

**DATE:** June 30, 2009

**SUBJECT:** Otay tarplant 5-Year Review – No recommendation in change of threatened status. Recovery priority number changed from 5 to 8C.

**BACKGROUND:**

*Deinandra conjugens* (Otay tarplant) is an annual herbaceous plant in the Asteraceae (sunflower family). The species is endemic to San Diego County, California, and adjacent Baja California, Mexico. Thirty-four extant native occurrences are distributed discontinuously in southwestern San Diego County, California. The overall status of *Deinandra conjugens* is better now, than it was at the time of listing in 1998. Significant amounts of habitat for the species have been included within the MSCP Preserve and other conserved areas. Eight new occurrences have been detected since listing, though nine occurrences have been extirpated and several have been diminished since listing.

**MAIN DECISION OR MESSAGE:**

*Deinandra conjugens* continues to be threatened by urbanization and associated activities. Of the 34 currently recognized extant occurrences, 18 are threatened by potential development, including 13 occurrences in the Multiple Habitats Plan Area. A total of 17 occurrences are threatened by maintenance activities associated with access roads and utilities, and OHV activity is considered a threat at 7 occurrences. However, as a species covered under the Narrow Endemics Policy, 80 percent of each occurrence must be preserved. This will ensure preservation of occurrences across the range of the species. Though the magnitude of these threats has diminished since the listing, these threats are not considered to be alleviated at this time. This should be accomplished upon full implementation of the MSCP and its subarea plans as well as other HCPs in the region.

Since listing, the nature and magnitude of impacts from competition with invasive, nonnative plants have been demonstrated by research and field observations. The impacts are range-wide, being noted at all 34 of the extant occurrences. Although short-term management measures for invasive, nonnative plants have been effective in some locations, only in one instance is the management still active. Completion of the MSCP Preserve to include *Deinandra conjugens* occurrences, permanent funding, and implementation of an Adaptive Management Plan that includes effective measures to control invasive, nonnative plants will allow the Service to consider delisting this species within the next 5 years.

*Deinandra conjugens* has received considerable conservation attention and much occupied habitat is protected from development. Therefore, the recovery priority number is being changed from a 5 (high degree of threat and low recovery potential) to 8C, indicating that the species faces a moderate degree of threat, has a high recovery potential, and is in conflict with construction or development.

*Deinandra conjugens* remains at risk of becoming endangered due to ongoing threats throughout its narrow geographical and ecological range. Therefore, we recommend that the status of *Deinandra conjugens* as threatened remain unchanged at this time.

**RECOMMENDATIONS FOR FUTURE ACTIONS:**

- 1) Implement and fully fund a management plan for the MSCP Preserve that includes adequate provisions for management of invasive, nonnative plants.
- 2) Encourage permit holders to complete the MSCP Preserve on private lands, to include the targeted *Deinandra conjugens* occurrences, by identifying opportunities through the Service's Partners Program.
- 3) Develop, implement, and monitor effective invasive species management actions for all conserved occurrences of *Deinandra conjugens*.
- 4) Reevaluate recovery criteria for this species to incorporate meaningful measures of the degree to which recovery has been achieved.
- 5) Identify and monitor measures for indicating species status that are separable or insulated from natural annual population expressions.

*Deinandra conjugens*  
(Otay tarplant)

**5-Year Review:  
Summary and Evaluation**



Photos: U.S. Fish and Wildlife Service (Gjon Hazard)

**U.S. Fish and Wildlife Service  
Carlsbad Fish and Wildlife Office  
Carlsbad, California**

**June 30, 2009**

## **5-YEAR REVIEW**

### ***Deinandra conjugens* (Otay tarplant)**

#### **1. GENERAL INFORMATION**

*Deinandra conjugens* (Otay tarplant) is an annual herbaceous plant in the Asteraceae (sunflower family). Individual plants are less than 16 inches (4 decimeters) tall, with lobed leaves and yellow flowers arranged in heads of 8-10 ray flowers and 13-21 disk flowers. The species is endemic to San Diego County, California, and adjacent Baja California, Mexico. Thirty-four extant native occurrences are distributed discontinuously in southwestern San Diego County, California. *Deinandra conjugens* is typically associated with clay soils supporting grasslands, open coastal sage scrub, or maritime succulent scrub vegetation of San Diego County, California.

##### **1.1. Reviewers**

Lead Regional Office: Diane Elam and Jenness McBride, Region 8, California, (916) 414-6464.

Lead Field Office: Gary D. Wallace, Carlsbad Fish and Wildlife Office, (760) 431-9440.

**1.2. Methodology used to complete the review:** This review was conducted by the Carlsbad Fish and Wildlife Office. We relied on our 1998 listing rule (63 FR 54938-54956), the 2001 proposed critical habitat rule (66 FR 32052-32071, June 13, 2001), the 2002 final critical habitat rule (67 FR 76030-26053, December 10, 2002), and on the 2004 recovery plan for this species (USFWS 2004, pp. 1-65). We also relied on reports and information in our files and information submitted during the information request period.

##### **1.3. Background**

**1.3.1. FR Notice citation announcing initiation of this review:** A notice announcing initiation of the 5-year review for this species and the opening of a 60-day public information request period was published in the *Federal Register* (71 FR 14538, March 22, 2006). We received one response during the public response period.

### 1.3.2. Listing history

#### Original Listing

FR notice: 63 FR 54938

Date listed: October 13, 1998 (effective November 12, 1998).

Entity listed: *Deinandra conjugens* (as *Hemizonia conjugens*), a plant species.

Classification: Threatened.

This species was listed as Endangered by the State of California in 1979.

**1.3.3. Associated rulemakings:** On December 10, 2002, we published the final rule designating 6,330 acres (2,562 hectares) of critical habitat for *Deinandra conjugens* (67 FR 76030-26053). This designation became effective on January 9, 2003.

**1.3.4. Review History:** No prior 5-year reviews.

**1.3.5. Species' Recovery Priority Number at start of five-year review:** The Recovery Priority Number is 5 according to the 2007 Recovery Data Call for the Carlsbad Fish and Wildlife Office, based on a 1-18 system where 1 is the highest-ranked recovery priority and 18 is the lowest (48 FR 43098, September 21, 1983). This number indicates that the taxon is a species with a high degree of threat and a low potential for recovery.

### 1.3.6. Recovery Plan or Outline

**Name of plan:** Recovery plan for *Deinandra conjugens* (Otay tarplant).

**Date issued:** December 7, 2004.

**Dates of previous revisions:** No previous plans.

## 2. REVIEW ANALYSIS

**2.1. Application of the 1996 Distinct Population Segment (DPS) policy:** This policy is not applicable to plants.

**2.1.1. Is the species under review a vertebrate?** No. The Endangered Species Act of 1973, as amended (Act), defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment (DPS) of any species of vertebrate wildlife. This definition limits listing as a DPS to vertebrate species of fish and wildlife. Because the taxon under review is a plant, the DPS policy is not applicable. Therefore, application of the DPS policy to the taxon's listing is not addressed further in this review.

### 2.2. Recovery Criteria

**2.2.1. Does the species have a final, approved recovery plan containing objective, measurable criteria?** Yes.

**2.2.2. Adequacy of recovery criteria.**

**2.2.2.1. Do the recovery criteria reflect the best available and most up-to-date information on the biology of the species and its habitat? Yes.**

**2.2.2.2. 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)? Yes.**

**2.2.3. 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.**

Note: This recovery plan was prepared prior to guidance for writing recovery plans in a threats-based format. Where possible, topics addressed in the following sections are designated as relating to one of the five listing factors addressed in section 2.3.2. below (A, present or threatened destruction, modification, or curtailment of habitat or range; B, overutilization for commercial, recreational, scientific, or educational purposes; C, disease and predation; D, inadequacy of existing regulatory mechanisms; and E, other natural or human-caused factors).

The recovery plan states that *Deinandra conjugens* may be considered for delisting when the following 8 recovery criteria or conditions are met (USFWS 2004, p. 31):

1. *Known populations (including naturally occurring seed banks) within areas identified for conservation under the San Diego County Multiple Species Conservation Program (MSCP) are permanently protected from future development or other significant threats.* This criterion addresses threats applicable to listing Factors A and E. The discussion here focuses on provisions of the MSCP and protections from future development under the MSCP; however, this and other topics considered threats are also discussed below in the five-factor analysis section.

The MSCP is a regional habitat conservation plan that covers 85 species, including 46 plant taxa. The purpose of the San Diego MSCP is to establish a conservation program to minimize and mitigate the expected loss of habitat values and, with regard to “covered” animal species, the incidental take of such species. Assembly of the MSCP Preserve Subarea is expected to take place over the 50-year life of the incidental take permit; however, this process is occurring much more rapidly than the 50-year time frame. Local jurisdictions implement their respective portions of the MSCP Plan through subarea plans. Permits authorizing implementation of subarea plans that covered *Deinandra conjugens* were issued to the City of San Diego in 1997, the County of San Diego in 1998, and the City of Chula Vista in 2005. The subarea plans are City of San Diego (1997, pp. 1-109, and Appendix A pp. 1-67), County of San Diego (1997, pp. 1-1 – 4-33), and City of Chula Vista (2003, pp. 1-1 – 9-4).

Each of the MSCP subareas includes portions of those lands identified for preservation under the MSCP. These lands include all or portions of the ranges and occurrences of the species covered under the MSCP. An occurrence is a local area where the species may generally be found. The MSCP requires that area specific management directives be developed for the preserve as it is assembled.

Occurrences of *Deinandra conjugens* and other rare taxa are tracked by the California Department of Fish and Game's (CDFG) California Natural Diversity Data Base (CNDDDB 2007). Occurrence records contain data from field survey forms submitted by observers and/or from verified museum specimens. Each record determined to represent a new site is reported by the CNDDDB as an element occurrence (EO) and given a consecutive EO number. The Service often uses the cumulative data in these CNDDDB EO reports although the level of precision and data reported may vary. In the following discussion, the differences between numbers of occurrences referred to are due to a mixture of source documents that use different terminology for sites where plants occur.

Some occurrences are based on point localities indicating a few to several plants at a site. Single point localities or aggregations of point localities identified as polygons may be recognized by CNDDDB as a single element occurrence. Data from some project survey efforts have not been reported to or entered into the CNDDDB. Differing survey methods and mapping precisions as well as annual climatic conditions make it difficult to compare or equate occurrence records and boundaries to population boundaries. In this document we will generally address occurrences. However, when dealing with GIS analyses of data layers it will be necessary to frame the discussion in terms of polygons (i.e., areas with determinable perimeters within which one or more point localities of *Deinandra conjugens* may have been identified) and point localities apart from any defined polygon and lacking any ascribed acreage.

### Future Development

Under the provisions of the MSCP, approximately 172,000 acres (69,608 hectares) are targeted to be preserved within the City of San Diego's Multiple Habitats Plan Area (MHPA) and the County of San Diego's Pre-approved Mitigation Area (PAMA) (USFWS 2004, p. 27). To date, about 117,000 acres (47,350 hectares) (or 68 percent of the targeted acres) have been added to the MSCP Preserve and thus are protected from future development (MSCP News, Summer 2006 edition, p. 1; <http://www.co.san-diego.ca.us/dplu/mscp/docs/Newsletters/2006summer.pdf> accessed August 1, 2006).

Implementation of the MSCP is expected to adequately conserve 15 of the 22 extant occurrences of *Deinandra conjugens* identified by Roberts (1997, p. 8) and used in the listing rule. This figure includes eight of the 12 occurrences considered "major" based on population estimates from 1997 (Roberts 1997, p. 3). These areas were not considered preserved upon issuance of the permit but rather, preservation will be achieved over the 50-year life of the permit as lands are added to the Preserve.

Roberts (1997, p. 2) defined a major population as one that supported an estimated 1,000 or more standing plants. These occurrences are identified in Appendix 2. The expected conservation level is cited in the final MSCP Plan, Table 3-5, as 66 percent of the major populations (City of San Diego 1998, pp. 3-48). For long-term comparisons, this system may be unreliable as is shown by the often vastly different numbers of individuals, in different years, at some of the occurrences in Appendix 1. As may be seen in Appendix 2, most of the occurrences considered “major” at the time of listing have been impacted by development to some extent or are not yet in the Preserve. To date, the MSCP’s Preserve lands capture habitat associated with 9 of the 15 occurrences identified for conservation by the MSCP. An additional two occurrences are partially captured in preserved lands. These occurrences are considered to be permanently protected from future development and applicable to the conservation goals of this recovery criterion. Not all sites supporting *Deinandra conjugens* represent point localities or polygons that have been reported to and/or been given element occurrence numbers by CNDDB.

Beyond protection noted above for major populations, *Deinandra conjugens* is afforded additional protection because it is considered a Narrow Endemic Plant under the MSCP, and provisions of the Biological Mitigation Ordinance apply (County of San Diego, Biological Mitigation Ordinance 1997, p. 10). These documents stipulate that where complete avoidance of populations of a narrow endemic plant on County lands is not feasible at least 80 % must be avoided depending upon the sensitivity of the individual species and the size of the population. Encroachment cannot exceed 20 percent of the population on-site.

We conducted a GIS assessment of *Deinandra conjugens* polygons and point localities (USFWS 2006). The known range of the species in the United States consists of 899 acres (364 hectares) in 273 polygons and 805 point localities not included in polygons. Of these, 80 percent of the polygon acres (717 acres (287 hectares)) and 52 percent of the point localities (417 points) are in the MSCP. To date, 39 percent (282 acres (114 hectares)) of the 717 acres (287 hectares) of polygons and 44 percent (183 of the 417 point localities) in the MSCP are within preserved lands. Except for the Bonita Meadows Open Space Preserve noted below, these polygons and points are in the MSCP’s Preserve (USFWS 2006). These figures include a site west of Moody Canyon where an estimated 1,348,281 plants were found in 2003 (AMEC Earth and Environmental 2003, p. 6). These lands are considered protected from loss due to development. See Appendix 2 for a general description of extant occurrences. Many occurrences consist of impacted and preserved portions.

Examples of implemented preservation and management:

In the City of Chula Vista MSCP Subarea Rolling Hills Ranch (aka Salt Creek Ranch) development created a 22-acre (8.9-hectare) Tarplant Management Area (TMA) to preserve and manage *Deinandra conjugens*. The TMA includes 9.8 acres (4 hectares) of occupied habitat (USFWS 2002, pp. 26, 30). Additional *Deinandra conjugens* plants will be preserved within 40.9 acres (16.5 hectares) of on-site passive open

space. Off-site the project proponents will preserve 210,000 *Deinandra conjugens* plants on 10 acres (4 hectares) in Johnson Canyon to be managed in perpetuity by the County of San Diego/City of Chula Vista Preserve Owner manager (USFWS 2002, p. 7). In addition, about 15,000 plants on about 6 acres (2.4 hectares) in the San Miguel Conservation Bank (USFWS 2002, p. 30) will be conserved and managed as part of the San Diego National Wildlife Refuge.

As part of the Preserve, the San Diego National Wildlife Refuge maintains a 68-acre (27.5-hectare) Otay Tarplant Preserve with suitable habitat (USFWS 2005b). This preserve (the Tri-mark Parcel) is located south of Sweetwater Reservoir and north of Procter Valley Road. These lands are being actively managed for reduction of invasive nonnative plants (Martin 2006). *Deinandra conjugens* occupies 6.2 acres (2.5 hectares) in the Otay Tarplant Preserve. These lands have not yet been transferred to the Service.

*Deinandra conjugens* within the CDFG Rancho Jamul Ecological Reserve, also part of the MHPA, are threatened by invasive nonnative plants, access road maintenance, and off-highway vehicle (OHV) activity (McMillan 2003, p. 10; Dillingham 2007, p. 1). Currently the area is generally managed to control nonnative plants and OHV activity; however, as yet there is no specific management plan for *Deinandra conjugens* on these lands (Dillingham 2007, p. 1).

Although not a signatory to MSCP, the California Transportation Department (Caltrans) established a 200-acre (81-hectare) Bonita Meadows Open Space Preserve as mitigation for impacts along State Route 125 South (USFWS 1999; EDAW 2004, p. 1). Although not originally included in the PAMA, this area will be incorporated into the MSCP Preserve, and benefits from long-term management for *Deinandra conjugens* (EDAW 2004). In 2003, the population was estimated to be 119,500 plants scattered among 37 separate stands (EDAW 2004, p. 5). The 5-year management plan includes provisions for decreasing competitive weeds to 5 percent at the end of the period (EDAW 2004, p. 57).

## **Summary**

The first recovery criterion has not been met. Eighty percent of the polygons and 52 percent of the point localities supporting *Deinandra conjugens* are within the boundaries of the MSCP. To fully meet the first recovery criterion, occurrences of *Deinandra conjugens* identified by MSCP for preservation must be protected both from development and other identified threats. Significant progress has been made in assembly of the Preserve which will protect extant occurrences (including polygons and point localities) from future development. According to our GIS analysis, 39 percent of the polygons and 44 percent of the point localities that support *Deinandra conjugens* in the MSCP are currently in the Preserve. This is not translatable to the 66 percent of the major populations identified for conservation under the MSCP. Polygons (68 percent) and point localities (77 percent) not in the MSCP or not yet in the Preserve are still subject to development and have no management requirements.

Other significant threats from OHVs, road maintenance, and invasive nonnative plants are discussed below under Factors A and E. Several occurrences are subject to impacts from road maintenance, and although OHV impacts have been reduced since listing they still threaten some occurrences. The preservation, management, and monitoring efforts for the preserve will occur in perpetuity (USFWS 2004, p. 27). Several occurrences in the Preserve have been successfully managed for invasive nonnative plants. However, the interim duration for this management has expired and activities have ceased on all but one site. For the majority of occurrences, on-the-ground management for invasive nonnative plants has not been undertaken. A management plan for the MSCP Preserve that is expected to address long-term management of nonnative plants and OHV impacts has not been completed. Implementation of management actions in the plan will depend upon adequate funding.

2. *Permanent funding and management mechanisms that are required under the MSCP are in place and functioning.* This recovery criterion is related to listing Factor D. As a condition of permits issued under the 1997 MSCP, subarea permittees are required to have funding to manage and maintain MSCP Preserve lands.

Funding necessary to manage and maintain MSCP Preserve lands may be derived from different sources. Permanent Preserve management funding mechanisms are described in the City of Chula Vista's Subarea Plan (City of Chula Vista 2003, pp. 8.1-8.14). The City of Chula Vista will institute a Biological Enhancement Program to increase the Preserve management in the Central City. Likewise the City will establish a Preserve Management Endowment Fund for the North City area and Otay Ranch. These actions are expected to generate a perpetual annual budget of \$50,000 to \$92,000 (2002 dollars) for the City.

The City and County of San Diego have sought funding sources for their MSCP management activities. The commitment to establish a regional source of funding was made when the MSCP was approved in 1997 and is still in progress (Davis 2007, p. 3).

A county-wide initiative, TransNet Environmental Mitigation Program (TransNet), was developed in 2004. It was thought that a collaborative effort among Caltrans and Federal and State resource agencies would be more cost effective and provide better conservation value. The purpose was to serve as a source of funding for environmental mitigation associated with the MSCP in San Diego County. As part of the TransNet Program, the voters of San Diego County approved extension of a \$0.005 sales tax to fund transportation projects, including associated environmental mitigation (DiGregoria et al. 2006, p. 109). Monies were to be allocated to a Regional Habitat Conservation Fund and be available for regional habitat acquisition, management, and monitoring activities necessary to implement the MSCP and MHCP (DiGregoria et al. 2006, p. 109). Under provisions of the TransNet Environmental Mitigation Program Principle 10, the San Diego Association of Governments (SANDAG) agreed to secure funding commitments to meet long-term requirements

for implementing habitat conservation plans in the San Diego Region. A quality of life initiative to provide for regional funding has been proposed for the 2010 ballot in San Diego. In the interim, the City and County are funding MSCP out of their general funds. Lands managed by the City of Chula Vista, CDFG, USFWS, and Caltrans described in the previous section are currently funded.

## **Summary**

The second recovery criterion has not been fully met. Adequate funding mechanisms for acquisition and management of Preserve lands under the City of Chula Vista Subarea Plan appear to be assured, as well as for several other areas. Current funding the San Diego City and County portions of MSCP are derived from the general funds. As noted above, regional funding is proposed for the 2010 ballot.

3. *Established reserves (i.e., MSCP preserve lands, lands protected under other habitat conservation plans, National Wildlife Refuge lands, and State preserve lands) provide sufficient suitable habitats and space to sustain the full ecological needs of *Deinandra conjugens*. We expect those needs to include: a) connectivity to maintain natural gene flow among conserved populations, and b) sufficient habitat to maintain wild populations of native *Deinandra conjugens* pollinators.* This criterion is related to listing Factor A.

Established reserves that support *Deinandra conjugens* include: the MSCP Preserve, lands addressed by the San Diego Gas and Electric's Subregional Natural Communities Conservation Plan (NCCP), the Draft Joint Water Agencies NCCP/Habitat Conservation Subregional Plan, lands that are part of the San Diego National Wildlife Refuge, and lands that are part of the CDFG Rancho Jamul Ecological Reserve. The degree of connectivity and amount of habitat required by pollinators has yet to be determined. However, we consider these reserves to include sufficient suitable habitat and space to sustain the full ecological needs of *Deinandra conjugens* occurrences on-site.

### MSCP Preserve

Not all of the occurrences of *Deinandra conjugens* projected to be included in the reserve design have been secured. Those occurrences not yet in the Preserve are subject to the MSCPs Narrow Endemics Policy that allows for the loss of up to 20 percent of each on-site occurrence of *Deinandra conjugens*. For occurrences outside of the MHPA the City of San Diego allows impacts, but requires transplant and salvage. The instances of this and success rates are unknown. The degree to which occurrences not yet in the Preserve will facilitate connectivity among the reserves is unknown. Although not part of the MSCP, San Diego Gas and Electric and the Joint Water Agencies also have habitat conservation plans that cover this species.

### San Diego Gas and Electric's Subregional NCCP

*Deinandra conjugens* is a “covered species” under the San Diego Gas and Electric’s Subregional NCCP (SDG&E 1995). Provisions of the plan require that development of appropriate avoidance and minimization measures, which may include restoration of the site if impacts are deemed temporary rather than permanent. Under the plan, habitats will be preserved to the maximum extent practicable as will corridors connecting habitats, thereby providing for exchange of genetic material and opportunities for natural population expansion. No occurrences have as yet been identified on these lands but their conservation would be expected to contribute to connectivity among nearby reserve areas.

#### Draft Joint Water Agencies NCCP/Habitat Conservation Subregional Plan

The Draft Joint Water Agencies Natural Community Conservation Plan/Habitat Conservation Plan Subregional Plan (NCCP/HCP) proposes to conserve 49 known locations (84 percent) and 131 acres (53 hectares) of predicted habitat for *Deinandra conjugens* primarily on the south side of Sweetwater Reservoir in the Sweetwater Preserve (Joint Water Agencies 2007, pp. 4-57 –4-61). These occurrences are likely to have a degree of connectivity to nearby occurrences.

#### San Diego National Wildlife Refuge (Refuge)

An occurrence of *Deinandra conjugens* is at Mother Miguel Mountain on the Refuge. The Refuge also manages the San Miguel Ranch Otay Tarplant Preserve (also known as the Tri-mark Parcel). This 67-acre (27-hectare) parcel supports a large occurrence of *Deinandra conjugens* (Martin 2006, p. 2); see Gobbler’s Knob/Horseshoe Bend occurrence in Appendix 2. The parcel is being managed to control invasive nonnative plants (Martin 2006, p.3). Both of these occurrences likely provide a degree of connectivity to nearby occurrences.

#### CDFG’s Rancho Jamul Ecological Reserve

*Deinandra conjugens* also occurs at the CDFG’s Rancho Jamul Ecological Reserve. The extent of suitable habitat for *Deinandra conjugens* on the reserve is unknown. There is no specific management plan for the species, although there are general management efforts that benefit the species. These measures include control efforts for invasive nonnative plants and OHVs. The degree of connectivity to other occurrences would be expected to be low because the nearest other occurrence is about 4 miles (6.4 kilometers) away.

#### **Summary**

The third recovery criterion has been met. Lands in San Diego County covered by the San Diego Gas and Electric Company Subregional NCCP, the City of San Diego MSCP Subarea Plan, and the County of San Diego MSCP Subarea Plan were excluded from critical habitat designation (67 FR 76044, December 10, 2002). Each of the approved Subarea plans protects habitat essential to *Deinandra conjugens* within their

respective plan areas; these areas provided sufficient habitat and conditions to sustain the species.

The extent of ongoing gene flow across the range of established preserves has not yet been measured. The correlation between the lower pollinator visitations and degraded grasslands has not been verified to exist over several occurrences and an estimation of the impact to *Deinandra conjugens* occurrences has not been made. Quantification of sufficient habitat for pollinators has not been established. However, it is unlikely to pose a threat at most occurrences because some appear to be able to periodically sustain large numbers of plants indicating adequate pollinator services.

4. *Populations of Deinandra conjugens are stable or increasing within established reserves. As discussed by Rice (1989), seed banks typically are "more developed in annuals than in perennials" and "more extensive in forbs than in grasses." For Deinandra conjugens, an annual forb, population stability will depend on the long-term maintenance of the seed banks within each reserve. The primary factors that may threaten the long-term maintenance of Deinandra conjugens and its seed banks include reduced or failed pollination (i.e., pollinators) and fruiting, excessive seed predation, loss of genetic variability and inbreeding, and impaired seed dispersal within and potentially among reserves.* This criterion is related to listing Factors C and E. Satisfying this criterion will indicate that occurrences in reserves are extensive enough and resilient enough to persist, at least for a period of time, under current conditions.

We do not have enough information to determine whether occurrences of *Deinandra conjugens* are stable, increasing, or decreasing.

As with most annual plants, *Deinandra conjugens* often exhibits large differences in annual standing population numbers as shown in Appendix 1 and described below under Updated Information and Current Species Status. The annual expression of the population of an annual plant is likely linked to a great extent to environmental conditions, such as rainfall. Without long-term studies, determination of occurrences as stable or increasing is difficult to discriminate from natural, annual differences in standing occurrences. Another significant factor determining the standing occurrence is the status and local distribution of the seed bank. The seed bank, in turn, depends upon the balance of interdependent factors such as adequate genetic diversity of the occurrences, successful pollination, adequate seed set, seed dispersal, and seed predation.

The persistence of the species at an occurrence site is, in some measure, a sign of population stability at a site but not population growth. Population growth for this species could be evidenced by a persistent increase in standing plant densities, consistently high reproductive output, or in the amount of suitable on-site habitat that is occupied. We are not aware of any long-term monitoring studies that examine these possibilities. Likewise we are not aware of any studies documenting failed pollination frequency, seed predation, or seed dispersal. These factors could result in diminished

reproductive output and would be one cause for fewer viable seeds to be shed to the soil seed bank. There have not been adequate assessments to determine whether this recovery criterion has been met.

## Summary

The fourth recovery criterion, as described, is relevant to the species but has not been met. No adequate measures of population growth have been developed and factors affecting the seed bank have not yet been studied. However, related to this recovery criterion is the fact that based on available information, overall, occurrences of *Deinandra conjugens* have persisted at known extant preserved occurrences since the species was listed. From the standpoint of numbers of known occurrences, there are more now than there were at the time of listing. However, some occurrences have been extirpated since listing. Even assuming a correlation to numbers of plants at each of these occurrences, this does not mean that the population is increasing. In this context an increasing population implies a trend in reproductive output. With a few more occurrences now known than have been lost, the status has improved but the population is not necessarily increasing or decreasing.

*5. Criteria 3 and 4 have been assessed through monitoring over an adequate length of time to incorporate year-to-year variability associated with known variations in climate (e.g., drought, El Niño/Southern Oscillation, etc.) We anticipate a period that encompasses three drought cycles; however, this time period may change should additional scientific information on the amount of time necessary to adequately determine the population trend of Deinandra conjugens indicate otherwise. If the species is delisted, the monitoring period will be extended for an additional 5 years after the delisting, as required by the Endangered Species Act for species that are delisted due to recovery.*

The fifth recovery criterion addresses listing Factors A and E but has not yet been met. At present, no existing assessments address these issues as they relate to the status of *Deinandra conjugens*.

*6. The current status (including a threats assessment) and distribution of Deinandra conjugens have been determined in Mexico.*

This criterion has relevance to the overall status of the species. It could potentially address several listing factors. The sixth recovery criterion has not been met. Beyond prelisting references reported in the recovery plan (USFWS 2004, p. 9), the Service has no recent information regarding the status and distribution or threats to *Deinandra conjugens* in Mexico.

*7. Depending upon the results from criterion 6, dialogue should be established with Mexican governmental and nongovernmental organizations to secure protection for Deinandra conjugens in Mexico.*

The seventh recovery criterion potentially addresses Factor D, but has not been met. Although a potential framework for discussion now exists (Trilateral Commission) no proposals have been presented related to protection of *Deinandra conjugens* in Mexico.

8. *Research on several aspects of the species' biology and ecology, as detailed in the Recovery Narrative section, has been completed to adequately assess the above recovery criteria. Results should be published in readily available refereed journals. Results from this research may redirect the recovery strategy.*

The recovery plan identifies seven categories of research needs: 1) determine the population dynamics of conserved populations of *Deinandra conjugens*; 2) determine ecological requirements for the species; 3) assess and plan for conservation of genetic variability within *Deinandra conjugens*; 4) based on this research, determine the number of populations, the spatial distribution, and the amount of suitable and occupied habitat necessary to recover the species; 5) study the pollinators and their management needs; 6) develop techniques to germinate and propagate *Deinandra conjugens*; 7) develop seed storage techniques for *Deinandra conjugens* and collect seeds from all available sources (USFWS 2004, pp. 41-45).

There have been research contributions in some of these categories. Bauder et al. (2002, p. 10) determined that *Deinandra conjugens* is associated with clay and clay loam soils in the Diablo, Linne, and Olivenhain series (category 2, above). Bauder and Truesdale (2000, p. 13) describe clay content, soil pH, and soil components for two different sites that support *Deinandra conjugens* (category 2). There is a negative impact of nonnative plants on reproductive output of *Deinandra conjugens* under greenhouse conditions (Bauder et al. 2002, pp. 17-24). Bauder and Truesdale (2000, p. 22) found substantial genetic diversity within the limited number of populations they sampled and suggested conserving each remaining population (category 3). Bauder et al. (2002, pp. 32-38) included data on identification of potential pollinating insects (category 5); however, no suggestions for their management were provided. Techniques to germinate seeds in the laboratory and viability of the ray and disk achenes was studied by Bauder et al (2002, pp. 43-50) (category 6).

## **Summary**

The eighth recovery criterion has been partially met. However, most research carried out to date should be considered preliminary and requires additional work. Two categories of research have yet to be addressed. The population dynamics of *Deinandra conjugens* remains unknown. Likewise, no determinations of the amount and distribution of suitable habitat necessary to sustain this species have been made.

## **2.3. Updated Information and Current Species Status**

### **2.3.1. Biology and Habitat**

*Deinandra conjugens* is a self-incompatible annual plant in the Asteraceae (sunflower family). Basic information on the life history and biology was provided in the final listing rule (63 FR 54939, October 13, 1998) and the recovery plan for the species (USFWS 2004, pp. 5-8). Included here are topics either not included in the listing rule or for which previously there was minimal discussion. Since this species was listed, additional information on gene flow, pollinators, seed banks, and soil preferences has become available.

Since listing, data have been developed that indicate that gene flow among populations currently occurs or has occurred in the recent past. Based on relatively few polymorphic loci (genes with different forms) from plant samples from three occurrences, Bauder and Truesdale (2000, p. 30) present evidence that substantial genetic diversity resides within individual populations. They found no major effect of species distribution on the extent and structure of genetic variation in this species (Bauder and Truesdale 2000, p 30). However, these findings should be tested across a larger number of occurrences to satisfy this part of the recovery criterion. Gene flow among smaller, more isolated populations may prove to be limited.

Since listing, potential pollinators for *Deinandra conjugens* have been identified. Bees were found to be the most common putative pollinators (Bauder et al 2002, p. 32). Production of a seed bank depends, in part, on successful pollination and subsequent fruit production. Twelve potential pollinator groups were identified at two sites (Bauder et al 2002, p. 32). The frequency of all flying insect visitors was lower at a site lacking native scrub habitat in the immediate vicinity (Bauder et al 2002, p. 40). The frequency of visitation by all flying insects, including putative pollinators, was greater at a site very near coastal sage scrub habitat than at a disturbed grassland site dominated by nonnative grasses and forbs (Bauder et al. 2002, p 40). However, pollen carried by the insects was not identified to plant species. Because of the presence of a seed bank, numbers of standing plants of *Deinandra conjugens* in a given year can not be correlated to pollinator success the previous year.

Each flower of *Deinandra conjugens* and other members of the Asteraceae produce one-seeded fruits called achenes. The fruits (for this species the terms fruits and seeds are used interchangeably because of their structure) of *Deinandra* species are dimorphic (of two forms). The ray flower achenes have a thicker fruit wall and germinate later than disk flower achenes (Tanowitz et al. 1987, p. 310). This likely affects the duration of the seed bank. As seeds are produced by a plant, they are subject to several potential fates. Seeds may germinate immediately in situ, they may be dispersed to new areas, lost to predation, or shed to the soil seed bank. Seed banks are of critical concern for an annual plant including *Deinandra conjugens*. Seed banks develop when a plant produces more viable seeds than germinate in any given year, even when conditions are appropriate for germination. Seed banks contribute to the long-term persistence of a species by sustaining them through periods when conditions are not conducive to adequate germination, subsequent reproduction and replenishment of the seed bank. Annual differences in the numbers and location of standing plants are indicative of the presence

of a seed bank. Determination of the long-term stability of the seed banks of each preserve, for example, would require study of the seed bank dynamics.

The seed bank and consequently standing populations of *Deinandra conjugens* are restricted to a natural mosaic of clay-related soils in southwestern San Diego County, California. Occurrences of this species are often separated from each other by areas with less suitable habitats. Descriptions of suitable habitat, including soil preferences, may be found in the final listing rule (63 FR 54938, October 13, 1998) and the critical habitat designation (67 FR 76040, December 13, 2002). Since listing, more detailed characterizations have been made. The species is usually on soils with high clay content (generally greater than 25 percent), or clay intrusions or lenses that are associated with grasslands, open coastal sage scrub, or maritime succulent scrub communities between 80 feet (25 meters) and 1,000 feet (300 meters) elevation. These communities contain natural gaps in the shrub cover that provide habitat for *Deinandra conjugens* life-cycle and pollen and seed dispersal agents (67 FR 76040, December 10, 2002).

#### Distribution of *Deinandra conjugens*

In the listing rule the Service stated that there were 25 historical occurrences of this species in the United States near Otay Mesa in southern San Diego County, California and one in adjacent Baja California, Mexico (63 FR 54939, October 13, 1998). By the time of listing, three additional occurrences were considered extirpated, including Otay Mesa, Siempre Viva Road; State Route 54 West; and State Route 54 East (Appendix 2). The known historical range of this species was from the Mexican border north to the Jamacha area, and from Encanto and the Otay River Valley east to Rancho Jamul Ecological Reserve (USFWS 2004, p. 9). *Deinandra conjugens* exists in a series of occurrences in scattered areas of suitable habitat.

The occurrences identified in the listing rule were based on descriptions in Roberts (1997, pp. 1-9). Some of Roberts' 22 extant "occurrences" combined two or more of CNDDDB EOs into one, another EO was treated as two occurrences, and some of Roberts' occurrences had no assigned CNDDDB EO numbers. Some of this latter group were subsequently extirpated (e.g., East Otay Ranch), were merged with a nearby occurrence (e.g., Central Salt Creek), or subsequently assigned an EO number by CDFG (e.g., Spring Canyon). These alignments may be seen in Appendix 2. Currently, the Service treats most of the CNDDDB EOs as separable units. Consequently, Roberts' (1997) 22 extant "occurrences" cited in the listing rule represented 35 localities that are considered here to be included in 32 CNDDDB EOs. This evaluation does not alter their spatial distribution.

Local and regional distribution may appear to change over time. Annual differences in numbers and local distribution of standing plants may make it appear that the population of this annual plant "moves" spatially from year to year. In fact, this reflects conditions under which a different portion of the soil seed bank has produced standing plants (USFWS 2004, p. 7). Differences in survey methodologies make direct comparisons of location and conditions of occurrences over time problematic. However, general comparisons of location and conditions are possible; see Appendices 1 and 2.

Since the species was listed, an additional six occurrences are considered extirpated or likely extirpated. These are Upper Dennery Canyon, Telegraph Canyon, East of Dennery Canyon, Dennery Ranch, Eastern Otay Mesa by Border, and the northeast side Sweetwater Reservoir (Appendix 2). Some of these extirpated occurrences were likely portions of some occurrence complexes in the final listing rule that were lost in lieu of conservation of associated higher quality sites (e.g., CNDDDB EO 29). During the same period additional new occurrences were detected, as discussed below.

Since the species was listed, eight previously unknown extant occurrences have been detected (Appendices 1 and 2). In all likelihood, the occurrences detected since the listing (e.g., near Moody Canyon) represent previously undetected occurrences rather than population growth or recent dispersal events. One site is west of Moody Canyon, south of SR 905 and east of Interstate 805 (AMEC Earth and Environmental 2003, p. 6). Another previously unknown population was detected in 2001 on 2.9 acres (1.2 hectares) in Johnson Canyon (Helix Environmental Planning 2001, p. 2). An occurrence was found within the CDFG Rancho Jamul Ecological Reserve (McMillan 2002b, p. 15; McMillan 2003, p. 10). Two occurrences were detected northeast of National City in the City of San Diego Subarea. One was detected in 2001 at Paradise Valley, after last being collected there in 1936 (San Diego Museum) (McMillan 2002a, p. 23) while the other in Valencia Hills was detected in 2001 (McMillan 2002a, Appendix 1b, p. 2). The remaining three new occurrences are at Beyer Hills in the City of San Diego; and at Skyline Wesleyan Church property and Alta Road in the San Ysidro Mountains, both in unincorporated San Diego County.

The distribution of *Deinandra conjugens* has remained relatively unchanged since the listing. Although additional occurrences have been detected, there are no indications that the species has spread since listing into previously unoccupied sites. In the listing rule we indicated that there were 22 extant occurrences. Currently, the Service recognizes those as representing 32 separate occurrences. Balancing the number of occurrences lost to development since listing (six) and those detected since listing (eight), there are currently 34 extant occurrences of *Deinandra conjugens* (Appendix 1).

#### Abundance, population trends, and demographic features of *Deinandra conjugens*:

At listing, it was estimated that as many as 300,000 plants might exist under favorable conditions. It was thought that the five largest populations in 1997 collectively represented 90 percent of the known individuals. These populations included: Rancho San Miguel (CNDDDB EOs 10, 20, 32 and 33), Rice Canyon (CNDDDB EO 9), Dennery Canyon (CNDDDB EOs 6, 17, 27, 28, and 29), Poggi Canyon (EO 7, 8, and 26), and Procter Valley (EO 21 and 22) (Roberts 1997, p. 8; Appendix 1). We noted that numbers of individuals of an annual plant can differ significantly from year to year depending upon the amount and timing of rainfall and temperature and that estimating the effective population size is impossible without knowledge of the species' demography, seedbank, and seedbank dynamics (63 FR 54939, October 13, 1998).

Since listing, these difficulties were reiterated in the recovery plan (USFWS 2004, pp.7-8, 12) and expanded to state that “determination of population trends in an annual plant species is difficult due to these natural annual fluctuations in numbers of standing plants within areas of suitable habitat” (USFWS 2004, p. 7). Differences in reported population numbers for occurrences of *Deinandra conjugens* at listing and since may be seen in Appendix 1. Population estimates, based on CNDDDB occurrences variously combined by different surveyors, or different survey methodologies also make comparisons difficult.

Since listing, McMillan (2003) estimated the numbers of individuals at most of the extant occurrences, presumably using the same techniques for all sites visited. Comparing numbers of standing plants at listing to more recent counts (Appendix 1), Rice Canyon, Dennery Canyon, and Poggi Canyon reportedly supported fewer plants in 2003 than they did in 1997. It is difficult to compare plant number estimates at or prelisting with those in current or post-listing columns, because of the different groupings of occurrences made for population estimates (Appendix 1).

Fluctuations in population numbers and patterns of habitat occupancy are common and are likely associated with natural annual cycles of environmental conditions (see Appendix 1). This, coupled with the existence of a seed bank, make assessment of whether populations of the Otay tarplant are “stable” or “increasing” difficult or impossible at this time (USFWS 2004, p. 12).

#### Genetics, genetic variation, or trends in genetic variation:

Typically, *Deinandra conjugens* and most other tarplants cannot produce viable seed without cross-pollination from other individuals (i.e., they are strongly self-incompatible) (Keck 1959, p. 1117; Baldwin in litt. 2001). The particular type of self-incompatibility means that related plants that share the same alleles (different forms of a gene) at the gene loci that code for self-incompatibility are incapable of crossing to produce viable seeds.

Gene flow through pollen transfer among populations is important to the survival of plant species (Ellstrand 1992, p. 78). Gene flow in *Deinandra conjugens* is likely achieved through pollen movement within (Bauder et al. 2002, pp. 32-38) and among populations. Lack of gene flow may lead to a depletion of genetic variation (Ellstrand 1992, p. 77; Wofford et al. 2005, p. 633).

#### Taxonomic classification or changes in nomenclature:

At the time of listing in 1998, Otay tarplant was recognized as *Hemizonia conjugens*. Bruce Baldwin realigned several species previously included in *Hemizonia* based on the results of phylogenetic, biosystematic, and cytogenetic work on the tribe of the Asteraceae that includes the Otay tarplant (Baldwin 1999). Baldwin (1999, p. 468) published the currently recognized combination *Deinandra conjugens* (D.D. Keck) B.G. Baldwin. The critical habitat designation (67 FR 76030, December 10, 2002) and recovery plan (USFWS 2004) identify the species as *Deinandra conjugens*.

Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

At listing, the Service estimated that 70 percent of the suitable habitat for this species within its known range was lost to development or agriculture (63 FR 54939, October 13, 1998). The Service stated in the listing rule that about 30,310 acres (11,930 hectares) of land with suitable clay soils or clay subsoils existed within the general range of *Deinandra conjugens*. About 10,600 acres (4,200 hectares) of this was urbanized and another 10,555 acres (4,155 hectares) was heavily cultivated and grazed (63 FR 54939, October 13, 1998). This left 9,155 acres (3,705 hectares) of suitable habitat available for the plants. The distribution of this species is highly correlated with habitats that have clay soils, subsoils, or lenses (Bauder et al. 2002, p. 10).

Since listing, additional specifics regarding habitat were identified as primary constituent elements in the final rule designating critical habitat for *Deinandra conjugens* (67 FR 76040, December 10, 2002). These included soil with a high clay content (greater than 25 percent), including clay lenses or intrusions that are associated with grasslands, open coastal sage scrub, or maritime succulent scrub communities between 80 feet (25 meters) and 1,000 feet (300 meters) elevation. The associated plant communities contain natural openings that provide nesting, foraging, and dispersal sites for *Deinandra conjugens* pollinators and seed dispersal agents.

Since listing, the amount and distribution of habitat for *Deinandra conjugens* has not changed appreciably. This is taking into account the gains and losses in distribution described above in the section on distribution and shown in Appendix 1. Regarding the suitability of habitat, general threat factors for the occurrences and specific threats to the occurrences are identified in Appendices 1 and 2. The amount, distribution, and suitability of *Deinandra conjugens* habitat continue to be affected by potential development, OHV activity, and invasive nonnative plants. These threats are attributed, where possible, for individual occurrences in Appendix 2 and are discussed under the appropriate factors in the Five-Factor Analysis below.

**2.3.2. Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)**

Detailed accounts of threats attributable to each of the five listing factors at the time of listing may be found in the 1998 listing rule (63 FR 54938, October 13, 1998). Additional information is in the 2002 final rule designating critical habitat (67 FR 76030, December 10, 2002) and our recovery plan (USFWS 2004). Threats and conservation status attributable to individual occurrences of *Deinandra conjugens* at the time of listing and currently are outlined in Appendices 1 and 2.

**2.3.2.1. Factor A: Present or threatened destruction, modification or curtailment of its habitat or range:**

The 1998 listing rule (63 FR 54945, October 13, 1998) states under Factor A that potentially suitable habitat for *Deinandra conjugens* had been cleared for agriculture and urbanization. Ongoing threats identified at the time of listing included development and secondary effects of development such as invasive nonnative plants replacing native flora, habitat isolation, and fragmentation. The listing rule also identified utilities, roads, OHV activity, and Border Patrol activities (OHVs) as threats. The rule stated that occurrences conserved under the MSCP may be affected by Federal and State activities not subject to the MSCP, including OHV activity, Caltrans projects (State Routes 125 and 905), border fencing, Border Patrol facilities, and airport expansion (63 FR 54949, October 13, 1998).

In the discussion below, threats are arranged by those related directly and indirectly with urbanization, including development, road construction and maintenance; utility construction, maintenance, and access; Caltrans projects; OHV impacts; Border Patrol activities; habitat fragmentation, and agricultural activities. Impacts from invasive nonnative plants are also discussed below under Factor E. Supposed threats from airport expansion have not been documented since the listing and will not be discussed further.

Urbanization including direct and indirect impacts from development, road construction and maintenance, utility construction, maintenance, and access, and Caltrans projects.

Prior to listing and since listing, development of areas supporting *Deinandra conjugens* has occurred. The impacts from approved developments were not considered to jeopardize *Deinandra conjugens*. Since listing, habitat loss has generally been accompanied by permanent habitat protection and management efforts. Habitat losses associated with individual occurrences of *Deinandra conjugens* (Appendix 2) diminish each of those occurrences and may contribute to the further fragmentation of the species habitat and the isolation of the remaining areas. This likely affects all of the occurrences, but more so, those more isolated from adjacent occurrences. Further isolation of remaining habitat and reduction in the size of some occurrences may pose a cumulative threat to the species.

Several of the occurrences known at the time of listing have been impacted by development and agricultural activities (67 FR 76032, December 10, 2002; Appendix 1). However, these impacts have not extirpated the species in any portions of the range. For example, although portions of two large occurrences at Rancho San Miguel and Procter Valley and some occurrences associated with Dennery Canyon have been lost to development, the remaining occupied areas are protected from development as MSCP Preserve or as part of the San Diego National Wildlife Refuge.

Impacts associated with approved development are usually associated with preservation of the remaining portions of these occurrences. For example, for Rancho San Miguel, approximately 31 percent of the on-site occupied habitat supporting 30

percent of the on-site population in 1998 was considered preserved, while the remaining 69 percent was lost to development and infrastructure (Merkel & Associates, Inc. 1999, p. 9). Because of the documented differences in the on-site numbers and location of plants from year to year, it may not be known whether or not the final Preserve captures the intended proportion of the on-site population of *Deinandra conjugens*.

Loss of habitat and plants due to urbanization threatens 18 of the 34 extant occurrences of *Deinandra conjugens* (Appendix 2). At least two of these occurrences, not in the MSCP Preserve, the planning area, or an Amendment Area, and not covered by another HCP, are threatened by development. These occurrences are a portion of Telegraph Canyon (CNDDDB EO 7) that is on the south side of Poggi Canyon and northeast end of the County landfill property, and the occurrence at Rock Mountain (CNDDDB EO 14) (McNeeley in litt. 2007, p. 1). Areas in the planning area are those preferred for inclusion in the MSCP Preserve.

Although occurrences of *Deinandra conjugens* in the planning area but not yet in the Preserve are expected to be preserved there may be some habitat loss associated with their development (see Appendix 1). *Deinandra conjugens* is also considered a Narrow Endemic Plant under the MSCP, and provisions of the Biological Mitigation Ordinance apply (County of San Diego, Biological Mitigation Ordinance 1997, p. 10). These documents state that where complete avoidance of populations of a narrow endemic plant is not feasible; encroachment may be authorized depending upon the sensitivity of the individual species and the size of the population. Encroachment cannot exceed 20 percent of the population on-site. Thirteen of the above 18 occurrences are in the planning area and are subject to some loss of habitat (to include up to 20 percent of an on-site population) due to development. In other words, up to 20 percent of any population in an occurrence that is in the planning area but not yet in the preserve could be lost to development or other activities that result in loss of habitat. These potential losses could apply to occurrences such as Otay Valley (CNDDDB EO 12), Wolf Canyon (CNDDDB EO 13), Spring Canyon (CNDDDB EO 39), and Otay Mesa near Siempre Viva Road (CNDDDB EO 11) (see Appendix 1). Occurrences in MSCP Amendment Areas are also subject to development and loss of habitat. However, project proposals require concurrence from USFWS. These Amendment Areas include part of an occurrence in Proctor Valley (CNDDDB EO 22) and two occurrences in the San Ysidro Mountains (CNDDDB EO 5 and 36).

Periodic grading and scraping to maintain accessibility and reduce fuel loads of permanent access roads and utility lines poses an ongoing threat to 17 of the 34 occurrences of *Deinandra conjugens* (Appendix 2). These components of infrastructure are likely to be permanent impacts. McMillan (2003, pp. 1-10) states that access-road maintenance poses a threat to *Deinandra conjugens* occurrences at Sweetwater Reservoir, upper Otay Valley east of Dennery Canyon, Wolf Canyon, Salt Creek, Dennery Ranch, Proctor Valley, slopes of Mother Miguel Mountain, Rancho Jamul, and Paradise Valley. Areas for which the Service has information that road maintenance is currently a threat include Wolf Canyon, Rock Mountain, Otay Valley

east end, Otay Valley Road east of river crossing, Salt Creek, and Rolling Hills Ranch (McNeeley in litt. 2007, p. 1); see also Appendix 2.

The magnitude of the threat from loss of habitat due to development is lower than it was at the time of listing. However, as approved development continues, and occurrence areas are partially lost to development, fragmentation and isolation of habitat remnants increases. Although losses of plants and habitat were anticipated and accepted as part of the development process that resulted in lands being added to the MSCP Preserve, the cumulative impacts of habitat fragmentation have yet to be determined. A potential threat associated with agricultural development persists near at least one of the occurrences (Skyline Wesleyan Church Property, EO 38) in the form of discing of habitat (see Appendix 2).

Urbanization and OHV activity contribute to habitat fragmentation, which in turn impacts the species. In a study of habitat fragmentation, often due to development, Soule et al. (1992, pp. 41, 43) document the reduction of plant species diversity and proportion of native plant cover in habitat fragments in San Diego County over time. They also report that the number of native plant taxa decreases and the number of nonnative ornamental species increases with time since the habitat was isolated. In what may be considered an edge effect (see Appendix 2), this trend is accelerated where the perimeter of the habitat fragment is longer (Alberts et al. 1993, p. 106). Examples of occurrences likely susceptible to these threats include Bonita/Long Canyon (CNDDDB EO 1), Rice Canyon (CNDDDB EO 9), Paradise Valley, and Valencia Hills (Appendix 2). This topic, as it related to invasive nonnative plants, is further discussed below under Factor E.

#### Off-Highway Vehicles (OHVs)

Generally, impacts from OHVs include crushing of standing plants and seedlings, soil compression, and creation of ruts that alter water retention patterns. OHV impacts contribute to local habitat fragmentation and serve as invasion routes for nonnative species.

In the final listing rule, the Service stated that OHVs had affected several populations of *Deinandra conjugens* on Otay Mesa (63 FR 54946, October 13, 1998). Since the listing, McMillan (2003, pp. 1-10) visited nearly all known occurrences of *Deinandra conjugens*. He noted numbers of plants and conditions at the occurrences he visited and that OHVs threatened 11 of the currently recognized 34 occurrences (McMillan 2003, pp. 1-10) (Appendix 2). Threats from OHVs persist for at least 7 of the currently recognized 34 occurrences. A recent increase in OHV activity threatens the occurrence near the road in Proctor Valley (EO 22) (Martin 2007), but significant efforts are being made to reduce impacts to the area (Martin 2007; Miller 2007, p. 1). A portion of the Gobblers Knob/Horseshoe Bend occurrence (EO 20) called the Rancho San Miguel Otay Tarplant Preserve is still threatened by OHV activity (USFWS 2004, p. 20; Martin 2007). Likewise an area on Refuge land southwest of the Skyline Wesleyan Church property (CNDDDB EO 38) is threatened by OHV

activity (Martin 2007, p. 1). Dillingham (2007, p. 1) stated that OHVs still impact the Rancho Jamul Ecological Reserve. Border Patrol activities in the form of OHV use persists at several occurrences noted in Appendix 2.

Efforts are being made to control OHV activity in some areas. For example, OHV activity near vernal pools at Dennery Canyon in the City of San Diego Subarea has ceased with installation of post and cable barriers. Threats from OHVs have been reduced at *Deinandra conjugens* occurrences in the City of Chula Vista (e.g., Rice Canyon CNDDDB EO 9, Gobbler's Knob/Horseshoe Bend CNDDDB EO 20) (McNeeley in litt. 2007, p. 1). The level of OHV activity at occurrences associated with the Otay Valley Regional Park has been reduced due to monitoring by Park Rangers at Otay Valley Regional Park (CNDDDB EO 4) (McNeeley in litt. 2007, p. 1), Upper Otay Valley (CNDDDB EO 12), Otay Valley east end (CNDDDB EO 15), and Otay Valley Road (CNDDDB EO 16) (McNeeley in litt. 2007, p. 1) (Appendix 2).

The magnitude of threat from OHVs is less than it was at the time of listing. However, OHVs still pose a threat to several occurrences. Impacts from OHVs are expected to decrease as management activities of the Refuge and Subarea Plans under the MSCP are fully implemented.

### Summary

*Deinandra conjugens* continues to be threatened by urbanization and associated activities. Of the 34 currently recognized extant occurrences, 18 are threatened directly or indirectly by potential development, including 13 occurrences in the planning area, and it is likely that all occurrences are threatened by fragmentation even as preservation continues. A total of 17 occurrences are threatened by maintenance activities, associated with access roads and utilities, and OHV activity is considered a threat at 7 occurrences. The magnitude of these threats has diminished since the listing. However, these threats are not considered to be alleviated at this time. This should be accomplished upon full implementation of the MSCP and its subarea plans as well as other HCPs in the region.

#### **2.3.2.2. Factor B: Overutilization for commercial, recreational, scientific, or educational purposes:**

The listing rule identified vandalism and/or collection as potential threats attributable to this factor. However, we have no information to indicate that these are threats to *Deinandra conjugens*.

#### **2.3.2.3. Factor C: Disease or predation:**

The listing rule (63 FR 54947) did not identify a threat from disease for this species and stated that predation was not known to be a threat. Consistent with the final listing rule, this factor is considered not applicable at this time. It is not known to what extent satisfaction of recovery criterion 4, noted above (regarding maintenance

of stable or increasing populations of *Deinandra conjugens* within established reserves), would affect potential threats attributed to this factor.

#### **2.3.2.4. Factor D: Inadequacy of existing regulatory mechanisms:**

In the final listing rule (63 FR 54947-54950, October 13, 1998), regulatory mechanisms thought to have some potential to protect *Deinandra conjugens* included: (1) the Endangered Species Act in cases where the species occurs in habitat occupied by a listed wildlife species and is consequently incidentally protected there; (2) conservation provisions of the Federal Clean Water Act; (3) listing under the California Endangered Species Act (CESA); (4) the California Environmental Quality Act (CEQA); (5) implementation of conservation plans pursuant to the California NCCP program; (6) land acquisition and management by Federal, State, or local agencies or by private groups and organizations; (7) local laws and regulations; and (8) enforcement of Mexican laws.

In the final listing rule, we noted that the Endangered Species Act has the potential to protect *Deinandra conjugens* where it occurs with other listed species such as the coastal California gnatcatcher (*Polioptila californica californica*); however, the local ranges are not coincident to a great degree. The Clean Water Act is unlikely to afford much protection because *Deinandra conjugens* does not occur in habitat subject to U.S. Army Corps of Engineers (Corps) jurisdiction. The California Endangered Species Act, under which *Deinandra conjugens* was listed as endangered in 1979, prohibits take of State-listed plants except with a 2081(b) permit, or if take is incidental to agricultural operations. The California Environmental Quality Act requires disclosure of potential environmental impacts and a determination of “significant” if a project has the potential to reduce the number or restrict the range of a rare or endangered plant or animal; however, projects may move forward if there is a statement of overriding consideration. Regional planning efforts such as the San Diego MSCP and other NCCP efforts under which *Deinandra conjugens* is a covered species were expected to adequately conserve 9 of the 12 major occurrences including 35 percent of the plants known at the time, and avoid and minimize impacts to others; transportation projects, however, were not considered to be subject to MSCP. Land acquisition and management under MSCP was expected to benefit the 9 occurrences of *Deinandra conjugens*. Development projects continued to be approved under local laws, regulations, and ordinances.

Current analyses of some of the regulatory mechanisms with the potential to protect *Deinandra conjugens* are in agreement with those in the listing rule. Since listing, the Service is not aware of any projects that have proceeded under CESA or CEQA due to a statement of overriding consideration. There has been significant conservation progress achieved under the regional MSCP. However, development under local laws, regulations, and ordinances likely still occurs outside those areas covered by the MSCP Subarea plans or other HCPs.

Since listing, about 117,000 acres (47,350 hectares) or 68 percent of the acreage

targeted by MSCP for conservation have been added to the MSCP Preserve (City of San Diego 2006). Areas of the planning area included in MSCP Preserve do not always include *Deinandra conjugens* occurrences. Currently 282 acres (114 hectares) (39 percent) of the 717 acres (287 hectares) of *Deinandra conjugens* polygons and 183 (44 percent) of the 417 point localities are within preserved lands. This includes the City of Chula Vista's Subarea Plan, signed since the species was listed. Habitat in the Preserve is considered permanently protected from loss due to development.

*Deinandra conjugens* is afforded additional protection because it is considered a Narrow Endemic Plant under the MSCP, and provisions of the Biological Mitigation Ordinance apply (County of San Diego, Biological Mitigation Ordinance 1997, p. 10). These documents stipulate that where complete avoidance of populations of a narrow endemic plant on County lands is not feasible at least 80 % must be avoided depending upon the sensitivity of the individual species and the size of the population. Encroachment cannot exceed 20 percent of the population on-site.

We consider the regulatory mechanisms associated with the MSCP to be adequate, although 16 of the 34 currently extant occurrences of *Deinandra conjugens* identified in Appendix 2 face threats associated with the current lack of a management plan for the Preserve lands and permanent long-term regional funding to support the management and acquisition activities of MSCP.

Control of invasive nonnative plants was successful at some occurrences (e.g., Dennery Canyon), though there is no plan to carry out these programs range-wide after the 5-year management terms have expired. The MSCP calls for permanent protection and management to allow for recovery of covered species (USFWS 1998, p. 62). The Implementing Agreement for the San Diego area MSCP includes requirements for a preserve management program (Section 10.10) as well as for long term regional funding (Section 11.2.C) (County of San Diego 1998, pp. 31-33). To date these requirements have been funded through the general fund of the City of San Diego and County of San Diego. The other operative subarea, the City of Chula Vista's Subarea Plan, signed since the listing, includes management and funding measures.

The Draft Joint Water Agencies Natural Community Conservation Plan/Habitat Conservation Plan Subregional Plan (JWA NCCP/HCP) proposes to conserve 49 known locations (84 percent) and 131 acres (53 hectares) of predicted habitat for *Deinandra conjugens* primarily on the south side of Sweetwater Reservoir in the Sweetwater Preserve (Joint Water Agencies 2007, pp. 4-57 – 4-61). Conservation measures include habitat enhancement, control of edge effects, enhancement of conserved populations, restoration of damaged populations, implementation of fire management plans, and provision for genetic exchange through habitat connectivity. The need for control of invasive nonnative plants was not addressed in the plan.

### Summary

The regulatory mechanisms where applicable are considered adequate as are those associated with the MSCP. However, certain threats addressed elsewhere in this review are associated with lack of full implementation of the MSCP. When a management plan for the MSCP that addresses control of nonnative plants is prepared and implemented, and permanent regional funding is in place to support management the MSCP, three requirements will be met. First, requirements of the Implementing Agreement; second, the MSCP may be considered an adequate regulatory mechanism for the conservation of *Deinandra conjugens*; and third, the second recovery criterion will be satisfied (permanent funding and management mechanisms required under the MSCP are in place and functioning).

#### **2.3.2.5. Factor E: Other natural or manmade factors affecting its continued existence:**

The final listing rule (63 FR 54950, October 13, 1998) included as threats local extinction because of the inability to recolonize areas due to dispersal barriers. Invasive nonnative plants were said to depress populations of the species. Since listing we have no data on the seed dispersal mechanisms, colonization patterns or specific dispersal barriers for *Deinandra conjugens*. Therefore, these will not be discussed further.

Since listing, we have considerably more information on the biological and landscape impacts of invasive nonnative plants. Apart from loss of suitable habitat, invasive nonnative plants have been identified as the most widespread significant threat to this species, affecting all of the known occurrences (McMillan 2003, pp.1-10; USFWS 2004, pp. 13-17, 21; McNeeley in litt. 2007, p. 1; Hanely in litt. 2007, p. 1; Miller 2007, p. 1; Doderer 2007, p. 1; see Appendix 2).

It has been suggested that seed production in *Deinandra conjugens* may be reduced as a result of competition from invasive nonnative plants (Bauder et al. 2002, pp. 20, 40; Martin 2006, p. 13; USFWS 2005b). Morey (1994) attributed depression of *Deinandra conjugens* population numbers to presence of dense populations of nonnative species at the Rice Canyon. At this site McMillan (2003, p. 5) reported that populations [of *Deinandra conjugens*] continued to decline in area and in density as nonnative plant cover had increased. Native plant species were hardly visible because of the presence of weeds prior to a restoration effort in Dennery Canyon (RECON 2005, p. 35).

Diminishment of the soil seed bank on lands managed by the San Diego National Wildlife Refuge was attributed to the possible long-term suppression of the standing populations of *Deinandra conjugens* by invasive nonnative plants in the area (USFWS 2005b; Martin 2006, p. 13). Reproductive output was greater in this species when plants were free from nonnative plants. Based on field observations and greenhouse experiments, invasive nonnative plants likely diminish input of seeds to the *Deinandra conjugens* soil seed bank.

In greenhouse experiments, *Deinandra conjugens* grown with high densities of

*Centaurea melitensis* (star thistle or tecolote; a known weedy competitor) exhibited significant reductions in dry plant biomass, height, number of branches, and numbers of inflorescences (Bauder et al. 2002, p. 17; Griffin and Brubaker 2004, p. 8). Plants were shorter and produced 97 percent fewer inflorescences under conditions where competitors were present (Bauder et al. 2002, p. 20). Based on flower numbers per head, this would result in a similar reduction in the percentage of seeds produced. Fewer seeds are likely available for dispersal and/or deposition to the seed bank under conditions where competitive plants are present. This could prove to be a substantial threat to smaller populations.

To alleviate this threat, suppression of invasive nonnative plants has been undertaken at some occurrences and is considered to be effective. However, management and restoration efforts implemented to control invasive nonnative plants in Dennery Canyon (RECON 2005, p. 25) were suspended in 2003 after the 5-year requirement had expired (Dodero 2007, p. 1). Efforts in Wolf Canyon have likewise ceased 5 years after its initiation in 1999 (Dodero 2007, p. 1). More recently, a habitat management plan that includes management of invasive nonnative plants for Bonita Meadows Otay tarplant preservation area has been adopted (EDAW 2004).

The San Diego National Wildlife Refuge (Refuge) manages the San Miguel Ranch Tarplant Preserve (Tri-mark Parcel) that is part of the MSCP Preserve (Martin 2006, p. 2). A Stipulated Settlement Agreement with the California Native Plant Society and the Center for Biological Diversity in 2000 established management and monitoring for Otay tarplant habitat lands on the Tri-mark parcel for an initial 5-year period, including target levels for invasive perennial and annual plants such as *Brassica* spp. (mustard) and *Centaurea melitensis*. The Refuge has used post-germination herbicide treatments to selectively kill seedlings of the invasives. Although December 2005 was the end of the 5-year period, the Refuge continued to conduct restoration on the site (Martin 2006, p. 3). Between 2005 and 2006 the acreage occupied by *Deinandra conjugens* increased from 1 acre (0.4 hectare) to 6.2 acres (2.5 hectares) (Martin 2006, p. 6). Plants were found in areas not seen to be occupied since 2003. This may indicate the effectiveness of the targeted control of invasive nonnative plants. Mapping of Otay tarplant in 2001, 2003, 2004, and 2005 using GPS suggests that the Otay tarplant may have been suppressed by weeds on the Refuge for so long that the tarplant seed bank has been diminished. Therefore, mortality to tarplant in this area due to application of a pre-emergent herbicide was likely low (USFWS 2005b). This treatment was reserved for a single central area of the Tri-mark parcel considered devoid of tarplant.

Only one of four management programs that controlled invasive nonnative plants has continued (that administered by the San Diego National Wildlife Refuge), two have ended, and no annual reports have been received by the other. It is expected that the adaptive management plan, once developed and implemented, will include provisions for monitoring the extent and effectiveness of management programs and practices designed to reduce or eliminate the impacts of invasive nonnative plants to *Deinandra conjugens* (Winchell pers. comm. 2007). Currently, the majority of known

occurrences of *Deinandra conjugens* receive no protective management for invasive nonnative plants (Appendix 2).

### Summary

Populations of *Deinandra conjugens* may occur in areas dominated by nonnative plants. However, invasive, nonnative plants continue to be recognized as a widespread threat to *Deinandra conjugens*, impacting each of the 34 extant occurrences, the entire range of the species (Appendix 2). Populations of *Deinandra conjugens* decline in areas where there are increases in nonnative plants (McMillan 2003, p. 5). Since listing, the mechanisms of suppression of *Deinandra conjugens* by invasive, nonnative plants have been demonstrated experimentally and validated by effective management activities in the field. Of four management programs for invasive, nonnative plants only one is known to be ongoing. Although the MSCP's Adaptive Management Plan is expected to address management of invasive nonnative plants, it is not yet completed and permanent funding is not yet secured to maintain the management activities. Invasive, nonnative plants are now and will continue to be a range-wide threat to *Deinandra conjugens*, but this issue will be addressed when the Adaptive Management Plan for MSCP is developed, implemented, and supported by permanent funding.

## **2.4. Synthesis**

The overall status of *Deinandra conjugens* is better than it was at the time of listing in 1998. Significant amounts of habitat for the species have been included within the MSCP Preserve and other conserved areas and are thus protected from development. Eight new occurrences have been detected since listing, nine occurrences have been extirpated, and several have been diminished since listing. The potential for considering a recommendation for delisting this species within the next 5 years is high. It is expected that provisions of the MSCP (e.g. the MSCP Preserve, the Narrow Endemics Policy, and the Adaptive Management Plan) when complete or implemented with permanent funding, *Deinandra conjugens* may no longer be at risk of becoming endangered in the near future. By this measure we will be able to consider a recommendation to remove this species from the Federal list of endangered and threatened species.

Although more than half of the targeted acreage of occupied habitat is in the MSCP Preserve, this acreage does not include all of the targeted *Deinandra conjugens* occurrences. Currently only 39 percent of the polygons and 44 percent of the point localities in the MSCP that support *Deinandra conjugens* are in the MSCP Preserve. Polygons (68 percent) and point localities (77 percent) not in the MSCP or not yet in the MSCP Preserve are subject to development and have no management requirements. Eighteen of the 34 extant occurrences, including 13 in the planning area, are threatened by development; however, as a species covered under the Narrow Endemics Policy, 80 percent of each occurrence must be preserved. This will ensure preservation of occurrences across the range of the species. Of the 34 occurrences, 17 are threatened by maintenance activities associated with access roads and utilities, and 7 have been impacted from OHVs. Since *Deinandra conjugens* was listed, the

nature and magnitude of impacts from competition with invasive nonnative plants has been demonstrated by research and field observations. The impacts from invasive nonnative plants are range-wide, being noted at all 34 of the extant occurrences. Although short-term management measures for invasive nonnative plants have been effective in some locations, only in one instance is management still active. Completion of the Preserve to include *Deinandra conjugens* occurrences and securing permanent funding for, and implementation of an Adaptive Management Plan to control invasive nonnative plants will allow the Service to consider delisting this species within the next 5 years. During that time we plan to compile available information on site-specific threats and conditions and the status of *Deinandra conjugens* at each of the known occurrences. This will be accomplished, in part, by monitoring efforts by the Service and our partners.

Although significant conservation has been achieved, currently *Deinandra conjugens* remains at risk of becoming endangered due to ongoing threats, described above, throughout its narrow geographical and ecological range. Therefore, we recommend that the status of *Deinandra conjugens* as threatened remain unchanged at this time.

### **3. RESULTS**

#### **3.1. Recommended Classification**

No change is needed. Though this species still faces loss and degradation of habitat, protection is afforded from development at sites within the MSCP Preserve. Some of the MSCP goals for *Deinandra conjugens* have not yet been achieved and the species also faces threats from invasive nonnative plants and OHVs.

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

**3.2. New Recovery Priority Number** 8C

This new recovery priority number indicates that the species faces a moderate degree of threat and has a high potential for recovery. This species has received considerable conservation attention and much occupied habitat is protected from development. However, other areas of occupied habitat identified for conservation have not been added to the preserve and the management plan is not in place to ensure control of invasive plants as needed. In addition, threats from development and OHVs persist in unprotected sites. Invasive nonnative plants are essentially a range-wide threat; however, the potential for recovery is bolstered by the fact that effective management methods of nonnative plants have been identified and field tested.

**4. RECOMMENDATIONS FOR FUTURE ACTIONS**

- 1) Implement and fully fund a management plan for the MSCP Preserve that includes adequate provisions for management of invasive, nonnative plants.
- 2) Encourage permit holders to complete the MSCP Preserve on private lands, to include the targeted *Deinandra conjugens* occurrences, by identifying opportunities through the Service's Partners Program.
- 3) Develop, implement, and monitor effective invasive species management actions for all conserved occurrences of *Deinandra conjugens*.
- 4) Reevaluate recovery criteria for this species to incorporate meaningful measures of the degree to which recovery has been achieved.
- 5) Identify and monitor measures for indicating species status that are separable or insulated from natural annual population expressions.

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Appendix 1. *Deinandra conjugens* Occurrences 2007

Number	Occurrence Name	CNDDB Element Occurrence Number (EO)	Current Conservation Status (3)	Condition at or pre-listing (1)		Current or post-listing condition (2)				
				Plant Estimate (EO numbers) (4)	Threat Factors	Highest # Post-listing (EO numbers) (5)	Year	Threat Factors (6)	Year (7)	Occurrence Extant (8)
1	Bonita/Long Canyon	1	MSCP Preserve; CCV Subarea	2,000	A	5,000	2003	A, E	2003, 2007	yes
2	Sweetwater Reservoir, N side	3	MHPA	2,000	A	50,000 (3, 33, 35)	2003	A, D, E	2003	yes
3	Otay Valley Regional Park	4	MSCP Preserve; City SD Subarea	4000 (4, 12)	A	no estimate	none	A, D, E	2007	yes
4	San Ysidro Mtns., W edge	5 (incl 31)	MSCP Amendment Area; County SD Subarea	<1,000	A, E	500 (5, 30, 31)	2003	A, D, E	2007	yes
5	Dennery Canyon, upper	6	part MSCP Preserve; City SD Subarea	15,000 (6, 17, 27, 28, 29)	A	5,000 (6, 17)	2003	A, D, E	2003, 2007	No
6	Telegraph Canyon, N of Poggi Canyon	7	none; CCV Subarea	11,000 (7, 8, 26)	A	275,000 (7, 8, 26)	2004	A, E	2007	No
7	Poggi Canyon N side	8	CCV Preserve	11,000 (7, 8, 26)	A	10,000 (7, 8, 26)	2003	A, E	2003, 2007	yes
8	Rice Canyon	9	CCV Preserve	50,000 (9 south, 9 north)	A	25,000	2003	A, E	2007	yes
9	East Bonita	10	none	196,000 (10, 20, 32, 33)	A	50,000 (10,20,23)	2003	A, E	2003	yes

10	Otay Mesa, Siempre Viva Rd.	11	none (extirpated?)	<1,000	A	no plants found	2003	A, D, E	2003, 2007	No
11	Upper Otay Valley	12	MHPA	4000 (4, 12)	A	10,000 (12, 14, 15, 16)	2003	A, D, E	2003, 2007	Yes
12	Wolf Canyon	13	MHPA; CCV Subarea	4,000 (13, 14)	A	50,000	2003	A, D, E	2007	Yes
13	Rock Mountain	14	none; CCV Subarea	4,000 (13, 14)	A	10,000 (12, 14, 15, 16)	2003	A, E	2007	Yes
14	Otay Valley, E end	15	CCV Preserve	<1,000	A	10,000 (12, 14, 15, 16)	2003	A, E	2003, 2007	Yes
15	Otay Valley Rd., E of river crossing	16	none; CCV Subarea	<1,000	A	10,000 (12, 14, 15, 16)	2003	A, D, E	2007	Yes
16	Dennery Canyon, E of	17	none (extirpated); City SD Subarea	15,000 (6, 17, 27, 28, 29)	A	5,000 (6, 17)	2003	N/A	N/A	No
17	Salt Creek	18	MHPA; CCV Subarea	1,000 & <1,000	A	no estimate	N/A	A, D, E	2007	Yes
18	Rolling Hills Ranch	19	MHPA; CCV Subarea	<1,000	A	50,000 (19, 21, 22)	2003	A, D, E	2003	Yes
19	Gobbler's Knob/Horseshoe Bend	20 (incl 23)	none & MSCP Preserve	196,000 (10, 20, 32, 33)	A	50,000 (19, 21, 22)	2003	A, E	2007	Yes
20	Proctor Valley (Bella Lago)	21	MSCP Preserve	10,000 (21, 22)	A	50,000 (19, 21, 22)	2003	A, E	2003	Yes
21	Proctor Valley, NE Upper Otay Reservoir	22	MSCP Amendment Area	10,000 (21, 22)	A	50,000 (19, 21, 22)	2003	A, D, E	2003, 2007	Yes
22	State Route 54 South	24	none	extirpated	A	N/A	N/A	N/A	N/A	No
23	State Route 54 North	25	none	extirpated	A	N/A	N/A	N/A	N/A	No
24	Poggi Canyon S side	26	MHPA	11,000 (7, 8, 26)	A	10,000 (7, 8, 26)	2003	A, E	2007	Yes
25	Dennery Canyon, North	27	most extirpated	15,000 (6, 17, 27, 28, 29)	A	5,000 (27, 28, 29)	2003	A, D, E	2003	Yes

26	Dennerly Canyon, South	28	most MSCP Preserve	15,000 (6, 17, 27, 28, 29)	A	5,000 (27, 28, 29)	2003	A, D, E	2003	Yes
27	Dennerly Ranch	29	extirpated since listing	15,000 (6, 17, 27, 28, 29)	A	5,000 (27, 28, 29)	2003	A, E	2003	No
28	Eastern Otay Mesa	30	MSCP Amendment Area	<1,000	A	extirpated	2003	A, D	2003	No
29	Mother Miguel Mountain	32	MSCP Preserve	196,000 (10, 20, 32, 33)	A	N/A	N/A	A, E	2006	Yes
30	Sweetwater Reservoir, SE side	33	Some MSCP Preserve; some MHPA	196,000 (10, 20, 32, 33)	A	50,000 (3, 33, 35)	2003	A, D, E	2003	Yes
31	Otay Water District	34	none	<1,000	A	N/A	N/A	A, D, E	2003	Yes
32	San Diego National Wildlife Refuge N	35	SDNWR	2,000	A	50,000 (3, 33, 35)	2003	E	2006	Yes
33	San Ysidro Mtns, Alta Rd.	36	MSCP Amendment Area	not known at listing	N/A	N/A	N/A	A, D, E	2007	Yes
34	Johnson Canyon	37	MSCP Preserve & Amendment Area	not known at listing	N/A	N/A	N/A	A, D, E	2007	Yes
35	Skyline Wesleyan	38	SDNWR & none	not known at listing	N/A	N/A	N/A	A, E	2006	Yes
36	Spring Canyon	39	MHPA & none; City SD Subarea	5,000 (no EO #)	A	N/A	N/A	A, D	2007	Yes
37	E. Otay Ranch	N/A	none; CCV Subarea	<1,000 (no EO #)	A	N/A	N/A	A, D, E	2007	Yes
38	Sweetwater Reservoir NE side	N/A	none	<1,000; (no EO #)	?	N/A	N/A	N/A	N/A	No
39	Rancho Jamul	N/A	CDFG; County SD Subarea	not known at listing	N/A	2,000	2002	A, E	2003, 2007	Yes
40	W of Moody Canyon	N/A	MSCP Preserve; City SD Subarea	not known at listing	N/A	1,348,000	2003	A, D, E	2007?	Yes

41	Beyer Hills	N/A	MSCP MHPA	not known at listing	N/A	N/A	N/A	A, D, E	2004	Yes
42	Paradise Valley	N/A	MSCP Preserve; City SD Subarea	not known at listing	N/A	500	2002	A, D, E	N/A	Yes
43	Valencia	N/A	MSCP Preserve; City SD Subarea	not known at listing	N/A	N/A	2002	A, D, E	N/A	Yes

Notes:

1. Information used in listing rule
2. Most current information available
3. Afforded conservation and MSCP Subarea designation
4. Estimated number of plants at the occurrence at the time of listing; EO numbers combined in the estimate
5. Highest number of plants reported for the occurrence or combined occurrences; EO numbers combined in the estimate (same entry repeated under each of the included EO numbers here)
6. Factor to which current threats are ascribed
7. Year(s) of source for current threats
8. Is most of the occurrence, as currently understood, considered extant?

Appendix 2. *Deinandra conjugens* occurrences status 2008

OCCURRENCE (1)	KNOWN AT LISTING (2)	CURRENT THREATS (3)	CURRENT CONSERVATION (4)
<b>Bonita/Long Canyon</b>  EO 1	Long Canyon; not in MHPA; major population (Roberts 1997, p. 7).	<u>Factor A:</u> OHV activity (McMillan 2003, p. 1).  <u>Factor E:</u> Invasive nonnative plants (McMillan 2003; McNeeley 2007, p. 1).	In CCV Subarea. Occurrence polygon partly in MSCP Preserve, the remainder is extirpated. There was a Section 6 Grant to the State to implement weed control.
<b>Sweetwater Reservoir NW side</b>  EO 3	North Shore Sweetwater Lake. Includes the occurrence identified as E. Sweetwater Reservoir but lacking a CNDDDB number; in MHPA; major population (Roberts 1997, p. 7).	<u>Factor A:</u> maintenance of access roads, firebreaks; trail activity (McMillan 2003, p. 1; includes EO 33 & 35). Development  <u>Factor D:</u> There is no management requirement for occurrences in the MHPA.  <u>Factor E:</u> Invasive nonnative plants (McMillan 2003, p. 1; includes EO 33 & 35).	In MHPA but not in Preserve. Joint Water Agencies Draft NCCP/HCP Subregional Plan (2007) proposes to conserve 49 known point locations (84 percent) and 131 acres (53 ha) (82 percent) of predicted habitat within the study area that includes CNDDDB EO 33.
<b>Otay Valley Regional Park</b>  EO 4:	Otay River Valley (EO 4, 12) occurrence imprecisely located; most in MHPA; part of a major population (Roberts 1997, p. 7).	<u>Factor A:</u> Afforded some protection from OHVs by monitoring of Park lands; still road maintenance (McNeeley 2007, p. 1)  <u>Factor D:</u> MSCP Management Plan still in preparation; MSCP funding not secured.  <u>Factor E:</u> nonnative plants still a threat (McNeeley 2007, p. 1).	Appears to be in City of San Diego Subarea MSCP Preserve.
<b>San Ysidro Mtns., W. edge</b>	East Otay Mesa North (EO 5 & 31);	<u>Factor A:</u> Development, heavy	In County of San Diego Subarea. Occurrence

<b>OCCURRENCE (1)</b>	<b>KNOWN AT LISTING (2)</b>	<b>CURRENT THREATS (3)</b>	<b>CURRENT CONSERVATION (4)</b>
EO 5 (includes EO 31):	in MSCP Amendment Area. (Roberts 1997, p. 8);	<p>impact from OHVs, including Border Patrol (CNDDDB 2007, McMillan 2003, p. 3). Development; OHVs (Hanely, 2007, p. 1)</p> <p><u>Factor D:</u> MSCP Management Plan still in preparation; MSCP funding not secured.</p> <p><u>Factor E:</u> Invasive nonnative plants, illegal dumping (CNDDDB 2007, McMillan 2003). Invasive nonnative plants (Hanely, 2007, p. 1).</p>	polygons in MSCP Plan Amendment Area but not in MSCP Preserve.
<b>Dennery Canyon, upper</b>  EO 6	Part of the Dennery Canyon-Cal Terraces Complex; over half of the polygon is graded the remainder is in City of San Diego MSCP Preserve; part of a major population (Roberts 1997, p. 7).	<p><u>Factor A:</u> Edge effects from associated development.</p> <p><u>Factor D:</u> MSCP Management Plan still in preparation, MSCP funding not secured.</p> <p><u>Factor E.</u> Invasive nonnative plants (McMillan 2003, p. 3.)</p> <p><b>EO considered extirpated.</b></p>	Part of the occurrence polygon is in the City of San Diego MSCP Preserve; area near vernal pools is protected and monitored. No sensitive plants ( <i>Deinandra conjugens</i> ) found on site in 2001 (RECON 2002, Fig 20). A population of <i>D. conjugens</i> was created south of EO 6 polygon on three sites in the Preserve on Otay Mesa N of I-905 (RECON 2005, p. 30).
<b>Telegraph Canyon</b> (N. of Poggi Canyon)  EO 7:	Part of Poggi Canyon occurrence; in CCV Subarea Plan area but all of mapped EO polygon is outside of MHPA; part of a major population (Roberts	<u>Factor A:</u> Occurrence polygons are outside of the MHPA and the majority of that area is developed (McMillan 2003). To the north, occupied area in the MHPA has been	In the CCV Subarea. Not in MSCP Preserve, MHPA, or MSCP Amendment Area. None of this occurrence is projected to be conserved (McNeeley 2007, p. 1).

OCCURRENCE (1)	KNOWN AT LISTING (2)	CURRENT THREATS (3)	CURRENT CONSERVATION (4)
	1997, p. 7).	<p>developed (USFWS GIS). Development a threat (McNeeley 2007, p1)</p> <p><u>Factor E:</u> Invasive nonnative plants a threat for the remaining area (McNeeley 2007, p. 1)</p> <p><b>EO likely to be extirpated</b></p>	
<p><b>Poggi Canyon, N. side</b></p> <p>EO 8:</p>	Part of Poggi Canyon occurrence; in CCV MSCP Open Space Preserve; part of a major population (Roberts 1997, p. 7).	<p><u>Factor A:</u> Portions of occurrence have been developed and the remainder will likely be subject to edge effects; OHVs including Border Patrol (McMillan 2003, p. 4)</p> <p><u>Factor E:</u> Invasive nonnative plants) (McMillan 2003, p4; McNeeley 2007).</p>	The remaining portion of the polygon is in the CCV Subarea Preserve.
<p><b>Rice Canyon</b></p> <p>EO 9:</p>	Split into Rice Canyon North and Rice Canyon South, polygon in CCV MSCP Preserve; major population (Roberts 1997, p. 7).	<p><u>Factor A:</u> Trail access, edge effects from residential development, OHV activity (McMillan 2003, p. 5). Trail access still a threat but OHV activity has been halted (McNeeley 2007, p. 1).</p> <p><u>Factor E:</u> Invasive nonnative plants (dominant is <i>Centaurea melitensis</i>) increase each year and the <i>Deinandra conjugens</i></p>	In CCV Subarea. Most of remaining population is in Rancho del Rey and Rice Canyon open space of CCV Subarea Preserve. There was a Section 6 Grant to the State to for weed control.

OCCURRENCE (1)	KNOWN AT LISTING (2)	CURRENT THREATS (3)	CURRENT CONSERVATION (4)
		population continues to decline; surrounded by nonnative grassland; (McMillan 2003). Invasive nonnative plants (McNeeley 2007, p. 1).	
<b>East Bonita</b>  EO 10:	Part of Rancho San Miguel Complex; not in MHPA; part of a major population (Roberts 1997, p. 7).	<u>Factor A:</u> Development, utility maintenance (McMillan 2003, p. 5)  <u>Factor E:</u> Invasive nonnative plants (McMillan 2003, p. 5).	County of San Diego Subarea. Not in MHPA, MSCP Preserve, or MSCP Amendment Area; surrounded by development.
<b>Otay Mesa Siempre Viva Rd.</b>  EO 11:	South Otay Mesa; polygon adjacent to MHPA, not yet in Preserve (Roberts 1997, p. 8).	<u>Factor A:</u> Commercial development; OHVs including Border Patrol; no plants found in 2003 (McMillan 2003).  <u>Factor D:</u> MSCP Management Plan still in preparation; MSCP funding not secured. No management requirement for MHPA lands.  <u>Factor E:</u> Invasive nonnative plants (McNeeley 2007, p. 1).  <b>EO extirpated by time of listing</b>	City of San Diego Subarea. Adjacent to or in MHPA not in MSCP Preserve;
<b>Upper Otay Valley</b>  EO 12:	Part of the Otay River Valley occurrence; in MHPA but not yet in Preserve Area; part of a major population (Roberts 1997, p. 7).	<u>Factor A:</u> OHVs, road maintenance (McMillan 2003, p. 6). Area identified for Active Recreation, Otay Valley Regional Park, limited OHV activity (McNeeley	Partly in CCV Subarea and partly in County of San Diego Subarea. Most of the polygon is in the MHPA but not yet in the Preserve Area.  Final management plan

OCCURRENCE (1)	KNOWN AT LISTING (2)	CURRENT THREATS (3)	CURRENT CONSERVATION (4)
		<p>2007, p. 1; Hanley 2007, p. 1).</p> <p><u>Factor D:</u> For County of San Diego Subarea: MSCP Management Plan still in preparation; MSCP funding not secured. There is no management requirement for occurrences in the MHPA (EDAW 2003).</p> <p><u>Factor E:</u> Invasive nonnative plants occurrence is in poor condition (McMillan 2003, p. 6). Invasive nonnative plants (McNeeley 2007, p. 1; Hanley 2007, p. 1).</p>	<p>for the Johnson Canyon Open Space Preserve associated with mitigation for SR 125 South (EDAW 2003). Plan includes mitigation: 4.02 acres (1.6 ha) secured “on-site” (see above, corresponds to CNDDDB EO 12) (EDAW 2003, p. 31).</p>
<p><b>Wolf Canyon</b></p> <p>EO 13:</p>	<p>Part of the Wolf Canyon-Rock Mountain occurrence; polygon in MHPA but not yet part of CCV Preserve; part of major population (Roberts 1997, p. 7).</p>	<p><u>Factor A:</u> Maintenance of roads and utilities, edge effects from future development (McMillan 2003, p. 7; McNeeley 2007, p. 1).</p> <p><u>Factor D:</u> There is no management requirement for occurrences in the MHPA.</p> <p><u>Factor E:</u> Invasive nonnative plants (McMillan 2003, p. 7; McNeeley 2007). Maintenance contract expired (Dodero 2007, p. 1).</p>	<p>In the CCV Subarea. In MHPA but not yet in MSCP Preserve. Restoration, mostly designed for <i>Deinandra conjugens</i> includes effective weed control program. (McMillan 2003, p. 7) but contract period is over (Dodero 2007, p. 1)</p>

<b>OCCURRENCE (1)</b>	<b>KNOWN AT LISTING (2)</b>	<b>CURRENT THREATS (3)</b>	<b>CURRENT CONSERVATION (4)</b>
<p><b>Rock Mountain</b></p> <p>EO 14:</p>	<p>Part of the Wolf Canyon-Rock Mountain occurrence; subpopulations not in MSCP Preserve or in MHPA; part of major population (Roberts 1997, p. 7).</p>	<p><u>Factor A:</u> Maintenance of access roads, OHV activity including Border Patrol (threats based on combined EO 12, 14, 15, and 16) (McMillan 2003, p. 6). Maintenance of access roads and the potential for development (McNeeley 2007, p. 1).</p> <p><u>Factor E:</u> Invasive nonnative plants (threats based on combined EO 12, 14, 15, and 16) (McMillan 2003, p. 6). Invasive nonnative plants (McNeeley 2007, p. 1).</p>	<p>In the CCV Subarea but not in MHPA or MSCP Preserve. No conservation is known.</p>
<p><b>Otay Valley E. end</b></p> <p>EO 15:</p>	<p>East Otay Valley; in MSCP Preserve (Roberts 1997, p. 8).</p>	<p><u>Factor A:</u> maintenance of access roads, OHVs (McMillan 2003, p. 6). Maintenance of access roads is still a threat, OHV activity has been limited by patrols (McNeeley 2007, p. 1)</p> <p><u>Factor E:</u> Invasive nonnative plants (McMillan 2003, p. 6; McNeeley 2007, p. 1).</p>	<p>In CCV Subarea Preserve</p>
<p><b>Otay Valley Rd. E of where it crosses Otay River</b></p> <p>EO 16:</p>	<p>West Otay Ranch; Small portion of polygon is apparently in MHPA but not in MSCP Preserve (Roberts 1997, p. 7).</p>	<p><u>Factor A:</u> Maintenance of access roads and utilities, OHVs (McMillan 2003, p. 6). Maintenance of access roads is still a threat, however, potential for development, OHV activity has been</p>	<p>In the CCV Subarea. A small part of occurrence is in the MHPA but not yet in the MSCP Preserve; the remainder is unprotected.</p>

OCCURRENCE (1)	KNOWN AT LISTING (2)	CURRENT THREATS (3)	CURRENT CONSERVATION (4)
		<p>limited by Otay Valley Regional Park Ranger patrols (McNeeley 2007, p. 1)</p> <p><u>Factor D:</u> There is no management requirement for occurrences in the MHPA.</p> <p><u>Factor E:</u> Invasive nonnative plants (McMillan 2003, p. 6; McNeeley 2007, p. 1).</p>	
<p><b>Dennery Canyon, east of</b></p> <p>EO 17:</p>	<p>Part of the Dennery Canyon-Cal Terraces Complex; part of a major population (Roberts 1997, p. 7).</p>	<p><u>Factor A:</u> Development.</p> <p><b>EO extirpated since time of listing</b></p>	<p>In the City of San Diego Subarea. Not in MHPA, MSCP Preserve, or MSCP Amendment Area.</p>
<p><b>Salt Creek</b></p> <p>EO 18:</p>	<p>Old Salt Creek occurrence and Central Salt Creek occurrence (no CNDDDB EO number) considered a separate occurrence by (Roberts 1997, p. 7); in MHPA; major population (Roberts 1997, p. 7).</p>	<p><u>Factor A:</u> Maintenance of roads and utilities, indirect threat from development (McMillan 2003, p. 7). A sewer line, maintenance of access roads, and utilities are still threats (McNeeley 2007, p. 1)</p> <p><u>Factor D:</u> There is no management requirement for occurrences in the MHPA.</p> <p><u>Factor E:</u> Invasive nonnative plants (McMillan 2003, p. 7; McNeeley 2007, p. 1).</p>	<p>In CCV Subarea. In MHPA but not yet in MSCP Preserve.</p>

OCCURRENCE (1)	KNOWN AT LISTING (2)	CURRENT THREATS (3)	CURRENT CONSERVATION (4)
<p><b>Rolling Hills Ranch</b> EO 19.</p>	<p>Salt Creek Ranch (Roberts 1997, p. 7).</p>	<p><u>Factor A:</u> Apparently site built out. Maintenance of utilities (McNeeley 2007, p. 1).</p> <p><u>Factor D:</u> There is no management requirement for occurrences in the MHPA.</p> <p><u>Factor E:</u> Invasive nonnative plants (McNeeley 2007, p. 1).</p>	<p>In CCV Subarea. Mostly in MHPA, some in CCV Subarea Preserve. On-site preservation 9.8 acres (4 ha) with about 12,148 plants. Off-site compensation: 5.8 ac (2.3 ha) with 15,080 plants at San Miguel Conservation Bank; 10 ac (4 ha) with 200,000 plants at Johnson Canyon (USFWS 2002a, pp. 6-7).</p> <p>South end of this occurrence is Eastlake Woods (Helix 2001). This project protected about 1,000 plants in a native grassland restoration area.</p>
<p><b>Gobblers Knob/Horseshoe Bend</b> EO 20 (includes EO 23).</p>	<p>Part of the Rancho San Miguel Complex; part of a major population (Roberts 1997, p. 7).</p>	<p><u>Factor A:</u> Maintenance of utility easements, OHVs, edge effects from development (McMillan 2003, p. 5). Apparently built out, utility easements, limited OHV activity still threaten (McNeeley 2007, p. 1). Bonita Meadows Open Space Preserve threatened by utility maintenance, OHVs but patrols are reducing this (Caltrans 2004, p. 13).</p> <p><u>Factor E:</u> Invasive nonnative plants (McMillan 2003, p. 5;</p>	<p>San Miguel Ranch in the CCV Subarea. Conserves 48 acres (19 ha) supporting habitat, donates money for the management by San Diego National Wildlife Refuge (SDNWR). The Tri-mark Property is in MSCP Preserve but not now part of the SDNWR. It is currently managed by SDNWR. The Tri-mark Parcel is managed for invasive nonnative plants (USFWS 2005b FWS-SDG-3255.3).</p> <p>Bonita Meadows Open Space Preserve (Caltrans lands) includes 31 ac</p>

OCCURRENCE (1)	KNOWN AT LISTING (2)	CURRENT THREATS (3)	CURRENT CONSERVATION (4)
		<p>J. Martin 2007; McNealey 2007, p. 1). Bonita Meadows Open Space Preserve: Illegal dumping but increased patrols are reducing this (Caltrans 2004, p. 13). Invasive nonnative plants (EDAW 2004, p. 5).</p>	<p>(12.5 ha) supporting 119,500 <i>Deinandra conjugens</i> in 2003 (EDAW 2004, p. 5). Of that, 4 ac (1.6 ha) with 15,000 plants are in the proposed I-15 mitigation area. Also 1.1 ac (0.5 ha) with 12,770 plants are in an SDG&amp;E Easement. About 25.6 ac (10.4ha) with 91,730 plants that fulfill the mitigation obligation of 18.6 ac (7.53 ha) and 90,000 (EDAW 2004, p. 6). A management plan proposed to decrease weeds to 5% in five years and maintain that level.</p>
<p><b>Proctor Valley Bella Lago</b>  EO 21.</p>	<p>Part of the Proctor Valley occurrence; part of a major population (Roberts 1997, p. 7).</p>	<p><u>Factor A:</u> Maintenance of access roads and utilities, edge effects from development, OHVs (McMillan 2003, p. 8).</p> <p><u>Factor E:</u> Invasive nonnative plants (McMillan 2003, p. 8).</p>	<p>In CCV Subarea. 86.5 ac (35 ha) of open space for the Preserve including <i>Deinandra conjugens</i> on-site. An additional 2.5 ac (1 ha) with at least 200 plants will be purchased off-site. (City of Chula Vista 2003a, p. 7—34).</p>
<p><b>Proctor Valley NE of Upper Otay Reservoir</b>  EO 22:</p>	<p>Part of the Proctor Valley occurrence; about half of occurrence polygon is in MSCP amendment area and CH, the remainder is not in MHPA or MSCP Preserve; part of a major population (Roberts</p>	<p><u>Factor A:</u> Maintenance of access roads and utilities, OHVs (McMillan 2003, p. 8). Area along road (dirt) heavily impacted by OHVs (Martin 2007, p. 1; Roblek 2007, p. 1).</p> <p><u>Factor D:</u> MSCP Management Plan still</p>	<p>In County SD Subarea. In an MSCP Amendment Area.</p>

OCCURRENCE (1)	KNOWN AT LISTING (2)	CURRENT THREATS (3)	CURRENT CONSERVATION (4)
	1997, p. 7).	in preparation; MSCP funding not secured.  <u>Factor E:</u> Invasive nonnative plants (McMillan 2003, p. 8).	
<b>State Rt. 54 West</b>  EO 24:	Highway 54 south; extirpated by highway construction; major population (Roberts 1997, p. 7.)	<b>EO extirpated prior to listing, 1994.</b>	In City SD Subarea.
<b>State Rt. 54 East</b>  EO 25:	Highway 54 north; extirpated by highway construction (Roberts 1997, p. 7.)	<b>EO extirpated prior to listing, 1994.</b>	In City SD Subarea.
<b>Poggi Canyon S. side</b>  EO 26:	Part of Poggi Canyon occurrence; most in MHPA but not yet in Preserve Area; S portion in open space for landfill; part of a major population (Roberts 1997, p. 7).	<u>Factor A:</u> OHVs including Border Patrol, edge effects from development (McMillan 2003, p. 4). Maintenance of roads and utilities (USFWS 2005a).  <u>Factor D:</u> There is no management requirement for occurrences in the MHPA.  <u>Factor E:</u> Invasive nonnative plants (McMillan 2003, p. 4; USFWS 2005a, p. 26; McNeeley 2007, p. 1).	In CCV Subarea. Point localities on site are in the MHPA but not yet in Preserve Area. At southern edge of the area, the Otay Water District (OWD) Reservoir and pump station (Allen, S.M. 2004 in AMEC Earth and Environmental 2004; USFWS 2005a FWS-SDG-4253.3). In NW corner 5.17 acres (2.1 ha) of CH will be permanently impacted, including 0.3 acre (0.01 ha) occupied by 368 plants, based on 2004 survey (USFWS 2005a FWS-SDG-4253.3, p. 26). However, 1.14 acres (0.46 ha) of critical habitat to the north of the reservoir

OCCURRENCE (1)	KNOWN AT LISTING (2)	CURRENT THREATS (3)	CURRENT CONSERVATION (4)
			including 1.12 acres (0.45 ha) occupied by 263,000 plants based on 2004 surveys (USFS 2005a, p. 26) will be preserved by OWD as an Otay Tarplant Preserve. When added to OWD's 4.99 acre (2 ha) expansion of its off-site San Miguel Habitat Management Area, a total of 6.13 acres (2.5 ha) of preserved CH will offset the loss of 5.17 acres (2.1 ha) of CH.
<p><b>Dennery Canyon, north</b></p> <p>EO 27:</p>	<p>Part of the Dennery Canyon-Cal Terraces Complex; small polygon in MSCP Preserve Larger polygon has been converted to residential housing; part of a major population (Roberts 1997, p. 7).</p>	<p><u>Factor A:</u> Most of occurrence converted to residential housing by the time of listing.</p> <p><u>Factor D:</u> MSCP Management Plan still in preparation; MSCP funding not secured.</p> <p><u>Factor E:</u> Invasive nonnative plants focused for control in the area (RECON 2005, p. 25). Five year program ceased about 2003 (Doderer 2007, p. 1)</p>	<p>In City of SD Subarea. Smaller occurrence polygon (eastern) of <i>Deinandra conjugens</i> is in the MSCP Preserve.</p>
<p><b>Dennery Canyon, south</b></p> <p>EO 28:</p>	<p>Part of the Dennery Canyon-Cal Terraces Complex some of polygon in MSCP Preserve, some in MHPA, nearby areas in neither Preserve or MHPA; part of a major population</p>	<p><u>Factor A:</u> Some OHV, maintenance of access roads and utilities, future edge effects from development (McMillan 2003, p. 9).</p> <p><u>Factor D:</u> MSCP Management Plan still</p>	<p>In City of SD Subarea. Since listing, Hidden Trails development extirpated 10 local occurrences while preserving 27 in the MSCP Preserve (City of San Diego 2000, p 104). Only ranges of numbers of</p>

<b>OCCURRENCE (1)</b>	<b>KNOWN AT LISTING (2)</b>	<b>CURRENT THREATS (3)</b>	<b>CURRENT CONSERVATION (4)</b>
	(Roberts 1997, p. 7).	<p>in preparation; MSCP funding not secured.</p> <p><u>Factor E:</u> Invasive nonnative plants (McMillan 2003, p. 9). Invasive nonnative plants focused for control in the area (RECON 2005, p. 25).</p>	plants were provided making comparisons difficult.
<p><b>Dennery Ranch</b></p> <p>EO 29:</p>	Part of the Dennery Canyon-Cal Terraces Complex; part of a major population (Roberts 1997, p. 7).	<p><u>Factor A:</u> Possible extirpated (McMillan 2003, p. 9).</p> <p><u>Factor D:</u> MSCP Management Plan still in preparation; MSCP funding not secured.</p> <p><u>Factor E:</u> Invasive nonnative plants (McMillan 2003, p. 9).</p> <p><b>EO apparently extirpated since listing</b></p>	In City of SD Subarea.
<p><b>Otay Mesa, eastern by border</b></p> <p>EO 30:</p>	East Otay Mesa South; Area in MSCP Amendment Area. (Roberts 1997, p. 8).	<p><u>Factor A:</u> Impacted by OHVs including Border Patrol, development; likely extirpated (McMillan 2003, 3). No current information (Hanely 2007, p. 1).</p> <p><u>Factor D:</u> MSCP Management Plan still in preparation; MSCP funding not secured.</p> <p><b>EO apparently extirpated since listing</b></p>	In County of SD MSCP Amendment Area.

OCCURRENCE (1)	KNOWN AT LISTING (2)	CURRENT THREATS (3)	CURRENT CONSERVATION (4)
<p><b>Mother Miguel Mountain</b></p> <p>EO 32:</p>	<p>Part of the Rancho San Miguel Complex; in MSCP Preserve; part of a major population (Roberts 1997, p. 7.)</p>	<p><u>Factor A:</u> Maintenance of access roads and utilities, OHVs (McMillan 2003, p. 9). OHV impacts likely to diminish on SDNWR.</p> <p><u>Factor E:</u> Invasive nonnative plants (McMillan 2003, p. 9; Martin 2006, p. 1)</p>	<p>In County SD Subarea. On SDNWR lands but not managed to control invasive nonnative plants (Martin 2006, p. 1).</p>
<p><b>Sweetwater Reservoir SE side</b></p> <p>EO 33</p>	<p>Part of the Rancho San Miguel Complex; in MHPA but most polygons not in MSCP Preserve. A portion is in SDNWR; part of a major population (Roberts 1997, p. 7.).</p>	<p><u>Factor A:</u> Maintenance of access roads, firebreaks; trail activity (McMillan 2003, p. 1).</p> <p><u>Factor D:</u> There is no management requirement for occurrences in the MHPA.</p> <p><u>Factor E:</u> Invasive nonnative plants (McMillan 2003, p. 1).</p>	<p>In Joint Water Agencies Draft NCCP/HCP Subregional Plan area. In MHPA but most not in Preserve. Not protected by any agreement but Joint Water Agencies Draft NCCP/HCP Subregional Plan (2007) proposes to conserve 49 known locations (84 percent) and 131 acres (53 ha) (82 percent) of predicted habitat within the study area that includes CNDDDB EO 3. A portion is apparently in SDNWR. (USFWS 2004, p. 13).</p>
<p><b>Otay Water District.</b></p> <p>EO 34:</p>	<p>Mother Miguel or south of Mother Miguel (Roberts 1997, p. 7).</p>	<p><u>Factor A:</u> Maintenance of access roads and utilities (McMillan 2003, p. 9). Development potential.</p> <p><u>Factor D:</u> There is no management requirement for occurrences in the MHPA.</p>	<p>Otay Water District (OWD) initiated a Subarea Plan but it has not been completed. Only one of the local occurrences appears to be in the MHPA, none are in the Preserve, No management measures are known to be in place; (Factor D).</p>

OCCURRENCE (1)	KNOWN AT LISTING (2)	CURRENT THREATS (3)	CURRENT CONSERVATION (4)
		<p><u>Factor E:</u> Invasive nonnative plants (McMillan 2003, p. 9).</p>	
<p><b>SDNWR North</b>  EO 35</p>	<p>Jamacha Hills; major population (Roberts 1997, p. 7). 23.2 ac (9.4 ha).</p>	<p><u>Factor E:</u> Invasive nonnative plants (Martin 2006, p. 1)</p>	<p>In SDNWR. Not yet managed for invasive nonnative plants. Since listing additional small occurrence found north of site (Martin 2007).</p>
<p><b>San Ysidro Mtns. Alta Rd.</b>  EO 36:</p>	<p>Not known at time of listing.  In MSCP amendment area.</p>	<p><u>Factor A:</u> Private land development, OHV activity (Hanley 2007, p. 1). Gas pipeline for Otay Mesa Generating Company (RECON 2004, p. 1).</p> <p><u>Factor D:</u> MSCP Management Plan still in preparation; MSCP funding not secured.</p> <p><u>Factor E:</u> Invasive nonnative plants (Hanley 2007, p. 1).</p>	<p>In County SD Subarea. In MSCP Amendment area</p>
<p><b>Johnson Canyon</b>  EO 37:</p>	<p>Not known at the time of listing.</p>	<p><u>Factor A:</u> Potential highway development. (EDAW 2003, p. 1).</p> <p><u>Factor D:</u> MSCP Management Plan still in preparation; MSCP funding not secured.</p> <p><u>Factor E:</u> Invasive nonnative plants (USFWS 2004, p. 16).</p>	<p>In County of SD Subarea. Approx. 10 ac (4 ha) supporting most of occurrence 486,723 plants (Helix 2001, p. 2) was purchased for MSCP Preserve (USFWS 2002a).</p> <p>Final management plan for the Johnson Canyon Open Space Preserve associated with mitigation for SR 125 South (EDAW 2003). Plan includes</p>

OCCURRENCE (1)	KNOWN AT LISTING (2)	CURRENT THREATS (3)	CURRENT CONSERVATION (4)
			mitigation: 4.02 acres (1.6 ha) secured “on-site” (see above, corresponds to CNDDDB EO 12) and 18.6 acres (7.5 ha) supporting over 100,000 plants on Bonita Meadows; EDAW (2003, p. 31) (see above at CNDDDB EO 20). Plan calls for qualitative monitoring of existing <i>Deinandra conjugens</i> on sites in Johnson Canyon set aside other listed species.
<p><b>Skyline Wesleyan Church Prop.</b></p> <p>EO 38:</p>	<p>Not known at time of listing. Not in MHPA.</p>	<p><u>Factor A:</u> Development (CNDDDB 2007). OHVs, illegal disking (Martin 2007, p. 1).</p> <p><u>Factor E:</u> Invasive nonnative plants, illegal dumping (Martin 2007, p. 1).</p>	<p>County of SD Subarea. Polygon not in MHPA, MSCP Preserve, or in MSCP Amendment Area. No conservation provisions for the site. Just to the southwest an area in on SDNWR.</p>
<p><b>Spring Canyon</b></p> <p>EO 39:</p>	<p>Upper Spring Canyon; no EO number; major population (Roberts 1997, p. 7).</p> <p>Since listing, occurrence supported 16,605 plants (Caltrans July 2004, p.39).</p>	<p><u>Factor A:</u> OHVs (Miller 2007, p. 1).</p> <p><u>Factor D:</u> There is no management requirement for occurrences in the MHPA.</p> <p><u>Factor E:</u> Invasive nonnative plants (Miller 2007, p. 1).</p>	<p>In City SD Subarea. Likely part is in MHPA but not in Preserve.</p>
<p><b>East Otay Ranch</b></p> <p>EO # none</p>	<p>East Otay Ranch (Roberts 1997, p.8).</p>	<p><u>Factor A:</u> Development, likely for most of occurrence not in MHPA.</p>	<p>In CCV Subarea. Some point localities in MHPA but most outside MHPA.</p>

OCCURRENCE (1)	KNOWN AT LISTING (2)	CURRENT THREATS (3)	CURRENT CONSERVATION (4)
		<p><u>Factor D:</u> There is no management requirement for occurrences in the MHPA.</p> <p><u>Factor E:</u> Likely invasive nonnative plants associated with development.</p>	
<p><b>Sweetwater Reservoir NE side</b></p> <p>EO # none</p>	<p>East Sweetwater Reservoir (Roberts 1997, p. 6)</p>	<p><u>Factor E:</u> Likely threatened by invasive nonnative plants.</p> <p><b>EO likely extirpated.</b></p>	<p>In County SD Subarea. Not in MHPA, MSCP Preserve, of MSCP Amendment Area.</p>
<p><b>Rancho Jamul</b></p> <p>EO # none:</p>	<p>Not known at time of listing. In MHPA on CDFG land.</p>	<p><u>Factor A:</u> Maintenance of access roads and utilities, OHV, trail access (McMillan 2002, 2003, p. 10). OHVs (Dillingham 2007, p. 1).</p> <p><u>Factor E:</u> Invasive nonnative plants, (McMillan 2003, p. 10; Dillingham 2007, p. 1).</p>	<p>State lands. Rancho Jamul Ecological Reserve is protected from development</p>
<p><b>W. of Moody Canyon</b></p> <p>EO # none:</p>	<p>Not known at time of listing. Acreage</p> <p>An estimated 1,348,281 plants were found (GIS calculation) 3.6 ac (1.46 ha) (AMEC Earth and Environmental 2003, p. 6) Most of the area is in MSCP Preserve.</p>	<p><u>Factor A:</u> Potential edge effects from adjacent development less than 100 m east and west of the site.</p> <p><u>Factor D:</u> MSCP Management Plan still in preparation; MSCP funding not secured.</p> <p><u>Factor E:</u> Likely invasive nonnative plants from adjacent development.</p>	<p>In City SD Subarea. About 80% of the occurrence area is in the MSCP Preserve.</p>

OCCURRENCE (1)	KNOWN AT LISTING (2)	CURRENT THREATS (3)	CURRENT CONSERVATION (4)
<p><b>Beyer Hills</b></p> <p>EO # none</p>	<p>Not known at time of listing.</p> <p>Otay tarplant in July 1998 on 2.05 acres (0.83 ha), of this 1.8 acres (0.73 ha) are in the MHPA (RECON 1998, p. 12).</p>	<p><u>Factor A:</u> Potential for development (Miller 2004). OHVs.</p> <p><u>Factor D:</u> There is no management requirement for occurrences in the MHPA.</p> <p><u>Factor E:</u> Likely invasive nonnative plants associated with adjacent development. Occurrence not protected from development or managed.</p>	<p>In City SD Subarea. In MHPA but not yet in MSCP Preserve.</p>
<p><b>Paradise Valley</b></p> <p>EO # none:</p>	<p>Not known at the time of listing.</p> <p>Site identified as a new locality. A small population of over 500 plants was found in a patch of grassland (McMillan Feb. 2002. p. 23 (2001 MSCP Rare PI Survey). 1,000 plants (McMillan 2003, p. 10) .</p>	<p><u>Factor A:</u> Likely edge effects from nearby development.</p> <p><u>Factor D:</u> MSCP Management Plan still in preparation; MSCP funding not secured.</p> <p><u>Factor E:</u> Likely invasive nonnative plants.</p>	<p>In City SD Subarea. In MSCP Preserve (USFWS 2004 p. 17).</p>
<p><b>Valencia Hills</b></p> <p>EO # none:</p>	<p>Not known at the time of listing.</p> <p>Site identified as a new locality (McMillan Feb. 2002. Appendix 1b, p. 2 (2001 MSCP</p>	<p><u>Factor A:</u> Likely edge effects from nearby development.</p> <p><u>Factor D:</u> MSCP Management Plan still in preparation; MSCP funding not secured.</p>	<p>In City SD Subarea. In MSCP Preserve (USFWS 2004 p. 17).</p>

OCCURRENCE (1)	KNOWN AT LISTING (2)	CURRENT THREATS (3)	CURRENT CONSERVATION (4)
	Rare PI Survey).	<u>Factor E</u> : Likely invasive nonnative plants.	

Abbreviations:

EO = CNDDDB Element Occurrence.

MSCP = San Diego Area Multiple Species Conservation Program.

MHPA = MSCP Multiple Habitat Planning Area.

City SD Subarea = City of San Diego Subarea.

County SD Subarea = County of San Diego Subarea.

CCV Subarea = City of Chula Vista Subarea

Identifications of are based on CNDDDB names, previous USFWS determinations, location information, and ownership and preserve boundaries.

1. Name of occurrence and CNDDDB EO number if assigned.
2. Information about occurrence as known at listing.
3. Current threats to the occurrence segregated by listing factor.
4. Current conservation measures for each occurrence.

**U.S. FISH AND WILDLIFE SERVICE**  
**5-YEAR REVIEW of *Deinandra conjugens* (Otay tarplant)**

Current Classification Threatened  
Recommendation resulting from the 5-Year Review

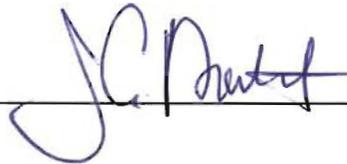
- Downlist to Threatened**
- Uplist to Endangered**
- Delist**
- No change is needed**

Appropriate Listing/Reclassification Priority Number, if applicable \_\_\_\_\_

Review Conducted By Gary D. Wallace

**FIELD OFFICE APPROVAL:**

Lead Field Supervisor, Fish and Wildlife Service

Approve  Date June 30, 2009