

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

California Endangered Species Act



Petition Evaluation for Carquinez Goldenbush (*Isocoma arguta*)

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

CESA – California Endangered Species Act
 CNDDDB – 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
 var. – variety

EXECUTIVE SUMMARY

This petition evaluation for Carquinez goldenbush (*Isocoma arguta*) has been prepared by the California Department of Fish and Wildlife (Department) in response to the petition to list Carquinez goldenbush as threatened 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.

Carquinez goldenbush is a subshrub in the sunflower family (Asteraceae) that blooms August through December. The petition describes Carquinez goldenbush as being known from 14 occurrences in the southeastern Sacramento Valley, and occurring in valley and foothill grassland on alkaline substrates. The petition provides an abundance estimate at 10 occurrences with population sizes ranging from one to 2,753 plants at each occurrence, with half of the occurrences having fewer than 100 plants, and provides information to suggest a declining population trend. The petition lists several threats to Carquinez goldenbush including agricultural and developed land uses, climate change, and invasive species. The petition mentions that extirpation from much of its range or extinction of the species may occur because: most occurrences are threatened and the severity of some threats is increasing, the species has been documented at only a small number of sites that are also small in area, and most sites 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 Carquinez goldenbush as threatened 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 Carquinez goldenbush (*Isocoma arguta*) as threatened 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 Carquinez goldenbush as threatened 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

Carquinez goldenbush is not listed under the Federal Endangered Species Act (16 U.S.C. § 1531 et seq.). In 1993, the U.S. Fish and Wildlife Service provided notice that it was possibly appropriate to propose listing Carquinez goldenbush as endangered or threatened, but sufficient data was not then available to support a listing proposal (58 Fed.Reg. 51144 (Sep. 30, 1993)).

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 or G rank), describing the status of a given taxon over its entire global distribution, and a subnational conservation status rank (subnational rank or S rank), describing the status of a given taxon over its state distribution (Master et al. 2012). NatureServe has assigned Carquinez goldenbush 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 extirpation 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 (CNDDDB 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 Carquinez goldenbush 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 percent of occurrences threatened and a high degree and immediacy of threat (CNDDDB and CNPS 2020).

2 SPECIES DESCRIPTION AND TAXONOMY

2.1 Species Description

A summary of Carquinez goldenbush’s appearance and physical attributes was compiled from botanical manuals (Nesom 2006; Keil 2012) and a scientific publication (Nesom 1991). Carquinez goldenbush is a member of the sunflower family (Asteraceae). It is a subshrub that is 10 to 50 cm (3.9 to 19.7 in) tall and branches at the base. The plant stands upright or its branches lie on the ground and then curve upwards. Plants are generally hairless but can sometimes have scattered long hairs, usually near the very base of the plant, and plants can be rough textured. Leaves are thickened and have 3 to 5 pairs of leaf serrations, and the serrations may be lobe-like. Leaves are 1.0 to 2.5 cm (0.4 to 1 in) long, 3 to 7 mm (0.12 to 0.28 in) wide and have sticky glands.

As is typical with plants in the sunflower family, Carquinez goldenbush has numerous small flowers clustered into a head-like inflorescence (grouping of flowers). The inflorescences are composed of 10 to 13 flowers held densely together on a short stalk by leaf-like structures called phyllaries. Each inflorescence has 20 to 24 phyllaries that are arranged in 3 to 4 series. The phyllaries are hardened, oblong, have a small acute projection on the tip, and are sticky from glands that sometimes coalesce into a small resin pocket. Flower petals are yellow and 4 to 5 mm (0.16 to 0.2 in) long. Flowers develop into single-seeded fruits called achenes that are 3 to 3.5 mm (0.12 to 0.14 in) long, have 6 to 8 resinous ribs, and are covered with very fine close-pressed hairs.

2.2 Species Taxonomy

Carquinez goldenbush was first described by E. L. Greene in 1894 as *Isocoma arguta* (Greene 1894). The taxon was reduced to a variety of *Isocoma veneta* by W. L. Jepson in 1901 (Jepson 1901). Some authors also subsumed the genus *Isocoma* into *Haplopappus*, considering it a form of *Haplopappus venetus vernonioides* or using the name *Haplopappus venetus* var. *argutus* (Hall 1928; Keck 1958). In 1991, Carquinez goldenbush was again recognized as a full species within the genus *Isocoma* (Nesom 1991). The currently accepted name for Carquinez goldenbush is *Isocoma arguta* (Keil 2012).

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 5 and 6 of the petition provides information on the life history of Carquinez goldenbush.

The petition provides a physical description of Carquinez goldenbush, with descriptions of its habit, stems, leaves, flowers, and fruits. The petition describes Carquinez goldenbush as a small subshrub with a woody base and herbaceous growth that dies back annually and that blooms August through December. The petition states that the species is insect pollinated and wind dispersed. The petition mentions that Carquinez goldenbush seed dormancy and germination have not been studied, but that seeds of a related species germinate readily if exposed to light and moisture, and few of its seed remain viable after 18 months. The petition states that the population ecology and specific habitat requirements of Carquinez goldenbush have not been studied.

3.1.1 Department Assessment

The Department considers the information provided in the petition on the life history of Carquinez goldenbush 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 pages 3 and 4 of the petition provides information on the range of Carquinez goldenbush. Section C on page 4 of the petition provides information on its distribution. Section L, Figure 2 on page 20 of the petition provides a distribution map, which has been provided as Figure 1 of this petition evaluation.

The petition describes Carquinez goldenbush as a California endemic with a limited range in the southeastern Sacramento Valley. The petition states that Carquinez goldenbush's range comprises approximately 800 square kilometers (309 square miles), and that it occurs in Contra Costa and Solano counties at elevations of 1 to 20 m (5 to 65 ft). The petition states that Carquinez goldenbush is known from 14 sites that were documented between 1891 and 2003. The petition states that the species is restricted to east of Suisun Marsh, except for one historical occurrence at the Carquinez Strait. Four 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 mentions that Carquinez goldenbush likely occupies some additional, undocumented sites.

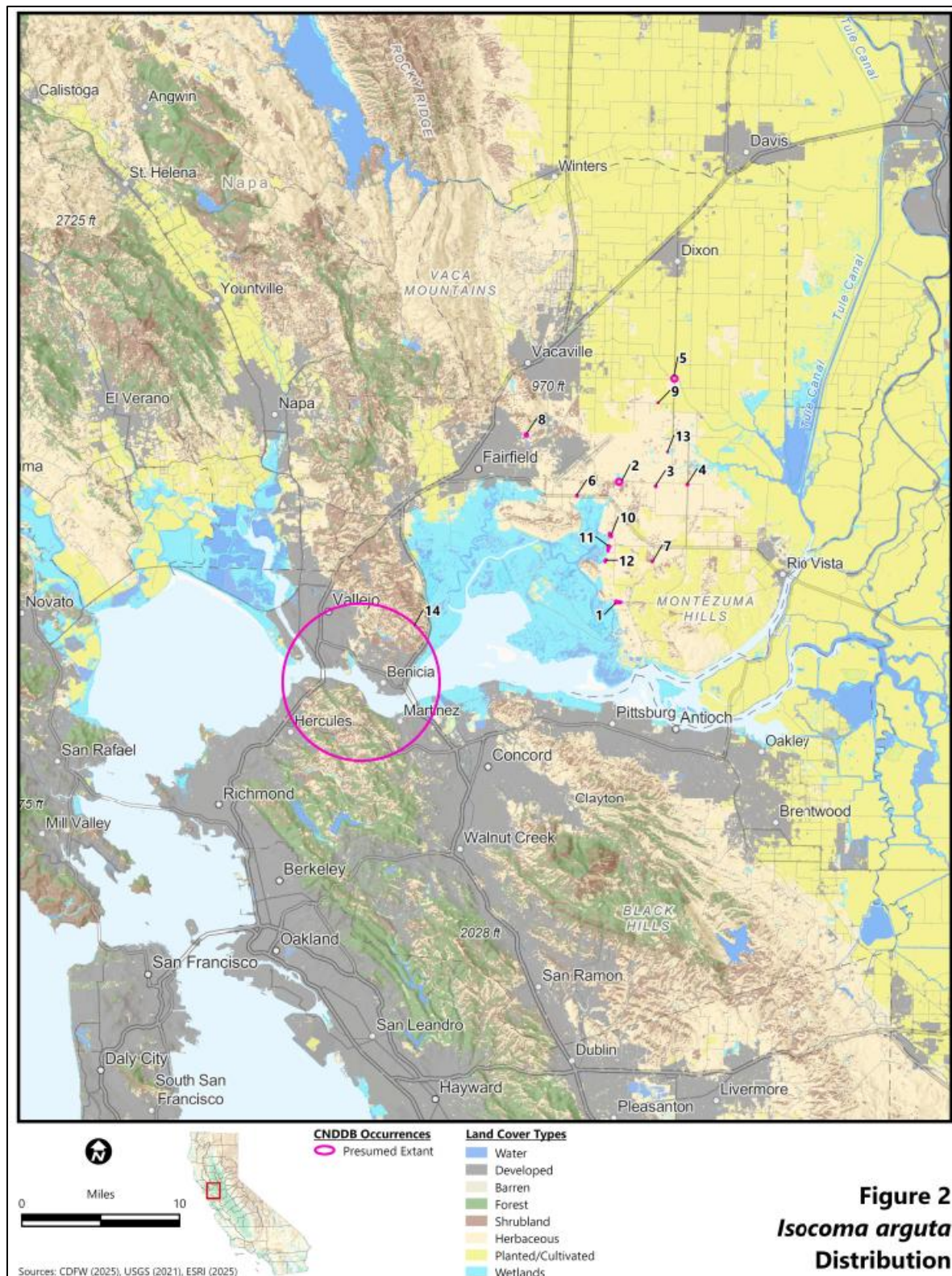


Figure 1. Map of the range and distribution of Carquinez goldenbush as provided in Figure 2 of the petition. Occurrences from the California Natural Diversity Database (CNDDDB) are labeled with CNDDDB occurrence numbers. Some occurrences consist of multiple polygons.

3.2.1 Department Assessment

Range and distribution of Carquinez goldenbush are presented in the petition based primarily on data from 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 has some additional, readily available information from the CNDDB not presented in the petition. The CNDDB was updated in April 2024 and November 2025 which resulted in one additional Carquinez goldenbush occurrence being added to the CNDDB. While this additional, readily available information contributes to our current knowledge on the range and distribution of Carquinez goldenbush, this information does not compensate for deficiencies in data in the petition for these topics. The information presented in the petition, considered alongside readily available information from the Department, is not adequate for assessing the range and distribution of Carquinez goldenbush.

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 Carquinez goldenbush survival.

The petition states Carquinez goldenbush occurs in valley and foothill grassland on alkaline substrates. The petition notes that the species grows at the edge of seasonal wetlands or on mounds in “hummocky” grassland that also contains seasonal wetlands. The petition also includes a list of plant species that grow with Carquinez goldenbush.

3.3.1 Department Assessment

The Department considers the information provided in the petition on the kind of habitat necessary for survival of Carquinez goldenbush 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 pages 4 and 5 of the petition provides information on the abundance of Carquinez goldenbush. Section A on page 3 of the petition provides information on the population trend of Carquinez goldenbush.

The petition summarizes information on the abundance of Carquinez goldenbush at 10 CNDDDB occurrences with population sizes ranging from one to 2,753 plants at each occurrence, with half of the occurrences having fewer than 100 plants. The petition states that range-wide, multi-year monitoring of Carquinez goldenbush 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 43 hectares (105 acres) based on CNDDDB polygon data.

The petition states that, based on information from the CNDDDB and land cover mapping from the U.S. Geological Survey, Carquinez goldenbush has had a decreasing population trend because of loss and degradation of occupied habitat at eight or more of the 14 sites where the species has been observed. The petition lists four occurrences that are either likely extirpated or have a fair population viability in the CNDDDB and reports seven occurrences that are likely experiencing degradation or loss of habitat based on land cover mapping. The petition states that the species has had additional, undocumented habitat losses, population reductions, or both, that occurred before the distribution of Carquinez goldenbush was well documented.

3.4.1 *Department Assessment*

Abundance of Carquinez goldenbush 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 there have been efforts to estimate population sizes at all occurrences, whether the population estimates are historical or recent, and whether the population estimates are based on complete or partial surveys of the occurrences. 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.

Population trend of Carquinez goldenbush is determined in the petition to be declining based on: 1) the number of CNDDDB occurrences that are designated as possibly extirpated or with a fair population viability, 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 valley and foothills grasslands. No discussion is provided in the petition on the completeness of the information, including whether any recent efforts have been made to update information on the presence and condition of Carquinez goldenbush or whether population declines at some occurrences have resulted in a population decline throughout the species' range. 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 valley and foothill grasslands likely causing additional, undocumented habitat losses, population reductions, or both to Carquinez goldenbush are too general and do not specifically identify impacts to habitat likely to have contained Carquinez goldenbush.

The Department has some additional, readily available information from the CNDDDB not presented in the petition. The CNDDDB was updated in April 2024 and November 2025 which resulted in one additional Carquinez goldenbush occurrence being added to the CNDDDB and eleven existing occurrences of Carquinez goldenbush being updated in the CNDDDB; some of those updates included abundance data and/or updated observation dates. While this additional, readily available information contributes to our current knowledge on abundance of Carquinez goldenbush, this information does not compensate for deficiencies in data for these topics. The information presented in the petition, considered alongside readily available information from the Department, is not adequate for evaluating the abundance and population trend of Carquinez goldenbush.

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 10 of the petition provides information on factors affecting the ability of Carquinez goldenbush to survive and reproduce (threats). Section H on pages 10 through 13 of the petition provides information on the degree and immediacy of threats to Carquinez goldenbush.

The petition lists several prominent range-wide threats to Carquinez goldenbush: agricultural and developed land uses, climate change, and invasive species. The petition

also mentions biocides, grazing, recreational use, and road/trail construction/maintenance have been reported by botanists as additional threats affecting occurrences based on CNDDDB data. The petition describes agricultural and developed land uses as major threats to Carquinez goldenbush because these land uses have been directly eliminating, fragmenting, and increasing threats to the remaining habitat. The petition notes that according to the CNDDDB and the interpretation of land cover mapping in the petition showing agriculture and development in relation to CNDDDB occurrences of Carquinez goldenbush, seven specifically mapped occurrences and four nonspecifically mapped occurrences may be impacted or threatened by agriculture and development.

The petition states that climate change directly and indirectly threatens Carquinez goldenbush 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 Carquinez goldenbush 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 invasive species have not been identified as a threat to Carquinez goldenbush in the CNDDDB, but invasive species are a significant, range-wide threat. The petition notes that invasive grass species co-occur with Carquinez goldenbush at multiple sites. The petition states that infestations of invasive species can directly affect the conditions or resources Carquinez goldenbush relies on, thereby reducing abundance and making the species more vulnerable to extirpation from other causes.

The petition states that without additional management actions, there is a moderate to high likelihood that Carquinez goldenbush will be extirpated from much of its range or become extinct. The petition mentions that this may occur because: most occurrences are threatened and the severity of some threats is increasing, the species has been documented at only a small number of sites that are also small in area, and most sites 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 Carquinez goldenbush to survive and reproduce, and the degree and immediacy of threats, are presented in the petition based primarily on threat data reported in the CNDDDB. Threats listed in the CNDDDB can be representative of various types of threat data, including current threats, future threats, past threats, threats affecting a small portion of the site, threats in one year but not another, etc. The

petition also presents climate change and invasive species as threats to Carquinez goldenbush that are not listed in the CNDDDB. None of these threats are described in adequate detail in relation to Carquinez goldenbush and the petition does not provide information on the degree and immediacy of these threats for the species.

The petition uses CNDDDB polygon data overlaid on land cover mapping to see if there is any overlap between the CNDDDB polygon data with development or agriculture to determine additional occurrences that may be experiencing threats. 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. 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 Carquinez goldenbush.

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

The Department has some additional, readily available information from the CNDDDB not presented in the petition. The CNDDDB was updated in April 2024 and November 2025 which resulted in one additional Carquinez goldenbush occurrence being added to the CNDDDB and eleven existing occurrences of Carquinez goldenbush being updated in the CNDDDB; some of those updates may include additional threat information. While this additional, readily available information contributes to our current knowledge on abundance of Carquinez goldenbush, this information does not compensate for deficiencies in data for these topics. The information presented in the petition, considered alongside readily available information from the Department, is not adequate for assessing the factors affecting the ability of Carquinez goldenbush to survive and reproduce or the degree and immediacy of threats to Carquinez goldenbush.

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 13 and 14 of the petition provides information on the impact of existing management efforts on Carquinez goldenbush.

The petition states that management of Carquinez goldenbush 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 Carquinez goldenbush 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 one occurrence of Carquinez goldenbush is on protected land and another occurrence may be preserved, but the status and location of the occurrence is not precisely known, so it may also be on unpreserved land. The petition mentions that seeds of Carquinez goldenbush have been collected and placed in long-term storage at University of California Botanical Garden at Berkeley.

The petition states that one occurrence is managed for education, research, and passive recreation, with the primary goal of preserving, protecting, and enhancing habitat for native plants and animals. The petition mentions that none of the Carquinez goldenbush occurrences are the subject of formal monitoring but one occurrence is regularly visited by botanists.

The petition states that efforts have not been made to restore or create habitat occupied by Carquinez goldenbush. The petition discusses how surveys have not been conducted to confirm the continued existence of Carquinez goldenbush at all occurrences, surveys have not been conducted to more precisely map nonspecific occurrences, and range-wide surveys of potential habitat have not been conducted to search for additional, undocumented populations. The petition states that research has not been conducted on the species' genetic diversity, pollination, dispersal, establishment, growth, mortality, interactions with other species, population dynamics, habitat requirements, or other aspects of its ecology.

3.6.1 Department Assessment

The Department considers the information provided in the petition on impact of existing management efforts on Carquinez goldenbush 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 14 and 15 of the petition provides suggestions for future management of Carquinez goldenbush.

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 occupied sites 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 extant populations to prevent the spread of invasive species and eradicate existing infestations,
- implement compatible grazing practices,
- establish a memorandum of understanding with Caltrans and Solano County regarding maintenance activities,
- coordinate and share information among organizations working to conserve the species,
- coordinate with and support private landowners implementing conservation practices in occupied habitat,
- restore degraded, occupied habitat,
- establish additional populations,
- conduct surveys to improve data on distribution and abundance,
- document genetic diversity, and
- investigate the species' population ecology 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 Carquinez goldenbush 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 15 through 18 of the petition provides the sources of information used in the Carquinez goldenbush 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 Carquinez goldenbush.

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 Carquinez goldenbush 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 also contacted to determine if additional information on the species was readily available and in the possession of Department staff. 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 Carquinez goldenbush, 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 Carquinez goldenbush under CESA may be warranted and recommends the Commission reject the petition and not consider it further under CESA.

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