

Interim Core Map Documentation for Contra Costa Goldfields

Version 1

Review Completed: October 2025

Core Map Developer: EPA's Office of Pesticide Programs (OPP)

Species Summary

The Contra Costa goldfields (*Lasthenia conjugens*; Entity ID 566) is an endangered terrestrial plant (dicot). Contra Costa goldfields typically grow in vernal pools, swales, moist flats, and depressions within a grassland matrix. However, several historical collections were from populations growing in the saline-alkaline transition zone between vernal pools and tidal marshes on the eastern margin of the San Francisco Bay. The extent to which pollination of *L. conjugens* depends on host-specific bees or more generalist pollinators is currently unknown. Additional information on the species is provided in **Appendix 1**.

Description of Core Map

The core map for the Contra Costa goldfields is based on biological information. The core map included the designated critical habitat and areas where verified known locations overlapped with terrestrial significant habitat from the California Department of Fish and Wildlife's Areas of Conservation Emphasis (ACE). Selected terrestrial significant habitats include riparian area, freshwater wetlands including vernal pools, and meadows ([California Department of Fish and Wildlife's Areas of Conservation Emphasis \(ACE\), 2020](#)).

Figure 1 depicts the resulting interim core map for Contra Costa goldfields. The size of this core map is approximately 85,025 acres. Landcover categories within the core map area are included in **Table 1**. Landcover is predominantly Grassland/herbaceous and shrub lands.

The core map developed for the Contra Costa goldfields is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the Contra Costa goldfields. This core map incorporates information developed by FWS and made available to the public; however, the core map has not been formally reviewed by FWS. This interim core map may be revised in the future to incorporate species expert feedback from FWS. This interim core map has an "average" (3) best professional judgment classification to describe major uncertainties/limitations. The map is based on known locations described by FWS, and EPA removed some additional areas based on biological needs of the species. This core map does not replace or revise any range or designated critical habitat developed by FWS for this species.

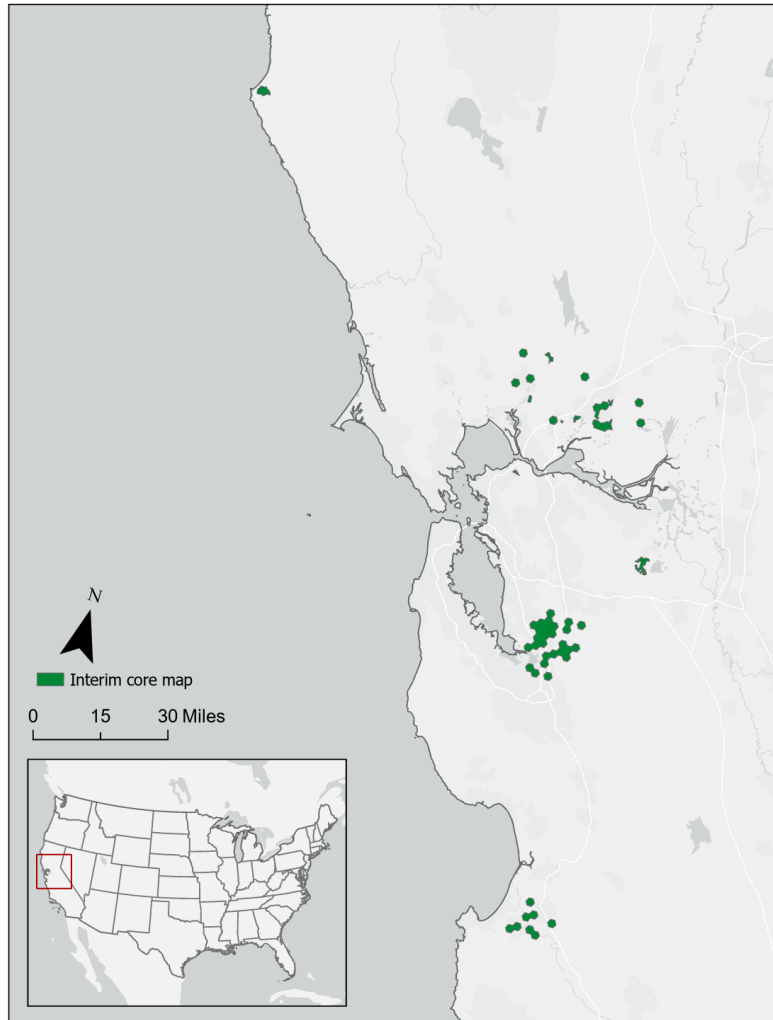


Figure 1. Interim core map for the Contra Costa goldfields.

Table 1. Percentage of Interim Core Map Represented by National Land Cover Database (NLCD)¹ Land Covers and Associated Example Pesticide Use Sites/Types.

| Example pesticide use sites/types | NLCD Class/Value | % Area |
|-----------------------------------|-----------------------------------|-----------------|
| Forestry | Deciduous Forest (41) | 0% |
| Forestry | Evergreen Forest (42) | 2% |
| Forestry | Mixed Forest (43) | 8% |
| Agriculture | Pasture/Hay (81) | 1% |
| Agriculture | Cultivated Crops (82) | 10% |
| Mosquito adulticide, residential | Open space, developed (21) | 4% |
| Mosquito adulticide, residential | Developed, Low intensity (22) | 6% |
| Mosquito adulticide, residential | Developed, Medium intensity (23) | 14% |
| Mosquito adulticide, residential | Developed, High intensity (24) | 5% |
| Invasive species control | Woody Wetlands (90) | 1% |
| Invasive species control | Emergent Herbaceous Wetlands (95) | 2% |
| Invasive species control | Open water (11) | 2% |
| Invasive species control | Grassland/herbaceous (71) | 28% |
| Invasive species control | Scrub/shrub (52) | 16% |
| Invasive species control | Barren land (rock/sand/clay; 31) | 0% |
| Total Acres | Interim Core Map Acres | ~ 85, 025 acres |

Evaluation of Known Location Information

There are four datasets with known location information:

- Descriptions of locations provided by FWS
- Occurrence locations in iNaturalist
- Occurrence locations in NatureServe
- Occurrence locations in the Global Biodiversity Information Facility (GBIF)

EPA evaluated these four sets of data before selecting the type of and developing the core map. FWS appeared to have the finest resolution of the location information (**Figure A1-2 in Appendix 1**). Many known locations in iNaturalist, about a third are research grade, align with FWS range map. GBIF also aligns with the FWS range map, although it has two entries farther South, one also on the central coast and another in Naples, CA. The two entries outside the range are preserved specimens. **Appendix 1** includes more information on the available known location information.

¹ Dewitz, J., 2023, National Land Cover Database (NLCD) 2021 Products: U.S. Geological Survey data release, <https://doi.org/10.5066/P9JZ7AO3>

Approach Used to Create Core Map

The core map was developed using the “Process EPA Uses to Develop Core Maps for Draft Pesticide Use Limitation Areas for Species Listed by the U.S. Fish & Wildlife Service (FWS) and their Designated Critical Habitats”² (referred to as “the process”). EPA developed the core map using the 4 steps described in the process document:

1. Compile available information for a species
2. Identify core map type
3. Develop the core map for the species
4. Document the core map

For step 1, EPA compiled available information for the Contra Costa goldfields from FWS, as well as observation information available from various publicly available sources (including iNaturalist, NatureServe, and GBIF). The information compiled for the Contra Costa goldfields is included in

Appendix 1. Influential information that impacted the development of the core map included:

- Occurrences and known locations of the Contra Costa goldfields
- Based on FWS information, this species has been extirpated from Santa Barbara, Santa Clara, and Mendocino Counties. The Recovery Plan states that seven reintroductions should occur throughout the current and historic range of the species.
- Critical habitat does not include some known occurrence locations, including large areas to the North and South of the bay area.
- Range map is large and it contains areas that are likely unoccupied by the species.

For step 2, EPA used the compiled information to identify the core map type including species range, critical habitat, known location information, and habitat requirements (referred to as suitable habitat and terrestrial significant habitat).

This core map was created by identifying where iNaturalist- and GBIF-verified occurrences overlap with habitat areas identified using Areas of Conservation Emphasis (ACE, 2020) and the designated critical habitat. Suitable/significant habitat included riparian area, freshwater wetlands including vernal pools, and meadows (ACE, 2020). The entire range of the species was not used as the core map because the range contains areas where the species does not occur.

For step 3, EPA used the best available data sources to generate the core map. Data sources are discussed in the process document. **Appendix 2** provides more details on the GIS analysis and data used to generate the core map.

² Dated 2024, available online at: <https://www.epa.gov/endangered-species/process-epa-uses-develop-core-maps-pesticide-use-limitation-areas>

Discussion of Approaches and Data that were Considered but not Included in Core Map

EPA did not explore approaches other than those described in this documentation.

Appendix 1. Information Compiled for the Contra Costa Goldfields During Step 1

1. Recent FWS documents/links and other data sources

- [Contra Costa Goldfields 5-Year Review - 2024](#)
- [Final rule; administrative revisions - Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants \(includes Contra Costa goldfields\) – 2006](#)
- [Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon \(includes Contra Costa goldfields\) – 2005](#)

2. Background information

- **Status:** Federally listed as **endangered** in **1997**
- **Resiliency, redundancy, and representation** (the 3Rs)
 - N/A
 - **Habitat**
 - Habitat: “These species occur primarily in vernal pool, swale, or ephemeral freshwater habitats and are largely confined to a limited area by topographic constraints, soil types, and climatic conditions. Surrounding (or associated) upland habitat is critical to the proper ecological function of these vernal pool habitats.” – 2005 recovery plan
 - “Contra Costa goldfields are most often associated with vernal pools, though natural occurrences are found in a variety of habitat types, including vernal and playa pools, seasonal pond edges, stream terraces, and margins of the San Francisco Bay (Vollmar 2022, p. 4). Contra Costa goldfields are known to have historically occurred in seven vernal pool regions: Central Coast, Lake-Napa, Livermore, Mendocino, Santa Barbara, Santa Rosa, and Solano-Colusa” – 2024 five-year review
- **Taxonomy**
 - Terrestrial Plant
 - FWS Category: Flowering dicot plants with host-specific bees and more unknown generalist pollinators.
- **Relevant Pesticide Use Sites**

Clothianidin, imidacloprid, and thiamethoxam (insecticides with toxicity to bees) have indirect adverse effects on Contra Costa goldfields via pollinators.
- **Recovery Criteria/Objectives (2006 recovery plan)**

(Information for this section is typically obtained from Recovery Plans, or if one of those is not available, Recovery Outlines.)

- protection from further habitat loss, fragmentation, and incompatible uses of the habitat to protect and maintain the full range of genetic and geographic variation in each species
 - development and implementation of appropriate habitat management plans for each species and area identified for protection
 - achievement of self-sustaining populations as determined through species monitoring and status surveys
 - completion of research necessary to refine measures to ameliorate or eliminate threats, and incorporation of results into habitat protection, management, and species monitoring efforts
 - establishment of regional recovery implementation working groups and development of outreach and education programs to ensure public support and participation in recovery efforts
- **Recovery Actions**
 - protect habitat within core areas, vernal pool regions, and all other areas that contribute to recovery, as appropriate
 - refine areas for vernal pool conservation by conducting Geographic Information Systems, Remote Sensing, and other analyses
 - restore habitat where needed and adaptively manage vernal pool conservation areas
 - develop and implement standardized survey and monitoring protocols to determine success in meeting recovery criteria
 - conduct research necessary to refine management techniques and recovery criteria
 - develop and implement cooperative programs and partnerships by establishing regional recovery implementation working groups
 - develop and implement participation programs in the form of outreach and education

3. Description of Species Range

- Figure A1-1 depicts the FWS range. The range was last updated on 3/20/2018. The total acreage of the range is around 3,226,200 acres.

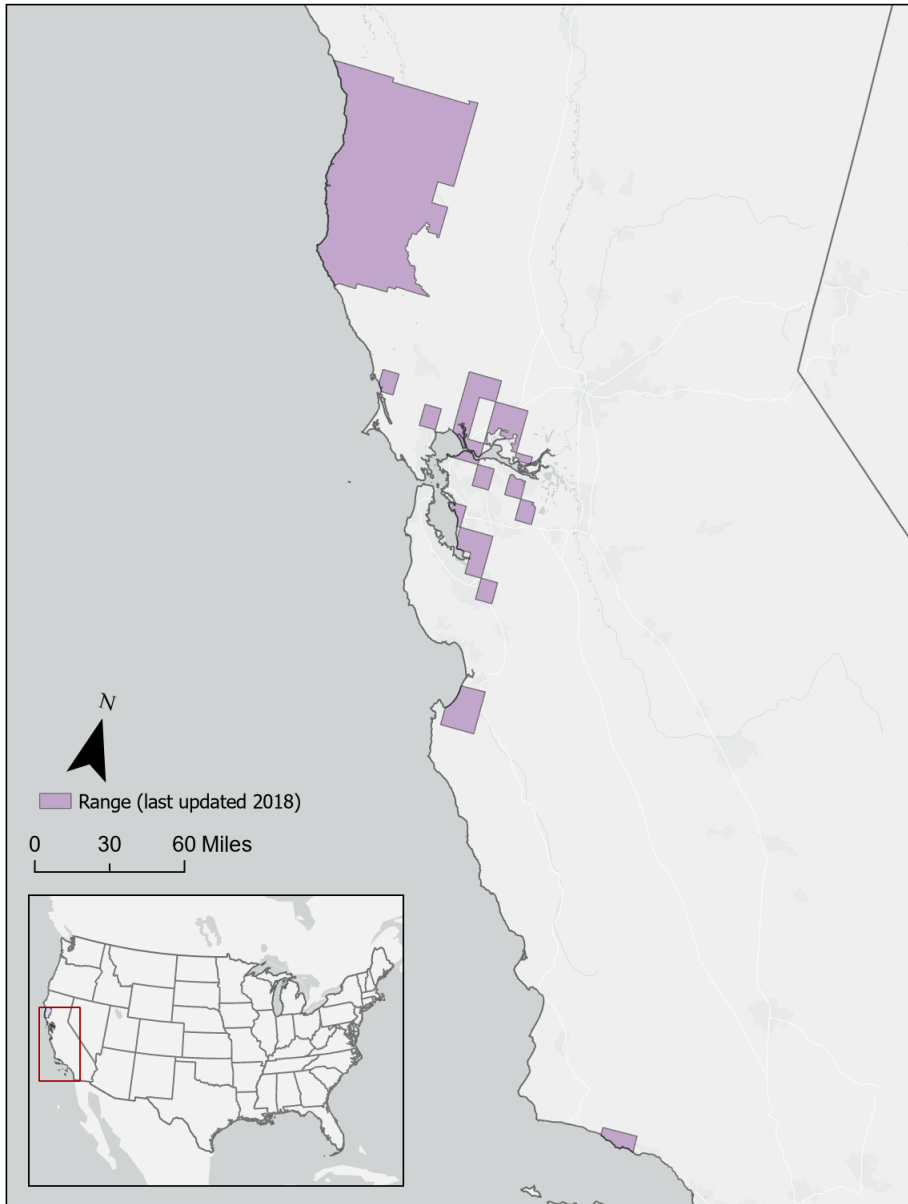


Figure A1-1. FWS range for the Contra Costa goldfields. The total acreage of the range is around 3,226,200 acres.

4. Critical Habitat

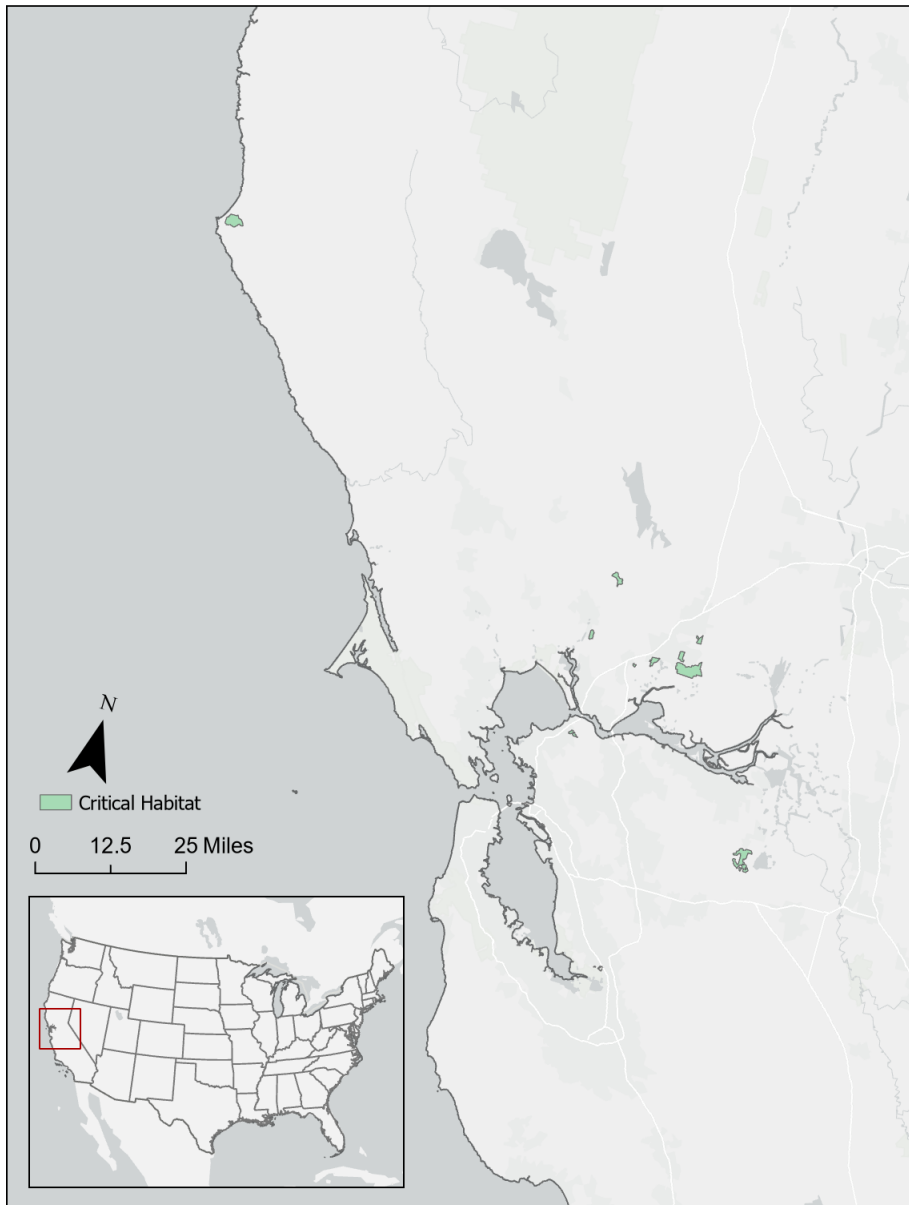


Figure A1-2. FWS critical habitat for the Contra Costa goldfields.
(https://ecos.fws.gov/docs/crithab/zip/FCH_Lasthenia_conjugens_20060210.zip)

5. Known Locations

- **Occurrences Included in Public Databases**
 - EPA queried iNaturalist, GBIF, and NatureServe. Occurrences in NatureServe were also consistent with other occurrence data.
 - iNaturalist: There are 53 research grade known locations in [iNaturalist](#); all align with FWS range map.

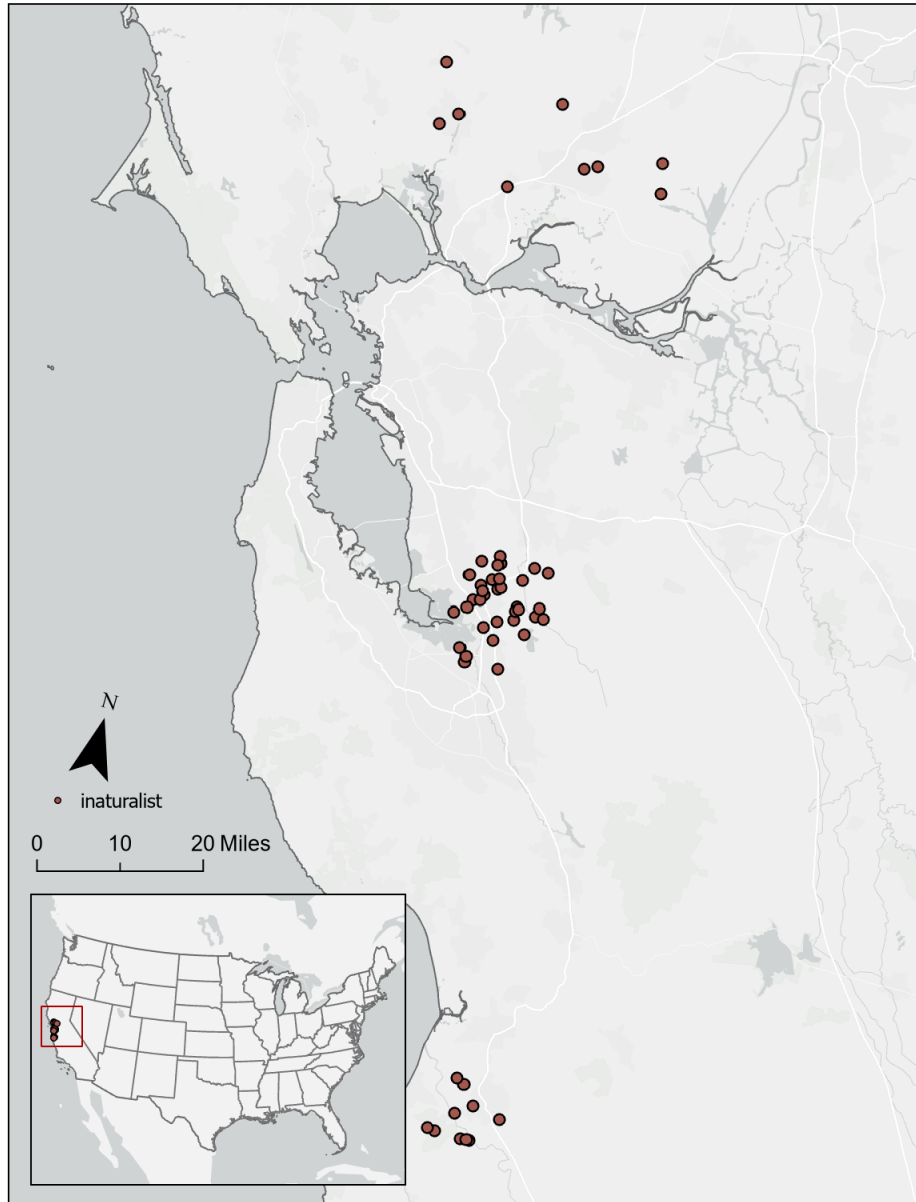


Figure A1-3 depicts the currently known locations from iNaturalist.

- GBIF (linked [here](#)): There are 255 observations available from GBIF and those points also align with the FWS range map. Among 255 observations, 151 occurrences preserved or fossil specimens. These include the two entries farther South, one also on the central coast and another in Naples, CA. Only human observations from GBIF, which is also closely aligned with iNaturalist points were used in developing core map.

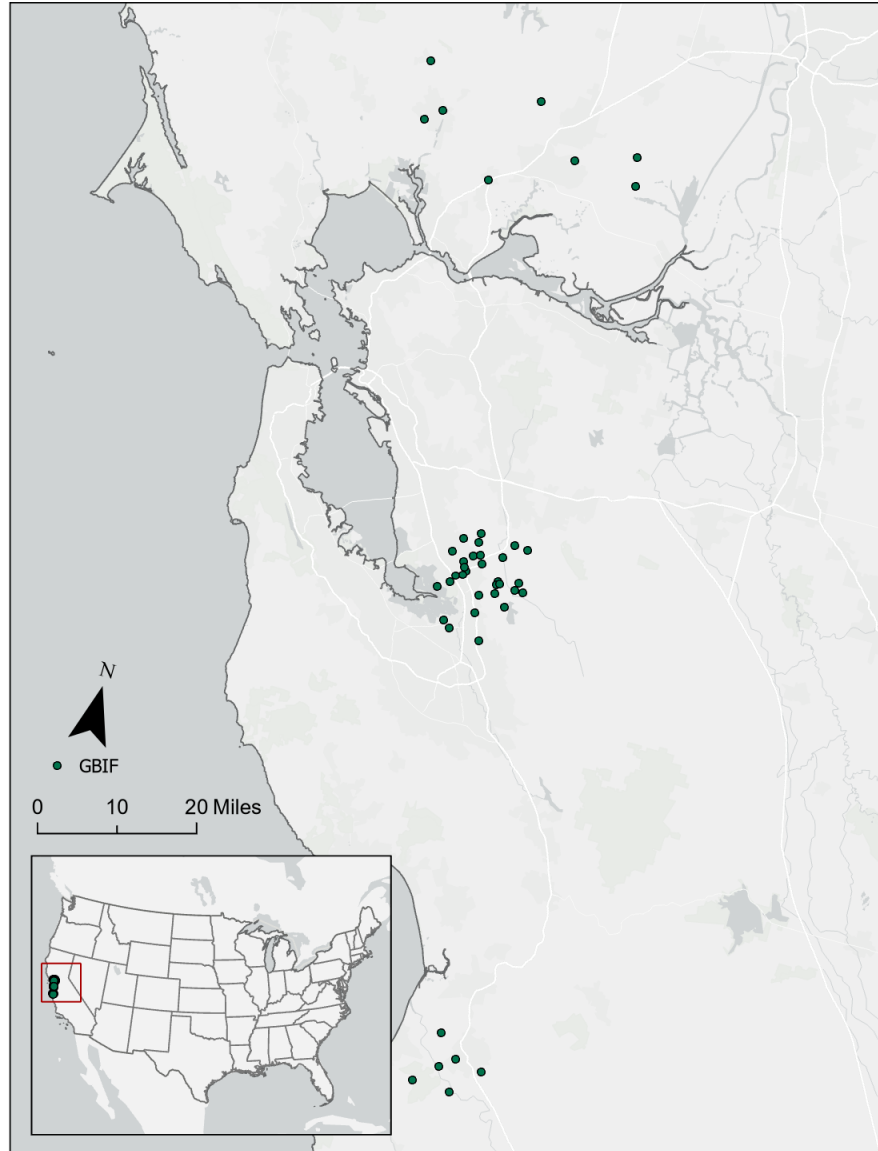


Figure A1-4 depicts the currently known locations from GBIF

- Known Locations Described in FWS Recovery Documents
 The description below provides information on the current known locations from [FWS \(Contra Costa Goldfields 5-Year Review, 2024\)](#).

“Contra Costa goldfields are most often associated with vernal pools, though natural occurrences are found in a variety of habitat types, including vernal and playa pools, seasonal pond edges, stream terraces, and margins of the San Francisco Bay (Vollmar 2022, p. 4). Contra Costa goldfields are known to have historically occurred in seven vernal pool regions: Central Coast, Lake-Napa, Livermore, Mendocino, Santa Barbara, Santa Rosa, and Solano-Colusa (Service 1997, p. 33029; Keeler-Wolf et al. 1998, p. 104). In addition, several historical occurrences in Contra Costa County are outside of the defined vernal pool regions. Ornduff (1966, p. 38) reported collection of the species from 13 sites in Alameda, Contra Costa, Mendocino, Napa, Santa Barbara, Santa Clara, and Solano counties. The majority of the location

information used in this status review is from the Diversity Database that reports species locations as “occurrences” rather than populations. An “occurrence”, which may represent a documented collection, observation, or museum specimen of a species, is defined by the Diversity Database as a location occupied by a species separated from other locations by at least 0.25 mile, and may contain multiple records. At the time of listing in 1997, there were only 13 known occurrences of Contra Costa goldfields in four counties: Napa, Contra Costa, Alameda, and Solano. The species had been extirpated from Mendocino, Santa Barbara, and Santa Clara counties (Service 1997, pp. 33029, 33033; Diversity Database 2023, pp. 14–16). At the time of the 2005 Recovery Plan for Vernal Pools Ecosystems of California and Southern Oregon (Recovery Plan) (Service 2005a), and 2008 status review (Service 2008), 32 occurrences of Contra Costa goldfields were catalogued, and when the 2013 status review was completed, there were 34 occurrences documented in ten counties in the Diversity Database: Alameda, Contra Costa, Marin, Mendocino, Monterey, Napa, Santa Barbara, Santa Clara, Solano, and Sonoma. Seven of these occurrences were considered extirpated and four were considered potentially extirpated (Service 2013, pp. 4–5). The species is believed to be completely extirpated from Santa Clara and Santa Barbara counties (Service 2013, p. 5).

Currently, the distribution of the species remains as described in our 2013 status review. The Diversity Database now reports 36 occurrences of Contra Costa goldfields (Appendix A; Diversity Database 2023, entire). The two occurrences (occurrences #45 & 46) added to the Diversity Database since the 2013 status review are found in Solano County in proximity to other known occurrences on Travis Air Force Base and are mapped as “transplanted populations” (Diversity Database 2023, p. 41). These occurrences do not represent new populations of Contra Costa goldfields but are part of ongoing conservation efforts and mitigation for projects on Travis Air Force Base (Collinge 1999, entire) (discussed in Conservation Efforts). These transplanted occurrences are within the previously known range of the species and do not change our understanding of the distribution of the species. Seven occurrences continue to be considered extirpated and four are considered potentially extirpated (Diversity Database 2023, entire). The majority of the presumed extant occurrences are located in Solano County, where 13 occurrences are presumed extant (Diversity Database 2023, pp. 4–41). Other large concentrations of occurrences are in Monterey County and Alameda County, each with three occurrences (Diversity Database 2023, p. 25). Of the 25 presumed extant records, 4 occurrences may now be extirpated having not been seen for some time or the exact location is unknown (Diversity Database 2023, p. 39): (1) An occurrence (occurrence #16) in Mendocino County has not been observed since 1937; (2) An occurrence (occurrence #37) in Alameda County has not been observed since 1959; (3) A single plant (occurrence #21) was observed in Napa County in 1987 and has not been documented since; and (4) An occurrence (occurrence #43) in Solano County was noted on a field checklist in 1996 and the specific location of the occurrence is unknown. The distribution of Contra Costa goldfields is uncertain due in part to the difficulty of relocating sites and because this species may reappear on a site after several years of it being absent. In December 2022, Vollmar Natural Lands Consulting, as part of the Contra Costa goldfields captive propagation and reintroduction to Contra Costa County project (discussed in Conservation efforts), conducted a status survey of 20 subpopulations associated with 9 known Contra Costa goldfields occurrences (occurrences # 1, 3, 7, 20, 23, 24, 30, & 33). Data from these status surveys have not yet been added to the Diversity Database. Their findings are in line with previous understanding of Contra Costa goldfields habitat requirements. They found that while Contra Costa goldfields occur in a wide range of habitats, all occupied sites have similar characteristics: grassland habitat grazed by cattle, seasonally wetted soils, and fine-grained soil with high clay or silt content that is likely alkaline (Vollmar 2022, pp. 4–7).”

Appendix 2. GIS Data Review and Method to Develop Core Map (Step 3)

This core map was created based on biological information, including where iNaturalist- and GBIF-verified occurrences overlap within terrestrial significant habitats areas from the California Department of Fish and Wildlife's Areas of Conservation Emphasis (ACE), and the designated critical habitat. Selected terrestrial significant habitats include riparian area, freshwater wetlands including vernal pools, and meadows ([California Department of Fish and Wildlife's Areas of Conservation Emphasis \(ACE\), 2020](#)).

1. Dataset References and Software

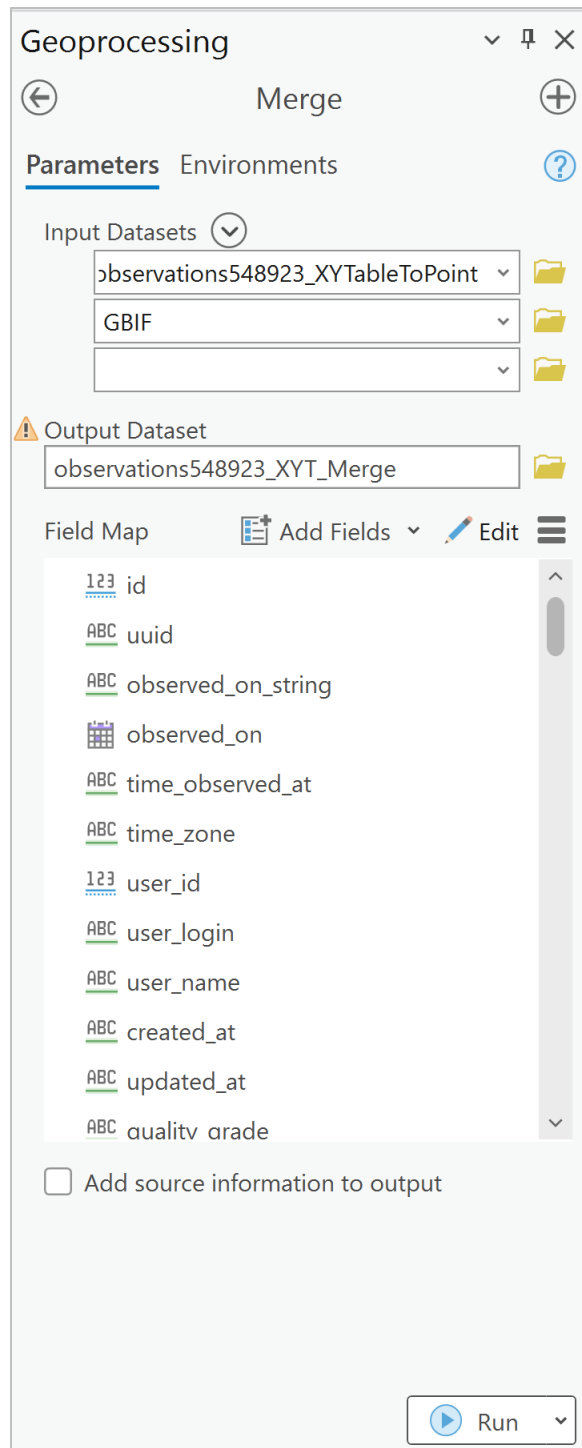
- Software used: ArcGIS Pro 3.2
- FWS Species Critical Habitat
- FWS Species Range – last updated on 3/20/2018
- [California Department of Fish and Wildlife's Areas of Conservation Emphasis \(ACE\), 2020](#)
- Occurrence Data

2. Datasets Used in Core Map Development

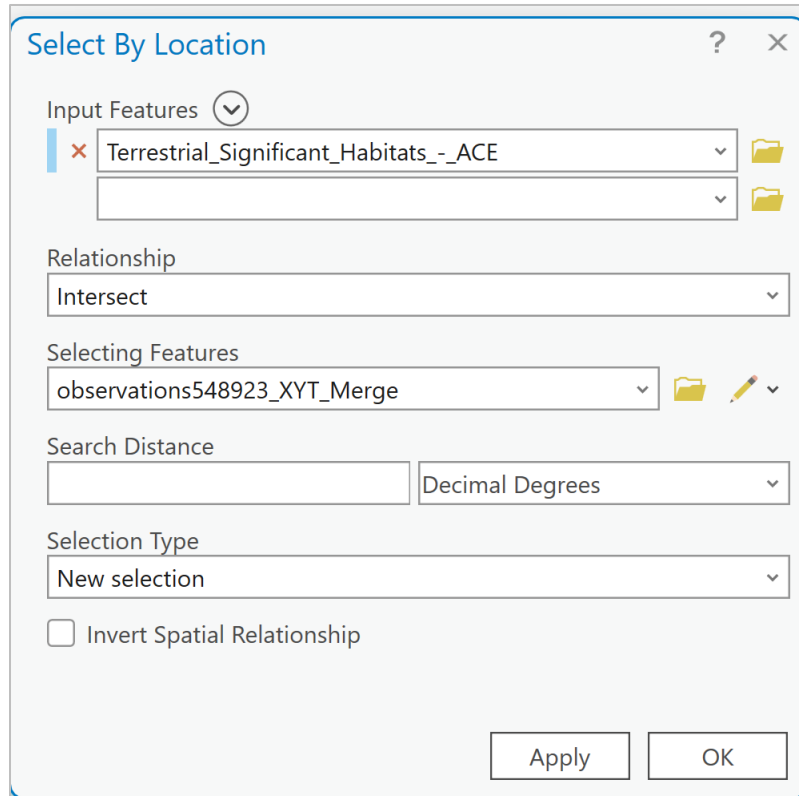
All datasets used in core map development are described in EPA's process document.

3. Core Map Development

- Research grade iNaturalist occurrence data and human observation GBIF data were merged using merged geoprocessing tool. The areas where they overlap with the California Department of Fish and Wildlife's Areas of Conservation Emphasis (ACE) were included in the core map.
- The species' designated critical habitat was included merged with the resulting area to create the final core map.



- Intersecting terrestrial significant habitat from the California Department of Fish and Wildlife's Areas of Conservation Emphasis (ACE) was selected using "Select By Location" geoprocessing tool. Selected terrestrial significant habitats include riparian area, freshwater wetlands including vernal pools, and meadows ([California Department of Fish and Wildlife's Areas of Conservation Emphasis \(ACE\), 2020](#)).



- Selected terrestrial significant habitat and critical habitats were merged using “merge” geoprocessing tool, to develop final core map.