

## CONTRA COSTA GOLDFIELDS

*Lasthenia conjugens*

USFWS: Endangered

CDFG: None

CNPS: List 1B

### Species Account

**Status and Description.** Contra Costa goldfields (*Lasthenia conjugens*) was federally-listed as endangered on June 18, 1997 (62 FR 33029) and is a CNPS List 1B species. Critical habitat was designated for this species on August 6, 2003 (68 FR 46683), however Solano County is excluded. Contra Costa goldfields are 10 to 40 cm tall, annual herbs in the sunflower tribe (Heliantheae) of the sunflower family (Asteraceae). The opposite leaves are sometimes divided into segments. Each plant bears one to several, all-yellow flowerheads, the individual flowers lacking pappus (modified floral structures at the top of the fruit). The leaf-like phyllaries subtending the flowerheads are fused less than ½ of their lengths (Baldwin 2012, USFWS 2001). The partially fused phyllaries and the lack of pappus distinguish this species from the common Fremont's goldfields (*Lasthenia fremontii*).



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**Range and Distribution.** Historically, Contra Costa goldfields were found in the counties surrounding San Francisco Bay and along the coast, from Santa Barbara County to Mendocino County. Many historical occurrences are considered extirpated. Currently, there are 22 known extant occurrences (CNDDDB 2011). The largest concentration and number of populations occur in the Fairfield-Suisun area in Solano County (10 occurrences). Other presumably extant populations are in Alameda (3), Contra Costa (1), Napa (2), Marin (1), Mendocino (1), Monterey (3), and Sonoma (1) counties (CNDDDB 2011).

**Habitat and Ecology.** Contra Costa goldfields grow in vernal pools, swales, and other depressions in open grassland and woodland communities, often in alkaline soils. It grows in Northern Basalt Flow, Northern Claypan, and Northern Volcanic Ashflow vernal pool types (P. Baye *in litt.* 2000), usually at elevations of 2 to 61 meters. It grows on clay or loam soil types in the Aiken, Antioch, Concepcion, Conejo, Crispin, Haire, Linne, Los Robles, Rincon, Solano, and San Ysidro soil series, plus the Arnold-Santa Ynez, Habright-rock outcrop, and Los Osos complexes. It blooms from March through June, depending on environmental conditions (CNDDDB 2011, CNPS 2011). Common associates include Italian ryegrass (*Lolium multiflorum*), popcorn flower (*Plagiobothrys* spp.), brass buttons (*Cotula coronopifolia*), valley downingia (*Downingia puchella*), California eryngo (*Erygium aristulatum*), smooth goldfields (*Lasthenia glaberrima*), little mousetail (*Myosurus minimus*), and California semaphore grass (*Pleuropogon californicus*) (USFWS 2005).

Contra Costa goldfields occur under varying moisture, soil, and salinity conditions, indicating that different populations are ecologically unique. The potential variations in population characteristics suggest that conservation efforts should consider the potential differences in populations and attempt to preserve this diversity (Collinge et al. 2003).

Contra Costa goldfields is an annual plant, which means that seed production is the only way for new individuals to occur in the population and for new populations to be established. In addition, Contra Costa goldfields are self-incompatible and require insect visitors for successful pollination and seed production. Insect visitors to *Lasthenia* flowers belong to five orders: Coleoptera, Diptera, Hemiptera, Hymenoptera and Lepidoptera (Thorp and Leong 1998). All of the specialist pollinators of *Lasthenia* are solitary bees in the family Andrenidae (These species are described and discussed in the *solitary bee* species account.). The presence of the bees is likely to be critical for the long-term viability of Contra Costa goldfields and other vernal pool plant populations. Also, Contra Costa goldfields seeds are very small but are not adapted to long-distances dispersal via wind or water. As a result, animal seed-dispersers are probably important for the viability of goldfields populations. There is some evidence that jackrabbits, which forage in grasslands, may contribute significantly to long-distance dispersal of goldfields and other vernal pool plants (Zedler and Black 1992, Collinge, *unpublished data*). The population and reproductive characteristics of Contra Costa goldfields (limited distance dispersal) make it likely that long distances between vernal pools have and will effectively isolate populations.

**Population Levels and Occurrence in Plan Area.** Contra Costa goldfields occur in the low mesic areas of the Plan Area's Valley Grasslands and Vernal Pools Natural Community. Although the Contra Costa goldfields in various locations in Solano County exhibit different responses to soil moisture and salinity (Collinge et al. 2003), these populations historically likely represent one large meta or interconnected population. However, development over the last 50 to 60 years has severely fragmented the population. During the initial stages of development of the Solano HCP, there was limited information on the distribution and status of Contra Costa goldfields. Therefore, the remaining areas that were known to support or were suspected to support Contra Costa goldfields were divided into seven Core Population Areas based on similarity in soil types and watershed location. These Core Population Areas are:

- McCoy Creek Basin Core Population Area (610 acres) (Vernal Pool Conservation Subarea 1B)
- Upper Union Creek Core Population Area (1,430 acres) (Vernal Pool Conservation Subarea 1C)
- Vanden Core Population Area (100 acres) (Vernal Pool Conservation Subarea 1D)
- Walters/Air Base Parkway Core Population Area (170 acres) (Vernal Pool Conservation Subarea 1E)
- Potrero Hills/Lower Union Creek/Denverton Creek Core Population Area (5,280 acres) (Vernal Pool Conservation Subarea 1F)
- Ledgewood Creek C Core Population Area (470 acres) (Vernal Pool Conservation Subarea 1G)
- Cordelia Core Population Area (17 acre) (Vernal Pool Conservation Subarea 1H)

Over the last several years, biologists, funded both by private property owners and by SCWA, have conducted additional surveys for CCGs within the Core Population Areas and potential habitat areas. The research performed as part of the Section 6 grant award to the SCWA and work on the Solano HCP Conservation Strategy, both inspired and facilitated the sharing of information between consultants, private property owners and SCWA on the distribution and status of this species. Several private property owners either have allowed SCWA to survey their property for CCGs or have funded independent surveys themselves for the species. In combination, these surveys have greatly expanded our understanding of the distribution of the species throughout the County. Approximately 15,290 acres of land within the previously designated Core Population areas and potential habitat and watershed areas has been surveyed and only approximately 7,680 acres have not been surveyed. The attached figure shows the most current distribution of CCGs within the County.

There are primarily five relatively robust populations remaining (i.e. areas consisting of multiple occupied pools). These five populations consist of: the McCoy Creek Basin Core Population Area, the Walters/Air Base Parkway Core Population Area, the Ledgewood Creek Core Population Area, the Vanden Core Population area and the southwestern portion of the Upper Union Creek Core Population Area, and a population just north of the Potrero Hills and south of Hwy 12 within the Vernal Pool Subarea 1F. In addition to these five populations, there are 12 other occurrences, primarily within Subarea 1F, consisting of a few isolated pools occupied by Contra Costa goldfields. Initial surveys revealed that subareas 1C and 1F, the areas containing the largest contiguous potential habitat areas, were relatively unoccupied.

There are five primary populations consists of two robust populations with a population typically supporting millions of plants on annual basis (McCoy and Potrero/Union Creek), and two small populations (Ledgewood and Cordelia), and possibly one extinct population (upper Union Creek). The McCoy and Potrero/Lower Union Creek populations consist of a number of disjunct or fragmented subpopulations.

Most populations of Contra Costa goldfields in this area are large, ranging in size from a few thousand plants to many millions of plants (LSA 2007). Other small populations may be present in the Fairfield-Suisun area and it is probable that more populations exist north, east, and south of Travis Air Force Base, in undeveloped and agricultural lands. The known populations all occur in the Fairfield-Suisun area:

- 1) Northeast Fairfield: several sub-populations exist in northeast Fairfield, within the watersheds of McCoy and western Union creeks. Most of these sub-populations are separated from each other by existing roads and development.
- 2) Potrero Hills Flats: two sub-populations exist in this area. One large sub-population occurs at the base of the Potrero Hills at the lower end of the watershed of Union Creek. A second, small sub-population exists to the east in the flats north of Hwy 12, within the lower Denverton Creek watershed. Additional populations are likely scattered through this area.
- 3) Cordelia Road: one small, remnant population exists near Cordelia Road in the flats south of a rock quarry, southwest of Fairfield at the lower end of the watershed of Dan Wilson Creek.
- 4) Lower Ledgewood Creek: this population occurs in the lower reaches of the watershed of Ledgewood Creek, southwest of Fairfield.

- 5) Vanden Road: a small population was historically reported in low areas along the railroad tracks that parallel Vanden Road, north of Travis Air Force Base in the upper region of the watershed of Union Creek. This population appears to be extinct, although other undocumented populations may be present in vernal pool habitats east of Vanden Road.

Depending on the number of unknown locations of Contra Costa goldfields, these seven populations, may represent as much as 95% of the remaining populations of this species. In addition to these known populations, the CNDDDB (2011) also list one historical record (1918) that is identified as “Little Oak” in the vicinity of Vacaville (EONDX #51716). This record is presumed to be extirpated.

**Threats to the Species.** Contra Costa goldfields are threatened by development, habitat alteration, hydrological alteration, overgrazing and non-native plants (CNPS 2011). Loss of vernal pool communities through development and drainage of wet areas is the greatest threat to Contra Costa goldfields. Four of the five known Contra Costa goldfields populations in Solano County are found within the Fairfield and Suisun City urban boundaries. Although goldfields can withstand some disturbance (*i.e.*, grazing or disking), disturbance typically allows weeds to invade a habitat, thus increasing competition for water and nutrient resources. Contra Costa goldfields are particularly threatened by Italian ryegrass (*Lolium multiflorum*), which can shade out the goldfields and negatively impact vernal pool hydrology by decreasing inundation periods in pools (Marty 2004). Repeated or severe disturbance will eliminate Contra Costa goldfields (CNDDDB 2011, CNPS 2011, USFWS 2001). In addition, habitat modification and destruction that reduce the presence of solitary bees that are important pollinators and other small mammals and birds that may be critical for seed dispersal could compromise the viability of existing and future goldfields populations.

**Conservation Issues.** The majority of the known populations of Contra Costa goldfields occur within the urban boundaries of Fairfield and Suisun City. If these cities expand across their designated urban boundary, the majority of the Contra Costa goldfields habitat in California would be converted to urban areas.

Other conservation issues pertain to the maintenance of the hydrology and pollinator populations of the stands of Contra Costa goldfields. In addition, maintaining connectivity between vernal pool complexes in the Jepson Prairie region (Zone 1A), McCoy Creek (Zone 1B), and Upper Union Creek (Zone 1E) watersheds is an important conservation issue.

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