as a scientific peer reviewer for the California Department of Fish and Wildlife's (Department) draft status review report for Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*). The Department seeks your input regarding the assessments and conclusions in this draft status review report based on the best scientific information currently available. Please keep the enclosed report and your review of it confidential until the final report is made public upon receipt by the California Fish and Game Commission (Commission) as an agenda item at a public Commission meeting. Please note that your review will be appended to the final status review report and made public upon receipt by the Commission. **The Department requests your review on or before July 7, 2025.**

The Department seeks your scientific peer review as part of formal proceedings pending before the Commission under the California Endangered Species Act (CESA). The Commission is a constitutionally established entity distinct from the Department, exercising exclusive statutory authority under CESA to add species to or remove species from the endangered or threatened species lists (Fish & G. Code, § 2070). The Department serves in an advisory capacity during CESA listing proceedings, directed by the Fish and Game Code to evaluate the status of the species based on the best scientific information available to the Department and make a recommendation to the Commission as to whether the petitioned action is warranted (Fish & G. Code, § 2074.6).

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Josh Grover
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Isabel Baer
Environmental Program Manager

Kristi Lazar
Senior Environmental Scientist (Specialist)

June 2, 2025

Dr. Timothy Krantz
Conservation Director
The Wildlands Conservancy
39611 Oak Glen Road, Building 11
Oak Glen, CA 92399

Subject: PEER REVIEW OF THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE'S REPORT ON THE STATUS OF BEAR LAKE BUCKWHEAT

Dear Dr. Timothy Krantz,

Thank you for agreeing to serve as a scientific peer reviewer for the California Department of Fish and Wildlife's (Department) draft status review report for Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*). The Department seeks your input regarding the assessments and conclusions in this draft status review report based on the best scientific information currently available. Please keep the enclosed report and your review of it confidential until the final report is made public upon receipt by the California Fish and Game Commission (Commission) as an agenda item at a public Commission meeting. Please note that your review will be appended to the final status review report and made public upon receipt by the Commission. **The Department requests your review on or before July 7, 2025.**

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Josh Grover
Deputy Director, Ecosystem Conservation Division

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Kristi Lazar
Senior Environmental Scientist (Specialist)

Comments from Peer Reviewers on the Draft Bear Lake Buckwheat Status Review

Page Number	Line Number	Reviewer	Reviewer Comment	Department Response
v	25	S. Eliason	I recommend "In addition, Bear Lake buckwheat *may be* threatened..." While the identified primary threat and other significant threats as described are ongoing or reasonable to expect in the near future, these listed additional threats are possible but are not well understood in terms of mechanism or timeframe of effects. I agree with the final clause in this paragraph that monitoring and protection are needed to better understand and react to these threats in the future.	Suggested edit was made.
7	242-251	T. Krantz	The ERMIL population is disjunct from the nearest other E. microtheca varieties by 1.5-2 miles on the other side of Big Bear Lake, where E.m. corymbosoides occurs on limestone soils. I have systematically surveyed all other limestone and alkaline clay soil communities throughout the San Bernardino National Forest, searching for other San Bernardino Mountain endemic plants, and have never found any other plant community or ERMIL plants as the ones found on the Alden Road populations.	Added text after line 251 (page 7) about *E.m. corymbosoides* occurring 1.5-2 mi from Bear Lake buckwheat. Additional text added to line 385 (page 13) about surveys not finding Bear Lake buckwheat anywhere else.

Page Number	Line Number	Reviewer	Reviewer Comment	Department Response
13	383-384	T. Krantz	Several other alkaline clay meadow endemic species occur in close proximity to the ERMIL plants, including Pyrrocoma uniflora gossypina and Perideridia parishii parishii.	Added text after line 418 (page 14) to mention that rare plant species occur near Bear Lake buckwheat. Also added a new table (Table 2) to include all rare plant species that grow near Bear Lake buckwheat (including those on the adjacent pebble plain).
13	388	S. Eliason	It is worth noting (here or alternatively in the earlier var. comparison) that the other varieties of E. microtheca that are reported from the San Bernardino Mountains are associated (strongly but not exclusively) with carbonate soils (i.e. soils derived from limestone, marble, dolomite and other rock types primarily composed of calcium carbonate or calcium magnesium carbonate). These tend to be coarse gained, well-drained, poor (low-nutrient) and somewhat alkaline. While they have not been analyzed to my knowledge, the silty clay soils that support E.m. var. lacus-ursi at the Alden Road site are subjectively very different than these carbonate soils that support the other varieties in the San Bernardino Mountains.	Added text after line 257 (page 7) about other *E. microtheca* varieties having a strong preference for carbonate soils which is a different soil type from what Bear Lake buckwheat is restricted to.
14	392	S. Eliason	"Alden Road Property" is undefined and could cause confusion. I recommend characterizing the site where the unique soil is present as 'the immediate vicinity of Alden Road.'	Edited references to "Alden Road property" throughout status review.

Page Number	Line Number	Reviewer	Reviewer Comment	Department Response
14	392-393	S. Eliason	I suggest introducing the hill as follows: A small hill on the west side of Alden Road supports this unique soil type on the south and southwest aspects, while the top of the hill and the north to north-east aspect supports a reddish clay soil and quartzite cobbles typical of pebble plain habitat.	Edited line 392 (page 14) to remove reference to "Alden Road property" and describe site as "on the east side of Alden Road."
14	393-394	T. Krantz	And associated pebble plains species noted above.	Added text after line 418 (page 14) to mention that rare plant species occur near Bear Lake buckwheat. Also added a new table (Table 2) to include all rare species that grow near Bear Lake buckwheat (including those on the adjacent pebble plain).
14	398	S. Eliason	I recommend deleting the sentence postulating the south exposure preference. Since most of the plants are at or near the toe of the slope, I don't think we have a good basis to speculate about a slope preference.	Suggested edit was made.

Page Number	Line Number	Reviewer	Reviewer Comment	Department Response
14	405-418	T. Krantz	It should be noted that at the east end of the ERMIL population, a pebble plain plant community containing Eriogonum kennedyi austromontanum, Eremogone ursina, and Castilleja cinerea--all Federal- and State-listed as Threatened species--occurs within meters of occupied ERMIL habitat. Also, the Federal-/State-Endangered Sidalcea pedata occurs along the eastern portion of the property, together with several other Big Bear meadow endemics. All four listed taxa, together with ERMIL, occurred on the west side of Alden Road prior to grading and extirpation of the West Alden Road parcel in the 1990s. The combination of pebble plain, wet meadow and alkaline clay plant communities conspired to create an incredibly diverse flora on the West Alden property of 108 species on a single acre. (Krantz surveys and species list, 1988-1992)	Added text after line 418 (page 14) to mention that rare plant species occur near Bear Lake buckwheat. Also added a new table (Table 2) to include all rare species that grow near Bear Lake buckwheat (including those on the adjacent pebble plain).
14	415	D. Bell	The Lomatium that occurs in this general area is Lomatium nevadense var. parishii.	Suggested edit was made.

Page Number	Line Number	Reviewer	Reviewer Comment	Department Response
14	416	D. Bell	The Crepis species that occurs in this general area is Crepis occidentalis, or could it have actually been Pyrrocoma uniflora var. gossypina?	Changed from *Crepis* sp. to *Crepis occidentalis*. The Crepis sp. was based on associates listed in a 2003 Denslow herbarium collection. That collection also lists *Pyrrocoma* as an associate so they were likely able to tell the difference between the two species.
14	416	D. Bell	Pyrrocoma uniflora var. gossypina occurs alongside the Bear Lake buckwheat, so would also be good to include here, especially since it's a rare endemic plant of the San Bernardino Mountains.	Suggested edit was made.
14	417	D. Bell	The Cordylanthus species that occurs in the general area, and elevation, is Cordylanthus nevinii.	Suggested edit was made.
16	471	S. Eliason	I confirm that I believe that the higher count in 2024 relative to earlier numbers does not indicate an increase in the population, but rather a more accurate and precise count with greater effort.	Comment noted.
14	392	S. Eliason	"Alden Road Property" is undefined and could cause confusion. I recommend characterizing the site where the unique soil is present as 'the immediate vicinity of Alden Road.'	Edited references to "Alden Road property" throughout status review.

Page Number	Line Number	Reviewer	Reviewer Comment	Department Response
17-18	520-531	T. Krantz	This morning (7/7/25) a neighbor to the Bear Lake buckwheat property called me and reported that he had received a 45-day notice of termination of his lease as the City is proceeding with plans for development of a community park, public beach and picnic area on the property. He said that the two businesses on the property (Pines Lakefront and Pines Tavern on the Lake) were also given notices of termination of their leases.	Comment noted.
18	542-559	T. Krantz	As of a field inspection of the property on 7/3/25, fresh ORV tracks were observed (photographs attached) ascending to the top of the hill from the north and east, extending through occupied ERMIL habitat at its eastern extent.	Added text at lines 555-556 (page 18) about ORVs still being a threat in July 2025.
18	560-566	T. Krantz	Under dry conditions, the soil is very loose and, therefore, very susceptible to disturbance by ORVs. Under wet conditions this same soil is even more vulnerable to deep ruts from ORVs, resulting in significant damage to vegetation and alteration of surface hydrology that affects ERMIL plants situated below the damaged areas on top of the hill.	Added text after line 566 (page 18) about soil disturbance.
21	634	S. Eliason	The number of non-native plant species occurring in proximity is not the most important threat to rare plants, it is the density (individuals per unit area) or biomass per unit area that is more meaningful with regard to competitive exclusion of rare plants. And the poor soils are a likely reason for the low density and biomass of non-native plant species, as well as the number of such species locally.	Added text at line 634-635 (page 21) to mention the low density of non-native plants on the site.

Page Number	Line Number	Reviewer	Reviewer Comment	Department Response
21	640-656	T. Krantz	A dense population of Lepidium latifolium--a highly invasive non-native species--is well established on the alkaline clay soils along the eastern edge of the property, representing a serious potential threat to the ERMIL population, should the Lepidium become established in the draw along the southern portion of the property along the fenceline.	Added a paragraph after line 656 (page 21) on *Lepidium latifolium* (perennial pepperweed).
21	664	S. Eliason	Many perennial buckwheat species flower and set seed by their second year, so generation time is probably not an important factor in the taxon's ability to migrate in response to climate change and other stressors. For this taxon, it probably has more to do with having small seeds, with no structures for airborne or animal borne dispersal, and the fragmented habitat (surrounded by lake and urban development.) Some Eriogonum species have elaiosomes, which are structures that provide ants an oil reward for assisting with seed dispersal. Climate change, and invasive species also threaten ant species diversity and ecology. I'm not aware of any data that would tie this notion to the status of Bear Lake buckwheat, but it would be an interesting and important study.	Edited text at line 664-667 (page 21) to indicate seed dispersal within a fragmented landscape is more of an issue than the species being a perennial for the threat of climate change.

Page Number	Line Number	Reviewer	Reviewer Comment	Department Response
23	723	S. Eliason	It is worth noting that if the City does agree to protect and manage the population as part of its overall plans for the area, that could represent an improvement to the species status, relative to the current conditions of unmanaged threats and unprotected plants/habitat.	Added text at line 723 (page 23) to include note about the City of Big Bear Lake's protection and management actions being potentially beneficial for the species.
23	724	S. Eliason	typo (Beak)	Fixed
23	729-736	T. Krantz	The Kennedy's southern mountain buckwheat (E. kennedyi austromontanum) and Bear Valley sandwort (Eremogone ursina) both also occur with the ash-gray paintbrush, and are also federal- and state-listed as Threatened species.	Added text after line 418 (page 14) to mention that rare plant species occur near Bear Lake buckwheat. Also added a new table (Table 2) to include all rare species that grow near Bear Lake buckwheat (including those on the adjacent pebble plain).

Page Number	Line Number	Reviewer	Reviewer Comment	Department Response
24	761-763	T. Krantz	Eriogonum microtheca lacus-ursi clearly meets the criteria for listing as Endangered in accordance with the CESA. In all of my professional botanical experience working in the San Bernardino Mountains, and based on more than 15,000 collection records of the flora of the San Bernardino Mountains, I have never encountered a species as restricted in range as this one. (Krantz 1994) The fact that this species is confined to such a small population, surrounded by intense development to the east, south and west, and the lake to the north, renders the Bear Lake buckwheat extremely vulnerable to significant impacts and potentially extinction.	Comment noted.
25	797	S. Eliason	ORV activity *and trash dumping / littering*	Edited text at lines 799-802 (page 25) to incorporate text on deterring trash dumping/littering.
26	832	S. Eliason	public information is important and may justify some impacts to habitat (despite primary goal articulated on line 796). An interpretive trail with some information signage on the periphery of the population, where plants are visible) may be worth some minor impact. As with protection of plants and habitat, the motivation to achieve this education goal may not be possible in the absence of listing.	Added text after line 833 (page 26) on a possible interpretive trail to inform the public on the unique species/habitat.

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

California Endangered Species Act

Status Review for Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*)

Report to the Fish and Game Commission

[MONTH YEAR]

Cover page photo credit: Kristi Lazar (2024)

Suggested citation: California Department of Fish and Wildlife (CDFW). 2025. Report to the Fish and Game Commission, status review for Bear Lake buckwheat (*Eriogonum microthecum* var. *lacus-ursi*). California Department of Fish and Wildlife, P.O. Box 944209, Sacramento CA 94244-2090. [XX] pp., with appendices.

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LIST OF ABBREVIATIONS, ACRONYMS, AND TERMS

CAL FIRE – California Department of Forestry and Fire Protection

CEQA – California Environmental Quality Act

CESA – California Endangered Species Act

CNDDB – California Natural Diversity Database

CNPS – California Native Plant Society

Commission – California Fish and Game Commission

CRPR – California Rare Plant Rank
Department – California Department of Fish and Wildlife
ESA – Federal Endangered Species Act
et al. – “and others”
et seq. – “and the following”
ORV – Off-road vehicle
sp. – species
USFWS – United States Fish and Wildlife Service
var. – variety

EXECUTIVE SUMMARY

This status review for Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*) has been prepared by the California Department of Fish and Wildlife (Department) for the California Fish and Game Commission (Commission) pursuant to the requirements of the California Endangered Species Act (CESA; Fish & G. Code, § 2050 et seq.). This status review is based on the best scientific information currently available to the Department regarding each of the components listed under section 2072.3 of the Fish and Game Code and section 670.1 of title 14 of the California Code of Regulations. In addition, this status review includes a preliminary identification of habitat that may be essential to the continued existence of the species and the Department's recommendations for management activities and other recommendations for recovery of the species (Fish & G. Code, § 2074.6). This status review has been independently reviewed by scientific peers (Fish & G. Code, § 2074.6).

Bear Lake buckwheat is a subshrub in the buckwheat family with only one known occurrence on the south shore of Big Bear Lake in San Bernardino County, California. Bear Lake buckwheat grows on a unique substrate of gray, silty, clay soil in Jeffrey pine and juniper woodland habitat. Bear Lake buckwheat occupies an area of less than one acre with 836 plants estimated in 2024.

The primary threat to Bear Lake buckwheat is habitat modification or destruction from potential development of the private property where the species occurs. The City of Big Bear Lake leases the property from the Bear Valley Mutual Water Company and is exploring development opportunities. Other significant threats to Bear Lake buckwheat include human disturbances (from off-road vehicle use, footpaths/trampling, and trash dumping/littering), effects of small population size, and potential fire and fuel reduction activities. In addition, Bear Lake buckwheat is threatened by climate change, non-native plant competition, and potential overexploitation, which could become increasingly significant in the future if the species is not monitored or adequately protected.

Based on the criteria described above and the best scientific information available, the Department has determined that listing Bear Lake buckwheat as endangered under CESA is warranted at this time. The Department further recommends implementation of the management recommendations and recovery measures described in this status review.

1 INTRODUCTION

1.1 Status Review Overview

This status review serves as the basis for the California Department of Fish and Wildlife's (Department) recommendation to the California Fish and Game Commission (Commission) on whether the petitioned action to list Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*) as endangered under the California Endangered Species Act (CESA) is warranted. This status review is based upon the best scientific information available to the Department. It is not intended to be an exhaustive review of all published scientific literature on Bear Lake buckwheat; rather, this status review is intended to summarize key points relevant to the status of the species and address regulatory report requirements.

Each of the petition components and listing factors that the Commission must consider in making its determination are included and addressed in this status review (Fish & G. Code, §§ 2072.3 & 2074.6; Cal. Code Regs., tit. 14, § 670.1). A petition to list a species under CESA must include "information regarding the population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce, the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, and the availability and sources of information. The petition shall also include information regarding the kind of habitat necessary for species survival, a detailed distribution map, and any other factors that the petitioner deems relevant" (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)). A status review must include a preliminary identification of the habitat that may be essential to the continued existence of the species and recommend management activities and other recommendations for recovery of the species (Fish & G. Code, § 2074.6; Cal. Code Regs., tit. 14, § 670.1, subd. (f)(1)). Additionally, the status review addresses the following required factors: "present or threatened modification or destruction of its habitat, overexploitation, predation, competition, disease, or other natural occurrences or human-related activities" (Cal. Code Regs., tit. 14, § 670.1, subd. (i)(1)(A)). In some instances, the Department has grouped similar components together and renamed components, described where applicable, to create a more cohesive and readable report.

In addition to addressing each of the petition components and listing factors, the Department must make a recommendation to the Commission as to whether the petitioned action to list Bear Lake buckwheat as endangered is warranted. An endangered species is defined under CESA as one "which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease" (Fish & G. Code, § 2062). A threatened species under CESA is

one that "although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by [CESA]" (Fish & G. Code, § 2067).

Receipt of this status review is to be placed on the agenda for the next available meeting of the Commission after delivery. At that time, the report will be made available to the public for a 30-day public comment period prior to the Commission taking any action on the petition.

1.2 CESA Petition History

On July 16, 2024, the Commission received a petition and recommendation from the Department to list Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*) as endangered pursuant to CESA (Fish & G. Code, § 2050 et seq.).

On July 30, 2024, the Commission published its notice of receipt of the Department's petition and recommendation in the California Regulatory Notice Register (Fish & G. Code, § 2073.3; Cal. Code Regs., tit. 14, § 670.1, subd. (c); Cal. Reg. Notice Register 2024, No. 32-Z, p. 1017).

On October 10, 2024, at its public meeting, the Commission considered the Department's petition and recommendation, comments received, and oral testimony (Fish & G. Code, §§ 2074 & 2074.2). The Commission found that sufficient information exists to indicate the petitioned action may be warranted and accepted the petition for consideration (Fish & G. Code, § 2074.2; Cal. Code Regs., tit. 14, § 670.1, subd. (e)).

On October 25, 2024, the Commission published its notice of findings in the California Regulatory Notice Register, designating Bear Lake buckwheat a candidate species (Fish & G. Code, § 2074.2; Cal. Code Regs., tit. 14, § 670.1, subd. (e); Cal. Reg. Notice Register 2024, No. 43-Z, p. 1396). The Department subsequently initiated this status review (Fish & G. Code, § 2074.6; Cal. Code Regs., tit. 14, § 670.1, subd. (f)).

1.3 Federal Endangered Species Act Petition History

Bear Lake buckwheat is not currently listed under the federal Endangered Species Act (ESA). In 2008, a recommendation was made to the United States Fish and Wildlife Service (USFWS) by Fred Roberts, Jr. with the San Bernardino/Riverside chapter of the California Native Plant Society (CNPS) to add Bear Lake buckwheat to the federal candidate list for threatened and endangered species (Roberts 2008). The USFWS considered the recommendation but did not move forward with ESA candidate listing because there was no proposed project for the site in 2008 and the USFWS was considering opportunities for a conservation agreement with the landowner (M. Crawford, personal communication, March 12, 2024).

1.4 Additional Species Status Designations

1.4.1 NatureServe Conservation Status Ranks

NatureServe's conservation status ranks are one way to assess the conservation status of a species across geographic scales using standard methods. These conservation status ranks are typically assigned by natural heritage programs. There is a nationwide network of natural heritage programs, with more than 80 programs throughout the western hemisphere, overseen by an organization called NatureServe (CNDDB 2020). The California Natural Diversity Database (CNDDB) is California's natural heritage program.

All natural heritage programs use the same ranking methodology originally developed by The Nature Conservancy, and subsequently revised and maintained by NatureServe, to assign conservation status ranks (Master et al. 2012). For subspecies and varieties, these conservation status ranks consist of three components: 1) a global conservation status rank (global rank, G rank) describing the status of a given species over its entire distribution; 2) a trinomial conservation status rank (trinomial rank, T rank) describing the status of a given subspecies or variety over its entire distribution; and 3) a subnational conservation status rank (subnational rank, S rank) describing the status of a given subspecies or variety within a state (Master et al. 2012). Global, trinomial, and subnational ranks are calculated using NatureServe's rank calculator, which uses a combination of rarity, threats, and trends to assign a conservation status rank for the taxon in question (Master et al. 2012). CNDDB has assigned Bear Lake buckwheat a global rank of G5, a trinomial rank of T1, and a subnational rank of S1, indicating that the full species, *Eriogonum microtheca*, is common globally, whereas the variety *lacus-ursi* is critically imperiled both globally and within California due to one or more of the following: very high risk of extinction due to a very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors (CNDDB 2020, 2024).

1.4.2 California Rare Plant Rank

CNPS works in collaboration with botanical experts throughout the state, including Department biologists, to assign rare plants a California Rare Plant Rank (CRPR) reflective of their rarity status (CNDDB and CNPS 2020). Bear Lake buckwheat has been assigned a CRPR of 1B.1 (CNPS 2025). Plants with a CRPR of 1B are considered rare, threatened, or endangered throughout their range with the majority endemic to California (CNDDB and CNPS 2020). The threat code extension of ".1" indicates that the species is seriously threatened in California with over 80% of occurrences threatened and a high degree and immediacy of threat (CNDDB and CNPS 2020).

1.5 California Native People and Traditional Ecological Knowledge

Since time immemorial, California Native American tribes have lived alongside the fish, wildlife, and native plants of California, including Bear Lake buckwheat. California Native American people have acquired knowledge of the environment over thousands of years; this is often referred to as Traditional Ecological Knowledge (TEK) and encompasses the world view where ecology, spirituality, human-animal relationships, and more should be in balance and are all interconnected. TEK and related practices support a deeper understanding of a species' life history and informs its management.

Through our tribal engagement process, the Department sought to understand how tribes would like to engage with the development of this status review and how TEK and tribal practices of stewardship, restoration, and conservation relate to and affect Bear Lake buckwheat and its habitat. The Department ensures permission is received from tribes before including any shared information in a status review. While the Department did not receive any tribal comments or information to be included in this status review, the Department is committed to providing opportunities for tribes to engage in future conservation discussions related to Bear Lake buckwheat, and to promoting collaborative management of California's natural resources. The tribal engagement summary for Bear Lake buckwheat is further described in Appendix A.

1.6 Notifications, Information Received, and Peer Review

Following the Commission's action to designate Bear Lake buckwheat as a candidate species for endangered status, the Department notified affected and interested parties and solicited data and comments on the petitioned action pursuant to Fish and Game Code section 2074.4 (see also Cal. Code Regs., tit. 14, § 670.1, subd. (f)(2)).

Tribal notifications were distributed by letter and email to tribes identified by the Native American Heritage Commission as having a cultural or traditional affiliation within the geographic area of Bear Lake buckwheat. The Department did not receive any comments in response to the tribal notifications. See Appendix A for additional details.

Public notifications were distributed to affected and interested parties and sent to email distribution lists maintained by the Department and the Commission. A press release was also distributed through the Department's website. The Department received six comments in response to public notifications. See Appendix B for additional details.

The draft status review was independently peer reviewed by [#] experts external to the Department (Fish & G. Code, § 2074.6; Cal. Code Regs., tit. 14, § 670.1, subd. (f)(2)). The Department evaluated the input received and amended the status review as

appropriate. See Appendix C for additional details and the Department's written response to peer review.

2 SPECIES DESCRIPTION AND TAXONOMY

The Commission has the authority to list "species or subspecies" as endangered or threatened under CESA (Fish & G. Code, §§ 2062, 2067, 2068, 2070). The listing process is the same for species and subspecies (Fish & G. Code, §§ 2070–2079.1). Conservation of infraspecific taxa (i.e. subspecies and varieties) is important for preserving the biological diversity of a species; there are currently 28 varieties and 33 subspecies of plants listed as rare, threatened, or endangered under CESA (Cal. Code Regs., tit. 14, § 670.2). Bear Lake buckwheat is a variety of the species *Eriogonum microtheca*; however, for convenience, the term "species" is used herein to refer to Bear Lake buckwheat.

2.1 Species Description

Bear Lake buckwheat is a perennial member of the buckwheat family (Polygonaceae). It is a subshrub with a woody stem at the base of the plant and herbaceous (i.e., non-woody) stems that die back seasonally (Figure 1) (Reveal 2005; Baldwin et al. 2012; Reveal and Rosatti 2012). Bear Lake buckwheat is typically 15–20 cm (5.9–7.9 in) tall and 40–60 cm (15.7–23.6 in) in diameter (Reveal and Rosatti 2012). Leaf blades are narrowly elliptic measuring 0.7–1.5 cm (0.3–0.6 in) long and 0.07–0.3 cm (0.03–0.12 in) wide (Reveal 2005; Reveal and Rosatti 2012). Leaf margins are usually rolled under, with white, densely matted hairs on the lower surface of the leaves and no hairs on the upper surface of the leaves (Figure 1) (Reveal and Rosatti 2012).

Bear Lake buckwheat has groupings of flowers (inflorescences) that are 1–3 cm (0.4–1.2 in) long (Figure 1) (Reveal 2005; Baldwin et al. 2012; Reveal and Rosatti 2012). Flowering stems are 4–8 cm (1.6–3.1 in) long and are generally hairless but may have some sparse hairs (Reveal 2004, 2005; Reveal and Rosatti 2012). Like most members of the buckwheat family, Bear Lake buckwheat has involucres, which are structures that grow under the flower or grouping of flowers that hold them together as a unit (Baldwin et al. 2012). Involucres in Bear Lake buckwheat are 3–4 mm (0.12–0.16 in) long and are generally hairless (Reveal and Rosatti 2012). Individual flowers are 2–2.5 mm (0.08–0.10 in) long and are cream colored (Reveal 2005; Reveal and Rosatti 2012). Bear Lake buckwheat produces dry one-seeded fruits called achenes that are 2–2.5 mm (0.08–0.10 in) long (Reveal 2005; Baldwin et al. 2012).

Figure 1. Photographs of Bear Lake buckwheat showing general growth form (left), leaves (middle), and inflorescences (right).

2.2 Species Taxonomy

Bear Lake buckwheat (*Eriogonum microtheca* Nutt. var. *lacus-ursi* Reveal & A. Sanders) was first collected as *E. microthecum* in Bear Valley, San Bernardino County, California by Samuel Bonsall Parish and William Fletcher Parish in August of 1882 (Reveal 2004; CCH 2024); however, the species may have been known to Native Americans before that time. Bear Lake buckwheat was not formally described as a variety of *E. microthecum* until December 2004 when James Reveal published several new *Eriogonum* species and varieties including Bear Lake buckwheat (*E. microthecum* var. *lacus-ursi*) (Reveal 2004). The Department is not aware of molecular studies specific to *E. microthecum*; however, all current evidence supports the recognition of Bear Lake buckwheat as distinct from other varieties of *E. microthecum* based on morphological features and unique habitat requirements (Reveal 2004, 2005; Reveal and Rosatti 2012).

There is some confusion as to the correct spelling of Bear Lake buckwheat's scientific name. *E. microtheca* was first published as a species by Thomas Nuttall in 1848 (Nuttall 1848). The spelling of *E. microtheca* was maintained by several additional publications in 1853 and 1856 before *E. microthecum* began to be used in 1857 (Williamson Expedition 1857; Reveal and Gandhi 2014). The change in spelling may have been a result of correcting what many believed to be a grammatical mistake. The usual practice for Latin scientific names is to have the genus and specific epithet endings agree in grammatical gender (e.g., masculine, feminine, or neuter). *Eriogonum* is of the neuter gender, so the matching specific epithet would be *microthecum*, and not the feminine *microtheca*. While E. *microthecum* is the most common spelling used in publications

since 1858 and is still widely used today, recent publications and floras have reverted back to using *E. microtheca* (Reveal 2005; Reveal and Rosatti 2012; Reveal and Gandhi 2014). *E. microtheca* var. *lacus-ursi* is the currently accepted spelling for Bear Lake buckwheat based on the spelling published in recent floras and is the name used in this status review (Reveal 2005; Reveal and Rosatti 2012).

2.3 Similar Taxa

Bear Lake buckwheat is one of ten varieties of *E. microtheca* in California (Reveal and Rosatti 2012). In addition to Bear Lake buckwheat, three other varieties of *E. microtheca* have been documented to occur in the San Bernardino Mountains of California and are similar in appearance to Bear Lake buckwheat (Figure 2) (Reveal 2004; CCH 2024). Johnston's buckwheat (*E. m.* var. *johnstonii*), San Bernardino buckwheat (*E. m.* var. *corymbosoides*), and Simpson's buckwheat (*E. m.* var. *simpsonii*)[1] have all been reported as occurring in the same mountain range as Bear Lake buckwheat; however, Bear Lake buckwheat has a highly restricted distribution within the San Bernardino Mountains and does not directly co-occur with any other *E. microtheca* variety (CCH 2024).

Bear Lake buckwheat, Johnston's buckwheat, San Bernardino buckwheat, and Simpson's buckwheat can be distinguished from each other through a combination of characteristics related to plant size, leaf attributes, and stem hairs (Table 1). Bear Lake buckwheat can most easily be identified by its rolled-under leaf blade margins, hairless upper leaf surfaces, and generally hairless stems. These characteristics, taken together, are not shared by any other variety of *E. microtheca* in the San Bernardino Mountains.

3 LIFE HISTORY

This section considers the best available scientific information regarding the species' life history (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)).

Bear Lake buckwheat has bisexual flowers that bloom between July and October, with fruiting likely lasting into November (Reveal 2005; Reveal and Rosatti 2012; Bell 2023). There have not been any studies specific to the life history of Bear Lake buckwheat, but some assumptions can be made based on characteristics shared by most buckwheat species and based on Department staff observations. Buckwheat flowers tend to have an

[1] The Jepson eFlora indicates Simpson's buckwheat does not occur in the San Bernardino Mountains and is restricted to the eastern Sierra Nevada and eastern Mojave Desert in California (Reveal and Rosatti 2012). However, several herbarium collections from the San Bernardino Mountains have been identified as Simpson's buckwheat, so that variety is included in this section (CCH 2024).

open flower morphology with easily accessible nectar and pollen, which has been shown to attract generalist insect pollinators (McCall and Primack 1992; Ollerton et al. 2007).

Figure 2. Photographs of Eriogonum microtheca varieties from the San Bernardino Mountains. Upper left photo is Bear Lake buckwheat (Eriogonum microtheca var. lacus-ursi). Upper right photo is Johnston's buckwheat (E. m. var. johnstonii). Lower left photo is San Bernardino buckwheat (E. m. var. corymbosoides). Lower right photo is Simpson's buckwheat (E. m. var. simpsonii). Photo credit: Duncan Bell 2023.

Table 1. Key traits to distinguish between Eriogonum microtheca varieties that grow in the San Bernardino Mountains (Reveal 2005; Reveal and Rosatti 2012).

	Bear Lake buckwheat	Johnston's buckwheat	San Bernardino buckwheat	Simpson's buckwheat
Variety	*lacus-ursi*	*johnstonii*	*corymbosoides*	*simpsonii*
Height	15–20 cm (5.9–7.9 in)	6–13 cm (2.4–5.1 in)	30–60 cm (11.8–23.6 in)	10–150 cm (3.9–59 in)
Width	40–60 cm (15.7–23.6 in)	20–50 cm (7.9–19.7 in)	60–150 cm (23.6–59 in)	40–160 cm (15.7–63 in)
Leaf shape	Narrowly elliptic	Elliptic to ovate	Elliptic to obovate	Narrowly elliptic
Leaf margins	Rolled-under	Flat	Flat	Rolled-under
Upper leaf surface	No hairs	Hairy or not	Hairy or not	Hairy
Stem hairs	Sparse hairs or no hairs	Hairy or not	Dense white hairs	Dense white hairs

In 2024, Department staff observed a variety of insects visiting Bear Lake buckwheat flowers, including common grass skimmers (*Paragus haemorrhous*), bristle flies in the family Tachinidae, digger bees in the genus *Anthophora*, and ants (likely California harvester ants, *Pogonomyrmex californicus*). While Bear Lake buckwheat appears to be visited by a variety of generalist insect pollinators, studies are needed to determine the effectiveness of the insects at pollinating Bear Lake buckwheat.

Observations of Bear Lake buckwheat in 2023 noted that nearly all the plants were in flower in July (D. Bell, personal communication, February 12, 2024). This aligns with Department staff observations made in July 2024, in which 89% of the plants were reproductive (in bud, flower, or fruit) and 11% were vegetative. In 2008, about 10% of the plants observed were presumed to be seedlings (USFS 2008). No seedlings were observed in 2023 (D. Bell, personal communication, February 12, 2024). In 2024, Department staff looked for seedlings and observed them at both the west and east ends of the Bear Lake buckwheat population (Figure 3); however, a complete census of all seedlings was not performed. Seedlings were difficult to find unless specifically searching for them, which may account for the lack of seedlings observed in 2023.

Several rare perennial buckwheat species that have very restricted ranges in other parts of California and other states have been shown to have low seed set and high seedling mortality (Kaye et al. 1990; Morefield 1996; Dunwiddie et al. 2001; Caplow 2005).

Based on observations from 2023, Bear Lake buckwheat appears to have ample seed set with seeds viable when tested in a lab setting (D. Bell, personal communication, February 12, 2024; C. Birker, personal communication, February 15, 2024 and February 10, 2025). Seedlings were observed on site in 2008 and 2024, but it is unknown what proportion of seedlings survive to adulthood. Additional data on Bear Lake buckwheat seedling survival over time is needed.

Dispersal of Bear Lake buckwheat seeds is likely similar to observed dispersal of other buckwheat species, occurring primarily via gravity, wind, and animal movement (e.g., ants) (Dunwiddie et al. 2001). Buckwheat seeds fall from the plant enclosed by light, papery flower parts, suggesting that wind could play an important role in seed dispersal (Morefield 1996). Ants have been shown to move seeds of other buckwheat species, but methods of seed dispersal by insects have not been specifically studied for Bear Lake buckwheat (Dunwiddie et al. 2001). In 2024, Department staff observed ants around Bear Lake buckwheat plants that appeared to be carrying flower parts of an unidentified plant. Thus, ants may play a role in Bear Lake buckwheat seed dispersal as well.

No information is available on the typical growth rate and life span of Bear Lake buckwheat. In 2024, Department staff observed some Bear Lake buckwheat individuals with large woody stems, suggesting there are some plants in the population that are quite old (Figure 3). In addition, studies are needed on Bear Lake buckwheat's ecological relationships with other organisms, and the presence of seedlings, juveniles, reproductive adults, and senesced plants, to better assess the long-term health and viability of the species.

Figure 3. Photographs of a Bear Lake buckwheat seedling (left) and an older Bear Lake buckwheat plant with a large, sprawling woody stem (right).

4 RANGE AND DISTRIBUTION

This section considers the species' range and distribution and provides a detailed distribution map (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)). A species' range for the purposes of CESA and this status review is the species' California range (Cal. Forestry Assn. v. Cal. Fish and Game Com. (2007) 156 Cal.App.4th 1535, 1551). Range describes the general geographical area in which a species occurs. Distribution describes the actual sites where individuals and populations of the species occur within the species' range.

As documented in the Department's CNDDB, Bear Lake buckwheat is a species that has only ever been known from a single occurrence along Alden Road on the south shore of Big Bear Lake at the northeast end of the San Bernardino Mountains in San Bernardino County, California (Figure 4) (CNDDB 2024). This occurrence is at an elevation of about 2,063 m (6,770 ft) (CCH 2024). It is unknown if the species was once more common in the Big Bear Lake area prior to the creation of Big Bear Lake in 1884, and installation of a taller dam in 1912, which resulted in inundation of additional land around the lake (Holmes 1956; Hinckley 1983; Bellamy and Keller 2006). It is likely that the species has always had a very restricted range, given that no other Bear Lake buckwheat occurrences have been reported.

The Bear Lake buckwheat occurrence is bisected by Alden Road, and for the purposes of this status review, the portions of the occurrence on the west and east side of Alden Road are sometimes discussed as separate populations. The population on the west side of Alden Road has been extirpated (CNDDB 2024). The population on the east side of Alden Road is extant. Based on data collected by Department staff in 2024, the current area occupied by Bear Lake buckwheat is less than one acre. The Big Bear Lake area has been surveyed extensively over many years and no other populations of Bear Lake buckwheat have been found (T. Krantz, personal communication, February 9, 2025). This single occurrence is therefore thought to be the only occurrence of the species in existence and constitutes the entire distribution of Bear Lake buckwheat.

Figure 4. Map of Bear Lake buckwheat's range. Detailed location information is available through the California Natural Diversity Database (CNDDB). This figure shows the Bear Lake buckwheat occurrence as a more general shape (orange star) to adhere to the CNDDB license agreement and to protect the species from harm.

5 HABITAT

This section considers the best available scientific information regarding the kind of habitat necessary for the species survival (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)), and a preliminary identification of the habitat that may be essential to the continued existence of the species (Fish & G. Code, § 2074.6; Cal. Code Regs., tit. 14, § 670.1, subd. (f)(1)).

Bear Lake buckwheat is endemic to the south shore of Big Bear Lake in the San Bernardino Mountains. A weather station located less than 2.4 km (1.5 mi) from Bear Lake buckwheat has been recording climatic data since 1960, providing a good indication of the type of weather conditions Bear Lake buckwheat experiences (WRCC 2025). From 1960 through 2024, daily maximum temperatures recorded at the weather station were highest in the month of July with an average high of 27.1°C (80.8°F), and lowest in the month of January with an average low of -6°C (21.1°F) (WRCC 2025). Precipitation (rain and melted snow) averaged 54.9 cm (21.6 in) per year and snowfall averaged 154.9 cm (61 in) per year, with most of the precipitation and snowfall occurring in January (WRCC 2025).

Bear Lake buckwheat occurs on a geologic formation classified as Quarternary alluvium and is adjacent to Quarternary clay (Dibblee 1964). Soils at the site are part of the Garloaf-Urban land complex soil series with four to nine percent slopes (Soil Survey Staff 2024). Garloaf soils are described as well drained, very cobbly, clay, loam soils that are comprised of alluvium derived from granitoid parent material (Soil Survey Staff 2024). While these types of soils are common along the south side of Big Bear Lake, Bear Lake buckwheat appears to be restricted to an outcrop of unique substrate that is not reflected in available soil surveys. In 2003, Michael Denslow reported that no other substrate like the kind Bear Lake buckwheat grows on has been seen in the area (CCH 2024). The unique substrate Bear Lake buckwheat grows on is a fine, gray, silty, clay soil with a dispersed scattering of quartzite rocks (Figure 5) (D. Bell, personal communication, February 12, 2024; CCH 2024; T. Krantz, personal communication, February 12, 2024). This soil is similar in appearance to the gray soils found around Baldwin Lake, located several miles to the east; however, no Bear Lake buckwheat plants have been discovered beyond the Alden Road property, suggesting that the soil at this location may be uniquely suitable for Bear Lake buckwheat (T. Krantz, personal communication, February 12, 2024 and February 9, 2025). Detailed studies are needed on the chemical and physical properties of this soil.

Figure 5. Photographs of the fine, gray, silty, clay soil which is the substrate that Bear Lake buckwheat grows in.

This unique soil is restricted to a small hill on the south side of the Alden Road property. The very top of the hill contains pebble plain-like soils (reddish soils with a higher clay content and a loose pebble-rich layer near the surface), whereas the lower slopes of the hill contain the fine, gray, silty, clay soils characteristic of Bear Lake buckwheat habitat (Derby and Wilson 1978; Burge et al. 2017; Department observation 2024). Bear Lake buckwheat is restricted to the south side of the hill, despite the soil and habitat being very similar on the west, east, and north sides of the hill. This suggests the species has a preference for south-facing exposures. In addition, Bear Lake buckwheat occurs on the lower slopes of the hill but not further up the hill. This preference for the lower slopes may be because the lower slopes gather more moisture than the upper slopes, or may be a result of Bear Lake buckwheat plants being unable to establish on upper slopes where there is more erosion. Studies are needed to better understand Bear Lake buckwheat habitat preferences.

Bear Lake buckwheat grows in openings within a conifer woodland of Jeffrey pine (*Pinus jeffreyi*) and juniper (*Juniperus grandis*) (CCH 2024). Associates include Utah service-berry (*Amelanchier utahensis*), big sagebrush (*Artemisia tridentata*), June grass (*Koeleria macrantha*), bottlebrush squirreltail (*Elymus elymoides*), creeping wild rye (*Leymus triticoides*), blue sage (*Salvia pachyphylla*), Parish's umbrellawort (*Tauschia parishii*), fineleaf hymenopappus (*Hymenopappus filifolius*), broom snakeweed (*Gutierrezia sarothrae*), Indian rice grass (*Oryzopsis hymenoides*), yellow salsify (*Tragopogon dubius*), cheatgrass (*Bromus tectorum*), prickly lettuce (*Lactuca serriola*), spreading groundsmoke (*Gayophytum diffusum*), plain mariposa lily (*Calochortus invenustus*), southern mountain phlox (*Phlox austromontana*), Parry's fringed onion (*Allium parryi*), Mojave lomatium (*Lomatium mohavensis*), curveseed butterwort (*Ranunculus testiculatus*), hawksbeard (*Crepis* sp.), bird's-beak (*Cordylanthus* sp.), knotweed (*Polygonum* sp.), and buttercup (*Ranunculus* sp.) (USFS 2008; CCH 2024; Department observation 2024).

6 ABUNDANCE AND POPULATION TREND

This section considers the species' abundance and population trends (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)).

The abundance of Bear Lake buckwheat is very low. Only one occurrence of Bear Lake buckwheat has been documented to date. In 2024, Department staff performed a detailed population census of Bear Lake buckwheat. To the Department's knowledge, a full census had not previously been performed at the site and without regular population monitoring it can be difficult to determine population trends. However, as described below, the available information indicates that the species is experiencing a downward population trend when historic land use and known extirpations of Bear Lake buckwheat are considered.

The natural habitat in the Big Bear Lake area has been drastically altered by humans since the late 1800s, beginning with the installation of a dam and flooding of the valley to create Big Bear Lake (Bellamy and Keller 2006). The area has also been a popular tourist destination since the early 1900s when roads were constructed, leading to additional development and increased recreation (Holmes 1956; Bellamy and Keller 2006). Given how close Bear Lake buckwheat grows to the lakeshore, it is possible that the species was once more extensive in the area prior to the creation of Big Bear Lake. The property that contains Bear Lake buckwheat's entire distribution has been heavily impacted over the years by the construction of restaurants, homes, roads, and parking lots, which have destroyed or disturbed much of the natural habitat. It is possible that Bear Lake buckwheat once occurred throughout the property but is now restricted to the only remaining natural habitat on the site.

Immediately south of the property containing Bear Lake buckwheat is a mobile home park that has been in place since at least 1959 (LandVision 2024b). The extant population of Bear Lake buckwheat grows less than 1 m (3.3 ft) from a fence separating the Alden Road property from the adjacent mobile homes. It is likely the parcel with the mobile homes once contained habitat for, or populations of, Bear Lake buckwheat, given how close the extant population of Bear Lake buckwheat is to the parcel (LandVision 2024b). There is no appropriate habitat remaining for Bear Lake buckwheat on the mobile home park parcel.

The portion of the Alden Road property on the west side of Alden Road had a small population of about 25 Bear Lake buckwheat plants in 1986 but the species was extirpated from that site by 1999 (CCH 2024; CNDDB 2024; T. Krantz, personal communication, February 12, 2024). Bear Lake buckwheat plants were reportedly extirpated when soils were scraped and removed for expansion of the adjacent marina in 1998 and 1999 (Roberts 2008). The west side of Alden Road remains undeveloped but

Department staff surveys in 2024 confirmed that no Bear Lake buckwheat plants remain. The Department did find remnant patches of fine, gray, silty, clay soil on the west side of Alden Road that may be suitable for reintroductions of Bear Lake buckwheat in the future.

Estimates of population size on the east side of Alden Road have been noted by several collectors and observers over the years, with about 300 individuals in 2001, about 200 individuals in 2003, 310 individuals in 2008, about 100 individuals in 2022, and about 150 individuals in 2023 (Reveal 2004; USFS 2008; T. Krantz, personal communication, October 9, 2023; CCH 2024; CNDDB 2024; USFS 2024). It is unknown if these reported population sizes were for the entire Bear Lake buckwheat population or if they represent just a portion of the population. In 2024, Department staff performed a detailed population survey of Bear Lake buckwheat and counted a total of 836 individuals. Both Tim Krantz, who originally discovered the population in 1986, and Scott Eliason, who has visited the population periodically over the years, were with Department staff during the 2024 survey and report that the population on the east side of Alden Road is similar in size to previous years. This suggests that the 2024 population size is likely not an increase from previous years, as it appears, but that the population size documented in 2024 is just the first full census of the population. Previous population numbers were likely for small portions of the site or rough visual estimates. This also suggests that the population on the east side of Alden Road may have a stable population trend, but regular population monitoring is needed to confirm this anecdotal observation.

While 836 Bear Lake buckwheat individuals were counted in 2024, this may be a high population estimate. Nineteen of the plants counted in 2024 were seedlings and may not survive to adulthood. In addition, conducting an accurate survey of the entire Bear Lake buckwheat population presents challenges. It can be difficult to differentiate a single individual of Bear Lake buckwheat from multiple individuals, since some plants have connecting stems just under the soil surface. Bear Lake buckwheat plants can also grow underneath and within sagebrush shrubs, making it difficult to trace the stem back to the soil surface to differentiate a single Bear Lake buckwheat individual from multiple individuals.

While population trend data is not currently available for Bear Lake buckwheat due to lack of regular population monitoring, the Department's 2024 population census can be used as a baseline for determining population trends in the future. Given the extirpation of all plants on the west side of Alden Road in the late 1990s, Bear Lake buckwheat has lost a portion of its population, suggesting the species has experienced, or may be experiencing, a downward population trend since its discovery in 1986. As discussed above, the species has likely experienced an even larger downward population trend

given the habitat destruction and disturbances that have occurred throughout the Big Bear Lake area since the late 1800s.

7 THREATS

This section considers the factors affecting the ability of the species to survive and reproduce and the degree and immediacy of threat (Fish & G. Code, § 2072.3; see also Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)). In addition, this section addresses the six listing factors identified in title 14 of the California Code of Regulations, section 670.1, subdivision (i)(1)(A): present or threatened modification or destruction of habitat, overexploitation, predation, competition, disease, and other natural occurrences or human-related activities. This section reviews the best scientific information available, and assesses the degree of threat, for each factor. The sixth listing factor, "other natural occurrences or human-related activities," is addressed under the following subsections: 7.2 Other human disturbances, 7.3 small population size, 7.4 fire and fuel reduction, and 7.6 climate change.

7.1 Present or Threatened Modification or Destruction of Habitat

The most significant and immediate threat to Bear Lake buckwheat is habitat modification and destruction. The species currently occupies a small area of undeveloped habitat on private property on the east side of Alden Road in the City of Big Bear Lake (CNDDB 2024). The portion of the property containing Bear Lake buckwheat is zoned for commercial visitor use (City of Big Bear Lake 1999). While Bear Lake buckwheat occupies a small undeveloped area of the property (less than one acre), other portions of the property that may have contained suitable habitat have been developed with two restaurants (The Pines Lakefront and The Pines Tavern on The Lake), two single-family rental homes, paved and dirt roads, parking lots, and boat storage present on the property (City of Big Bear Lake 2021; LandVision 2024a).

In November 2021, the City of Big Bear Lake announced it would be leasing a 19-acre area from the Bear Valley Mutual Water Company, including the property containing the Bear Lake buckwheat population, for 99 years with an option to extend for up to 30 additional years (City of Big Bear Lake 2021). The City of Big Bear Lake also announced plans to develop at least 10 acres of the 19-acre area into a new park for residents and visitors to Big Bear Lake (City of Big Bear Lake 2021; LandVision 2024a). The City of Big Bear Lake indicates that in addition to a park, they plan to explore development opportunities within the 19-acre area, including construction of new workforce housing units and commercial development (City of Big Bear Lake 2021). As of April 2025, the City of Big Bear Lake was in the process of preparing a request for information to assess

interest in developing the property (City of Big Bear Lake, personal communication, April 1, 2025).

Since this area contains the only known population of Bear Lake buckwheat, development of, and disturbances to, the area could be detrimental to the population and could cause the species' extinction.

7.2 Other Human Disturbances

Bear Lake buckwheat is significantly and immediately threatened by human disturbance from off-road vehicle (ORV) activities, footpaths, and trash dumping/littering. The property containing Bear Lake buckwheat is easily accessible to the public, resulting in vehicular and foot traffic on the site. The Bear Lake buckwheat population is not completely fenced off, making it relatively easy for people and vehicles to access and potentially harm the species.

Trespass ORV activity from dirt bikes, bicycles, motorcycles, and other recreational vehicles is currently impacting the portion of the property that contains Bear Lake buckwheat (D. Bell, personal communication, February 12, 2024; Department observation 2024; T. Krantz, personal communication, February 12, 2024). ORVs and the creation of bike ramps on the hillside are negatively impacting the quality of the habitat on site by creating tracks and ruts in the soil and may be altering the surface hydrology of the site. ORVs and associated activities could lead to a decline in the Bear Lake buckwheat population by crushing and uprooting individual plants and making the soil and habitat conditions on the site no longer suitable for Bear Lake buckwheat. In 2024, ORV tracks were observed within Bear Lake buckwheat's current distribution, with some Bear Lake buckwheat plants damaged from the ORVs (Figure 6). The chain link fence that separates the Alden Road property from the mobile home park property to the south has a gate that is sometimes left open and appears to be the main entry point for ORVs onto the Alden Road property. In July 2024, the City of Big Bear Lake closed and locked the gate, but this may not prevent all trespass on the site. ORV activity will continue to harm and destroy Bear Lake buckwheat plants, leading to the decline of the species, if permanent barriers are not installed to prevent vehicular access to the population.

Several unofficial foot paths have also been observed through the area containing Bear Lake buckwheat that could negatively impact the species through direct trampling or destruction of plants (T. Krantz, personal communication, February 12, 2024). In addition to direct impacts from human disturbances, both ORV activity and unofficial foot paths can have indirect negative impacts on Bear Lake buckwheat due to soil disturbance and compaction, reduced vegetative cover, altered surface hydrology, and overall degradation of the habitat (Weaver and Dale 1978; Cole 1987).

Trash dumping and littering are additional human disturbances threatening Bear Lake buckwheat. Miscellaneous items such as spray paint cans, broken bottles, glass, and other plastic items have been observed among Bear Lake buckwheat plants (Figure 6) (D. Bell, personal communication, February 12, 2024; Department observation 2024). Items dumped on top of Bear Lake buckwheat individuals could harm or kill the plants and lead to a further decline in the species' population.

Figure 6. Photographs of human disturbances impacting Bear Lake buckwheat. The photograph on the left shows tire tracks through the Bear Lake buckwheat population with white arrows indicating Bear Lake buckwheat plants. The photograph on the right shows trash lying on top of Bear Lake buckwheat plants.

7.3 Small Population Size

Bear Lake buckwheat is extremely rare and has low abundance, which makes it highly vulnerable to extinction from human activities, natural catastrophes, and environmental and genetic chance events (Shaffer 1981, 1987; Menges 1991; Matthies et al. 2004). While population surveys conducted by Department staff in 2024 indicate that the population size is larger than previously reported, Bear Lake buckwheat still has a very small global population size with fewer than 850 individuals in an area of less than one acre. The inherent vulnerability of such a small population is a significant and ongoing threat to Bear Lake buckwheat.

Genetic drift, inbreeding depression, and a reduced ability to adapt to changing environmental factors are some of the risks of small population size, and these could be affecting Bear Lake buckwheat, however no genetic or demographic studies on the population have yet been conducted.

7.4 Fire and Fuel Reduction

No wildfires have been documented on the Alden Road property, which contains the only known population of Bear Lake buckwheat, but that may change as the climate

changes and wildfires become more frequent (CAL FIRE 2023a). It is unknown if Bear Lake buckwheat can survive fire or if fire would offer any benefits to the species. Other *Eriogonum* species with a subshrub growth form have been studied and shown to be negatively affected by fire with low rates of resprouting and a decrease in seed viability and germination (Keeley 2006; Shank 2019).

The California Department of Forestry and Fire Protection (CAL FIRE) uses fire hazard severity zones to identify which areas of the state have a moderate, high, or very high fire hazard severity. These fire hazard severity zones reflect areas that have similar burn probabilities and fire behavior characteristics (CAL FIRE 2023b). In 2008, CAL FIRE recommended that the local government designate most of the City of Big Bear Lake as a zone of very high fire hazard severity (CAL FIRE 2008). Currently, the property containing Bear Lake buckwheat is outside of the very high fire hazard severity zone area recommended by CAL FIRE; however, properties adjacent to the Bear Lake buckwheat population are within the very high fire hazard severity zone. This could increase the likelihood that fuel reduction activities will be prioritized on the property containing Bear Lake buckwheat, given that it is adjacent to an area that is considered very susceptible to wildfire. In 2023–2024, there was also legislation proposed that would have allowed the State Fire Marshal to alter fire hazard severity zone designations that may have impacted Alden Road property (Assem. Bill No. 3150 (2023–2024 Reg. Sess.)). That particular Assembly bill was not passed in 2024, but other bills related to fire hazard management activities could impact Bear Lake buckwheat in the future.

Big Bear Lake City Ordinance 2008-379 (Native Brush and Shrub Ordinance) requires private property owners to reduce fire fuel dangers posed by native brush and vegetation by minimizing fuel materials. While the ordinance provides exceptions to activities that would result in the taking of rare, threatened, or endangered plant species, Bear Lake buckwheat does not currently receive any state or federal protections. Bear Lake buckwheat could therefore be impacted by brush clearing for fuel reduction if vegetation on the property is deemed a fire hazard. In 2025, the Governor of California issued a state of emergency proclamation that suspended environmental statues, rules, and regulations in order to expedite critical fuels reduction projects (Governor's Proc. (March 1, 2025)). The impact that this proclamation will have on Bear Lake buckwheat is unknown, but suspension of certain environmental regulations could negatively affect Bear Lake buckwheat.

Fire and fuel reduction are significant and immediate threats to Bear Lake buckwheat since the surrounding area is considered a very high fire hazard severity zone. In addition, fuel reduction activities could be a high priority to protect the restaurants and homes on the property. Fire and fuel reduction could significantly reduce the population of Bear Lake buckwheat or cause the extinction of the species.

7.5 Competition with Non-native Plants

Non-native plants are not currently considered an immediate threat to Bear Lake buckwheat. It is possible that the lack of a large number of non-native plant species on the site is due to the unique soils Bear Lake buckwheat grows on. While analyses have not been conducted on Bear Lake buckwheat soils, the chemical and physical properties of the unusual soil may make the habitat difficult for non-native plants to invade. Habitats with harsh soils have been shown to be less invaded by non-native plants as compared to areas with more hospitable habitats and soils (Zefferman et al. 2015).

While there are not a large number of non-native plants growing with Bear Lake buckwheat, there are some non-native plants present on the Alden Road property that may become serious threats in the future, including intermediate wheatgrass (*Elymus hispidus*), curveseed butterwort, and several horticultural plants that likely escaped from the gardens of adjacent residences. Intermediate wheatgrass is a rhizomatous grass that can create a monoculture under the right conditions so it could spread across the site (D. Bell, personal communication, February 12, 2024). Intermediate wheatgrass is prevalent in the disturbed areas at the eastern end of the Bear Lake buckwheat population and could become a larger issue if it is not controlled (Department observation 2024). Curveseed butterwort is an invasive plant that spreads rapidly and can form dense mats if actions are not taken to control the species (The University of Arizona and Arizona Native Plant Society 2024). Curveseed butterwort is currently growing immediately adjacent to Bear Lake buckwheat plants and may be preventing Bear Lake buckwheat individuals from accessing resources they need to thrive on the site. The horticultural plants near Bear Lake buckwheat are not currently impacting the species directly but should also be removed from the site before they become established and start competing with Bear Lake buckwheat for resources.

7.6 Climate Change

California is experiencing effects of climate change and those effects are anticipated to increase in frequency and magnitude over the coming decades (Bedsworth et al. 2018). Predictions for California include rising temperatures, greater year to year variability in total precipitation, and reduced snowpack (Berg and Hall 2015; Polade et al. 2017; Bedsworth et al. 2018; Pierce et al. 2018). While some species may be able to adjust to a changing climate by migrating to more favorable conditions, it is unlikely that Bear Lake buckwheat will be able to do this. It is a perennial species with a long generation time, meaning it likely takes more time than short-lived plants to reach reproductive age, making it slow to migrate and adapt to changing climate conditions (Jump and Peñuelas 2005; Bisbing et al. 2021). In addition, since Bear Lake buckwheat appears to be a habitat specialist, migrating to more suitable conditions in the face of climate change is not likely if similar habitat and soil types are not available nearby. Further studies are

needed to determine how strict of a habitat specialist Bear Lake buckwheat is, but all evidence points to it being restricted to a specialized soil type that is not found anywhere else in the Big Bear Lake area.

Department staff assessed the vulnerability of Bear Lake buckwheat to climate change using the NatureServe Climate Change Vulnerability Index (CCVI) Version 4.0 (Lyons et al. 2024; CDFW 2025). The CCVI assesses a species' vulnerability to climate change by evaluating: 1) the species' exposure to projected climate change under a moderate emission scenario and a high emission scenario, and 2) the species' ability to adapt to climate change. The CCVI uses these components to separate species into four categories based on their vulnerability to climate change: less vulnerable, moderately vulnerable, highly vulnerable, and extremely vulnerable. Bear Lake buckwheat was assessed by the Department to be extremely vulnerable to climate change under both the moderate and high emission scenarios, and to have low adaptive capacity. The assessment of low adaptive capacity for Bear Lake buckwheat was based on several factors, including its: extremely small range extent and area of occupancy, restriction to a unique soil type, presumably long life span, anthropogenic barriers that restrict movement, and impacts from recreational use.

While climate change is not considered an immediate threat to Bear Lake buckwheat, it is a long-term threat that should be taken into consideration when developing management guidelines for the species and its habitat.

7.7 Overexploitation

Bear Lake buckwheat is not currently known to be in the horticultural trade; however, buckwheat species are popular plants for rock gardens. Bear Lake buckwheat was mentioned in a 2003 article titled "*Eriogonum* as a Rock Garden Plant" as an "attractive plant to the garden," but the article noted that it might not be as sought after as other buckwheat species (Reveal 2003). The Department is not aware of any Bear Lake buckwheat plants in the horticultural trade and overexploitation is not currently a significant or immediate threat to Bear Lake buckwheat, but this could change in the future.

7.8 Predation

There has been no documented herbivory of, or predation on, Bear Lake buckwheat plants or seeds. The Department therefore does not currently consider herbivory or predation to be a significant threat to the continued existence of Bear Lake buckwheat; however, further studies are needed on whether Bear Lake buckwheat experiences any negative impacts from herbivory or predation.

7.9 Disease

The Department does not have any information on diseases or parasites affecting Bear Lake buckwheat. The Department therefore does not currently consider disease or parasites to be a significant threat to the continued existence of Bear Lake buckwheat; however, further studies are needed on whether Bear Lake buckwheat experiences any negative impacts from disease.

8 EXISTING MANAGEMENT

This section considers the impact of existing management efforts on the species (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)).

No existing regulatory mechanisms are in place at the federal, state, or local level that adequately protect Bear Lake buckwheat. As of October 2023, the City of Big Bear Lake was in conceptual planning stages for developing the property that contains the only known occurrence of Bear Lake buckwheat (S. Sullivan, personal communication, October 29, 2023). The Department met with the City of Big Bear Lake in January, June, and November 2024, and in April 2025, to discuss Bear Lake buckwheat surveys on the Alden Road property and possible conservation measures for the species. The City of Big Bear Lake has represented it is receptive to excluding the Bear Lake buckwheat population from future development plans and to implementing management recommendations proposed by the Department, but absent formal regulatory protections from CESA, Beak Lake buckwheat remains vulnerable to extinction. As mentioned above, the lack of regulatory mechanisms to protect Bear Lake buckwheat contributed to the species becoming extirpated from the west side of Alden Road in the late 1990s. If regulatory mechanisms continue to be absent, the east side of Alden Road may be developed and Bear Lake buckwheat could go extinct.

Bear Lake buckwheat co-occurs with one federally threatened species, ash-gray paintbrush (*Castilleja cinerea*). Bear Lake buckwheat could gain some protection due to its proximity to the ash-gray paintbrush; however, the full protections afforded to plants listed under the ESA are not always provided to plants on private land (ESA § 9(a)(2)(B), 16 U.S.C. § 1538(a)(2)(B)). Moreover, even if ESA protections are afforded to ash-gray paintbrush, the two species only occur together over a small area, so protections for ash-gray paintbrush may not benefit the entire Bear Lake buckwheat population.

Seed collection is an important component to managing and preserving rare species, as collected seeds can be used for future research and restoration activities. Seed collections also provide insurance in case something happens to the natural population causing the species to go extinct in the wild. Germination tests are often run on collected

seeds to ensure they are viable. In September 2003, 4,258 seeds were collected from 65 Bear Lake buckwheat individuals (C. Birker, personal communication, February 15, 2024). In 2023, a 20-year follow-up germination test was run on the seeds and there was a 50% germination rate (C. Birker, personal communication, February 15, 2024). In October 2023, another 1,083 seeds were collected from 43 Bear Lake buckwheat individuals with follow-up germination tests of those seeds having a 92% germination rate (C. Birker, personal communication, February 15, 2024 and February 10, 2025).

9 RECOMMENDATION TO THE COMMISSION

CESA requires the Department to prepare this status review to: 1) assess the status of Bear Lake buckwheat in California based on the best scientific information available to the Department, and 2) indicate whether the petitioned action is warranted (Fish & G. Code, § 2074.6; Cal. Code Regs., tit. 14, § 670.1, subd. (f)).

Under CESA, an endangered species is defined as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease" (Fish & G. Code, § 2062). A threatened species is defined as "a native species or subspecies . . . that although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by [CESA]" (Fish and G. Code, § 2067).

Based on the criteria described above and the best scientific information available, the Department has determined that listing Bear Lake buckwheat as endangered under CESA is warranted at this time.

10 PROTECTION AFFORDED BY LISTING

It is the policy of the state to conserve, protect, restore, and enhance any endangered or threatened species and its habitat (Fish & G. Code, § 2052). If listed as an endangered or threatened species, unauthorized "take" of Bear Lake buckwheat will be prohibited, making the conservation, protection, and enhancement of the species and its habitat a statewide concern. As noted earlier, "take" is defined under CESA as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill" (Fish & G. Code, § 86). Any violation of the take prohibition would be punishable under state law. The Fish and Game Code provides the Department with related authority to permit "take" under certain circumstances (Fish & G. Code, §§ 2081, 2081.1, 2086, 2087, 2089.6, 2089.10, 2835).

Listed species receive additional considerations during environmental review under the California Environmental Quality Act (CEQA). CEQA requires public agencies to analyze

and disclose project-related environmental effects before discretionary approval of a project. CEQA requires adoption of mitigation measures to reduce or eliminate any significant environmental impacts.

CESA listing may prompt increased interagency coordination specific to Bear Lake buckwheat conservation and protection. Listing may also increase the likelihood that state and federal land and resource management agencies will allocate additional funds toward monitoring, research, protection, and recovery actions.

11 FUTURE MANAGEMENT

This section includes suggestions for future management and other recommendations for recovery of the species (Fish & G. Code, §§ 2072.3 & 2074.6; Cal. Code Regs., tit. 14, § 670.1, subds. (d)(1) & (f)(1)). The following actions, generated by Department staff, are not a detailed conservation strategy; however, they outline major components of a plan to prevent the extinction of the species. The Department recommends that the following actions be conducted in coordination with partners and interested parties, consistent with California's goals of preventing the extinction of rare, threatened, and endangered species:

- Preserve the species' existing occurrence and habitat. Bear Lake buckwheat is restricted to one occurrence on private property. Every effort should be made to preserve all Bear Lake buckwheat plants and to protect Bear Lake buckwheat habitat from any disturbances.
- Establish and maintain deterrents to ORV activity in the vicinity of Bear Lake buckwheat. The gate at the southeast corner of the property should be checked regularly to make sure it remains closed and locked. Signs should be installed to deter the public from entering the Bear Lake buckwheat area. Permanent barriers should also be established around the hill that contains Bear Lake buckwheat to prevent ORV disturbances to the species and its habitat.
- Implement weed management activities for horticultural and invasive plant species on the portion of the Alden Road site with Bear Lake buckwheat, especially for intermediate wheatgrass and curveseed butterwort. These actions may include hand pulling and/or careful application of herbicide by trained and certified field staff.
- Conduct studies to increase knowledge of the life history and ecology of Bear Lake buckwheat, including pollination, reproduction, seedling establishment and survival, seed dispersal, growth rate, life span, and soil chemistry and composition. Genetic studies are also needed to determine if Bear Lake buckwheat is experiencing any genetic effects from its small population size.
- Implement a demographic monitoring program in order to assess the health of the Bear Lake buckwheat population, understand the current status of the

species, and inform best management strategies and conservation measures to ensure its continued existence.

- Research the feasibility of enhancing the existing population and establishing additional populations. Studies are needed to determine if it is appropriate and feasible to enhance the current population of Bear Lake buckwheat through outplanting efforts. Research is also needed to determine if Bear Lake buckwheat is strictly endemic to the unique substrate it grows on or whether it could grow on other substrates. This information can be used to inform the likelihood of success of outplanting activities; however, outplanting activities should be done cautiously due to the extreme rarity of the species and low success rates of many outplantings for other rare species (Fiedler 1991).
- Collect additional seeds for long-term conservation storage and potential use in future efforts to increase the existing Bear Lake buckwheat population and/or establish new populations. All seed collections should follow Center for Plant Conservation's best practices (Center for Plant Conservation 2019). Because Bear Lake buckwheat seeds were collected in 2023, follow-up seed collections should not occur until 2033 (C. Birker, personal communication, February 10, 2025).
- Educate the public about the need to protect Bear Lake buckwheat and about ongoing protection efforts.

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APPENDIX A. TRIBAL ENGAGEMENT SUMMARY

The Department communicated with tribes throughout the status review process for Bear Lake buckwheat. The Department reached out to tribes identified by the Native American Heritage Commission as having a cultural or traditional affiliation with the geographic area of Bear Lake buckwheat. Initial outreach was in the form of a tribal notification letter sent to tribes to notify them that Bear Lake buckwheat is a candidate for listing as endangered under CESA, to describe the status review and listing process, and to request input on the petitioned action. Additionally, the tribal notification letter provided opportunities for engagement in the form of direct communication with Department staff or formal consultation. Additional details on the tribal outreach conducted for Bear Lake buckwheat and a summary of the responses received are listed below and incorporated into this status review as appropriate.

Tribal Outreach Efforts:

- On November 7, 2024, the Department distributed by mail and email the attached tribal notification letter to 31 contacts from 15 tribes. On January 15, 2025, the Department sent follow-up emails to those tribes that had not yet responded.
- On March 13, 2025, the Department made phone calls to those tribes who had not yet responded to tribal outreach efforts via email.

Summary of Responses Received:

- The Department did not receive any responses specific to Bear Lake buckwheat as a result of the tribal notification letter, follow-up emails, or follow-up phone calls. The Department also did not receive any requests for consultation.

APPENDIX B. PUBLIC COMMENT SUMMARY

A public notification letter was distributed to affected and interested parties to notify them that Bear Lake buckwheat is a candidate for listing as endangered under CESA. The letter requested data and comments on the species, explained that take authorizations are required now that the species is a candidate for listing, and explained the upcoming steps in the listing process. Additional details on the public outreach conducted for Bear Lake buckwheat and a summary of the responses received are listed below.

Public Notification Efforts:

- On November 8, 2024, the Department distributed the attached public notification letter to 13 affected or interested parties, including Bear Valley Mutual Water Company, the City of Big Bear Lake, local botanists, and non-profit organizations with an interest in the area and/or species.
- On November 8, 2024, the Department distributed the attached press release to an email distribution list maintained by the Department's Office of Communication, Education, and Outreach and posted the attached press release to the Department's Newsroom website.

Summary of Responses Received:

- The Department received two public comments from private individuals in opposition to the listing of Bear Lake buckwheat as endangered, indicating that protection will impede planned development projects, cause more off-road vehicle restrictions, and strain the resources of the Department.
- The Department received one comment from a private individual in support of listing Bear Lake buckwheat as endangered.
- The Department received a comment letter from CNPS expressing support for listing Bear Lake buckwheat as endangered. CNPS also expressed concern regarding the use of transplantation of rare plant populations as compensatory mitigation since transplantations are often unsuccessful.
- The Department received a comment from Dr. Timothy Krantz expressing support for listing Bear Lake buckwheat as endangered. Dr. Krantz described his extensive experience with the flora of the San Bernardino Mountains and personal experience with discovering Bear Lake buckwheat. Dr. Krantz indicated that due to a restricted distribution, being surrounded by development, and recreational/development threats, the species meets the definition of endangered. Dr. Krantz also suggested beneficial conservation measures.
- The Department received a comment letter from Sean Sullivan, Assistant City Manager with the City of Big Bear Lake. The City of Big Bear Lake indicated that they are supportive of the current status review but would like there to be a rigorous and comprehensive review process that addresses the genetics of Bear

Lake buckwheat and assesses the distribution of the silty gray soil in the area. The City of Big Bear Lake would also like to work with the Department to identify and implement management actions to protect Bear Lake buckwheat and its habitat at Alden Road and to develop a long-term management plan if the species is listed.

All communications are on file with the Department and can be provided on request by emailing nativeplants@wildlife.ca.gov.

APPENDIX C. COMMENTS FROM PEER REVIEWERS

Pursuant to Fish and Game Code section 2074.6, the status review process included independent peer review by experts on Bear Lake buckwheat (Table X). Reviewers were asked to evaluate the assessments and conclusions in the draft status review.

Table [X]. Status review peer reviewers.

Name	Title and Affiliation

The following pages of this appendix contain the peer reviewer invitation letter and a [table or list] of consolidated peer reviewer comments (arranged by page and line number) and Department responses to those comments. At the end of this appendix is the draft version of this status review sent by the Department to peer reviewers.

STATUS REVIEW FOR BEAR LAKE BUCKWHEAT

PRESENTATION TO THE CALIFORNIA FISH AND GAME COMMISSION

December 10, 2025

Kristi Lazar

Native Plant Program,
Habitat Conservation Planning Branch

Presentation Overview

- Background
- Species Overview
- Threats
- Current Management
- Future Management Recommendations
- Department Recommendation

Background

- July 16, 2024
  - Petition submitted by the Department to FGC
- October 25, 2024
  - Became a candidate under CESA
- September 5, 2025
  - One-year status review report submitted

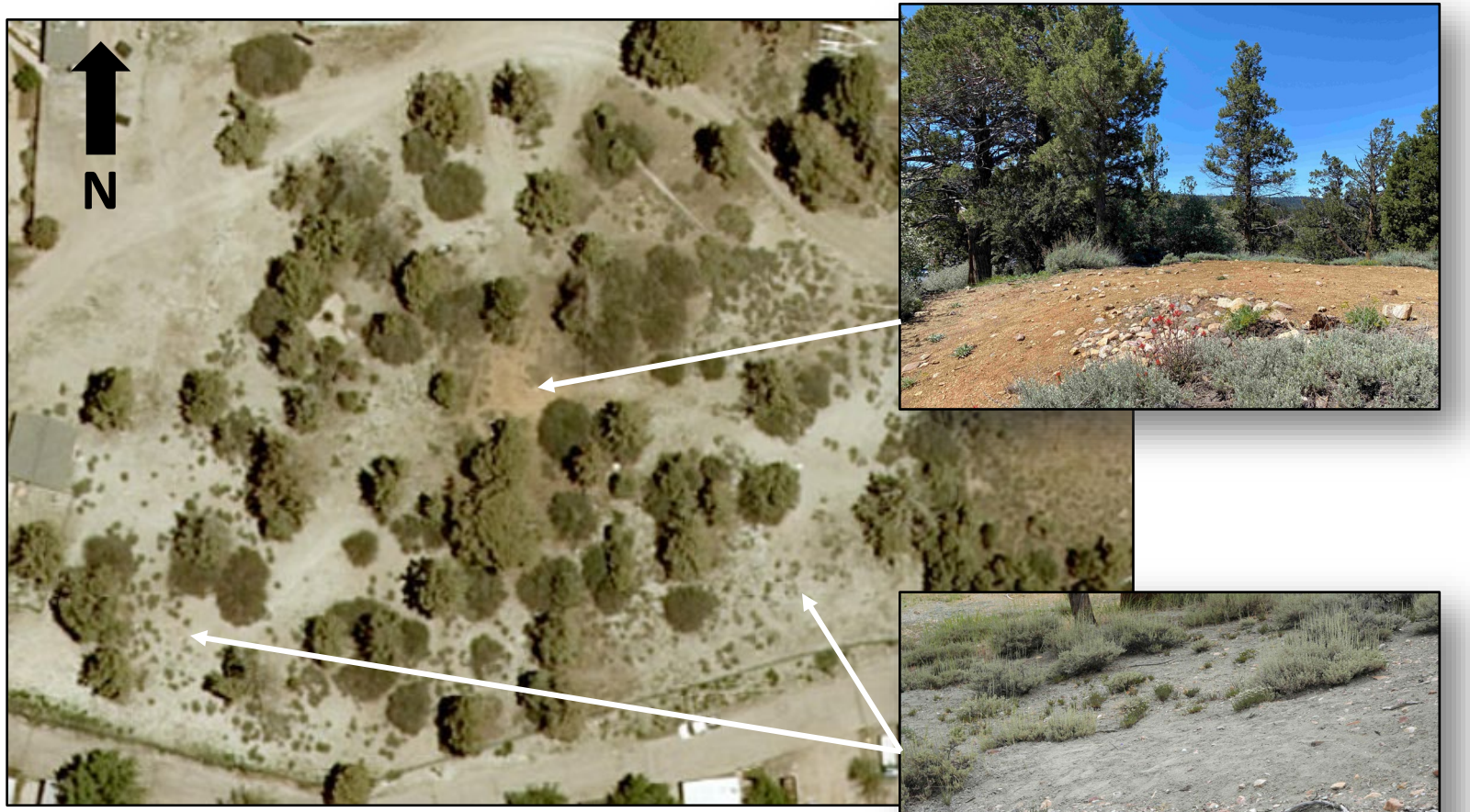
Species Overview: Life History

- Bear Lake buckwheat (*Eriogonum microtheca* var. *lacus-ursi*)
- Buckwheat family (Polygonaceae)
- Small shrub
- Flowers July-October
- Distinguished from other varieties through leaf characteristics

Species Overview: Geographic Range/Distribution

- South shore of Big Bear Lake in San Bernardino County
- One occurrence
- Current area occupied is less than 1.5 acres
- The Big Bear Lake area has been extensively surveyed, but no other populations have been found

Species Overview: Habitat Necessary for Survival



- Small hill at the south end of the property
  - Unique gray soils on the lower slopes
  - Reddish soils at the top

- Bear Lake buckwheat is restricted to the gray soils on the south side of the hill

Species Overview: Habitat Necessary for Survival

- Outcrop of fine, gray, silty, clay soil with a dispersed scattering of quartzite rocks
- Grows in openings under Jeffrey pine and Sierra juniper
- Co-occurs with several sensitive plant species

Species Overview: Population Trend/Abundance

- No population trend data but area occupied has declined
  - Big Bear Lake created in the late 1800s
  - Development of Big Bear Lake area
  - Portion of population extirpated
- Low abundance
  - Estimates from 2001-2023 ranged from 100 to 310 plants
  - 836 plants censused in July 2024
  - 744 plants censused in September 2025

Threats

- **Present or threatened modification or destruction of habitat**
- **Other human disturbances**
- **Small population size**
- **Fire and fuel reduction**
- Climate change
- Non-native plants
- Horticultural collecting (overexploitation)

Threats: Modification/Destruction of Habitat

- **Present or threatened modification or destruction of habitat**
  - Owned by Bear Valley Mutual Water Company
  - Leased to the City of Big Bear Lake
  - City of Big Bear Lake plans to develop portions of the property
  - No required protections

Threats: Other Human Disturbances

- **Other human disturbances**
  - Off-road vehicles/dirt bikes
  - Litter and trash dumping
  - Foot traffic/trampling

Threats: Small Population and Fire

- **Small population size**
  - Highly vulnerable to human activities and chance events
- **Fire and fuel reduction**
  - Brush clearing could occur to reduce fuels for safety

Degree and Immediacy of Threat

- Immediate and Ongoing Threats
  - Habitat modification or destruction
  - Human disturbances
  - Small population size
  - Fire and fuel reduction

- Potential Future Threats
  - Climate change
  - Non-native plants
  - Horticultural collecting (Overexploitation)

Current Management

- Direct management actions to benefit Bear Lake buckwheat
- Management actions to benefit other rare plant species on property
- Future development of the site into a city park is anticipated in the next few years
- CESA protections are critical to protect the species from development activities

Future Management Recommendations

- Preserve existing occurrence and habitat
- Establish and maintain deterrents to ORV activity
- Studies on Bear Lake buckwheat life history, ecology, and genetics
- Demographic monitoring
- Feasibility of population enhancement or new population establishment

Department Recommendation

The Department recommends that the Commission find the petitioned action to list Bear Lake buckwheat **to be warranted** and recommends that Bear Lake buckwheat be listed as an **endangered** species under CESA.

Thank You | Questions

Kristi Lazar

Senior Environmental Scientist (Specialist)

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Summary

- Small shrub in the buckwheat family
- Restricted to gray, silty soils on the south shore of Big Bear Lake
- One occurrence
- Survival and reproduction affected by habitat modification or destruction, human disturbances, small population size, fire and fuel reduction, climate change, non-native plants, horticultural collecting
- Most imminent and ongoing threats are development, off-road vehicles and litter, small population size, and brush clearing for fuel reduction
- The Department recommends the Commission list Bear Lake buckwheat as endangered under CESA