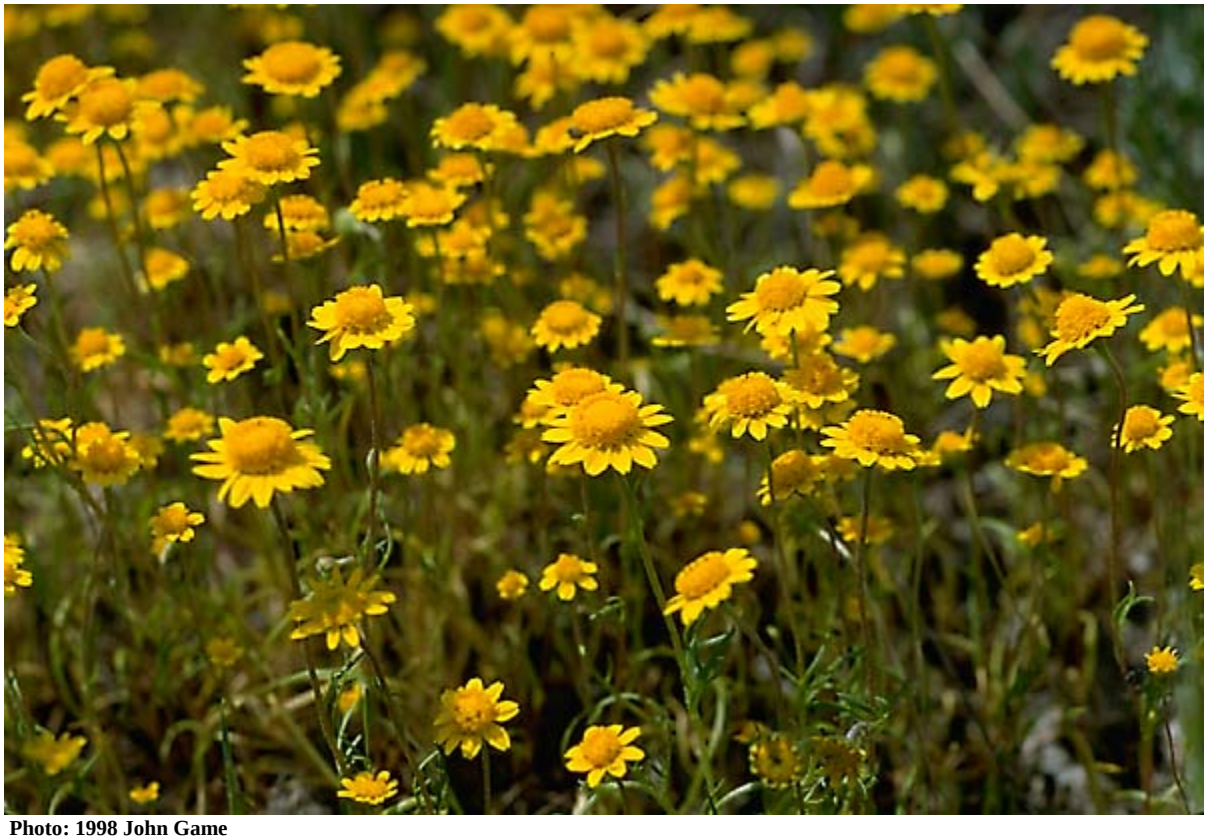
Contra Costa Goldfields
(*Lasthenia conjugens*)

5-Year Review:
Summary and Evaluation



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U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
Sacramento, California

September 2008

5-YEAR REVIEW
Contra Costa Goldfields (*Lasthenia conjugens*)

I. GENERAL INFORMATION

I.A. Methodology used to complete the review

This review was prepared by the Sacramento Fish and Wildlife Office (SFWO) of the U.S. Fish and Wildlife Service (Service) using information from the 2005 *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (Recovery Plan) (Service 2005), survey information from experts who have been monitoring various localities of this species, and the California Natural Diversity Database (CNDDB) (CNDDB 2007), which is maintained by the California Department of Fish and Game (CDFG). The Recovery Plan and personal communications with experts were our primary sources of information used to update the "species status" and "threats" sections of this review.

I.B. Contacts

Lead Regional or Headquarters Office – Diane Elam, Deputy Division Chief for Listing, Recovery, and Habitat Conservation Planning, and Amedee Brickey, Fish and Wildlife Biologist, California and Nevada Region 8 Office, 916-414-6464

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I.C. Background

I.C.1. FR Notice citation announcing initiation of this review: 72 FR 7064, February 14, 2007. We received information from the public in response to this notice. We received one letter from the California Native Plant Society, East Bay Chapter, providing 5-year review comments for five plant species (CNPS 2007). The letter indicated that the status for Contra Costa goldfields should remain endangered and more data and monitoring need to occur (CNPS 2007).

I.C.2. Listing history

Original Listing
FR notice: 62 FR 33029
Date listed: June 18, 1997
Entity listed: Species (*Lasthenia conjugens*)
Classification: Endangered

I.C.3. Associated rulemakings:

Critical habitat for this species was proposed on September 24, 2002 (67 FR 60033). The final rule to designate critical habitat for the Contra Costa goldfields was published on August 6, 2003 (68 FR 46683). A re-evaluation of non-economic exclusions from the August 2003 final designation was published on March 8, 2005 (70 FR 11140). An evaluation of economic exclusions from the August 2003 final designation was published on August 11, 2005 (70 FR 46923). Administrative revisions were published on February 10, 2006 (71 FR 7117). Clarifications on the economic and non-economic exclusions for the final designation of critical habitat were published on May 31, 2007 (72 FR 30269).

I.C.4. Review History

We have not conducted any status reviews for this species since the time of listing. Updated information on its status and threats was included in the 2005 Recovery Plan.

I.C.5. Species' Recovery Priority Number at start of review:

The recovery priority is 5C (based on a 1 to 18 ranking system where 1 is the highest recovery priority and 18 is the lowest) because the degree of threat is high and the potential for recovery is low and the taxonomic rank is full species. The "C" after the number 5 indicates the conflict of the species with development projects or other ground-disturbing activities.

I.C.6. Recovery Plan or Outline

Name of plan: Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon
Date issued: December 15, 2005

II. REVIEW ANALYSIS

Species Overview

Contra Costa goldfields is an annual flowering plant in the aster family (Asteraceae) that grows 10 to 30 centimeters (4 to 12 inches) tall and usually has a branched stem. The leaves are opposite, light green, and hairless. The lower leaves have smooth margins, but stem leaves have one or two pair of narrow lobes. The daisy-like flower heads are terminal, solitary, and all disk and ray flowers are golden-yellow (Greene 1888; Ornduff 1993). The phyllaries (bracts below the flower head in the aster family) are one-quarter to one-half fused; where all other species of *Lasthenia* have either free phyllaries or phyllaries fused more than two thirds of their length. The achenes (fruit) of Contra Costa goldfields are less than 1.5 millimeters (0.06 inch) long and always lack a pappus (the hair-like or scale-like structures attached to an achene, which assist in dispersal) (Ornduff 1969, Ornduff 1993). Contra Costa goldfields flower from March to June (Ornduff 1966, Ornduff 1976) and are self-incompatible. Habitat for Contra Costa goldfields includes vernal pools, swales, moist flats, and depressions within a grassland matrix (CNDDB 2007).

The two most commonly reported associates are Italian ryegrass (*Lolium multiflorum*) and popcorn flower (*Plagiobothrys* spp.). Other plant species that occur at several Contra Costa goldfield sites include brass buttons (*Cotula coronipifolia*), valley downingia (*Downingia pulchella*), California eryngo (*Eryngium aristulatum*), smooth goldfields (*Lasthenia glaberrima*), common mousetail (*Myosurus minimus*), and California semaphore grass (*Pleuropogon californicus*) (CNDDB 2007). Other rare plants that co-occur with Contra Costa goldfields include alkali milk-vetch (*Astragalus tener* var. *tener*), few-flowered navarretia (*Navarretia leucocephala* ssp. *pauciflora*), and Greene's legenere (*Legenere limosa***)** (CNDDB 2007).

Contra Costa goldfields typically grow in vernal pools, swales, moist flats and depressions within a grassland matrix (CNDDB 2007), and have been found in three types of vernal pools: Northern Basalt Flow, Northern Claypan, and Northern Volcanic Ashflow (Sawyer and Keeler-Wolf 1995). Landforms and geologic formations for sites where Contra Costa goldfields occur have not been identified. Elevations for this species range typically range from 2 to 61 meters (6 to 200 feet), but one occurrence in Napa County was recorded at 455 meters (1,460 feet) the Monterey occurrences are at 122 meters (400 feet) (CNDDB 2007).

Contra Costa goldfields has been reported in ten counties, which include: Alameda, Contra Costa, Marin, Mendocino, Monterey, Napa, Santa Barbara, Santa Clara, Solano, and Sonoma. The CNDDB reports 32 occurrences of this species, including 7 that are extirpated, 4 that are potentially extirpated, and 1 which has not been seen since 1937 and may be extirpated. 20 occurrences are presumed extant (CNDDB 2007). The status of the species is uncertain due in part to the difficulty of relocating sites and also because this species may reappear on a site after several years, even if it is absent during a given survey. Additionally, CNDDB occurrences have in some cases either been deleted or lumped, making tracking of the number of occurrence difficult. The majority of the location information used in this review is from the CNDDB, which 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 CNDDB as a location occupied by a species separated from other locations by at least 0.25 mile, and may contain multiple records.

II.A. Application of the 1996 Distinct Population Segment (DPS) policy

II.A.1. Is the species under review listed as a DPS?

____ ***Yes***
_X_ ***No***

The Endangered Species Act (Act) defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species if vertebrate wildlife. This definition limits listing as distinct population segments (DPS) to vertebrate species of fish and wildlife. Because the species under review is a plant and the DPS policy is not applicable, the application of the DPS policy to the species listing is not addressed further in this review.

II.B. Recovery Criteria

II.B.1. Does the species have a final, approved recovery plan containing objective, measurable criteria?

_X_ ***Yes***
___ ***No***

II.B.2. Adequacy of recovery criteria.

II.B.2.a. Do the recovery criteria reflect the best available and most up-to-date information on the biology of the species and its habitat?

__X_ ***Yes***
____ ***No***

II.B.2.b. Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and is there no new information to consider regarding existing or new threats)?

_X_ ***Yes***
____ ***No***

II.B.3. List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information. For threats-related recovery criteria, please note which of the 5 listing factors are addressed by that criterion. If any of the 5-listing factors are not relevant to this species, please note that here.

General recovery criteria for Contra Costa goldfields and 19 other listed plants and animals are described in the Recovery Plan (Service 2005). This Recovery Plan uses an ecosystem-level approach because many of the listed species and species of concern co-occur in the same natural ecosystem and share the same threats. The over-arching recovery strategy for Contra Costa goldfields is habitat protection and management. The five key elements that comprise this ecosystem-level recovery and conservation strategy are: (1) habitat protection; (2) adaptive management, restoration, and monitoring; (3) status surveys; (4) research; and (5) public participation and outreach.

The Recovery Plan describes the geographic distribution of vernal pool taxa according to the vernal pool regions defined by the California Department of Fish and Game (CDFG) (Keeler-Wolf *et al.* 1998). Vernal pool regions are discrete geographic regions identified largely on the basis of endemic species, with soils and geomorphology as secondary elements. Within the vernal pool regions, the Recovery Plan identifies core areas that support high concentrations of federally listed vernal pool species, are representative of a given species' range, and are generally where recovery actions are focused. Core areas are distinct areas that provide the features, populations, and distinct geographic and/or genetic diversity necessary to the recovery of a species. More than one federally listed vernal pool species may be found within a single core area, and the core areas encompass areas larger that just the location of any single species. Within each core area, the Recovery Plan identifies specific percentages of suitable habitat that

should be protected to achieve recovery for listed species. Core areas are ranked as Zone 1, 2, or 3 in order of their overall priority for recovery, with Zone 1 reflecting the highest priority areas. Protection of the majority of suitable habitat within Zone 1 core areas, and Zone 2 and 3 core areas where appropriate, is recommended to provide corridors and dispersal habitat, support metapopulation dynamics, provide for reintroduction or introduction sites, and to protect currently undiscovered populations.

The Recovery Plan provides recovery criteria that either directly or implicitly address four of the listing factors noted in the final rule to list the species: destruction, modification, or curtailment of habitat or range (Factor A), disease or predation (Factor C), inadequacy of existing regulatory mechanisms (Factor D), and other man-made or natural factors affecting its continued existence (Factor E). Factor B, overutilization for commercial, recreational, scientific, or education purposes, was not included as a threat in the listing rule and is not addressed in the Recovery Plan. Since the Recovery Plan has only recently begun to be implemented, species surveys and monitoring efforts that will provide data to evaluate progress towards recovery have not yet occurred.

Downlisting/delisting criteria for Contra Costa goldfields include:

1. <u>Habitat protection</u>: Accomplish habitat protection that promotes vernal pool ecosystem function sufficient to contribute to population viability of the covered species.

This criterion addresses Factor A1.

1A. Suitable vernal pool habitat within each prioritized core area for the species is protected.

Core areas support high concentrations of federally listed vernal pool species and are representative of a given species' range, and are generally where recovery actions are focused. Core areas support viable populations, and possibly even source populations of vernal pool species for larger metapopulations, that will contribute to the connectivity of habitat and thus increase dispersal opportunities between populations. More than one federally listed vernal pool species may be found within a single core area, and the core areas encompass an area larger than just the location of Contra Costa goldfields. In the Recovery Plan, the core areas that pertain to Contra Costa goldfields include: (1) Fort Ord; (2) SE San Francisco Bay; (3) Berryessa; (4) Napa River; (5) Jepson Prairie; (6) Suisun Marsh; (7) Rodeo Creek; (8) Altamont; and (9) Manchester. These nine core recovery areas are distributed among five vernal pool regions: (1) Central Coast; (2) Lake-Napa; (3) Solano-Colusa (4) Livermore; and (5) Mendocino. Additionally, the Santa Barbara Vernal Pool Region is identified as a region for reintroduction of Contra Costa goldfields.

[1] A) Present or threatened destruction, modification or curtailment of its habitat or range;
B) Overutilization for commercial, recreational, scientific, or educational purposes;
C) Disease or predation;
D) Inadequacy of existing regulatory mechanisms;
E) Other natural or manmade factors affecting its continued existence.

The Recovery Plan identifies specific percentages of suitable habitat to be protected in each of the nine core areas. Core areas are ranked as Zone 1, 2, or 3 in order of their overall priority for recovery. Core areas pertaining to Contra Costa goldfields are included as Zones 1, 2, and 3 in the Recovery Plan. Table 1 provides a summary of the six vernal pool regions that pertain to Contra Costa goldfields (including Santa Barbara), and the Zone designations for each of the nine core areas.

To downlist the Contra Costa goldfields, the Recovery Plan recommends that 95 percent of suitable Contra Costa goldfields habitat in Zone 1 and 85 percent of suitable Contra Costa goldfields habitat in Zone 2 core recovery areas be protected. In addition, the Recovery Plan recommends that 90 percent of known localities be protected. Neither of these criteria has been met. To delist Contra Costa goldfields, the Recovery Plan recommends that 100 percent of all reintroduced populations be protected. At this time, new populations have not been reintroduced. Therefore, this criterion has not been met.

The Service only recently approved the Recovery Plan and does not yet have sufficient information to quantify either the acreage of suitable habitat within each core area or the acreage of protected habitat that is suitable for Contra Costa goldfields. The amount of suitable habitat that exists range wide has not yet been estimated; therefore, the percent that has been protected range wide is still unknown. However, the vast majority of localities of this species are not protected. The protected populations of this species include: (1) the Fort Ord populations in Monterey County, (2) the Travis Air Force Base (AFB) population in Solano County, (3) the Wildlands North Suisun Mitigation Bank, in Solano County (4) the State Route 4 preserve managed by the Muir Heritage Land Trust in Contra Costa County (land has yet to have easement), and (5) the Warm Springs Seasonal Wetland unit of the Don Edwards San Francisco Bay National Wildlife Refuge (NWR) in Alameda County.

Table 1: Contra Costa Goldfields core recovery areas.

Regions/Core Areas	Presumed extant occurrences within core areas
Central Coast Vernal Pool Region:	
Core areas: Fort Ord (Zone 2)	**3**
SE San Francisco Bay (Zone 2)	**2**
Lake-Napa Vernal Pool Region:	
Core areas: Berryessa (Zone 2)	**1**
Napa River (Zone 2)	**1**
Solano-Colusa Vernal Pool Region	

Core areas: Jepson Prairie (Zone 1)	**7**
Suisun Marsh (Zone 2)	**2**
Rodeo Creek (Zone 2)	**1**
Livermore Vernal Pool Region	
Core area: Altamont Hills (Zone 1)	**0**
Mendocino Vernal Pool Region	
Core area: Manchester (Zone 3)	**0**
Santa Barbara Vernal Pool Region	**0**
	17 Total presumed extant within core areas

1B. Species localities distributed across the species geographic range and genetic range are protected. Protection of extreme edges of populations protects the genetic differences that occur there.

This criterion has been partially met. Contra Costa goldfields are still known to occur in the following vernal pool regions (from west to east): Central Coast; Lake-Napa; and Solano-Colusa. There are five protected localities in the Central Coast region, three at former Fort Ord in Monterey County and two at the Warm Springs Seasonal Wetland unit of the Don Edwards San Francisco Bay NWR in Alameda County. Two protected localities occur within the Solano-Colusa region, one within the North Suisun Mitigation Bank, in Solano County, and one within Travis AFB, Solano County. There are no known protected localities of Contra Costa goldfields in the Lake-Napa vernal pool region.

The extreme edges of this species range are not protected. The northern-most presumed extant locality occurs in Napa County and this locality is on private land and not protected. An extirpated locality in Mendocino County once represented the northern extent of this species range. The southern most presumed extant localities occur in Monterey County and are protected on public land. An extirpated locality in Santa Barbara County once represented the southern extent of this species' range, and reintroduction efforts have yet to be undertaken in this area.

1C. Reintroduction and introductions must be carried out and meet success criteria.

This recovery criterion has not been met. The Recovery Plan recommends introduction of Contra Costa goldfields to vernal pool regions and soil types from which status surveys indicate the species has been extirpated. This species has been extirpated from Santa Barbara, Santa Clara, and Mendocino Counties (Service 1997; CNDDB 2007). The Recovery Plan states that seven reintroductions should occur throughout the current and historic range of the species.

Four of these seven reintroductions will occur in the Berryessa core area, specifically Milliken canyon in Napa County; the Altamont Hills Core area in Alameda County; the Manchester Core area in Mendocino County; and a locality in Santa Barbara County, with no specific area determined. The other three introductions are recommended to be situated on appropriate soil types to replace extirpated occurrences.

1D. Additional localities that are detected (and determined essential to recovery goals) are permanently protected.

This recovery criterion has not been met. Additional localities have not been detected and permanently protected since the publication of the Recovery Plan.

1E. Habitat protection results in protection of hydrology essential to vernal pool ecosystem function, and monitoring indicates that hydrology that contributes to population viability has been maintained through at least one multi-year period that includes above average, average, and below average local rainfall as defined above, a multi-year drought, and a minimum of 5 years of post-drought monitoring.

This criterion has not been met. Monitoring of hydrology has not occurred at any of the known presumed extant populations; therefore, the Service is unable to determine whether the hydrology at presumed extant locations has supported viable populations through a variety of hydrologic conditions.

2. <u>Adaptive Habitat Management and Monitoring:</u>

This criterion implicitly addresses Factors A, D, and E.

2A. Habitat management and monitoring plans that facilitate maintenance of vernal pool ecosystem function and population viability have been developed and implemented for all habitat protected, as previously discussed in sections 1A-E.

This criterion has been partially met. Although several Contra Costa goldfield occurrences are protected within conservation banks, preserves, or sites that have management and monitoring plans in place, in most cases the plans are too new to determine whether they adequately facilitate maintenance of vernal pool ecosystem function, such as controlling invasive plant species or managing site hydrology. The North Suisun Mitigation Bank is adaptively managed under the *North Suisun Special Status Species Management Plan* (Wildlands, Inc. 2006). The Travis AFB occurrence is managed under the Travis AFB Land Management Plan. The Ford Ord occurrences are managed under the Habitat Management Plan (US Army Corp of Engineers 1997). The Warm Springs Seasonal Wetland unit of the Don Edwards San Francisco Bay NWR occurrence is not currently under a management plan but will be covered under the Comprehensive Conservation Plan (CCP) for the Refuge in spring of 2009 (I. Loredo, *in litt*., 2007). The State Route 4 Preserve occurrence is managed under the *Draft Contra Costa goldfields Management Plan* (ENTRIX, Inc. and Muir Heritage Land Trust, 2004). The Draft Contra Costa goldfields Management Plan mentions that if invasive species become a problem appropriate measures will be implemented to control such species.

2B. Mechanisms are in place to provide for management in perpetuity and long-term monitoring of 1A-E, as previously discussed (funding, personnel, etc).

This criterion has not been met. The State Route 4 Preserve does not have an endowment fund or other mechanism to provide for management in perpetuity and long-term monitoring at this time. The North Suisun Mitigation Bank has an endowment fund to ensure management in perpetuity and long-term monitoring. The occurrence at Travis AFB is protected as an ecological preserve, with protective measures and appropriate management for the species provided in the Travis AFB Land Management Plan (Service 2005). The occurrences at former Fort Ord are on land within the Habitat Management Plan Habitat Reserve Lands and will be conserved and managed in perpetuity (U.S. Army Corps of Engineers 1997). The occurrence at the San Francisco Bay NWR receives funding for management and protection of vernal pool species and is allocated to the NWR annually. The CCP is expected to include long-term management guidance and goals for protection, maintenance, and monitoring of vernal pool ecosystems on the Refuge.

2C. Monitoring indicates that ecosystem function has been maintained in the areas protected under 1A-D for at least one multi-year period that includes above average, average, and below average local rainfall, a multi-year drought, and a minimum of 5 years of post-drought monitoring.

Monitoring of ecosystem function has not occurred for any of the known populations of this species; therefore, the Service is unable to determine if the ecosystem function has been maintained at presumed extant locations that have supported viable populations through a variety of hydrologic conditions. It is probable that many of the protected sites have functional ecosystems that would meet the requirements specified in this recovery criterion.

2D. Seed banking actions have been completed for species that would require it as insurance against risk of stochastic extirpations or that will require reintroductions or introductions to contribute to meeting recovery criteria.

This criterion has not been met. The recovery plan recommends that Contra Costa goldfields seed be collected in each vernal pool region, and each core area. Seed collection from each population should be stored in at least two sites, including the National Center for Genetic Resources Preservation in Fort Collins, Colorado, and a facility certified by the Center for Plant Conservation (Service 2005).

3. <u>Status Surveys</u>:

This criterion implicitly addresses Factors A, D, and E.

3A. Status surveys, 5-year status reviews, and population monitoring show populations within each vernal pool region where the species occur are viable (e.g., evidence of reproduction and recruitment) and have been maintained (stable or increasing) for at least one multi-year period that includes above average, average, and below average local rainfall, a multi-year drought, and a minimum of 5 years of post-drought monitoring.

To our knowledge, monitoring has not occurred for a duration that meets the requirements specified in the Recovery Plan at any of the sites with known occurrences. Therefore, the Service is unable to determine if this criterion has been met at this time. Informal status surveys have occurred at the State Route 4 preserve, North Suisun Mitigation Bank, Travis AFB, former Fort Ord, and the Wet Springs Unit at San Francisco NWR. For these sites, biologists have noted the number of plants observed, but either no standardized annual site assessments exist for any of the sites, or monitoring protocols have just recently been established.

Vernal pool region working groups will be important for tracking the progress of recovery efforts, including monitoring the status of populations of this species, particularly on private lands that are not currently monitored.

3B. Status surveys, status reviews, and habitat monitoring show that threats identified during and since the listing process have been ameliorated or eliminated. Site-specific threats identified through standardized site assessments and habitat management planning also must be ameliorated or eliminated.

This criterion has not been met. Systematic habitat monitoring has not occurred at any of the known localities of Contra Costa goldfields since the listing of the species. Informal status surveys have occurred at the State Route 4 preserve, North Suisun Mitigation Bank, Travis AFB, Fort Ord, and the Wet Springs Unit at San Francisco NWR; however, these preserves areas have been established only recently and long-term data are not yet available. Informal monitoring indicates that the threats to this species described in the 1997 listing rule are still present, including impacts from agriculture practices, intensive grazing practices, and competition from invasive weed species (ENTRIX, Inc. and Muir Heritage Land Trust, 2004; Loredo 2007).

4. <u>Research</u>:

Research implicitly addresses all five listing factors.

4A. Research actions necessary for recovery and conservation of the covered species have been identified (these are research actions that have not been specifically identified in the recovery actions but for which a process to develop them has been identified). Research actions (both specifically identified in the recovery actions and determined through the process) on species biology and ecology, habitat management and restoration, and methods to eliminate or ameliorate threats have been completed and incorporated into habitat protection, habitat management and monitoring, and species monitoring plans, and refinement of recovery criteria and actions.

The Recovery Plan discusses a variety of research that would be beneficial to help refine recovery actions and criteria, and guide overall recovery and long-term conservation efforts (pages IV-53 to IV-63). The Recovery Plan recommends research on genetics, taxonomy, biology of vernal pool species, the effects of habitat management practices on vernal pool species and their habitat, and threats to vernal pool species and ecosystems. Currently, this criterion has been initiated, although the majority of information needs discussed in the

Recovery Plan are still outstanding. Studies have been conducted on insect pollinators, restoration of the vernal plant community at Travis AFB, effects of grazing and inundation periods, and the genetic structure of Contra Costa goldfields.

Thorp and Leong (1998) conducted a study on insect pollinators of the genus *Lasthenia.* The insects recorded to pollinate *Lasthenia* belonged to five orders: Colepotera, Diptera, Hemiptera, Hymenoptera, and Lepidoptera. All of the specialist pollinators of Lasthenia are solitary bees (family Andrenidae) (Thorp and Leong 1998). It is currently unknown how much Contra Costa goldfields depend on generalist pollinators or specialist pollinators like solitary bees. It is also unknown how Contra Costa goldfields disperse their seeds. Ornduff (1976), states that the lack of pappus and hairs on the achenes makes wind dispersal unlikely for Contra Costa goldfields.

Collinge (1999) reintroduced Contra Costa goldfield seeds in artificially constructed vernal pools at Travis AFB in Solano County. The restoration was conducted as mitigation for damaged pools at Travis AFB. Two hundred and fifty-six vernal pool basins were constructed as part of their mitigation plan. Contra Costa goldfields increased in absolute cover in the constructed pools during 2000 to 2005 (S. Collinge, University of Colorado, *in litt*. 2006). Currently, Contra Costa goldfields continue to grow in good populations in one-third of the pools, moderately sized populations in one-third of the pools and one-third of the remaining pools are covered with invasive plant species (S. Collinge, *in litt*., 2007).

Recent research by Dr. Jaymee Marty on the effects of cattle grazing on vernal pool species and inundation periods (Marty 2005; Pyke and Marty 2005) has been used to address grazing recommendations for preserves and private vernal pool habitats, although it is not yet incorporated into many management plans and may not be applicable range-wide.

Recent genetic studies have also been completed on maintenance of specific genetic variation in populations for Contra Costa goldfields. Ramp, et al. (2006) studied the population genetic structure of Contra Costa goldfields both in restored pools at Travis AFB and in naturally occurring pools across the current geographic range of the species using genetic markers. The method used to establish restored populations was successful in capturing similar levels and patterns of genetic diversity to those seen in the natural pools. Additionally, their study of Contra Costa goldfields suggested that the conservation of Contra Costa goldfields is dependent upon preservation of vernal pool habitat in the Central Valley as well as on the west side of the Coast Range (Ramp et al. 2006; S. Collinge *in litt.* 2006).

4B. Research on genetic structure has been completed (for species where necessary – for reintroduction and introduction, seed banking) and results incorporated into habitat protection plans to ensure that within and among population genetic variation is fully representative by populations protected in the Habitat Protection section of this document, described previously in sections 1A-E.

See 4A above.

4C. Research necessary to determine appropriate parameters to measure population viability for each species have been completed.

See 4A, above.

5. <u>Participation and Outreach:</u>

Public participation and outreach implicitly address all relevant listing factors.

5A. Recovery Implementation Team is established and functioning to oversee rangewide recovery efforts.

The Recovery Plan discusses a variety of participation programs to achieve the goal of recovering the listed species in the plan. An essential component of this collaborative approach is the formation of a single recovery implementation team overseeing the formation and function of multiple working groups formed at the vernal pool region level. The Service is currently in the preliminary stages of organizing both a recovery implementation team and multiple working groups. Service employees have met with various stakeholders to determine their interest in joining working groups and/or the recovery implementation team. This criterion has not been met.

5B. Vernal pool regional working groups are established and functioning to oversee regional recovery efforts.

See 5A, above.

5C. Participation plans for each vernal pool region have been completed and implemented.

This action has not been initiated.

5D. Vernal pool region working groups have developed and implemented outreach and incentive programs that develop partnerships contributing to achieving recovery criteria 1-4.

This action has not been initiated.

To downlist the Contra Costa goldfields, the Recovery Plan recommends that 95 percent of suitable Contra Costa goldfields habitat in Zone 1 and 85 percent of suitable Contra Costa goldfields habitat in Zone 2 core recovery areas be protected. In addition, the Recovery Plan recommends that 90 percent of known localities be protected. Neither of these criteria has been met. The vast majority of localities of this species are not protected. The protected populations of this species include: (1) the Fort Ord populations in Monterey County, (2) the Travis Air Force Base (AFB) population in Solano County, (3) the Wildlands North Suisun Mitigation Bank, in Solano County (4) the State Route 4 preserve managed by the Muir Heritage Land Trust in Contra Costa County (land has yet to have easement), and (5) the Warm Springs Seasonal Wetland unit of the Don Edwards San Francisco Bay National Wildlife Refuge (NWR) in Alameda County.

II.C. Updated Information and Current Species Status

II.C.1. Biology and Habitat

II.C.1.a. Abundance, population trends (e.g. increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends:

Informal status surveys have occurred at the following sites: Travis AFB, the State Route 4 preserve, Don Edwards San Francisco Bay NWR, North Suisun Mitigation Bank, Fort Ord, and various localities in Solano County. Through an ESA section 6 grant from the Service, the Solano County Water Agency has recently conducted a series of studies to investigate the genetics, seed bank, and populations of Contra Costa goldfields in Solano County, for development of the Solano Habitat Conservation Plan (LSA 2007). Surveys in Solano County are scheduled to continue for another two to three years to gather sufficient population and life history data (LSA, 2007).

Monitoring has not been sufficient to quantify abundance and identify population trends. Population numbers for this species vary widely from year to year (Service 2005; B. Pardieck, Muir Heritage Land Trust, pers. comm., 2007; CNDDB 2007). For the 20 presumed extant occurrences of this species catalogued in CNDDB, one occurrence has decreasing trends, one occurrence has a fluctuating trend, and the remaining occurrences are listed as unknown. One occurrence in Alameda County has not been seen since 1959 (CNDDB 2007).

II.C.1.b. Spatial distribution, trends in spatial distribution (e.g., increasingly fragmented, increased numbers of corridors, etc.), or historical range (e.g., corrections to the historical range, change in distribution of the species within its historical range, etc.):

Contra Costa goldfields are known from 20 presumed extant occurrences; at the time of listing there were only 13 known occurrences. This species is currently found in three types of vernal pools: Northern Basalt Flow, Northern Claypan, and Northern Volcanic Ashflow (Sawyer and Keeler-Wolf 1995). Currently, the number of occurrences reported by CNDDB is 20 within 7 counties; however, the number of populations represented by these occurrences has not been determined (CNDDB 2007). At the time of listing, Contra Costa goldfields were known to occur in four counties: Napa, Contra Costa, Alameda, and Solano. Contra Costa goldfields are now also known to occur in Marin, Monterey, and Sonoma Counties.

The additional localities since listing include one in Sonoma County, one in Marin County, one in Solano County, and three in Monterey County. Of these new localities, the Monterey and Solano County occurrences are currently protected; they are located at former Fort Ord and the North Suisun Mitigation bank. This species is believed to be extirpated from Santa Barbara, Santa Clara, and Mendocino Counties (Service 1997; Service 2005; CNDDB 2007). These extirpations occurred primarily from habitat conversion to urbanization, vineyards, competition from invasive plant species, and agriculture (CNDDB 2007). The majority of the presumed extant localities are located in Solano County, where nine localities are presumed extant (CNDDB 2007). The next largest concentrations of populations are in Monterey County and

Alameda County with three occurrences each (CNDDB 2007).

II.C.1.c. Presumed Extant Localities

Following is a discussion of known localities of this species by county and core recovery area:

Sonoma County

One occurrence of Contra Costa goldfields is located on private lands east of the City of Petaluma, south of Stage Gulch Road, near the Sonoma Mountains. This locality is within the Santa Rosa vernal pool region. The population was discovered by Sara Lynch, Monk and Associates, Inc., during a protocol level special status plant survey at the site in 2003, with about 15 plants observed. The land owner at the time was using the site for grazing and wanted to build an organic vineyard on a portion of the property with a 10 to 20 acre buffer around the goldfields. No development plans are moving forward with the land at this time and the goldfields are still currently presumed extant (S. Lynch, Monk and Associates, Inc., pers. comm., 2007). This population is not protected, is not within the vernal pool regions covered by the Recovery Plan, and is potentially threatened by future development within the watershed (S. Lynch, pers. comm., 2007; CNDDB 2007).

Marin County

One occurrence of Contra Costa goldfields is located on private lands along Highway 1 and south of Americano Creek. This locality is within the Santa Rosa vernal pool region. According to the Marin Chapter of the California Native Plant Society the site has been historically and currently sheep grazed (D. Smith, CNPS, *in litt*., 2007). From roadside observations, the sheep grazing does not seem to have a negative effect on the Contra Costa goldfields and in 2003 thousands of plants were observed (D. Smith, *in litt*., 2007; CNDDB 2007). This occurrence is not currently protected, and is not within the vernal pool regions covered by the Recovery Plan.

Monterey County

Three known occurrences of Contra Costa goldfields are found in Monterey County and they all occur within the Fort Ord core recovery area and Central Coast Vernal pool region. All occurrences are on land currently administered by the U.S. Bureau of Reclamation. This land has a Habitat Management Plan and will be managed and preserved in perpetuity (U.S. Army Corps of Engineers 1997). Approximately 2,779 hectares (6, 868 acres) of the former Fort Ord are designated as critical habitat for Contra Costa goldfields (Service 2003). There have been informal surveys conducted on site to monitor Contra Costa goldfields for 5 years. The most recent survey was conducted in 2003 and hundreds of thousands of plants were observed (MACTEC, Inc., 2004). The increase in population numbers from previous survey years since baseline was observed in 1999 could be due to natural population fluctuation, differences in annual precipitation, or an increase in survey efforts beginning in 2002 (MACTEC, Inc., 2004). Due to the increasing trend observed from past surveys, it was determined that no more surveys

were needed in subsequent years (MACTEC, Inc., 2004). As such, no long term population information can be derived from this location unless future surveys are conducted.

Napa County

Two known occurrences of Contra Costa goldfields are found in Napa County and occur in the Lake-Napa vernal pool region. One occurrence is adjacent to the Berryessa core recovery area with one plant observed in 1987; the sites' current status is unknown (CNDDB 2007).
The other population occurs within the Napa River core recovery area near Suscol Creek on private land. There have been informal surveys conducted at this location but not on a consistent basis (CNDDB 2007). More than 1,000 plants were observed in one pool during a 2005 survey, but grazing is no longer occurring on site and the quality of the site is declining (CNDDB 2007).

Contra Costa County

One known presumed extant occurrence of Contra Costa goldfields is found in Contra Costa County. This occurrence is within the Rodeo Creek core recovery area within the Solano-Colusa vernal pool region. This population is within the State Route 4 Preserve, which was designated as preservation land as part of compensation for the State Route 4 Gap Closure Project. This preserve is currently being managed by the Muir Heritage Land Trust in Contra Costa County. There had been historic year round grazing on that site until it was stopped in 2000. Grazing was resumed at a different scale in 2002 (ENTRIX, Inc. and Muir Heritage Land Trust 2004). Surveys have occurred every year since 2001 by the Muir Heritage Land Trust. The population declined to about 30 plants in 2001 due to lack of grazing management of the site (B. Pardieck, Muir Heritage Land Trust, pers. comm., 2007). With grazing restored and sufficient rainfall, the population went up to a few thousand plants in 2004. However, vernal pools were too inundated in 2006 for the species to grow. In 2007, only 3 plants were observed, due in part to the occurrence of a drought year in the region. (ENTRIX, Inc. and Muir Heritage Land Trust 2004; B. Pardieck, Muir Heritage Land Trust, pers. comm., 2007).

Alameda County

Three presumed extant occurrences of Contra Costa goldfields are found in Alameda County. All three occurrences are within the Central Coast vernal pool region. One occurrence is documented near Russell City and presumed extant, but has not been surveyed since 1959. The two other occurrences are within the S.E. San Francisco Bay core area and the Don Edwards San Francisco Bay National Wildlife Refuge-Warm Springs Unit/ Pacific Commons Preserve. The occurrences at the Warm Springs Unit are informally monitored and the NWR does not currently have a Habitat Management Plan, but is in the process of developing a Comprehensive conservation plan to begin in 2009 (I. Loredo, *in litt.* 2007). The 2006 Annual *Monitoring report Warm Springs Unit of the Don Edwards San Francisco National Wildlife Refuge* states that plant cover was higher in 2006 than 2005, but not as high as 2004 (Loredo 2006). In the spring of 2004, a seasonal grazing program was implemented at the Warm Springs unit.

Solano County

Nine presumed extant occurrences of Contra Costa goldfields are found within the Solano-Colusa Vernal pool region in Solano County. Two occurrences are within the Suisun Marsh core recovery area, one is along Cordelia Road, southwest of Fairfield on private land, and the other is on the privately owned Gentry property west of Suisun City (CNDDB 2007). Portions of the Gentry property are proposed for commercial development, which will remove known goldfields. The remaining seven occurrences are within the Jepson Prairie Core recovery area. Two of these seven occurrences are currently protected, one at Travis AFB and the other at the North Suisun mitigation bank. The other five occurrences within the Jepson-Prairie core recovery area are: one east of Branscombe Road and north of Highway 12, two east of Travis AFB and north of Airbase Parkway, one South of Highway 12 along Scally Road, and one northwest of Travis AFB and east of Peabody Road (CNDDB 2007).

II.C.1.e. Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.); taxonomic classification or changes in nomenclature:

Genetic information for Contra Costa goldfields has been recently gathered for populations in Solano County. Ramp (2004), conducted studies in Solano County and suggested that occurrences in Solano County may be disjunct subpopulations with genetic differences. It was further derived from Collinge (2003) that these subpopulations show different responses to soil, salinity of soil, and moisture.

II.C.2. Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms):

II.C.2.a. Present or threatened destruction, modification or curtailment of its habitat or range:

According to the 1997 listing rule, the remaining presumed extant localities of Contra Costa goldfields were threatened by direct destruction of the plants and their habitats or hydrologic changes in their vernal pool habitats. Such activities include urbanization, wetland drainage, industrial development, agricultural land conversion, ditch construction, off highway vehicle use, road widening, and trampling by cattle. Other threats to the species include vineyards, intensive grazing practices, insufficient grazing, and competition from invasive plants (see Section II.C.2.e. for a discussion of grazing and competition from invasive plants). All of these threats are still imminent.

Throughout the species range, 65 percent of known Contra Costa goldfield occurrences are on private land and are not protected (CNDDB 2007). Protected localities of this species include three occurrences within the former Fort Ord, in Monterey County; one occurrence at Travis AFB, in Solano County; one occurrence at North Suisun Mitigation bank in Solano County;, one occurrence at the State Route 4 Preserve, in Contra Costa County; and two occurrences at the Don Edwards San Francisco Bay National Wildlife. All of the remaining localities are on private lands and not protected from habitat loss. See Section II.C.1.c for a description of conservation efforts at presumed extant localities.

Solano County contains 45 percent of all known presumed extant occurrences of Contra Costa goldfields (CNDDB 2007). With the exception of the Travis AFB and the North Suisun Mitigation Bank, the remaining occurrences of Contra Costa goldfields in Solano County are subject to high development pressure. There are seven known occurrences of Contra Costa goldfields that are unprotected and threatened by development. Proposed projects that are near known occurrences of Contra Costa goldfields or may impact known occurrences are: Gentry Suisun, Hawthorne Mill, Jepson Parkway, and Biggs which include residential development, drainage, landfill expansion, highway projects, road expansions, and industrial development (Service 2006a, 2006b, 2007, CNDDB 2007). Even if development does not result in the destruction of known localities of this species, this development will occur in areas adjacent to known occurrences of Contra Costa goldfields. There is potential for development projects within close proximity to occupied Contra Costa goldfields habitat to cause indirect effects resulting from increases of deleterious substances (i.e., fertilizers, herbicides, and oil based products), human intrusion, habitat fragmentation, and modification of hydrology, even if the actual vernal pools are not filled. Recreational threats such as equestrian and mountain bike trespass, and past vehicle access have compacted and degraded soils in Monterey County (CNDDB 2007). Vineyards are also continuing to be threat to Contra Costa goldfields. The largest occurrence in Napa County is threatened by vineyard conversion and is currently not protected (CNDDB 2007).

The majority of occurrences of Contra Costa goldfields are not protected. The only protected occurrences of this species include three occurrences within the former Fort Ord, in Monterey County, one occurrence at Travis Air Force Base (AFB), in Solano County, one occurrence at North Suisun Mitigation Bank in Solano County, one occurrence at the State Route 4 Preserve, in Contra Costa County, and two occurrences at the Don Edwards San Francisco Bay National Wildlife Refuge (NWR). Threats such as urbanization, wetland drainage, industrial development, agricultural land conversion, ditch construction, off highway vehicle use, road widening, trampling by cattle, vineyards, competition from weedy invasive plants, inappropriate livestock grazing, elimination of grazing, and drainage channels threaten the presumed extant occurrences of this species (Service 2005; CNDDB 2007).

II.C.2.b. Overutilization for commercial, recreational, scientific, or educational purposes:

Overutilization was not known to be a threat to this species at the time of listing, and still does not appear to be a threat at this time.

I.C.2.c. Disease or predation:

Disease or predation was not known to be a threat to this species at the time of listing, and is still not known to be a threat at this time.

II.C.2.d. Inadequacy of existing regulatory mechanisms:

In the final rule we identified the inadequacies of the Federal Clean Water Act and the California Environmental Quality Act.

Federal Laws

The Endangered Species Act: The Endangered Species Act of 1973, as amended (Act), is the primary Federal law that provides protection for Contra Costa goldfields. Section 7(a)(2) requires Federal agencies to consult with the Service to ensure any project they fund, authorize, or carry out does not jeopardize a listed species. Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the "take" of federally endangered wildlife, however, plants are not protected against take. Instead, plants are protected from harm in two particular circumstances. Section 9 prohibits (1) the removal and reduction to possession (i.e. collection) of endangered plants from lands under Federal jurisdiction, and (2) the removal, cutting digging, damage, or destruction of endangered plants on any other area in knowing violation of a state law or regulation. The protection of section 9 afforded to endangered species is extended to threatened wildlife and plants by regulation. Federally listed plants may be incidentally protected if they co-occur with federally listed wildlife species.

Under the terms of section 7(b)(4) and section 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of an incidental take statement. Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species because take of plants in not prohibited. However, limited protection of listed plants from take is provided to the extent that the Act and the implementing regulations prohibit the removal and reduction to possession of federally listed threatened or endangered plants or the malicious damage of endangered plants on areas under Federal jurisdiction, or the destruction of endangered plants on non-Federal areas when in violation of state law or regulation or in the course of any violation of a State criminal trespass law.

National Environmental Policy Act: The National Environmental Policy Act (NEPA) (42 U.S.C. 4321 *et seq.*) may afford some protection to populations affected by Federal activities. The NEPA requires all Federal agencies to formally document, consider, and publicly disclose the environmental impacts of Federal actions and management decisions affecting the human environment. NEPA requires agencies to consider mitigation alternatives, but does not require or guide the actual implementation of mitigation for impacts.

Federal Clean Water Act: The Section 404 of the Clean Water Act (CWA) may afford some protection to Contra Costa goldfields. The U.S. Army Corps of Engineers (Corps) issues permits for the discharge of dredged or fill material into navigable waters of the United States. The Corps interprets "the waters of the United States" expansively to include not only traditional navigable waters, but also other defined waters that are adjacent or hydrologically connected to traditional navigable waters. Before issuing a 404 permit for a project that may affect federally listed species, the Corps is required under section 7 of the Act to consult with the Service. Thus, wetland protections under CWA that would benefit this species may be dependent upon its status under the Act.

However, recent Supreme Court rulings have called into question the Corps' definition of Waters

of the U.S. On June 19, 2006, the U.S. Supreme Court vacated two district court judgments that upheld this interpretation as it applied to two cases involving "isolated" wetlands. Currently, the Corps regulatory oversight of vernal pools is in doubt because of their "isolated" nature. In response to the Supreme Court decision, the Corps and the U.S. Environmental Protection Agency (USEPA) have recently released a memorandum providing guidelines for determining jurisdiction under the CWA. The guidelines provide for a case-by-case determination of a "significant nexus" standard that may protect some, but not all, vernal pool habitat (USEPA and USACE 2007). The overall effect of the new permit guidelines on loss of vernal pool habitat is not known at this time. If the Corps loses their regulatory authority over vernal pools, unmitigated destruction of potential habitat for Contra Costa goldfields may increase over the range of the species.

California State Laws

California Endangered Species Act: The State's authority to conserve wildlife includes the California Endangered Species Act (CESA) and the California Environmental Quality Act (CEQA). While Contra Costa goldfields are not listed under CESA, it must be considered under CEQA as a rare species (Section 15380, Public Resources Code). CEQA (chapter 2, section 21050 *et seq.* of the California Public Resources Code) requires government agencies to consider and disclose environmental impacts of projects and to avoid or mitigate them where possible. Under CEQA, public agencies must prepare environmental documents to disclose environmental impacts of a project and to identify conservation measures and project alternatives. Through this process, the public can review proposed project plans and influence the process through public comment. However, CEQA does not guarantee that such conservation measures will be implemented.

In summary, the Endangered Species Act is the primary Federal law that provides protection for this species since its listing as endangered in 1997. Other Federal and State regulatory mechanisms provide discretionary protections for the species based on current management direction, but do not guarantee protection for the species absent its status under the Act. Therefore, we continue to believe other laws and regulations have limited ability to protect the species in absence of the Endangered Species Act.

II.C.2.e. Other natural or manmade factors affecting its continued existence:

The 1997 listing rule states that restricted habitats/ranges and small population size are a threat to Contra Costa goldfields. Current threats include those discussed in the 1997 final rule, as well as climate change/drought, competition from invasive plant species and improper or lack of grazing regimes.

Invasive Plant Species:

Competition from invasive plant species poses a primary threat to this species. Non-native grasses occur commonly in vernal pool complexes and have become a threat to native vernal pool species through their capacity to change pool hydrology. Non-native grasses maintain

dominance at pool edges, sequestering light and soil moisture. Italian ryegrass (*Lolium multiflorum*) and waxy mannagrass (*Glyceria declinata*) increase thatch buildup, which leads to increased oxygen depletion in the pools (Dunne and Leopold 1978) and contributes to the shortening of inundation periods through increased evapotranspiration (Marty 2005). As vernal pool complexes become surrounded by residential development and disturbed habitat, the likelihood of invasion by non-native plants increases (Zedler and Black 2004). Residential and municipal landscaping provides a constant seed-source of non-native plants. Urban runoff, combined with the urban seed-source, are likely to convert the vernal pools to patches of nonnative weeds and grasses. Activities such as deep-ripping (breaking up the clay pan by thrusting metal prongs into the soil and dragging them with heavy machinery so water can drain from the area) and gravel mining disturb the habitat and allow non-native species to become more easily established (Service 2005). Small reserves may be particularly susceptible to degradation by non-native species, particularly when the reserves are located in a matrix of development and are associated with chronically disturbed transportation corridors (Zedler and Black 2004).

The CNDDB (2007) reports seven Contra Costa goldfield occurrences that are threatened by competition from invasive plants such as Italian ryegrass (*Lolium multiflorum*). Italian ryegrass threatens occurrences in Alameda County and a Napa County occurrence that is within the Napa River core recovery area (CNDDB 2007). Grazing ceased on the Napa County site in 2005, off road vehicle use has occurred, and Italian ryegrass has been invading (CNDDB 2007). Invasive plants have also become a concern for the State Route 4 preserve in Contra Costa County, since grazing had been discontinued for a number of years (B. Pardieck, Muir Heritage Land Trust, pers. comm., 2007). Non-native grasses such as Italian rye grass not only shade out short-statured plants like Contra Costa goldfields, but can also negatively impact vernal pool hydrology by decreasing inundation periods in pools (Marty 2004). In addition, encroachment of nonnative plants often follows surface disturbing activities such as discing, grading, filling, and off-road vehicle use (Service 2005).

Grazing:

Intensive grazing and lack of grazing are significant threats to Contra Costa goldfields (Service 2005; CNDDB 2007). Both lack of grazing and excessive grazing may cause an increase in organic matter in the habitat that can eliminate the natural vernal pool invertebrate community and promote opportunistic and invasive nonnative species, such as rye grass (*Lolium* spp.), that out compete the obligate vernal pool species (Rogers 1998; Rogers 2006). The cessation of cattle grazing has been found to exacerbate the negative effects of invasive non-native plants on vernal pool inundation period. Appropriate levels of grazing may help maintain soil conditions and limit the amount of thatch accumulation near vernal pools (Rogers 2006). Increased grass cover in and around ungrazed pools may lead to an increase in evapotranspiration rates, resulting in a decreased hydroperiod (Marty 2005). In areas where long-term grazing has been in effect, moderate grazing (in both stocking numbers and amount of time) may be an important tool in combating non-native plant species, when burning is not an option. Moderate grazing may be a necessary tool to maintain the species diversity of the natural vernal pool ecosystem (Marty 2005).

The population numbers of Contra Costa goldfields dropped significantly when grazing was removed from the State Route 4 Preserve in Contra Costa County (ENTRIX, Inc. and Muir Heritage Land Trust 2004). This phenomenon can be exacerbated during low rainfall years. The numbers have fluctuated but have started to increase with the introduction of a new grazing program (ENTRIX, Inc. and Muir Heritage Land Trust 2004). Heavy cattle grazing is cited as a threat for occurrences at the Gentry property, in Solano County, the Don Edwards San Francisco Bay NWR, in Alameda County, and three occurrences in portion of Solano County near Highway 12 (CNDDB 2007). Lack of cattle grazing is cited as a threat for occurrences in Napa County, the State Route 4 Preserve in Contra Costa Country, the Don Edwards San Francisco bay NWR, in Alameda County (CNDDB 2007).

Climate Change/Drought: Current climate change predictions for terrestrial areas in the Northern Hemisphere indicate warmer air temperatures, more intense precipitation events, and increased summer continental drying (Field *et al*. 1999; Cayan *et al*. 2005; IPCC 2007; Pyke 2005). However, climatic conditions for smaller sub-regions such as California remain uncertain (Pyke 2005). It is unknown at this time if climate change in California will result in a localized, relatively small cooling and drying trend, or a warmer trend with higher precipitation events (Pyke 2005). Contra Costa goldfields are dependent upon vernal pool wetlands, which signifies the importance of water availability on the survival and recovery for this species. If California receives more rainfall through intense precipitation events, suitable vernal pool habitat for Contra Costa goldfields may increase, which would benefit the species. However, if California enters into a drying trend, the resulting droughts could adversely affect Contra Costa goldfields.

While drought conditions are a normal part of environmental variability in California, a severe drought would exacerbate adverse effects associated with small, disjunct populations of Contra Costa goldfields, and would place additional strains on vernal pool ecosystems. Where populations persist on only marginal habitat, the increase in the severity and frequency of drought conditions is likely to result in high rates of mortality in the short term, with the effects of low reproductive output and survivorship persisting after the drought has ceased (Griggs and Jain 1983). However, a severe drought, if compounded by other factors such as improper grazing regimes, invasive plant species, and other unforeseen circumstances, could contribute to the local extirpation of this species.

II.D. Synthesis

When Contra Costa goldfields was listed as endangered in 1997, the primary threats to its survival and recovery were activities that result in the direct destruction of the plants and their habitats or hydrologic changes in their vernal pool habitats. Such activities include urbanization, wetland drainage, industrial development, agricultural land conversion, ditch construction, off highway vehicle use, road widening, and trampling by cattle. We have no new information to suggest that these threats to the species have substantially changed since the time of listing in 1997. In addition, other factors, such as drought, vineyard conversion, competition from weedy invasive plants, inappropriate livestock grazing, and elimination of grazing may also threaten this species. The majority of the localities of Contra Costa goldfields do not have management plans, monitoring programs, or adequate funding to ensure that these localities are sustainable in perpetuity. Lack of management, monitoring, and funding are not, in themselves, threats to

Contra Costa goldfields; however, without these components, the potential threats described above may not be identified and eliminated.

The are 8 occurrences within the range of this species that are protected from development (i.e. land conversion). Twelve occurrences of this species remain unprotected and all of these sites are on private lands. Other than habitat preservation, other criteria discussed within the Recovery Plan have not been met, and in some instances, not initiated, including research, monitoring, management, and public participation and outreach. Based on the continuing threat of habitat loss due to urbanization, agriculture practices, invasive weeds, intensive cattle grazing, we conclude that Contra Costa goldfields still meets the ESA definition of endangered. No status change is recommended at this time.

III. RESULTS

III.A. Recommended Classification:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist (*Indicate reasons for delisting per 50 CFR 424.11):*
____ *Extinction*
____ *Recovery*
____ *Original data for classification in error*
_X_ **No change is needed**

III.B. New Recovery Priority Number: No change

We recommend that the recovery priority number remain 5C.

IV. RECOMMENDATIONS FOR FUTURE ACTIONS

The following recommendations for future actions are from the 2005 Recovery Plan and the results of discussions on the status of the species and the species' needs with several recognized Contra Costa goldfields experts:

1. Contra Costa goldfield occurrences that are currently protected and managed for the benefit of the species include: (1) the North Suisun Mitigation Bank, in Solano County, (2) Travis AFB, in Solano County, (3) the State Route 4 Preserve, in Contra Costa County, (4) Don Edwards San Francisco Bay NWR, in Alameda County, and (5) the former Fort Ord, in Monterey County. Protection of additional localities of this species is necessary to recover this species. Protecting occurrences in Sonoma, Marin, and Napa Counties should be a priority over the next five years, as this is the northwestern edge of the species' range, and no occurrences in these counties are protected at this time.

2. Once additional sites are protected, management plans should be prepared. Results from standardized monitoring discussed in item 3, below, should be included in the

management plans for these protected sites. Grazing management and invasive weed control should be primary components of these management plans.

3. Conduct research at as many of the presumed extant localities as possible to incorporate research recommendations outlined in the Recovery Plan. The following research should be prioritized over the next five years:

    a. Develop a standardized method to monitor species status and population trends at all known locations. This will better our understanding of potential threats to the species, and will aid in the development of methods to ameliorate these threats.

    b. Conduct research on invasive weedy plant species to determine the most appropriate methods to control these plants and increase population numbers of Contra Costa goldfields and other listed vernal pools plants.

    c. Conduct further research on the genetic structure of the species to determine the feasibility of introducing Contra Costa goldfields to biologically appropriate vernal pool regions and soil types from which status surveys indicate the species has been extirpated.

4. Regional vernal pool working groups should be created in regions where Contra Costa goldfields are known to occur to aid with monitoring and management efforts.

5. Conduct additional research on how Contra Costa goldfields are pollinated. If certain insects are found to be important to pollination, and therefore to seed production, their habitat must be protected in each core area to contribute to the recovery of Contra Costa goldfields.

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U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW OF CONTRA COSTA GOLDFIELDS

Current Classification: Endangered
Recommendation resulting from the 5-Year Review

____ **Downlist to Threatened**
____ **Uplist to Endangered**
____ **Delist**
_X_ **No change is needed**

Appropriate Listing/Reclassification Priority Number, if applicable __N/A__

Review Conducted By __Sacramento Fish and Wildlife Office Staff_

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service JAN 3 0 2008

ACTING

Approve _____ Date_____

REGIONAL OFFICE APPROVAL:

Lead Regional Director, Fish and Wildlife Service

Approve _____ Date 9/30/08

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