

*(Pentachaeta lyonii)*  
**Lyon's pentachaeta**

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



photo by C. Hamilton, U.S. Fish and Wildlife Service

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

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**5-YEAR REVIEW**  
*Pentachaeta lyonii* (Lyon’s pentachaeta)

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**5-YEAR REVIEW**  
***Pentachaeta lyonii* (Lyon's pentachaeta)**

**1. GENERAL INFORMATION**

**1.1. Reviewers**

Lead Regional or Headquarters Office: Region 8; Jenness McBride, Fish and Wildlife Biologist; (916) 414-6613; and Diane Elam, Deputy Division Chief for Listing, Recovery, and Habitat Conservation Planning (916) 414-6453

Lead Field Office: Ventura Fish and Wildlife Office; Christine Hamilton and Mark A. Elvin, Fish and Wildlife Biologists, (805) 644-1766; and Connie Rutherford, Listing and Recovery Coordinator, (805) 644-1766

**1.2. Methodology used to complete the review:**

This review was conducted by staff of the Ventura Fish and Wildlife Office (VFWO), and is based on published and unpublished literature, discussions with species experts, and VFWO files.

**1.3. Background:**

**1.3.1. FR Notice citation announcing initiation of this review:** On February 14, 2007, the U.S. Fish and Wildlife Service announced initiation of the 5-year review for *Pentachaeta lyonii* and asked for information from the public regarding the species' status (72 FR 7064). No information was received as a result of this request.

**1.3.2. Listing history**

Original Listing

FR notice: 62 FR 4172

Date listed: January 29, 1997

Entity listed: species (*Pentachaeta lyonii*)

Classification: Endangered

**1.3.3. Associated rulemakings:** Critical habitat for this species was designated on November 14, 2006 (71 FR 66374), and comprises 3,396 acres (1,372 hectares) in Ventura and Los Angeles Counties.

**1.3.4. Review History:** No formal status reviews have been completed since the time of listing. However, the status of the species was reviewed during preparation of the recovery plan, prepared in 1999, the proposed critical habitat designation published on November 10, 2005 (70 FR 68982), and the final critical habitat designation published on November 14, 2006 (71 FR 66374).

**1.3.5. Species' Recovery Priority Number at start of 5-year review:** *Pentachaeta lyonii* has been assigned a recovery priority of 2, meaning that this species has a high degree of threat but also a high potential for recovery.

**1.3.6. Recovery Plan or Outline**

**Name of plan or outline:** Recovery plan for six plants from the mountains surrounding the Los Angeles Basin.

**Date issued:** September 30, 1999

**Dates of previous revisions, if applicable:** N/A

**2. REVIEW ANALYSIS**

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

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

**2.2. Recovery Criteria**

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

Yes  
 No

**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  
 No

**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

\_\_\_ No

**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):**

The recovery plan (U.S. Fish and Wildlife Service (Service)1999) states that *Pentachaeta lyonii* should be evaluated for downlisting to threatened when 10 populations of 10,000 or more plants from current sites meet the four criteria listed below. The species should be evaluated for delisting when 20 populations of 10,000 or more plants meet the same criteria. We believe that this criterion is adequate and appropriate to the recovery of the species, although it is difficult to determine if a population has 10,000 or more plants because *P. lyonii* exhibits large annual fluctuations in population size (Keeley and Baer-Keeley 1992). However, there are 10 populations that have contained 10,000 or more plants for at least one season in the last 15 years (since 1992; Appendix A). Therefore, the species meets the population criteria for evaluation for reclassification to threatened status. However, these populations do not meet all of the four criteria listed below.

1) Fully protected and managed with the primary intention of preserving the populations in perpetuity (addresses Factors A and D). We believe that this criterion is adequate and appropriate to the recovery of this species. Five of the 10 populations that contained 10,000 or more plants for at least one season in the last 15 years (since 1992) are known to be fully protected and managed in perpetuity (California Natural Diversity Data Base (CNDDDB) 2008). The remaining 5 populations are on private properties that are not known to be fully protected. Therefore, this criterion for delisting or downlisting has not been met.

2) Shown to be self-sustaining over a minimum of 15 years or longer (depending on whether the data continue to suggest large fluctuations in population size are characteristic of the species) (addresses Factor A). We believe that this criterion is adequate and appropriate to the recovery of this species. The data indicate that large annual fluctuations in population size are characteristic of *Pentachaeta lyonii*; however, because this is an annual plant, 15 years is likely sufficient to demonstrate that a population is self-sustaining because it would represent up to 15 generations of the plant, and could incorporate at least two drought cycles and other climactic variations. Of the 10 populations that have 10,000 or more plants, 7 have been self-sustaining for at least 15 years. The remaining 3 populations with 10,000 or more plants were discovered less than 15 years ago, so it is unknown how long they have persisted (CNDDDB 2008). Therefore, this criterion for delisting or downlisting has not been met. All of the 10 populations show fluctuations in population size, but none show a declining trend, suggesting that all are self-sustaining, although survey data are limited (CNDDDB 2008).

Population declines have generally occurred within the smaller populations (i.e., less than 1,000 plants; CNDDDB 2008).

3) Seed collected from all populations is stored at a certified Center for Plant Conservation botanic garden (addresses Factor E). We believe that this criterion is adequate and appropriate to the recovery of this species. Seed has been collected from only four populations and stored at Rancho Santa Ana Botanical Gardens. Therefore, this criterion has not been met.

4) Reliable seed germination and propagation techniques for the species are understood (addresses Factor E). We believe that this criterion is adequate and appropriate to the recovery of this species, and this criterion has been met. *Pentachaeta lyonii* seeds have been collected from the wild and successfully propagated on several occasions. In a study conducted by Fotheringham and Keeley (1998), growth response to differing substrates, shading, and soil moisture was examined for *P. lyonii* grown in pots. Competition with other plant species was examined by Pucchi (2007) for *P. lyonii* grown in pots.

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

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

*Pentachaeta lyonii* is an annual plant in the Asteraceae (Sunflower family). Its yellow flower heads bloom in late spring (April to June) on stems that grow up to 48 centimeters (18 inches) tall. Each plant produces 30 or more flower heads, and each of which produces 20 to 40 seeds; therefore, in a favorable year, one plant may produce on the order of 1,000 seeds. The seeds likely persist in the soil for several years during extended dry spells (Fotheringham and Keeley 1998).

Seeds are dispersed by a variety of vectors, some of which result in short-distance dispersal, and others which result in long-distance dispersal (Cain et al. 2000). The presence of deciduous pappus bristles on the seeds indicates that the plant does not exhibit long-distance dispersal by wind, as do many other species in this family, reducing the likelihood of colonization into new areas and contributing to limited distribution of the species (Keeley and Baer-Keeley 1992; Fotheringham and Keeley 1998). However, long-distance dispersal, when it occurs, is likely achieved by transport of seeds by wildlife. Seeds from species within the Asteraceae family are known to be transported by small seed-eating mammals, including ground squirrels (*Citellus* sp.), pocket mice (*Perognathus* sp.), kangaroo rats (*Dipodomys* sp.), and birds, including quail (*Lophortyx* sp.) (Martin et al. 1961). Small mammals facilitate seed dispersal through consumption and elimination of undigested seed and through seed caching (Cain et al. 2000, Sieg 1987).

*Pentachaeta lyonii* is not capable of self-pollination, but is dependent upon insect pollinators for seed production (Fotheringham and Keeley 1998). Known

pollinators include digger bees (Family Apidae), andrenid bees (*Andrena* sp.), and megachilid bees (*Ashmeadiella californica californica*) (Fotheringham and Keeley 1998, Braker and Verhoeven 1998). These pollinators are polylectic, meaning that they utilize several plant species within an area, and a variety of plants are needed to sustain pollinator populations (Braker and Verhoeven 1998).

**Habitat:** *Pentachaeta lyonii* occurs in saddles between hills, on the tops of small knolls, or in flat areas at the base of slopes at elevations ranging from 280 to 2,060 feet (85 to 628 meters) (Fotheringham and Keeley 1998, CNDDDB 2008). It tends to occur in a patchy distribution on rocky clay soils of volcanic origin (Baier & Associates 1991, Impact Sciences 2003), within pocket grasslands that mosaic with fire-adapted chaparral and coastal sage scrub communities, although seeds do not require fire-related cues (i.e., heat, smoke, and charates) to germinate (Keeley and Baer-Keeley 1992, Keeley 1995). It does not compete well with dense annual grasses or shrubs, but occurs where there is a majority of bare ground (greater than 60 percent) and low proportion of vegetative cover (less than 25 percent) (Keeley 1995, Fotheringham and Keeley 1998).

In 2003-2005, the National Park Service (NPS) conducted a study to evaluate impacts of non-native plants on *Pentachaeta lyonii*, and to determine effective restoration techniques (Brigham et al. 2006, Pucchi 2007). This study included restoration of a degraded site with a declining population, reintroduction of an extirpated site, and the introduction of *P. lyonii* to a new site on NPS land. They found that extirpated sites had greater presence of invasive annual grasses than sites where the species persisted (Brigham et al. 2006), supporting the finding that *P. lyonii* is outcompeted by invasive grasses, and that habitat degradation or modification that favors annual grasses is a threat to the species.

In the final critical habitat rule, published November 14, 2006 (71 FR 66374), the primary constituent elements required to sustain the essential life history functions of *Pentachaeta lyonii* were listed as: 1) clay soils of volcanic origin; 2) exposed soils that exhibit a microbiotic crust which may inhibit invasion by other plant competitors; and 3) a mosaic of bare ground (greater than 10 percent) patches in an area with less than 60 percent cover.

**Distribution:** *Pentachaeta lyonii* is endemic to coastal southern California and currently only occurs in the Santa Monica Mountains in eastern Ventura and western Los Angeles Counties and in the western Simi Hills in Ventura County (CNDDDB 2008), ranging over a distance of about 24 kilometers (km) (15 miles (mi)). Based on historical records, it once occurred on the Palos Verdes Peninsula and on Santa Catalina Island; the species has not been seen at these locations since 1910 and 1931, respectively, and is assumed to be extirpated (CNDDDB 2008, Consortium of California Herbaria 2008).

**Abundance and population trends:** Population boundaries exhibit annual fluctuations, although *Pentachaeta lyonii* may generally remain within core areas

that contain suitable microsite characteristics (Keeley and Baer-Keeley 1992). It persists in stable populations without disturbance if site conditions such as exposed soils that exhibit a microbiotic crust (Belnap 1990) inhibit the growth of shrubs and grasses, or it may require periodic disturbances to remove plant competitors (Fotheringham and Keeley 1998).

At the time of listing in 1997, there were approximately 31 known occurrences of *Pentachaeta lyonii* (62 FR 4172). Two of these were extirpated after listing, and an additional four are presumed extirpated, although in most cases the habitat remains and is degraded or altered (CNDDDB 2008). Five new occurrences were reported since the time of listing; four of these are in the Santa Monica Mountains and one is in the western Simi Hills along Montclef Ridge (CNDDDB 2008). Currently, there are 30 presumed extant occurrences (CNDDDB 2008, Appendix A). Several occurrences are reported as declining (NPS unpublished data 2007, Pucci 2007).

**Genetics:** Arias et al. (no date) examined genetic variability within populations and genetic diversity among populations for *Pentachaeta lyonii*. They found that most populations were genetically similar to each other, and there were very low levels of genetic variation among individuals within populations, which is expected for species with a restricted range and habitat such as *P. lyonii* (Ellstrand and Elam 1993). The one exception to this was the “Agoura Ranch” population, which is one of the easternmost populations that occurs in Agoura Hills, Los Angeles County. This large population was found to be genetically distinct from the other populations, and exhibited greater genetic variability within the population in comparison to the other populations Arias et al. (no date). This finding suggested that special effort should be made to preserve the Agoura Ranch population *in situ*.

**Taxonomy:** No name changes or changes in taxonomic relationship have been made since listing.

### **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, the primary threats to *Pentachaeta lyonii* were destruction of habitat from urban development. An indirect threat to the species was the influence of urban development on the surrounding environment, which facilitated the introduction of competitive weeds and altered ecosystem processes. Effects of urban development include habitat fragmentation, which reduces gene flow between sites, reduces insect pollinators, and displaces *P. lyonii* as a result of changes to the structure and composition of pocket grassland communities (i.e., introduction of competitive weeds, changes in local hydrology, and increased gopher activity) (Alberts et al. 1993, Conservation Biology Institute 2000). Gophers are known to till the soil and can facilitate the growth of annual



grasses. One site was extirpated in 1993 after the site was burned and non-native annual grasses and gophers became prevalent at the site (CNDDDB 2008).

**Land ownership:** Of the 30 known occurrences, 21 (70 percent) of these are on private lands, eight (27 percent) are on local agency lands (i.e., city and regional parks and a water district), and one (3 percent) is on Federal land (Santa Monica Mountains National Recreation Area) (CNDDDB 2008; Appendix A).

Direct and indirect threats from urban development still remain, given that most occurrences are in the vicinity of urban areas, and the majority of occurrences (21 of 30) are located on private lands, much of which is suitable for development (Pucchi 2007). Competition with nonnative invasive plants has probably had the most serious indirect impact from urban development on the plant. At least two occurrences have been extirpated since listing (although the habitat remains), as a result of habitat degradation from land use activities such as discing of fire management zones, and indirect effects of nearby urban developments (CNDDDB 2008).

The Agoura Ranch population may be indirectly impacted by a proposed housing development. Potential impacts to *Pentachaeta lyonii* from this development have been analyzed in a biological opinion, dated May 24, 2007 (Service 2007). There will be no direct removal of *P. lyonii*, and the entire occupied area (8.8 acres) will be preserved and managed within a 250-acre open space. However, approximately 20 percent of the total area occupied by *P. lyonii* (1.81 acres) on the property occurs within the fuel modification zone (500 feet beyond the development footprint). Indirect effects may occur as a result of the proposed development or activities within the fuel modification zone. Some of these effects may be reduced or eliminated by a Fire Management Plan and a Master Landscape Plan that will be implemented by the project proponent.

**2.3.2.2. Overutilization for commercial, recreational, scientific, or educational purposes:** This was not identified at the time of listing as a threat, and is not currently considered a threat.

**2.3.2.3. Disease or predation:** This was not identified at the time of listing as a threat, and is not currently considered a threat.

**2.3.2.4. Inadequacy of existing regulatory mechanisms:** Inadequacy of existing regulatory mechanisms was identified in the final listing document as a threat in determining endangered status for *Pentachaeta lyonii*. The species is listed as endangered under the California Endangered Species Act (CESA). Although CESA prohibits “take” of State-listed plants, this appears to be inadequate to protect against the taking of plants via habitat modification or land use change by landowners. After the California Department of Fish and Game (CDFG) notifies a landowner that a State-listed plant grows on his or her property, CDFG Code only requires that the landowner notify CDFG “at least 10

days in advance of changing the land use to allow salvage of such plant” (chapter 10 sec. 1913). Determinations by local lead agencies under the California Environmental Quality Act (CEQA) have resulted in negative impacts to *P. lyonii* (62 FR 4172). Because the intent of CEQA is to disclose project impacts, proposed mitigation measures do not necessarily guarantee protection and conservation of sustainable populations of *P. lyonii*.

The provisions of the Endangered Species Act helped to secure partial protections for two occurrences on private properties that were proposed for development. In order to obtain authorization from the U.S. Army Corps of Engineers’ (Corps), under the authority of section 404 of the Clean Water Act, these proposed development projects were subject to section 7 consultation requirements of the ESA. As a result, the lands where both populations occur were or will be protected in perpetuity, although both are subject to indirect effects from the nearby housing developments.

One population of *Pentachaeta lyonii* is located on NPS land within Santa Monica Mountains National Recreation Area (SMMNRA). The SMMNRA was established in 1978 in part to protect one of the last remaining examples of Mediterranean-type ecosystems in the world (PL 95-625). The NPS Organic Act of 1916 (39 Stat. 535, 16 U.S.C. 1, as amended), states that the National Park Service “shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations . . . to conserve the scenery and the national and historic objects and the wildlife therein . . .” The NPS Organic Act as well as NPS natural resources management guidelines would most likely provide some level of protection for this population even in the absence of listing under the ESA.

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

**Fire:** Despite efforts to suppress fires in coastal southern California, the present fire frequency of every 15 years or less, is substantially higher than it was historically, which is thought to be every 50 to 100 years (Keeley 2006). Over a period of 60 years, most of the Santa Monica Mountains burned an average of three to five times, with an average interval of every 12.4 to 20.7 years (Radtke et al. 1982). This current fire frequency may have negatively impacted *Pentachaeta lyonii* by displacing chaparral and coastal sage scrub communities with annual invasive grasses that displace *P. lyonii*. In addition, fire prevention and suppression activities such as spraying fire retardant and discing the soil around urban development remains a threat because it facilitates the growth of annual grasses.

**Human recreation:** Some light recreation is thought to be compatible and even beneficial to the species. Trails create a zone of compacted soils, and may reduce competition from annual grasses and allow *Pentachaeta lyonii* to grow. One of the largest populations, with a population of 100,000 plants reported, occurs

alongside a popular trail (CNDDDB 2008). However, higher intensity uses such as equestrian or vehicle use is a threat to the species. A portion of the population on NPS land was severely reduced after an increase in equestrian use (CNDDDB 2008). The remaining portions of the population have been fenced and have shown some signs of recovery (NPS unpublished data 2007).

***Stochastic extinction:*** Ten of the 30 known occurrences have greater than 10,000 plants; the remaining populations are small, with several reported at less than 1,000 plants (CNNDDB 2008; Appendix A). The small populations are vulnerable to extirpation by demographic, environmental, and genetic stochasticity, and natural catastrophes (Shaffer 1981). Demographic stochasticity is random variability in survival or reproduction among individuals within a population (Shaffer 1981), and could play a role in the extirpation of small populations of *Pentachaeta lyonii*. Environmental stochasticity refers to annual variation in birth and death rates in response to weather, disease, competition, predation, or other factors external to the population (Shaffer 1981). This could play a role in extirpations of small populations because the species exhibits large annual fluctuations in population size, probably in response to external factors such as rainfall and competition with other plant species.

Genetic stochasticity results from changes in gene frequencies due to founder effect, random fixation, or inbreeding (Shaffer 1981). The low levels of genetic variation among and within populations (Arias et al. no date) could impair the species' ability to adapt to changes in the environment or contribute to inbreeding depression (i.e., loss of reproductive fitness or vigor). Natural catastrophes such as fire, landslide, or prolonged drought could result in extirpation of populations (Shaffer 1981). The entire range of *P. lyonii* occurs within a distance of 24 km (15 mi); therefore, all populations would be expected to experience similar rainfall patterns or could be affected by a single fire.

***Climate change:*** Current climate change predictions for terrestrial areas in the Northern Hemisphere indicate warmer air temperatures, more intense precipitation events, and increased summer continental drying (Field et al. 1999, Hayhoe et al. 2004, Cayan et al. 2005, Intergovernmental Panel on Climate Change (IPCC) 2007). Recently, the potential impacts of climate change on the flora of California were discussed by Loarie et al. 2008). Based on modeling, they predicted that species' distributions will shift in response to climate change, specifically that the species will "move" or disperse to higher elevations and northward, depending on the ability of each species to do so. Species diversity will also shift in response to these changes with a general trend of diversity increases shifting towards the coast and northwards with these areas becoming de facto future refugia. The Santa Monica Mountains is expected to increase in diversity becoming one of these potential future refugia (Loarie et al. 2008). These increases in species diversity in the refugia, due to climate change, have the potential to result "...in new species mixes, with consequent novel patterns of competition and other biotic interactions..." to the species present (Loarie et al.

2008) with unknown consequences to the species present. We recognize that climate change is an important issue with potential effects to listed species and their habitats. While we lack adequate information to make specific and accurate predictions regarding how climate change, in combination with other factors such as small population size, will affect *Pentachaeta lyonii*, small ranged species, such as *Pentachaeta lyonii*, are more vulnerable to extinction due to these changing conditions (Pimm and Raven 2000, Loarie et al. 2008).

#### 2.4. Synthesis

Since the time of listing, two occurrences were extirpated, and an additional four may have been extirpated, for a total of 20 percent of known populations. Five new occurrences have been reported since listing; however, given the species' limited dispersal capability, it is unlikely that these occurrences are recently established populations. All of the new occurrences were within the same geographic area and habitat as known occurrences, so these discoveries do not reveal a larger range than previously thought.

The majority of currently known extant occurrences, 21 of 30, are on private lands, and do not have any protection measures in place. Therefore a majority of the occurrences of this species could be threatened by indirect or direct effects from existing or future urban development, recreational activities, and/or fire. Recent studies have clearly illustrated that any habitat modification that facilitates the spread of invasive annual grasses in the vicinity of *Pentachaeta lyonii* is a threat to the species and the likely cause of most population declines. Based on the limited survey data, it appears as if population declines have been limited to the smaller populations (i.e., less than 1,000 plants), which may be due to impacts of urban development and/or invasive annuals. The 10 large populations (i.e., 10,000 or more plants) have not shown population declines, although 5 of these are on public lands that are fully protected and managed in perpetuity, while the 5 large populations on private property could remain threatened with extirpation.

The range of *Pentachaeta lyonii* remains extremely limited and most populations are small enough that they are vulnerable to stochastic factors alone. In addition, known threats, including the spread of invasive annual grasses associated with urban development and other land activities, and the potential for habitat modification to impact the majority of populations that occur on private lands, indicate that the species remains in danger of extinction throughout a significant portion of its range. In addition, habitat modification due to fire also may affect populations on conserved lands. Therefore, we recommend that the status of *P. lyonii* remain unchanged from endangered.

### 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

### 4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

- 1) Monitor *Pentachaeta lyonii* populations to detect declines. Control and prevent establishment of invasive annual grasses within and near known populations.
- 2) Work with the NPS to introduce populations of *P. lyonii* to suitable habitat within the Santa Monica Mountains National Recreation Area.
- 3) Work with private landowners and local agencies to protect and manage *P. lyonii* on private property. If development is proposed or planned near *P. lyonii*, recommend measures to protect the species such as creating large buffer zones between development and plants and invasive plant prevention and control.
- 4) Work with local fire departments to prevent or limit discing of soil in fire management zones near *P. lyonii* habitat to prevent the spread of invasive annuals.

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Appendix A. Occurrences of *Pentachaeta lyonii*

| CNDDB Occurrence # | Location                   | Status                               | Number of Individuals (Year)  | Site Owner/ Manager                              |
|--------------------|----------------------------|--------------------------------------|---|--|
| 1                  | Point Fermin               | Possibly extirpated [before listing] | No data (1908), 0 (1997)  | Unknown  |
| 2                  | Palos Verdes Mt            | Extirpated [before listing]          | No data (1910) , 0 (1997)   | Unknown  |
| 3                  | Stunt Ranch                | Extirpated before listing            | <1,000 (1982), <100 (1984), <10 (1987), 12 (1988), 3 (1989), 0 (1990), 0 (1995), 0 (2005)   | University of California Natural Reserve System  |
| 4                  | Saddle Rock Ranch          | Extirpated [before listing]          | No data (1964) , 0 (1997)   | Private  |
| 5                  | Westlake Blvd              | Extirpated before listing            | <100 (1982), <100 (1984), 0 (1987), 0 (1990), 0 (1997)  | Private  |
| 6                  | Rocky Oaks                 | Declining                            | 10,000 (1982), <10,000 (1984), <100 (1987), <1000 (1988), 250 (2000), 450 (2003), 450 (2004), 800 (2004), 1,769 (2005)  | National Park Service                            |
| 7                  | Wilmington                 | Possibly extirpated [before listing] | No data (unknown), 0 (1997)   | Unknown  |
| 8                  | Santa Catalina Island      | Possibly extirpated [before listing] | No data (unknown), 0 (1997)   | Private  |
| 9                  | Malibu Creek State Park    | Extirpated before listing            | <100 (1983), <50 (1984), 3 (1988), 0 (1987), 0 (2000)   | California Department of Parks and Recreation    |
| 10                 | West side of Westlake Blvd | Stable                               | >1,000 (1983), ~1,000 (1987), >1,000 (1988), >1,000 (1990), 6,080-9,100 (1991), 7,500 (1992), 40 (2000), 24,202 (2000), 92,700 (2001), 342,644 (2002)             | Conejo Open Space Conservation Authority (COSCA) |
| 11                 | Ridge above Lake Eleanor   | Stable                               | SW <100 (1983), 0 (1987), <100 (1992), 200 (1996), 10 (1997) N POLY, 1,000 (1998), SE 8,000-9,000 (1999), 2,400 (2000), 9,690 (2003), 13,200 (2004), 9,032 (2006) | COSCA, Private                                   |
| 12                 | Wildwood Park              | Stable                               | >1,000 (1984), >1,000 (1987), >1,000 (1988), 1,200 (1996), 1,200 (1997), 550 (2000), 37 (2003), 1,000 (2004)  | COSCA  |
| 14                 | Wood Ranch                 | Stable or declining                  | 400 (1989), 500 (1996), 250 (2000)  | Private  |
| 15                 | Lake Sherwood              | Stable                               | 4,076 (1990), 3,999 (1993), 3,527 (1996)  | Private  |
| 16                 | Lake Sherwood, North       | Stable                               | 330 (1990), 250 (2001), 113 (2002), 387 (2002)  | Private  |

|         |                                 |                                       |   |   |
|---------|---------------------------------|---------------------------------------|---|---|
| 17      | Upper Carlisle                  | Stable                                | > 200 (1993), <1,000 (1994), 1,000 (1998)   | Private   |
| 18      | Eagles Nest Mullholland Highway | Stable                                | 200 (1989), 3,000 (2000)  | Private   |
| 19      | Lake Sherwood Southwest         | Unknown or Extirpated after listing   | 3,200 (1987), 200 (1988), 40 (1992) 7 (1993), 1 (1994)                                      | Private   |
| 20      | South of Olsen Road             | Stable                                | 200 (1988), 3,000 (2000)  | Private   |
| 21      | North of Olsen Road             | Extirpated after listing              | 20 (1991), 100 (1994), 0 (2000)   | Private   |
| 22      | Seventh-day Adventist           | Extirpated after listing              | 50-100 (1991), 200 (1993), 0 (2000)   | Private   |
| 23      | Newbury Park Academy            | Declining                             | 200 (1991), >1,000 (1993), 20,000 (1998), 3,675 (2000), 1,270 (2003)                        | Private   |
| 24      | Lynnmere                        | Stable                                | 500 (1991), 2,000 (1996), 3,100 (2000), 1,270 (2003), 8,000 (2004), 12,702 (2006)           | COSCA   |
| 25      | Montclef Peak                   | Stable                                | 200 (1994), 600 (1996), 1,200 (1998), 2,000 (2000)  | Private   |
| 26      | Baldwin Westlake                | Declining or extirpated after listing | >5,000 (1992), 3,000 (1996), 0 (2000)   | Private   |
| 27      | Baldwin Westlake                | Stable                                | >5,000 (1992), 10,000 (1996), 37,300 (2000), >100,000 (2003), 165,000 (2004), 97,016 (2006) | Mountains Recreation and Conservation Authority |
| 28      | Lake Eleanor Hills              | Stable                                | >6,000 (1991), 7,500 (1992), 2,000 (1996), 18,000 (2000)                                    | Private   |
| 29      | Reagan Library                  | Extirpated before listing             | <500 (1994), 0 (1996), 0 (2000)   | Private   |
| 30      | Carlsberg                       | Stable                                | 1,000 (1991), 230,000 (1997), 4,000 (2000), 26,500 (2004)                                   | Private   |
| 31      | Clovercast                      | Unknown                               | 60 (1991), 0 (2000)   | Private   |
| 32      | Bridgeway                       | Unknown                               | 11,050 (1991), 7,000 (1996), 200 (2000), 0 (2003)   | Private   |
| 33 & 34 | Triangle Ranch                  | Stable                                | 4,000 (1992), 1,000 (1996), 3,764,680 (1999), 1,500 (2000), 530,000 (2003)                  | Private   |
| 35      | Malibu Lake                     | Stable                                | 5,000 (1996), 100,000-200,000 (1998), 150 (2003), 72,473 (2004), 369,000 (2005)             | Private   |
| 36      | Hill Canyon                     | Unknown or Extirpated after listing   | 30 (1996), 0 (2000)   | Private   |
| 37      | North                           | Unknown or Extirpated after listing   | 1,200 (1995), 0 (2000)  | Private   |

|         |                   |                     |   |                                      |
|---------|-------------------|---------------------|---|--------------------------------------|
| 38      | Conejo Ridge      | Unknown             | 3,000 (1996)                              | Conejo Recreation and Parks District |
| 39      | Conejo Ridge      | Unknown             | 43 (1998)                                 | City of Thousand Oaks                |
| 41      | San Pedro         | Possibly extirpated | No data (1889)                            | Unknown                              |
| NEW     | Central           | Unknown             | No data                                   | Private                              |
| NEW     | Mullholland Crest | Unknown             | >10,000 (2003)                            | Mountains Restoration Trust          |
| NEW     | Mullholland Crest | Unknown             | No data                                   | Private                              |
| NEW 107 | Mullholland Crest | Stable              | 5,000 (2003), 1,130 (2004), 16,200 (2005) | Private                              |

**U.S. FISH AND WILDLIFE SERVICE**  
**5-YEAR REVIEW of Lyon's pentachaeta (*Pentachaeta lyonii*)**

**Current Classification:** Endangered

**Recommendation resulting from the 5-Year Review:**

Downlist to Threatened

Uplist to Endangered

Delist

No change needed

**Appropriate Listing/Reclassification Priority Number, if applicable:** N/A

**Review Conducted By:** Christine Hamilton and Mark Elvin

**FIELD OFFICE APPROVAL:**

Lead Field Supervisor, Fish and Wildlife Service

Approve Diane K. Nole Date 9/29/08

**REGIONAL OFFICE APPROVAL:**

Lead Regional Director, Fish and Wildlife Service

Approve Mark Elvin Date 9/30/08