

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

California Endangered Species Act



Petition Evaluation for Shasta Orthocarpus (*Orthocarpus pachystachyus*)

Report to the Fish and Game Commission
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LIST OF ABBREVIATIONS, ACRONYMS, AND TERMS

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

EXECUTIVE SUMMARY

This petition evaluation for Shasta orthocarpus (*Orthocarpus pachystachyus*) has been prepared by the California Department of Fish and Wildlife (Department) in response to the petition to list Shasta orthocarpus as endangered under the California Endangered Species Act (CESA). The purpose of this petition evaluation is to provide a recommendation to the Fish and Game Commission (Commission) on whether the petition provides sufficient information to indicate the petitioned action may be warranted.

Shasta orthocarpus is an annual plant in the broomrape family (Orobanchaceae) that blooms in May. The petition describes Shasta orthocarpus as being known from four occurrences in the eastern Klamath Ranges and western Cascade Ranges and occurring in Great Basin scrub and grasslands on serpentine substrates. The petition provides an abundance estimate for one occurrence where eight plants were observed in 1996 and only one plant was observed in 1998 and provides information to suggest a historically declining population trend. The petition lists agricultural and developed land uses and climate change as the main threats to Shasta orthocarpus. The petition mentions that extirpation from much of its range or extinction of the species may occur because: ongoing threats have likely already eliminated two, or potentially three of the four known occurrences and threaten the remaining occurrence(s), the species has been documented at only a small number of sites, and the remaining documented occurrences occupied by the species are unprotected and not managed for the conservation of the species. Existing management efforts were reviewed and suggestions for future management actions were discussed in the petition. Information sources and a distribution map were also provided in the petition.

The Department has determined that the petition does not sufficiently address each of the required petition components listed in Fish and Game Code section 2072.3 and California Code of Regulations, title 14, section 670.1, subdivision (d)(1):

- Life history
- Range
- Distribution
- Detailed distribution map
- Kind of habitat necessary for survival
- Abundance
- Population trend
- Factors affecting the ability to survive and reproduce
- Degree and immediacy of threat
- Impact of existing management efforts

- Suggestions for future management
- Availability and sources of information

In completing its petition evaluation, the Department considered the information in the petition and other relevant information the Department possesses. The Department has determined that there is not sufficient scientific information to indicate that the petitioned action to list Shasta orthocarpus as endangered under CESA may be warranted. Therefore, the Department recommends that the Commission reject the petition for further consideration pursuant to CESA.

1 INTRODUCTION

1.1 Petition Evaluation Overview

This petition evaluation 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 petition to list Shasta orthocarpus (*Orthocarpus pachystachyus*) as endangered under the California Endangered Species Act (CESA) should be accepted and considered. The recommendation is based on the sufficiency of scientific information in the petition, as well as other relevant information that was reviewed by the Department during the evaluation period.

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)).

Once a petition is submitted to the Commission, the Department has 90 days (120 days with extension) to prepare a petition evaluation that assesses each of the petition components and makes a recommendation to the Commission as to whether there is sufficient scientific information to indicate that the petitioned action to list the species under CESA may be warranted (Fish & G. Code, § 2073.5, subds. (a)-(b)). Once completed by the Department, the petition evaluation is delivered to the Commission and placed on the agenda for receipt at the next available meeting of the Commission. At that time, the petition evaluation will be made available to the public for a 30-day public comment period prior to the Commission taking any action on the petition. The Commission then considers the petition, the Department's petition evaluation and recommendation, written comments received, and oral testimony, and will then make a finding at the next available meeting of the Commission as to whether the petition provides "sufficient information to indicate that the petitioned action may be warranted" (Fish & G. Code, § 2074.2, subd. (e)(2)). The standard for accepting a petition for consideration and assessing sufficiency of information is addressed in *Center for Biological Diversity v. California Fish and Game Commission* (2008) 166 Cal.App.4th 597.

If the Commission determines that the petitioned action may be warranted, the species becomes a candidate for CESA listing and proceeds to the status review stage of the CESA listing process. The Department then prepares a peer-reviewed report that advises

the Commission on whether the petitioned action is warranted, based upon the best scientific information available (Fish & G. Code, § 2074.6). Finally, the Commission determines whether the petitioned action to list the species as threatened or endangered is warranted, based on the Department's status review and other information in the administrative record (Fish & G. Code, § 2075.5).

1.2 CESA Petition History

On August 29, 2025, Dr. John C. Hunter submitted a petition to the Commission to list Shasta orthocarpus as endangered under CESA. On September 8, 2025, the Commission referred the petition to the Department for evaluation. At its meeting on October 8, 2025, the Commission officially acknowledged receipt of the petition. At its meeting on December 10, 2025, the Commission granted the Department's request for a 30-day extension of the period to review the petition and prepare this petition evaluation.

1.3 Federal Status

Shasta orthocarpus has no status under the Federal Endangered Species Act (ESA) (16 U.S.C. § 1531 et seq.). Shasta orthocarpus has been considered for ESA listing in the past. In 1993, the U.S. Fish and Wildlife Service provided notice that Shasta orthocarpus was no longer being considered for listing as threatened or endangered due to persuasive evidence of extinction (58 Fed.Reg. 51144 (Sep. 30, 1993)). Shasta orthocarpus was considered extinct until its rediscovery in 1996 (CNPS 2025).

1.4 Additional Species Status Designations

1.4.1 NatureServe Conservation Status Ranks

NatureServe's conservation status ranks consist of a global conservation status rank (global rank, G rank) describing the status of a given species over its entire distribution, and a subnational conservation status rank (subnational rank, S rank) describing the status of a given subspecies or variety over its state distribution (Master et al. 2012). NatureServe has assigned Shasta orthocarpus a global rank of G1 and a subnational rank of S1, indicating that the species is critically imperiled both globally and within California with a very high risk of extinction due to one or more of the following: very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors (CNDDB 2020, 2025).

1.4.2 California Rare Plant Rank

The California Native Plant Society (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 (CNDDDB and CNPS 2020). CNPS has assigned Shasta orthocarpus 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 (CNDDDB 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 (CNDDDB and CNPS 2020).

2 SPECIES DESCRIPTION AND TAXONOMY

Shasta orthocarpus is a member of the broomrape family (Orobanchaceae). It is an annual plant that is a root-parasite and grows 10 to 20 cm (4 to 8 in) tall (Wetherwax et al. 2012b; Wetherwax 2024). The plant is sparsely covered with soft hairs, scabrous (rough to the touch), and partially covered with minute, glandular hairs (Wetherwax et al. 2012b). The stem is unbranched and stout, with alternately-arranged linear leaves that are 30 to 50 mm (1.2 to 2.0 in) long (Wetherwax et al. 2012b). The leaves are sessile (without a petiole or stalk) and the upper leaves have 3 to 5 lobes (Wetherwax et al. 2012a, b). The inflorescence (group of flowers) is 5 to 10 cm (2 to 4 in) and is arranged in a spike, which is an unbranched inflorescence in which the flowers are sessile and nearly always open from the bottom to the top of the inflorescence (Wetherwax et al. 2012b; Jepson Flora Project 2025). The flowers have an unequally four-lobed calyx (collective term for sepals) that is 15 to 20 mm (0.6 to 0.8 in) long, and a two-lipped club-shaped corolla (collective term for the petals) that is 25 to 30 mm (1.0 to 1.2 in) long. The upper lip of the corolla is rose-colored above and folded lengthwise with a rounded closed tip, and the opening is directed downward, forming a hood that encloses the anthers (pollen-bearing portion of the male reproductive organ) and style (the stalk that connects the ovary to the stigma) (Wetherwax et al. 2012a). The lower lip of the corolla is shorter with a slightly three-lobed pouch (Chuang and Heckard 1992; Wetherwax et al. 2012a, b). Each flower is subtended by a 20 to 30 mm (0.8 to 1.2 in), widely ovate, prominently net-veined bract with four narrow lateral lobes near the middle. The central lobe of the bract is ovate and 7 to 10 mm (0.3 to 0.4 in) wide, with pink-lavender margins at the tips. The fruit is a capsule (dry fruit that opens to release its seeds) that is 5 to 7 mm long (0.2 to 0.3 in) and contains several seeds about 3 mm (0.1 in) long (Chuang and Heckard 1992).

Shasta orthocarpus was first collected by Edward L. Greene in 1876 (Chuang and Heckard 1992). Shasta orthocarpus was formally described by Asa Gray in 1878 (Gray 1878) and was assigned the scientific name *Orthocarpus pachystachyus*. The currently accepted name for Shasta orthocarpus is *Orthocarpus pachystachyus* (Wetherwax et al. 2012b).

3 SUMMARY OF PETITION COMPONENTS

Pursuant to Fish and Game Code section 2072.3 and California Code of Regulations, title 14, section 670.1, subdivision (d)(1), the Department evaluated whether the petition contained information on each of the following petition components:

- Life history
- Range
- Distribution
- Detailed distribution map
- Kind of habitat necessary for survival
- Abundance
- Population trend
- Factors affecting the ability to survive and reproduce
- Degree and immediacy of threat
- Impact of existing management efforts
- Suggestions for future management
- Availability and sources of information

The Department did not receive new information from the public during the petition evaluation period (Fish & G. Code, § 2073.4). Pursuant to Fish and Game Code section 2073.5, the Department evaluated the petition to determine whether there is, or is not, sufficient information to indicate that the petitioned action may be warranted. A summary of the relevant information from the petition for each of the petition components is presented below. For each petition component, the Department has also presented an assessment of the information provided in the petition and a summary of any relevant information in the Department's possession. Overall sufficiency of the petition is determined by looking at the information in the petition as a whole and is further discussed in the "Sufficiency of Scientific Information and Recommendation to the Commission" section of this petition evaluation. In this petition evaluation, the Department has grouped similar petition components together and renamed components to create a more cohesive and readable document.

3.1 Life History

This section summarizes the information in the petition regarding the species' life history (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)). Section E on pages 6 and 7 of the petition provides information on the life history of Shasta orthocarpus.

The petition provides a physical description of Shasta orthocarpus, with descriptions of its habit, stems, leaves, flowers, fruits, and seeds. The petition contrasts Shasta orthocarpus with the physical properties of similar species. The petition describes Shasta orthocarpus as an annual root-parasitic herb that blooms in May and is pollinated by insects. The petition also describes how Shasta orthocarpus is hemi-parasitic; its leaves are green and it photosynthesizes, but its roots intrude into and connect to the tissues of host plant roots where they obtain water and nutrients. The petition also states that research on the species' pollination, dispersal, establishment, growth, mortality, interactions with other species, population dynamics, habitat requirements, or other aspects of its ecology has not been studied, but extensive research on its genus (*Orthocarpus*) provides some understanding of the ecology of Shasta orthocarpus.

3.1.1 Department Assessment

The Department considers the information provided in the petition on the life history of Shasta orthocarpus to be adequate for assessing this petition component.

3.2 Range and Distribution

This section summarizes the information in the petition regarding 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 petition evaluation is the species' range within California (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. Section B on page 4 of the petition provides information on the range of Shasta orthocarpus. Section C on pages 4 and 5 of the petition provides information on its distribution. Section L, Figure 2 on page 19 of the petition provides a distribution map, which has been provided as Figure 1 of this petition evaluation.

The petition describes Shasta orthocarpus as a California endemic of the eastern Klamath Ranges and western Cascade Ranges. The petition states that Shasta orthocarpus' range comprises approximately 799 square kilometers (309 square miles), and that it occurs in Siskiyou County at elevations of approximately 800 to 1,500 meters (2,600 to 4,900 feet). The petition states that Shasta orthocarpus is known from four sites that were documented between 1876 and 1998. Three occurrences are noted in the petition as being nonspecific occurrences in which the precise location and boundaries of the species have not been documented. The petition also notes that two of the nonspecific occurrences are likely extirpated and the third may be extirpated as well.

The petition also mentions that Shasta orthocarpus may occupy additional, undocumented sites.

3.2.1 Department Assessment

Range and distribution of Shasta orthocarpus are presented in the petition based primarily on data reported in the California Natural Diversity Database (CNDDB); however, no discussion is provided on the completeness of the information presented including whether the CNDDB data represents the complete range and distribution of the species, whether additional information on range and distribution is available for the species that is not reflected in the CNDDB data, or whether any survey efforts have been made to confirm or ascertain the full range and distribution of the species. Without further discussion explaining why the information provided in the petition is a scientifically defensible assessment of the range and distribution of the species, the Department is unable to properly determine whether the petition provides a reasonable explanation of the range and distribution of the species, or whether other petition components that rely on knowing the range and distribution of the species have been properly assessed.

The Department does not have additional, readily available information in its possession that compensates for deficiencies in data for these topics. The information presented in the petition is not adequate for assessing the range and distribution of Shasta orthocarpus.

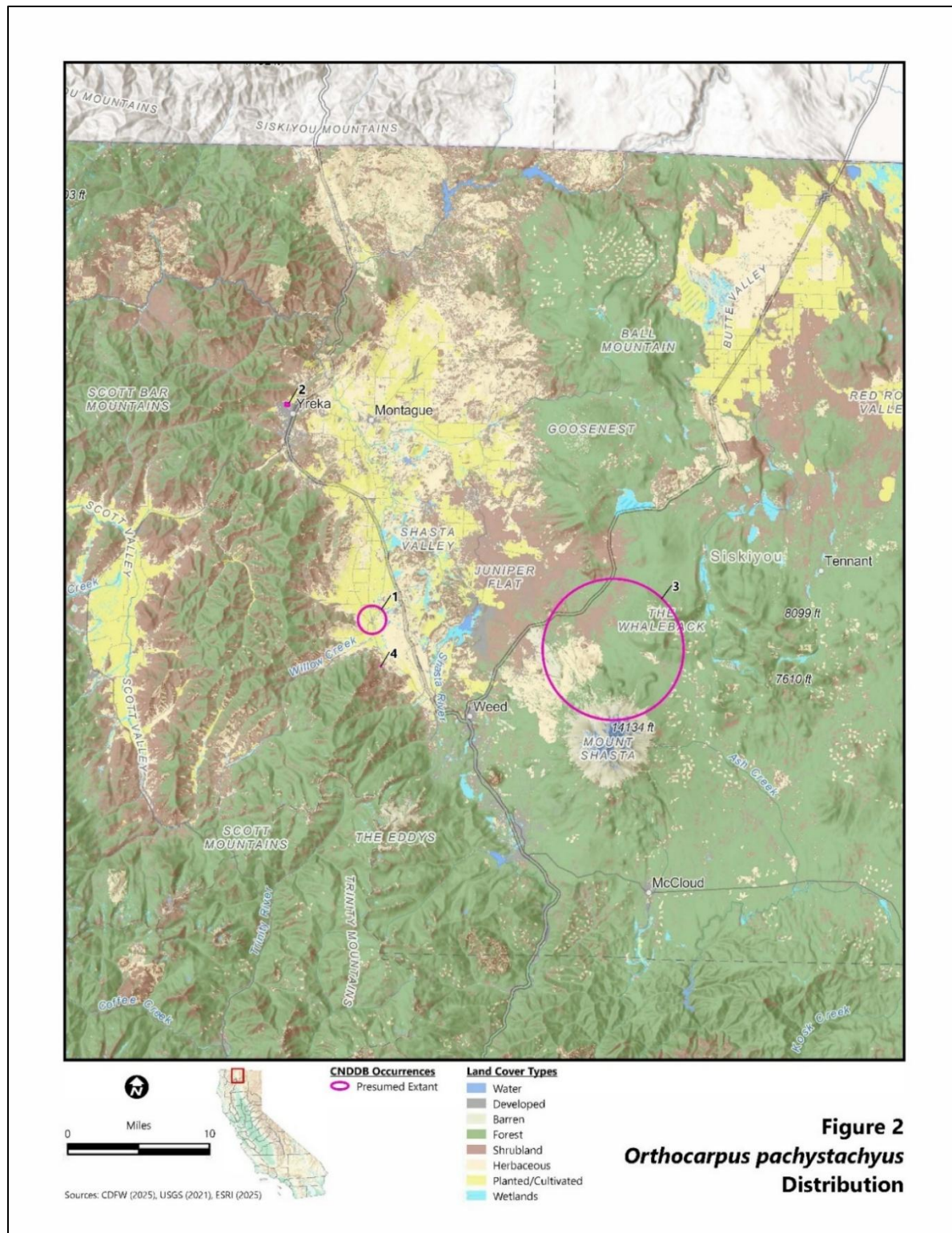


Figure 1. Map of the range and distribution of *Shasta orthocarpus* as provided in Figure 2 of the petition. Occurrences from the California Natural Diversity Database (CNDDDB) are labeled with CNDDDB occurrence numbers.

3.3 Habitat

This section summarizes the information in the petition regarding the kind of habitat necessary for species survival (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)). Section F on page 7 of the petition provides information on the kind of habitat necessary for the survival of Shasta orthocarpus.

The petition states that Shasta orthocarpus occurs in Great Basin scrub and grasslands and is restricted to serpentine substrates. The petition also notes that sagebrush (*Artemisia tridentata*) and “native perennial grasses” have been recorded as growing with Shasta orthocarpus.

3.3.1 Department Assessment

The Department considers the information provided in the petition on the kind of habitat necessary for Shasta orthocarpus survival to be adequate for assessing this petition component.

3.4 Abundance and Population Trend

This section summarizes the information in the petition regarding the species’ abundance and population trend (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)). Section D on page 5 of the petition provides information on the abundance of Shasta orthocarpus. Section A on pages 3 and 4 of the petition provides information on the population trend of Shasta orthocarpus.

The petition summarizes information on the abundance of Shasta orthocarpus at one CNDDDB occurrence, with a population size of eight plants in 1996 and only one plant in 1998. The petition states that recent, range-wide, multi-year monitoring of Shasta orthocarpus has not been conducted and, thus, a rigorous estimate of the total number of plants cannot be made. The petition estimates the area of occupied habitat to be less than 1.2 hectares (3 acres) based on CNDDDB polygons.

The petition states that, based on information from the CNDDDB, land cover mapping from the U.S. Geological Survey, aerial imagery from Google Earth, and the scientific literature, Shasta orthocarpus has had a decreasing population trend because of loss and degradation of occupied habitat at Shasta orthocarpus occurrences where the species has been observed, but the petition notes that its current population trend is unknown. Of the three historical occurrences, the petition discusses how habitat has been lost or degraded at two of the occurrences based on land cover mapping and aerial imagery. All three historical occurrences were surveyed without finding the plant according to Chuang and Heckard (1992) and as a result, the petition notes that these occurrences have likely been extirpated. The petition states that since the late 1800s to early 1900s

when three of the four occurrences were documented, substantial changes have affected the region's natural vegetation and may have impacted documented and undocumented occurrences of Shasta orthocarpus.

3.4.1 Department Assessment

Abundance of Shasta orthocarpus is provided in the petition based on population estimates reported in the CNDDDB; however, no discussion is provided on the completeness of the information including whether the population estimates at the one occurrence with population data was based on complete or partial surveys of the occurrence. Area of occupied habitat is estimated in the petition as an indicator of abundance using CNDDDB polygon data which the Department considers to be an inappropriate use of CNDDDB data. CNDDDB polygons are typically mapped to include a buffer that represents the locational accuracy of the data and therefore should not be used to determine area occupied by the species.

The petition states that Shasta orthocarpus has had a declining population trend in the past but its current population trend is unknown based on: 1) three of four occurrences being likely extirpated since the species was not found during surveys reported in Chuang and Heckard (1992), 2) the use of CNDDDB polygon data overlayed on land cover mapping to report the extent of any overlap between the CNDDDB polygon data with development or agriculture, and 3) the historical and ongoing changes to the region's natural vegetation. No discussion is provided in the petition on the completeness of the information including whether any efforts since Chuang and Heckard's surveys have been made to update information on the presence and condition of historical occurrences or if any efforts have been made since 1998 to update information on the one Shasta orthocarpus occurrence with population information. The petition uses CNDDDB polygon data overlayed on land cover mapping to report on the extent of overlap between CNDDDB polygons with development or agriculture to determine additional occurrences that may be experiencing a declining population trend. CNDDDB polygons are typically mapped to include a buffer that represents the locational accuracy of the data, and the petition does not indicate if development or agriculture shown on aerial imagery overlapped with the portion of the CNDDDB polygon that was previously occupied by the species or within areas that were once appropriate habitat for the species. In addition, the statements in the petition about changes to natural vegetation in the area likely causing additional, undocumented habitat losses, population reductions, or both to Shasta orthocarpus are too general and do not specifically identify impacts to habitat likely to have contained Shasta orthocarpus.

The Department does not have additional, readily available information in its possession that compensates for deficiencies in data for these topics. The information

presented in the petition is not adequate for assessing the abundance and population trend of Shasta orthocarpus.

3.5 Threats

This section summarizes the information in the petition regarding the factors affecting the ability of the species to survive and reproduce, and the degree and immediacy of threats (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)). Section G on pages 7 through 9 of the petition provides information on factors affecting the ability of Shasta orthocarpus to survive and reproduce (threats). Section H on pages 9 through 11 of the petition provides information on the degree and immediacy of threats to Shasta orthocarpus.

The petition lists two prominent range-wide threats to Shasta orthocarpus: agricultural and developed land uses and climate change. The petition describes agricultural and developed land uses as major threats to Shasta orthocarpus because these land uses have been directly eliminating, fragmenting, and increasing threats to the remaining habitat. The petition notes that according to the CNDDB and the interpretation of land cover mapping in the petition showing agriculture and development in relation to CNDDB occurrences of Shasta orthocarpus, two occurrences have likely been extirpated by agriculture and development, and development is a reported threat at an additional occurrence.

The petition states that climate change directly and indirectly threatens Shasta orthocarpus by altering growing conditions, water availability, and frequency and intensity of disturbances. The petition also notes that climate change can alter interactions of the plant with pollinators, dispersers, fungal symbionts, seed predators, herbivores, and competitors. The petition states that the magnitude of climate change impacts on Shasta orthocarpus is uncertain but may be substantial, particularly because of the species' limited range, rarity, habitat specificity, and distribution in relatively small and isolated areas that will be exposed to dramatic changes.

The petition states that without additional management actions, there is a moderate to high likelihood that Shasta orthocarpus will be extirpated from much of its range or become extinct. The petition mentions that this may occur because: ongoing threats have likely already eliminated two, or potentially three of the four known occurrences and threaten the remaining occurrence(s), the species has been documented at only a small number of sites, and the remaining documented occurrences occupied by the species are unprotected and not managed for the conservation of the species.

3.5.1 Department Assessment

Factors affecting the ability of Shasta orthocarpus to survive and reproduce, and the degree and immediacy of threats, are presented in the petition based mainly on the use of CNDDDB polygon data overlayed on land cover mapping to see if there is any overlap between the CNDDDB polygon data with development or agriculture to determine which occurrences may be experiencing threats or are extirpated based on proximity to agricultural or developed land uses. CNDDDB polygons are typically mapped to include a buffer to represent the locational accuracy of the data, and the petition does not indicate if development or agriculture shown on aerial imagery overlapped with the portion of the CNDDDB polygon that was previously occupied by the species or within areas that were once appropriate habitat for the species. Further discussion is needed on the use of aerial imagery to provide an accurate reflection of the degree of threat that development and agriculture are currently having on Shasta orthocarpus. The petition also presents climate change as a threat. None of these threats are described in adequate detail in relation to Shasta orthocarpus and the petition does not provide information on the degree and immediacy of these threats for the species.

The petition mentions small number and size of occupied sites, and lack of protection and management, as additional reasons why Shasta orthocarpus is likely to be extirpated from much of its range or become extinct. The petition has not shown that Shasta orthocarpus' distribution and number of sites have been fully assessed and has only provided population estimates for one occurrence. The petition also does not discuss what the unprotected lands with Shasta orthocarpus are being used for and how that land use is threatening, or potentially threatening, the species.

The Department does not have additional, readily available information in its possession that compensates for deficiencies in data for these topics. The information presented in the petition is not adequate for evaluating the factors affecting the ability of Shasta orthocarpus to survive and reproduce, or the degree and immediacy of threats to Shasta orthocarpus.

3.6 Existing Management

This section summarizes the information in the petition regarding the impact of existing management efforts on the species (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)). Section I on pages 11 through 13 of the petition provides information on the impact of existing management efforts on Shasta orthocarpus.

The petition states that management of Shasta orthocarpus has been very limited, has not sufficiently addressed threats to the species, and consequently has not resulted in significant conservation of the species. The petition describes the impact of several

management categories including legal protection, preservation and seed banking, management and monitoring, restoration, and surveys and research.

The petition describes Shasta orthocarpus as having no legal protections but notes that the species has a CRPR of 1B.1 and should be treated as a special-status species during environmental review under the California Environmental Quality Act.

The petition states that none of the occurrences of Shasta orthocarpus are on protected lands. The petition mentions that seeds of Shasta orthocarpus have not been collected and placed in long-term storage at a seed banking facility.

The petition notes that one occurrence of Shasta orthocarpus, whose location is only imprecisely known, may be on the Klamath National Forest, Shasta Trinity National Forest, or land managed by the Bureau of Land Management, all of which are public lands managed for multiple uses. The petition mentions that none of the Shasta orthocarpus occurrences are being monitored.

The petition states that no efforts have been made to restore or create habitat occupied by Shasta orthocarpus. The petition discusses how surveys have been conducted to relocate three occurrences, and Shasta orthocarpus was not observed at these sites. The petition notes that subsequent surveys of the region's serpentine habitats conducted in the 1990s documented an additional occurrence, and that additional local botanical surveys have also been conducted within and near the species' range. The petition states that research has not been conducted on the species' pollination, dispersal, establishment, growth, mortality, interactions with other species, population dynamics, habitat requirements, or other aspects of its ecology. The petition notes that the genus *Orthocarpus* has been extensively studied, providing some understanding of the ecology of Shasta orthocarpus.

3.6.1 Department Assessment

The Department considers the information provided in the petition on impact of existing management efforts on Shasta orthocarpus to be adequate for assessing this petition component.

3.7 Future Management

This section summarizes the information in the petition regarding suggestions for future management (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)). Section J on pages 13 and 14 of the petition provides suggestions for future management of Shasta orthocarpus.

The petition provides a list of suggestions for future management including:

- list the species under CESA and prepare a recovery plan for it,
- include the species as a focal species in regional conservation investment strategies and as a covered species in natural community conservation plans,
- preserve the extant occurrence and any occurrences discovered or established in the future in perpetuity,
- collect seed and place it in long-term storage at a seed-banking facility,
- develop and implement site-specific monitoring and management plans,
- manage the extant occurrence and any occurrences discovered or established in the future to prevent the spread of invasive species and eradicate existing infestations,
- identify and implement compatible grazing practices,
- coordinate and share information among organizations working to conserve the species,
- coordinate with and support private landowners implementing conservation practices in occupied habitat,
- establish additional populations,
- conduct surveys to improve data on distribution, abundance, and to search for additional, undocumented populations, and
- investigate the species' reproductive and population biology and its habitat requirements to inform conservation and management.

3.7.1 Department Assessment

The Department considers the information provided in the petition on suggestions for future management of Shasta orthocarpus to be adequate for assessing this petition component.

3.8 Availability and Sources of Information

This section summarizes the information in the petition regarding availability and sources of information (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)). Section K on pages 14 through 17 of the petition provides the sources of information used in the Shasta orthocarpus petition. Digital copies of references cited were also provided to the Commission and Department.

3.8.1 Department Assessment

The Department received digital copies of references cited in the petition and considers this to be adequate to address the availability and sources of information mentioned in the petition for Shasta orthocarpus.

4 OTHER RELEVANT INFORMATION AVAILABLE TO THE DEPARTMENT

Pursuant to Fish and Game Code section 2073.5, the Department also evaluates petitions in relation to other relevant information the Department possesses or receives. The Department evaluated readily available information relating to Shasta orthocarpus that is available from the Department's document library and the CNDDDB, including data housed in the CNDDDB's unprocessed data layer. Regional Department staff were contacted to determine if additional information on the species was readily available and in the possession of Department staff. In addition, the petitioner submitted supplemental information for the species via email on September 7, 2025. Any relevant information from these sources is mentioned within the "Department Assessment" section for each petition component.

To the extent the Department was able to review other relevant information in its possession as it relates to the petition, the Department concluded that none of the additional information compensates for data deficiencies in the petition. If the Commission accepts the petition for consideration, regardless of the Department's recommendation, all reasonable attempts will be made by the Department to notify affected and interested parties and to solicit data and comments on the petitioned action (Fish & G. Code, § 2074.4). At that time, the Department will commence a review of the status of the species and produce a written peer-reviewed report, based upon the best scientific information available to the Department, which indicates whether the petitioned action is warranted (Fish & G. Code, § 2074.6).

5 SUFFICIENCY OF SCIENTIFIC INFORMATION AND RECOMMENDATION TO THE COMMISSION

The Department evaluated the petition components set forth in Fish and Game Code section 2072.3 and California Code of Regulations, title 14, section 670.1, subdivision (d)(1) for sufficiency of information pursuant to Fish and Game Code section 2073.5. Based upon the information contained in the petition and other relevant information, the Department determined there is not sufficient information to indicate that the petitioned action may be warranted (Fish & G. Code § 2073.5).

In this petition evaluation, the Department has assessed the information in the petition for each petition component individually; however, sufficiency of the petition as a whole is ultimately determined by looking at all petition components taken together. The Department considers scientifically defensible information on range and distribution to be critical for determining sufficiency of the petition. For Shasta orthocarpus, the Department has determined that information is lacking for the following petition components: range, distribution, abundance, population trend, factors affecting the

ability of the species to survive and reproduce (threats), and the degree and immediacy of threats. Due to the lack of adequate information on these petition components, the Department does not consider the information in the petition to be sufficient as a whole for assessing whether listing Shasta orthocarpus under CESA may be warranted and recommends the Commission reject the petition and not consider it further under CESA.

LITERATURE CITED

- Chuang, T. I., and L. R. Heckard. 1992. A taxonomic revision of *Orthocarpus* (Scrophulariaceae - Tribe Pedicularae). *Systematic Botany* 17:560–582.
- CNDDDB (California Natural Diversity Database). 2020. California Natural Diversity Database (CNDDDB) Management Framework. California Department of Fish and Wildlife, Sacramento, CA, USA.
- CNDDDB (California Natural Diversity Database). 2025. RareFind 5 [internet]: *Orthocarpus pachystachyus*. Government version- dated October 2025. California Department of Fish and Wildlife, Sacramento, CA, USA.
- CNDDDB (California Natural Diversity Database), and CNPS (California Native Plant Society). 2020. The CNDDDB and CNPS cooperative relationship and rare plant status review process. Sacramento, CA, USA. Available from: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=175695&inline> (Accessed: 14 October 2025).
- CNPS (California Native Plant Society). 2025. Rare plant inventory (online edition, v9.5.1): *Orthocarpus pachystachyus*. Available from: <https://rareplants.cnps.org/Plants/Details/1205> (Accessed: 20 October 2025)
- Gray, A. 1878. *Orthocarpus pachystachyus*. *Synoptical Flora of North America* 2:300.
- Jepson Flora Project (eds.). 2025. Jepson eFlora Glossary. Available from: <https://ucjeps.berkeley.edu/eflora/glossary.html> (Accessed: 14 October 2025)
- Master, L., D. Faber-Langendoen, R. Bittman, G. Hammerson, B. Heide, L. Ramsay, K. Snow, A. Teucher, and A. Tomaino. 2012. NatureServe conservation status assessments: factors for evaluating species and ecosystem risk. NatureServe, Arlington, VA, USA.
- Wetherwax, M. 2024. Orobanchaceae in Jepson Flora Project, editors. Jepson eFlora, Revision 13. Available from: https://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=210 (Accessed: 21 October 2025)
- Wetherwax, M., T. Chuang, and L. Heckard. 2012a. *Orthocarpus* in Jepson Flora Project, editors. Jepson eFlora, Revision 13. Available from: https://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=11392 (Accessed: 21 October 2025)
- Wetherwax, M., T. Chuang, and L. Heckard. 2012b. *Orthocarpus pachystachyus* in Jepson Flora Project, editors. Jepson eFlora, Revision 13. Available from: https://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=35519 (Accessed: 21 October 2025)