

Vail Lake Ceanothus
(*Ceanothus ophiochilus*)

5-Year Review:
Summary and Evaluation



Vail Lake Ceanothus (Photo by Jonathan Snapp-Cook)

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

June 2008

5-YEAR REVIEW
Vail Lake Ceanothus
(Ceanothus ophiochilus)

1. GENERAL INFORMATION

1.1. Reviewers

Lead Region: Diane Elam and Jenness McBride, Region 8, California and Nevada,
916-414-6464

Lead Field Office: Karen A. Goebel and Sally D. Brown, Carlsbad Fish and Wildlife Office,
760-431-9440

1.2. Methodology used to complete the review:

This review was compiled by Sally Brown of the Carlsbad Fish and Wildlife Office (CFWO) and considered available literature, office files, and discussions with researchers whose expertise included *Ceanothus ophiochilus*, related species, or a biological field relevant to *Ceanothus* conservation.

1.3. Background:

1.3.1. FR Notice citation announcing initiation of this review:

The notice announcing the initiation of this and other 5-year reviews and opening the public response period for 60 days was published on February 14, 2007 (72 FR 7064). We did not receive any information specific to Vail Lake ceanothus, but we did receive one general comment letter supporting continued protection under the Endangered Species Act (ESA) of 1973, as amended, of all species noticed in this announcement.

1.3.2. Listing history

Original Listing

FR notice: Federal Register 63 FR 54956

Date listed: October 13, 1998

Entity listed: Species; Vail Lake ceanothus (*Ceanothus ophiochilus*)

Classification: Threatened

1.3.3. Associated rulemakings

Critical habitat has been designated for this species.

FR notice: 72 FR 54983

Date of notice: September 27, 2007

FR notice of proposed critical habitat: 71 FR 58340
Date proposed: October 3, 2006

Approximately 203 acres (82 hectares) of land in Riverside County, California, were designated as critical habitat for *Ceanothus ophiochilus*. Of the approximately 283 acres (115 hectares) proposed for designation, approximately 80 acres (33 hectares) of privately-owned land covered by the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) were excluded from critical habitat for *C. ophiochilus* under section 4(b)(2) of the Act.

1.3.4. Review History

No comprehensive status reviews have been conducted for this species.

1.3.5. Species' Recovery Priority Number at start of 5-year review

The species' Recovery Priority Number was reported as a value of "2" in the 2006 Recovery Data Call for the Carlsbad Fish and Wildlife Office. This indicates a high degree of threat and a high potential for recovery for a listed species.

1.3.6. Recovery Plan or Outline

No draft or final recovery plan has been prepared for the Vail Lake ceanothus.

2. REVIEW ANALYSIS

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

2.1.1. Is the species under review a vertebrate?

No. The Endangered Species Act defines species as including any subspecies of fish or wildlife or plants and any distinct population segment of any species of vertebrate wildlife. This definition limits listings as distinct population segments (DPS) only to vertebrate species of fish and wildlife. Because the Vail Lake ceanothus is a plant and the DPS policy is not applicable, the application of the DPS policy to the species listing is not addressed further in this review.

2.2. Recovery Criteria

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

No, there is no recovery plan for this species.

2.3. Updated Information and Current Species Status

2.3.1. Biology and Habitat

Vail Lake ceanothus is a 4-5 foot (ft) (1.2 -1.5 meter (m)) tall shrub in the buckthorn family (Rhamnaceae). Vail Lake ceanothus flowers from mid-February to March, and the seed capsules mature from about May to mid-June (Boyd *et al.* 1991; Schmidt 1993). This narrow endemic plant is restricted to three known occurrences in chamise-chaparral habitat on ridgetops and north- to northeast-facing slopes at elevations of 1,900 to 3,500 ft (579 to 1,067 m) (Boyd and Banks 1995) in southwestern Riverside County, California. The species is associated with harsh, phosphorus-deficient soils derived from metavolcanic and ultra-basic parent materials, deeply weathered gabbro, and pyroxenite-rich outcrops (Boyd 1991; Boyd *et al.* 1991; Oberbauer 1991; Fross and Wilken 2006).

These phosphorus-deficient soils may be essential for the continued reproductive isolation of Vail Lake ceanothus (Boyd *et al.* 1991). Hybridization is a common natural phenomenon among *Ceanothus* species (Schmidt 1993; Fross and Wilken 2006), and Vail Lake ceanothus appears to hybridize with the locally common *Ceanothus crassifolius* where the two species co-occur (Boyd *et al.* 1991). Hybrids are generally found on the periphery of Vail Lake ceanothus occurrences, where the transition occurs between the harsh, phosphorus-deficient soils that the species favors and the milder soils that support *C. crassifolius* (Boyd *et al.* 1991).

Periodic wildfire also plays an important role in the ecology of this species. Wildfire typically affects chaparral communities at intervals of approximately 20 to 50 years, and Vail Lake ceanothus, like most chaparral species, is adapted to this periodic disturbance. Vail Lake ceanothus lacks a basal burl (a swelling at the junction of roots and stems with a proliferation of dormant buds) and does not resprout following wildfire, but instead recovers by the germination of seeds stored in the soil (Boyd *et al.* 1991). As with other species of *Ceanothus*, this “obligate seeder” requires 5 to 25 years between burns to adequately replenish the seed bank (Keeley 1986). If frequent fires occur, obligate seeders like Vail Lake ceanothus may not produce enough seed and may eventually be eliminated from the chaparral community (Keeley 1986, citing Arnold *et al.* 1951; Keeley 2006; Zedler *et al.* 1983). Zedler *et al.* (1983) found that *Ceanothus oliganthus*, also an obligate seeder, was nearly eliminated from a site that had burned twice within 2 years. Further, sustained fire suppression may result in senescent stands of the species (Keeley 1986, Boyd *et al.* 1991).

Another important factor affecting this species and its habitat is the placement of fuel breaks. The sparse, ridge-line habitat that Vail Lake ceanothus favors appears to be an ideal location for fuel breaks, and all three occurrences have been affected by the grading of roads and/or fuel breaks (Boyd *et al.* 1989; Boyd 1991). In addition, studies of fuel breaks in the Cleveland National Forest near the species’ habitat have demonstrated an increase in the density of competing nonnative species, and it has been hypothesized that fuel breaks promote the spread of nonnative invasive plants (Merriam *et al.* 2007). These

nonnative plants alter local fuel conditions and change fire behavior and frequency (Merriam *et al.* 2007).

Spatial Distribution, Abundance, Population Trends, Demography

The listing rule (63 FR 54956) describes only three known occurrences of Vail Lake ceanothus, all of which are located in southwestern Riverside County, California. No new occurrences of this species have been documented since 1993, when extensive survey efforts were conducted for the species. These surveys included an aerial survey over approximately 62,700 acres (25,373 hectares) conducted while the species was in bloom, and approximately 360 field hours of surveys conducted on the ground by Federal, State, and independent botanists in areas of potentially suitable habitat from Black Mountain to the Cleveland National Forest (Shaffer 1993).

Much of the potentially suitable habitat for this species is located within the Cleveland National Forest. Because suitable habitat for this species is limited, and thorough surveys were conducted in 1993, the U. S. Forest Service (USFS) does not expect to find additional populations of the species within the Cleveland National Forest (K. Winter pers. comm. 2007). Biological surveys are currently being conducted on Pechanga Tribal lands located a short distance west of the known occurrences of the species. These lands include rugged terrain that is difficult to survey; however, surveys have been conducted in areas with the potential to support Vail Lake ceanothus, and the species has not been observed on these lands. Additional surveys will be conducted in the spring of 2007 (R. Riefner pers. comm. 2007).

While no new occurrences have been documented since the final listing rule, new information is available for the two occurrences located within the Agua Tibia Wilderness, consisting of a Post-Fire Recruitment Monitoring Report prepared by the USFS (2002a). Background information for the three localities and the new post-fire monitoring data are summarized below.

The type locality for the species is located on privately-owned land west of Vail Lake (Vail Lake Occurrence, California Natural Diversity Database (CNDDDB) Element Occurrence (EO) 1) (CNDDDB 2006). The Vail Lake Occurrence consists of about 3,000 to 5,000 plants, which occupy approximately 20 acres (8 hectares) of suitable habitat (Boyd 1991). This significant occurrence includes approximately half of the total 40 acres (16 hectares) of habitat occupied by the species. There is no new survey information for this population.

A second occurrence is located primarily within the Agua Tibia Wilderness of the Cleveland National Forest, with less than 0.5 acres (0.2 hectares) at the northeastern extent of the occurrence extending onto privately owned lands (Northern Wilderness Occurrence, CNDDDB EO 2) (Shaffer 1993). Population estimates for this occurrence have not changed since the time of listing and range from approximately 500 (Shaffer 1993; USFS 2002b; CNDDDB 2006) to as many as 2,000 to 4,000 (Boyd and Banks 1995) individuals on approximately 10.2 acres (4.1 hectares) (CNDDDB 2006).

The final occurrence is located entirely within the Agua Tibia Wilderness of the Cleveland National Forest (Southern Wilderness Occurrence, CNDDDB EO 3). This occurrence is divided into a northern and a southern stand. Population estimates for this occurrence have not changed since the time of listing and range from over 500 (CNDDDB 2006) to 4,000 (USFS 2002b), to 4,600 (Shaffer 1993), to as many as 6,000 to 12,000 (Boyd and Banks 1995) individual plants on approximately 9.9 acres (4 hectares) (CNDDDB 2006).

The USFS conducted post-fire recruitment monitoring for the Wilderness Occurrences of Vail Lake ceanothus in 2001 and 2002. This monitoring was performed due to concern regarding the regeneration ability of the Northern Wilderness Occurrence because this occurrence had burned twice within 11 years (USFS 2002a). The Northern Wilderness Occurrence was found to have an average (mean) of 0.69 and 0.4 seedlings per meter squared (m^2) for 2001 and 2002, respectively. The northern stand of the Southern Wilderness Occurrence had 3.79 and 4.76 mean seedlings per m^2 for 2001 and 2002 respectively, and the southern stand of this occurrence had 0.92 and 1.54 mean seedlings per m^2 for 2001 and 2002, respectively (USFS 2002a). This demonstrated an increase in mean seedlings per m^2 for both stands of the Southern Wilderness Occurrence, and a decrease of 29 percent in mean seedlings per m^2 for the Northern Wilderness Occurrence. It is not known whether this decrease was due to a depleted seed bank following the two fires, or if it was due to the unusually dry weather in 2002 (USFS 2002a).

Genetics

We have no new information about the genetics of this species. The listing rule acknowledged that hybridization is a natural phenomenon common among the *Ceanothus* species (Schmidt 1993) and conservation of hybrid plants needed to be addressed in a recovery plan (63 FR 54958).

Taxonomy

No papers have been published nor has new information become available since the listing that proposes to change the name, the taxonomic status, or systematic position of Vail Lake ceanothus.

Habitat Conditions

The final rule listing Vail Lake ceanothus identified a potential threat to the species from urban development based in part on an application from the property owner for a Conditional Use Permit to construct a recreational vehicle (RV) Park on a parcel adjacent and south of the parcel occupied by the Vail Lake Occurrence of the species. Following the final listing rule, this Conditional Use Permit was approved and the RV Park has since been constructed. According to information available on its website (<http://www.vaillakeresort.com/>) on February 28, 2007, this development, known as the Vail Lake Village Resort and Campground, includes 350 RV sites and 100 tent sites, as

well as a store and deli, arcade, miniature golf course, and swimming pools. This development was constructed in proximity to but not on land supporting Vail Lake ceanothus.

The final listing rule also acknowledged the threat posed by alteration of fire regimes. Prior to listing, Vail Lake ceanothus had been affected by the Vail Fire of 1989, which burned approximately 40 percent of the Northern Wilderness Occurrence. Since the final listing rule in 1998, the species has been affected by two additional large-scale fires. The Pechanga Fire of 2000 burned approximately 75 percent of the Northern Wilderness Occurrence and 70 percent of the northern stand, and 100 percent of the southern stand of the Southern Wilderness Occurrence (USFS 2002b). The perimeter Eagle Fire of 2004 encompasses the Vail Lake Occurrence; however the extent to which this occurrence was affected by the fire is unknown.

As noted above, the sparse, ridge-line habitat that Vail Lake ceanothus favors appears to be an ideal location for fuel breaks, and all three occurrences had been affected by the grading of roads and/or fuel breaks (Boyd *et al.* 1989; Boyd 1991) prior to the listing of the species. Approximately 1 to 3 percent of the Vail Lake Occurrence was affected by road grading (Boyd 1991), and between 10 percent (Shaffer 1993; K. Winter pers. comm. 2007) and 80 percent (S. Boyd pers. comm. 2007) of both of the Wilderness Occurrences had been affected by the grading of fuel breaks along Old Woodchuck Road despite their location within roadless wilderness areas.

Since the listing rule, efforts have been made to limit impacts to Vail Lake ceanothus from fuel breaks on National Forest lands. The USFS has a Resource Advisor who works with fire teams when fire prevention activities are conducted. In addition, Fire Chiefs are provided with printed management notebooks and have access to GIS data layers that include information on the location of rare and sensitive resources such as Vail Lake ceanothus. During the Pechanga Fire of 2000, a two- to three-foot wide fuel break was cleared by hand along the boundary between the Wilderness Area and privately owned lands at the northern end of the Northern Wilderness Occurrence (K. Winter pers. comm. 2007). Old Woodchuck Road has not been maintained since it was used as a fuel break in 1989, and it is now overgrown (K. Winter pers. comm. 2007).

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

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

At the time of listing, habitat for Vail Lake ceanothus was threatened by urban development and the grading of roads and fuel breaks (63 FR 54956). These threats continue to affect habitat for the species. The Vail Lake Village Resort and Campground, constructed following the listing of the species, has increased human presence in proximity to the Vail Lake Occurrence and has the potential to negatively

affect this occurrence through the introduction of invasive species and trampling by hikers and horseback riders.

The Vail Lake Occurrence of the species was also threatened at the time of listing by a community plan (Vail Lake Specific Plan No. 275) that proposed the subdivision of parcels in the Vail Lake area into 20-acre (8-hectare) lots. There was concern that individual landowners would convert the existing habitat to gardens, lawns, and pastures, and such development would fragment remaining habitat, introduce invasive plants, contribute to combustible fuel loads, and otherwise degrade the habitat (63 FR 54961). This Specific Plan proposal has since been withdrawn (A. Krizek pers. comm. 2007).

Another Specific Plan (No. 324) has been proposed for the Vail Lake area that proposes a large-scale development including 690 acres (279.2 hectares) of homes, 350 acres (141.7 hectares) of commercial business park, a 45-acre (18.2-hectare) corporate research village, and a golf course, park, and open space (A. Krizek pers. comm. 2007). While the proposed open space would include a 19-acre (7.7-hectare) Vail Lake ceanothus preserve including most of the habitat for the Vail Lake Occurrence, the development would surround the occurrence. The loss of the adjacent habitat could negatively affect this occurrence's long-term viability by potentially resulting in the loss of pollinators, the introduction of invasive species, and alteration of its natural fire regime.

In January of 2006, there was a proposal to abandon Specific Plan No. 324; however, this proposal has not been acted upon and the file is currently inactive (A. Krizek pers. comm. 2007). At this time, the Vail Lake Occurrence of the species that occupies approximately 20 acres (8 hectares) or half of the total area occupied by the species remains within a single 999.99-acre (404.68-hectare) privately-owned parcel. Until conservation of this population is assured, the potential for urban development in the Vail Lake area remains a significant threat to the Vail Lake ceanothus.

The Wilderness occurrences are located on conserved lands within the Agua Tibia Wilderness of the Cleveland National Forest, and there is an overall Land Resource and Management Plan for the Forest (K. Winter pers. comm. 2007). However, the USFS does not have a management plan specifically for Vail Lake ceanothus, and due to the species' location in difficult-to-access wilderness, the USFS does not plan to create a management plan for the species (K. Winter pers. comm. 2007).

Efforts have been made to limit impacts to Vail Lake ceanothus from the grading of roads and fuel breaks within the Wilderness Area. However, the potential remains for Vail Lake ceanothus habitat to be impacted in the future because Old Woodchuck Road is a logical place to put a fuel break, and privately owned homes adjacent to the Wilderness Area may be threatened by wildfire (K. Winter pers. comm. 2007). The status of road and fuel break grading at the Vail Lake Occurrence is unknown; however, because Vail Lake ceanothus favors habitat that appears to be an ideal

location to place fuel breaks, we assume that the threat remains at the Vail Lake location as well.

In summary, while efforts have been made to limit the impact of roads and fuel breaks on occurrences of Vail Lake ceanothus within the Cleveland National Forest, this threat has not been eliminated for any of the three known occurrences. While two of the known occurrences are located within a National Forest and are provided protection from urban development, development still threatens the largest occurrence of Vail Lake ceanothus, which is located entirely on private lands.

2.3.2.2. Overutilization for commercial, recreational, scientific, or educational purposes:

The species is cultivated at the Rancho Santa Ana Botanic Garden from seeds and cuttings collected from all three occurrences prior to listing (S. Boyd pers. comm. 2007). The listing rule noted that the Cleveland National Forest had received requests from two botanical gardens for permits to collect Vail Lake ceanothus, although no horticultural collections were permitted (63 FR 54956; Winter *in litt.* 1995). The USFS has not received any additional requests for permits to collect Vail Lake ceanothus since its listing (L. Young pers. comm. 2007). In addition, access to all occurrences of the species is limited by private property boundaries and/or inaccessible, rugged terrain. No evidence exists to suggest that overutilization is currently, or has ever been, a factor in the decline of the species.

Vandalism was identified as a general threat in the final rule listing the species because the presence of sensitive species can be viewed as an obstacle to development, in particular for occurrences on privately-owned land (63 FR 54962). We have not identified or documented any specific vandalism events that have occurred since listing of the species, but this general threat still applies to the occurrence on private lands.

2.3.2.3. Disease or predation:

At the time of listing, the threats of disease and predation were not known to be applicable. No evidence currently exists to suggest that either disease or predation have a substantial impact on the species.

2.3.2.4. Inadequacy of existing regulatory mechanisms:

State Protections

State laws providing protection to Vail Lake ceanothus include the Native Plant Protection Act (NPPA), California Endangered Species Act (CESA), California Environmental Quality Act (CEQA), and the Natural Communities Conservation Planning (NCCP) Act.

In 1994, the California Fish and Game Commission listed Vail Lake ceanothus as endangered under the Native Plant Protection Act (NPPA) (Division 2, chapter 10, section 1900 *et seq.* of the California Fish and Game Code (CFG)) and California Endangered Species Act (CESA) (Division 3, chapter 1.5, section 2050 *et seq.* of the CFG). Both the NPPA and CESA include prohibitions forbidding the “take” of Vail Lake ceanothus (Chapter 10, Section 1908 and Chapter 1.5, Section 2080, CFG code). However, sections 2081(b) and (c) of CESA allow the California Department of Fish and Game (CDFG) to issue incidental take permits for State-listed threatened and endangered species if:

- 1) The authorized take is incidental to an otherwise lawful activity;
- 2) The impacts of the authorized take are minimized and fully mitigated;
- 3) The measures required to minimize and fully mitigate the impacts of the authorized take are roughly proportional in extent to the impact of the taking on the species, maintain the applicant’s objectives to the greatest extent possible, and are capable of successful implementation;
- 4) Adequate funding is provided to implement the required minimization and mitigation measures and to monitor compliance with and the effectiveness of the measures; and
- 5) Issuance of the permit will not jeopardize the continued existence of a State-listed species.

CEQA is the principal statute mandating environmental assessment of projects in California. The purpose of CEQA is to evaluate whether a proposed project may have an adverse affect on the environment and, if so, to determine whether that effect can be reduced or eliminated by pursuing an alternative course of action or through mitigation. CEQA applies to projects proposed to be undertaken or requiring approval by State and local public agencies (http://www.ceres.ca.gov/topic/env_law/ceqa/summary.html). If significant effects are identified, the lead agency has the option to require mitigation through changes in the project or to decide that overriding considerations make mitigation infeasible (CEQA Sec. 21002). Any protection afforded rare or sensitive species or their habitats, through CEQA, are at the discretion of the lead agency involved.

The NCCP program is a cooperative effort between the State of California and numerous private and public partners with the goal of protecting habitats and species. A NCCP identifies and provides for the regional or area-wide protection of plants, animals, and their habitats, while allowing compatible and appropriate economic activity. The program began in 1991 under the State’s NCCP Act (CFG Code 2800-2835). The primary objective of the NCCP program is to conserve natural communities at the ecosystem scale while accommodating compatible land uses (<http://www.dfg.ca.gov/nccp/>). Regional NCCPs provide protection to federally listed species, such as Vail Lake ceanothus, by conserving native habitats upon which the species depend. On June 22, 2004, NCCP Approval and Take Authorization was issued by CDFG for the Western Riverside County Multiple Species Habitat

Conservation Plan (MSHCP). Vail Lake ceanothus is a “Covered Species” under the MSHCP, which is discussed further below.

Federal Protections

Federal laws providing protection to Vail Lake ceanothus include the National Environmental Policy Act (NEPA) and Endangered Species Act (ESA).

NEPA may provide some protection to Vail Lake ceanothus for projects with a Federal nexus (undertaken, funded, or authorized by Federal agencies). NEPA requires that the planning process for Federal actions be documented to ensure that effects on the environment are considered. The NEPA process is intended to help public officials make better decisions based on an understanding of the environmental consequences of their actions and to take actions to protect, restore, and enhance the environment (40 CFR 1500.1). Carrying out the NEPA process ensures that agency decision makers have information about the environmental effects of Federal actions and information on a range of alternatives that will accomplish the project purpose and need. For projects undertaken, funded, or authorized by Federal agencies, NEPA requires that any significant adverse impacts to the human environment, including impacts to the natural and physical environment (40 CFR 1508.14), be considered. For environmental impacts that are significant, the Federal agency must identify means to mitigate these impacts (40 CFR 1502.16); however, NEPA does not require that mitigation alternatives be implemented, only that they be evaluated and disclosed to the public.

The ESA is the primary Federal law providing protection for Vail Lake ceanothus. This protection is afforded primarily through sections 7 and 9 of the ESA. Section 7 of the ESA requires that Federal agencies insure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of listed species or adversely modify their critical habitat. Section 7 also encourages Federal agencies to use their authorities to carry out programs for the conservation of listed species. Section 9 of the ESA prohibits the removal, damage, or destruction of listed plants on Federal lands and on other areas in knowing violation of any State law or regulation or State criminal trespass law.

In 2001, non-jeopardy biological and conference opinions (USFWS 2001, 1-6-00-F-773.2) in accordance with section 7 of the ESA were issued to the USFS on the continued implementation of Land and Resource Management Plans (LRMPs) for the four southern California national forests and for some ongoing activities. These opinions included an analysis of the potential impacts of recreation, fuel break maintenance, and road and trail use and maintenance on Vail Lake ceanothus.

In 2005, non-jeopardy biological and conference opinions (USFWS 2005, 1-6-05-F-773.9) were issued to the USFS that addressed the Revised LRMPs for the four southern California national forests (USDA Forest Service 1986, 1987, 1988, and 1989). These plans included strategic direction in the form of land use zoning and

standards. In the biological opinion for the Revised LRMPs, we concluded that no new permanent loss of occupied habitat is expected. New projects will be implemented so that they promote the recovery of Vail Lake ceanothus. Expansion of facilities or new facilities will be designed to focus public use away from Vail Lake ceanothus. We also concluded that existing ground disturbance due to trails overlaps 1 acre (0.4 hectare) (1 percent) of occupied habitat within the forests, and potential impacts are expected to be minor or negligible due to the low impact nature of the activities involved. Exceptions were included in the plans for fuel treatments in wildland-urban interface areas and to allow for projects with short-term effects and long-term benefits.

At the time of the listing in 1998, the County of Riverside had signed a planning agreement with local, State, and Federal agencies to develop a habitat conservation plan (HCP) to address Vail Lake ceanothus and other listed species in Riverside County. On June 22, 2004, we issued an ESA section 10(a)(1)(B) incidental take permit for the Western Riverside County Habitat Conservation Plan (MSHCP). The MSHCP is a large-scale, multi-jurisdictional NCCP/HCP that addresses 146 listed and unlisted “Covered Species,” including Vail lake ceanothus, within a 1,260,000-acre (510,000-hectare) Plan Area in western Riverside County. The MSHCP was designed to establish a multi-species conservation program that minimizes and mitigates the expected loss of habitat and the incidental take of Covered Species (Dudek and Associates, Inc. 2003).

Participants in the MSHCP include 14 cities in western Riverside County, the County of Riverside, the California Department of Parks and Recreation, and the California Department of Transportation (Caltrans). We granted the participating jurisdictions take authorization of listed species in exchange for their contribution to the assembly and management of the “MSHCP Conservation Area.” Approximately 347,000 acres (140,426 hectares) of existing natural and open space areas (*e.g.*, State Parks, USFS, and County Park lands known as Public/Quasi-Public Lands) and an additional 153,000 acres (61,916 hectares) of new conservation lands (Additional Reserve Lands) will form the 500,000-acre (202,343-hectare) MSHCP Conservation Area.

The precise configuration of the 153,000 acres (61,916 hectares) of Additional Reserve Lands is not mapped or precisely identified in the MSHCP, but rather is based on textual descriptions within the bounds of a 310,000-acre (125,453-hectare) Criteria Area that is interpreted as implementation of the MSHCP proceeds. The three known occurrences of Vail Lake ceanothus on USFS and private lands are all targeted for conservation under the MSHCP.

The Vail Lake Occurrence, located on private lands, is targeted for inclusion as Additional Reserve Lands. The Agua Tibia Wilderness occurrences would be managed in concert with MSHCP objectives through a Memorandum of Understanding with the USFS. The MSHCP is a habitat-based conservation plan, and the specific conservation objectives in the MSHCP for Vail Lake ceanothus provide for conservation and management of at least 13,290 acres (5,378 hectares) of suitable

chaparral habitat and at least three core locations of this species in the vicinity of Vail Lake and the Agua Tibia Wilderness. As noted above, however, this plant is currently known to occupy only about 40 acres (16 hectares), despite extensive surveys of suitable habitat from Black Mountain to the Cleveland National Forest. The conservation strategy in the MSHCP reflects the need for surrounding chaparral and sage scrub to reduce the effects of an increased natural fire regime (see discussion of this threat in 2.3.2.5 below).

The MSHCP requires surveys for Vail Lake ceanothus as part of the review process for public and private projects where one or more of the permittees have discretionary authority for project approval (*e.g.*, where grading permits are required from local jurisdictions for development projects). These surveys are required where projects are proposed in suitable habitat within a defined boundary of the Criteria Area (see Criteria Area Species Survey Area Map, Figure 6–2 of the MSHCP, Volume I, Dudek and Associates, Inc. 2003). For locations with positive survey results, the MSHCP calls for impacts to be avoided within 90 percent of those portions of the property that provide long-term conservation value for the species until it is demonstrated that the conservation objectives for the species are met. This measure is aimed at precluding the loss of newly discovered populations of Vail Lake ceanothus, at least until the species-specific objectives are met.

In the biological opinion for the MSHCP (FWS-WRIV-870.19), we concluded that planned activities covered by the MSHCP in combination with this conservation strategy would not jeopardize the continued existence of Vail Lake ceanothus (USFWS 2004). However, the MSHCP has not yet been fully implemented, as a Memorandum of Understanding with the USFS has not been developed and the largest occurrence located on private lands, the Vail Lake Occurrence, has not been secured through the conservation of the targeted Additional Reserve Lands in the Vail Lake area. Likewise, no planned activities covered by the MSHCP immediately threaten the known occurrence of Vail Lake ceanothus on private lands, although development proposals are apparently still under consideration (A. Krizek pers. comm. 2007). Thus, while a regulatory mechanism exists to reduce the threat of urban development and potentially meet the goals of the MSHCP, the specific conservation objectives for this species have not yet been achieved. Moreover, the permittees have only limited discretionary authority to regulate actions on private lands and no authority within USFS lands.

In summary, while State law offers some protection to this species on private lands through the permit requirements of CESA, the ESA remains an important regulatory mechanism to address existing threats to the known occurrences of the Vail Lake ceanothus on Federal lands. The ESA also provides the primary mechanism for us to work with private landowners and local jurisdictions on voluntary actions, such as the western Riverside County MSHCP, that promote the recovery of the species.

2.3.2.5. Other natural or manmade factors affecting its continued existence:

The final rule listing the species identified hybridization and altered fire regimes as other factors affecting the continued existence of Vail Lake *Ceanothus* (63 FR 54956), and these factors continue to threaten the species.

One of the major threats to Vail Lake *Ceanothus* is hybridization and genetic introgression with the locally common *Ceanothus crassifolius* where the two species co-occur (Boyd *et al.* 1991). Hybridization, the interbreeding between two plants of different taxa, and introgression, the movement of a gene from one species into the gene pool of another by backcrossing an interspecific hybrid (a hybrid between different species within the same genus) with one of its parents, are natural phenomena that commonly occur in plant populations (Ellstrand and Elam 1993). However, these phenomena can threaten rare and sensitive species within small populations. If hybrid progeny plants are viable and vigorous, the sensitive parent species is at risk of assimilation, or loss of its unique genetic characteristics. If the progeny are infertile, then the rare parent species is at risk of outbreeding depression, resulting in decreased seed production and overall fitness (Ellstrand and Elam 1993).

The Vail Lake Occurrence of Vail Lake *Ceanothus* is spatially isolated, by at least 0.2 miles (mi.) (0.32 kilometers (km)), from other *Ceanothus* species. In addition, soils at this location consist of granite and basalt and are unusually rich in pyroxenite. These soils have a high pH, ranging from 7.3 to 7.8. They also have a shallow depth and coarse soil texture, which limits the amount of water available for plant growth, and provides fewer cation exchange surfaces, such that all nutrients at this location may be limiting (U. S. Fish and Wildlife Service *in litt.* 1993). Possibly due in part to the harsh soils at this location, this occurrence appears to be largely a pure stand with a limited number of hybrid individuals at the margins of the population (Boyd *et al.* 1991; Boyd and Banks 1995; Schaffer 1993).

The Wilderness occurrences are located on soils with higher concentrations of clay and less pyroxenite. These soils have a neutral to slightly acidic pH, a moderately deep depth class, a high capacity to hold water, and appear to be less successful at excluding competitive species (U. S. Fish and Wildlife Service *in litt.* 1993). The Wilderness occurrences are surrounded by *Ceanothus crassifolius* and contain more hybrid individuals than the Vail Lake Occurrence. Early estimates of the percentage of hybrids within the Wilderness populations ranged from 1 to 10 percent (Shaffer 1993). However, Boyd and Banks (1995) report that hybrid individuals comprise more than 50 percent of the Northern Wilderness Occurrence. Their estimate is based on the phenotypic observation that the fruiting bodies of these individuals differ slightly from those of *Ceanothus ophiochilus*. At the time this research was conducted, a similar estimate could not be made for the Southern Wilderness Occurrence because individual plants within the occurrence were largely too young to flower and bear fruit due to impacts from the Vail Fire of 1989 (Boyd and Banks 1995).

Increased fire frequency also remains a threat to all three occurrences due to drought conditions, invasive plant species, and increased human presence in the areas where they occur. Vail Lake ceanothus has been affected in recent years by three large-scale fires, two of which have occurred since the final listing rule. Fire is an important part of the life cycle of Vail Lake ceanothus; however, the potential for the alteration of fire regimes is viewed as a threat because the species requires 5 to 25 years between fires to replenish the seed bank (Keeley 1986). Post-fire recruitment monitoring of the Wilderness Occurrences conducted in 2001 and 2002 found a decrease of 29 percent in mean seedlings per m² for the Northern Wilderness Occurrence, which has burned twice within 11 years (USFS 2002a). It is unclear whether the decrease resulted from a depleted seed bank from the more frequent fires or the unusually dry weather in 2002 (USFS 2002a).

2.4. Synthesis

Vail Lake ceanothus is a narrow endemic species, and its entire known range is limited to a small region in southwestern Riverside County. Suitable habitat for the species is very limited, and despite extensive survey efforts there are only three known populations of this species. All three occurrences are nominally protected either by their location on USFS lands or within the boundaries of the western Riverside County MSHCP. The largest occurrence at Vail Lake occupies about 50 percent of the total occupied habitat for the species, which is limited to only 40 acres (16 hectares). The Vail Lake Occurrence is also significant because it appears to be largely a pure stand with a limited number of hybrid individuals at the margins of the population. The Vail Lake Occurrence is on private lands where only limited regulatory protections are provided through CESA and the MSHCP. While targeted for conservation under the MSHCP, this significant objective promoting the recovery of the species has not yet been achieved.

The final rule listing Vail Lake ceanothus identified habitat destruction, alteration, fragmentation, and degradation from urban development, as well as alteration of fire regimes, limited suitable habitat, grading of fuel breaks, and vandalism, as major threats to the species. These remain threats to one or more occurrences of Vail Lake ceanothus and to the survival and recovery of the species. Thus, we conclude Vail Lake ceanothus still meets the Act's definition of endangered, and no change to the status of this species is warranted at this time.

There is a high potential for the recovery of this species if the proposed conservation strategy in the approved Western Riverside County MSHCP can be successfully implemented. However, because limited suitable habitat, grading of fuel breaks, and alteration of fire regimes will continue to threaten the species even after its primary habitat has been conserved, additional activities that support the recovery of Vail Lake ceanothus include creating a recovery plan for the species, working with the USFS to develop a management plan for the species, and introducing the species into areas of suitable habitat where it does not currently occur.

3. RESULTS

3.1. Recommended Classification

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

3.2. New Recovery Priority Number

No change is needed, the recovery priority number for this species should remain “2”, indicating a high degree of threat and a high potential for recovery for a listed species.

4. RECOMMENDATIONS FOR FUTURE ACTIONS

- Coordinate with the Western Riverside Regional Conservation Authority to target acquisition of MSHCP conservation lands in the area west of Vail Lake where the Vail Lake Occurrence of Vail Lake ceanothus is located and to establish land management practices on these lands that will benefit the species.
- Create a recovery plan or recovery outline for the species. Coordinate with experts to incorporate these recommendations into a recovery plan or recovery outline for the species that will provide specific guidance on what must be accomplished for the species to recover.
- Examine areas within the Cleveland National Forest with harsh, phosphorus-deficient soils derived from metavolcanic and ultra-basic parent materials, deeply weathered gabbro, and pyroxenite-rich outcrops, located on ridgetops, and north- to northeast-facing slopes, at elevations of 1,900 to 3,500 feet (579 to 1,067 meters), to determine whether the species could be successfully introduced into these areas. If ongoing spring surveys on Pechanga Tribal Lands do not find new occurrences of the species, coordinate with the Pechanga Band of Luiseno Indians regarding the potential to prepare a Safe Harbor Agreement and introduce the species into areas of suitable habitat on tribal lands.
- Design a research proposal to determine the current distribution of hybrid individuals within the populations following the three recent large-scale fires. Determine whether hybrid individuals are located primarily on the periphery of the populations, or spread throughout the populations. Determine what effect hybrid individuals are having on the populations as a whole, and what can be done to minimize this threat.

- Coordinate with the USFS to both create a management plan for those occurrences of the species that are located within the Cleveland National Forest and conduct maternal line sampling of those occurrences. The management plan should incorporate periodic monitoring and should examine the potential to permanently relocate the fuel break along Old Woodchuck Road such that future fire prevention activities do not cause further harm to this species. Maternal line sampling should be coordinated with botanists from the Rancho Santa Ana Botanic Gardens.

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Personal Communications

We obtained valuable information about *Ceanothus ophiochilus* related issues in 2007 through personal communication with the following people who have expert knowledge about *C. ophiochilus* and/or its habitat.

Steve Boyd, Rancho Santa Ana Botanic Garden

Alisa Krizek, Riverside County

Rick Riefner, self-employed biological consultant

Kirsten Winter, U. S. Forest Service

Lisa Young, U. S. Forest Service

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW OF *CEANOOTHUS OPHIOCHILUS*

Current Classification: Threatened

Recommendation resulting from the 5-Year Review:

- Downlist to Threatened
 Uplist to Endangered
 Delist
 No change needed

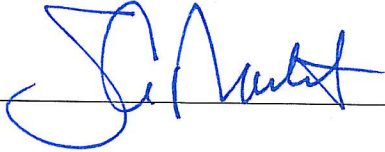
Appropriate Listing/Reclassification Priority Number, if applicable: NA

Review Conducted By: Karen A. Goebel and Sally D. Brown

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve



Date

July 15, 2008

REGIONAL OFFICE APPROVAL:

Lead Regional Director, Fish and Wildlife Service

Approve



Date

July 21, 2008