Taraxacum californicum
(California taraxacum)

Five-Year Review:
Summary and Evaluation

Photo by Scott Eliason

U.S. Fish and Wildlife Service/
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92011-4213

March 2008

Five-YEAR REVIEW

Taraxacum californicum (California taraxacum)

TABLE OF CONTENTS

FIVE-YEAR REVIEW
Taraxacum californicum (California taraxacum)

Taraxacum californicum is a thick-rooted perennial herb in the sunflower family (Asteraceae). Individual plants are less than 20 centimeters (8 inches) tall, with leaves arranged in basal rosettes and light yellow flowers clustered in heads on leafless stalks. This species occurs in the San Bernardino Mountains at elevations from 5,300 to 9,000 feet (1,600 to 2,800 meters in San Bernardino County, California. Twenty-four occurrences are distributed discontinuously from the Holcomb and Big Bear valleys south to South Fork Meadows in the Santa Ana River watershed. Suitable habitat includes vernally wet montane meadows without closed tree canopy or other montane wetland areas dominated by wetland-associated grasses in forest openings.

1. GENERAL INFORMATION

1.1. Reviewers:

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

Lead Field Office: Stacey Love, Carlsbad Fish and Wildlife Office, (760) 431-9440.

Cooperating Field Office (s): Not applicable.

1.2. Methodology used to complete the review: This review was conducted by Stacey Love at the Carlsbad Fish and Wildlife Office, U.S. Fish and Wildlife Service (Service). We relied on our 1998 listing rule and reports and information in our files, or obtained from interviews with individuals involved in surveys, research, or management of this plant. The species status and threats at the time of listing are compared to current status and threats.

1.3. Background

1.3.1. FR Notice citation announcing initiation of this review: A notice announcing initiation of the five-year review for this species and the opening of a 60-day public information request period was published in the Federal Register on February 14, 2007 (72 FR 7064). We did not receive any information relative to this species.

1.3.2. Listing history

Original Listing
FR notice: 63 FR 49006 (September 14, 1998).
Date listed: October 14, 1998
Entity listed: *Taraxacum californicum* (California taraxacum), a plant species.
Classification: Endangered

1.3.3. Associated rulemakings: Proposed critical habitat for *Taraxacum californicum* was published in the Federal Register on August 7, 2007 (72 FR 44232).

1.3.4. Review History: None.

1.3.5. Species' Recovery Priority Number at start of five-year review: The recovery priority number for this plant is "5" according to the 2006 Recovery Data Call for the Carlsbad Fish and Wildlife Office. This indicates that this plant faces a high degree of threat and has a low recovery potential.

1.3.6. Recovery Plan or Outline

To date, a recovery plan has not been prepared for *Taraxacum californicum*.

2. REVIEW ANALYSIS

2.1. Application of the 1996 Distinct Population Segment (DPS) policy: This policy is not applicable to plant species. The Endangered Species 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? No.

2.3. Updated Information and Species Current Status

2.3.1. Biology and Habitat

Biology and Life History

Taraxacum californicum is a thick-rooted perennial herb. Individual plants are 5 to 20 centimeters (cm) (2 to 8 inches (in)) tall, with leaves arranged in basal rosettes (cluster of leaves radiating from the center and close to the ground), light green, oblanceolate (much longer than broad, with rounded apex and tapering base), nearly entire to sinuate-dentate (wavy toothed) from 5 to 12 cm (2 to 5 in) long and 1 to 3 cm (0.4 to 1.2 in) wide. The light yellow flowers are clustered in heads on leafless stalks. The outer phyllaries (bracts of the inflorescence) are erect, lance-ovate and 5 to 7 millimeters (mm) (0.2 to 0.3 in) long while the inner phyllaries are lance-linear, and 12 to 15 mm (0.5 to 0.6 in) long. Plants flower from May to August. *Taraxacum californicum* is distinguished from the nonnative member of this genus within its range by its lighter green foliage, sub-entire

leaves, stocky cylindrical heads with truncate bases, erect phyllaries, paler yellow flowers, and small fruits (Munz and Johnston 1925, pp. 227-228; Stebbins 1993, p. 350).

Habitat Affinities

In the listing rule, *Taraxacum californicum* was reported to occur in moist meadow habitats in the San Bernardino Mountains at elevations from 6,700 to 9,000 feet (2,000 to 2,800 m), often associated with the endangered *Poa atropurpurea* (San Bernardino bluegrass). According to the listing rule, these taxa are restricted to the relatively open edges or meadow margins apart from more mesic plants such as *P. pratensis* (Kentucky bluegrass), *Carex* spp. (sedges), or *Juncus* spp. (rushes). The perimeter of such meadows often intergrades with sagebrush scrub dominated by sagebrush or pine forest (63 FR 49006, p. 49009).

Since listing, the description of suitable habitat for *Taraxacum californicum* was refined by the San Bernardino National Forest (SBNF), U.S. Forest Service (USFS), in their Meadow Habitat Management Guide (SBNF 2002, pp. 15, 149-150). According to the management guide, *T. californicum* occurs from 5,300 to 9,000 feet (1,600 to 2,800 meters). Occupied sites tend to be relatively flat and may occur along perennial streams (SBNF 2002, p. 15). Suitable habitat includes vernally wet montane meadows without closed tree canopy or other montane wetland areas dominated by wetland-associated grasses in forest openings (SBNF 2002, pp. 149-150). Additionally, Scott Eliason, District Resource Botanist at the SBNF, observed that *T. californicum* occurs inside the perimeter of meadows in wetter areas of the meadow and may not be as closely associated with *Poa atropurpurea* and meadow margins as previously thought. He also observed that *T. californicum* does appear to prefer open patches of meadow habitat (S. Eliason, SBNF, pers. comm. 2007a, p. 1).

Habitat Conditions

As noted in the listing rule, significant loss of meadow habitats in the Bear Valley began in the late 1880's with the construction of a dam that resulted in the formation of Big Bear Lake. Prior to construction of the dam, approximately 15,300 acres (6,177 hectares) of meadow/grassland were mapped within a majority of the range of *Taraxacum californicum*, including the Big Bear Valley region and to the south in the Big Meadow area of the Santa Ana River (Leiberg 1900, pl. 147). By 1932 approximately 2,900 acres (1,171 hectares) remained, an 81 percent decrease (CFRES 1932, p. 1). Krantz (1990) estimated that there are less than 1,000 acres (400 hectares) of meadow habitat remaining across the largest portion of the range which includes Big Bear and Holcomb valleys (Krantz 1990, p. 20). Approximately 91 percent of all meadow habitat in those areas has been destroyed since the turn of the century (63 FR 49006, p. 49012).

This meadow habitat loss was described by the SBNF in their Biological Assessment for the San Bernardino National Forest Meadow Plant Species (Butler 2000). According to the Biological Assessment, before the inundation of Big Bear Lake, ribbons of riparian/meadow habitat likely connected the Big Bear Meadow to smaller outlying

meadows. Since inundation, meadow habitat in Big Bear Valley has been reduced to small disconnected meadow remnants around the lake, resulting in isolation of smaller fragments of outlying meadow habitats (Butler 2000, p. 46). As a result, the connectivity of habitat for gene flow, pollinator activity, and seed dispersal has been compromised. Moreover, riparian zones connecting meadow systems (*e.g*., Santa Ana River, Rathbun Creek, Shay Creek, etc.) have been degraded, further reducing the amount of meadow habitat (Butler 2000, p. 46).

Much of the meadow habitat on the SBNF and surrounding lands has been surveyed and mapped by SBNF personnel and private contractors in recent years. In 2007, the SBNF categorized the condition of meadow habitat as either "destroyed", "not functioning", "somewhat altered but functioning" or "unaltered". "Destroyed" describes conditions in which meadow hydrology is no longer present due to activities such as channelization, water withdrawal, and roads, and in which meadow vegetation is no longer present. "Not functioning" describes conditions in which meadow hydrology is no longer present, but meadow vegetation partially exists. "Somewhat altered but functioning" describes conditions in which minor hydrological modification has occurred, however a substantial portion of the meadow habitat is intact (*e.g*. presence of a condition that causes a partial surface water withdrawal, such as an unpaved road near or through meadow). "Unaltered" describes conditions in which no discernible impacts to meadow habitat from meadow vegetation modification or upstream hydrologic modification have occurred (J. Bill, SBNF, pers. comm. 2007a, p. 1). According to an analysis by the SBNF, there are approximately 2,803 acres (1,132 hectares) of meadow habitat remaining across 24 meadows that contain occurrences of *Taraxacum californicum*. Of this remaining meadow habitat, nine percent was categorized as "not functioning"; 70 percent was "somewhat altered but functioning"; and only 21 percent was considered unaltered. The remaining 2,546 acres (1,030 hectares) of functional habitat and unaltered meadow habitat is divided between federal lands (1,128 acres (455 hectares), or 44 percent, SBNF); private lands (1,033 acres (417 hectares), or 41 percent); and state and municipal lands (385 acres (155 hectares), or 15 percent) (S. Eliason, SBNF, pers. comm. 2007d, p. 6).

Described below in section 2.3.2.1, additional losses of meadow habitat since listing have been caused by activities such as development of privately owned parcels and recreation.

Spatial Distribution

Taraxacum californicum is endemic to the San Bernardino Mountains, ranging from the Holcomb and Big Bear valleys to South Fork Meadows in the Santa Ana River watershed (Service 2005, p. 214). According to the listing rule (63 FR 49006), about 20 occurrences of the species were known at the time of listing, with sizes ranging from two to 300 individuals (63 FR 49006, p. 49009). About half of these occurrences were located within or adjacent to urbanized areas such as Big Bear City, Big Bear Lake Village, and Sugarloaf in San Bernardino County, California (63 FR 49006, p. 49009). Although not specifically identified in the listing rule, records indicate that 21 occurrences were in the following 20 meadows at the time of listing: Belleville Meadow,

Big Meadow, Bluff Meadow, China Gardens/Eagle Point Meadows, Cienega Seca Meadow, Erwin Meadows, Fish Creek Meadows, Green Spring Meadow, Hitchcock Meadow, Horse Meadow, Metcalf Meadow (2 occurrences), North Shore Meadows, North Baldwin Meadow, Pan Hot Springs Meadow, Shay Meadow, South Fork Meadows, unnamed meadow east of Fish Creek Meadows, unnamed meadow east of South Fork Meadow, unnamed meadow near the town of Sugarloaf, and Wildhorse Meadows (CNDDB 2007, pp. 1-42; J. Bill, SBNF, pers. comm. 2007b, pp. 1-2). Meadow names follow nomenclature in the Meadow Habitat Management Guide (SBNF 2002), except North Shore Meadows. As depicted in Figure 1, all occurrences along the north shore of Big Bear Lake (Division Meadow, East and West Observatory Meadows, Juniper Meadow, and Minnelusa Meadow) are grouped as one occurrence of *T. californicum* by the SBNF (Bill, pers. comm. 2007b, p. 1). Thus, the term "North Shore Meadows" is used to generally describe these meadows for purposes of this review.

Since listing, three new occurrences of *Taraxacum californicum* were found in four additional meadows within the extant range of the species. The meadows include Bow Meadow, Broom Flat Meadow, Merriman Meadow, and Red Ant Meadow (CNDDB 2007, pp. 29-30, 35-36; Bill, pers. comm. 2007b, p. 1). As depicted in Figure 1, populations at Merriman Meadow and Red Ant Meadow are grouped as one occurrence of *T. californicum* by the SBNF (Bill, pers. comm. 2007b, p. 2). According to an analysis by the SBNF in 2007, there are currently 24 occurrences of *T. californicum* (Eliason, pers. comm. 2007d, p. 4).

As mentioned above, about half of *Taraxacum californicum* occurrences were located within or adjacent to urbanized areas at the time of listing. According to the SBNF, this analysis is current; approximately half (11 of 24) of the extant occurrences are within or adjacent to urbanized areas (Eliason, pers. comm. 2007d, p. 4).

The SBNF analyzed the current condition of habitat supporting all 24 extant occurrences. Two occurrences fall on habitat the SBNF categorized as partly "not functioning" and partly destroyed; both of these occurrences are on private lands. One occurrence, also on private lands, falls on habitat categorized by the SBNF as "not functioning". Eleven of the 24 occurrences fall on lands categorized as "somewhat altered but functioning". Of these 11 occurrences, three are on private lands, four overlap SBNF and private lands, one overlaps SBNF and state lands, and three are on SBNF lands. The habitat supporting the remaining 10 occurrences was categorized by the SBNF as unaltered; all 10 occurrences on unaltered habitat occur on SBNF lands (Eliason, pers. comm. 2007d, p. 4).

The overall extent of the range of this plant has not changed appreciably since the listing. However, the spatial distribution within that range continues to be fragmented by factors described below in sections 2.3.2.1 and 2.3.2.5. The extant range is documented by references in Table 1 and depicted in Figure 1.

Abundance, Population Trends, Demographic Features and Demographic Trends

The listing rule did not present information on population trends, demographic features, and demographic trends. Although not specifically identified in the listing rule, records indicate that 21 occurrences were located in 20 meadows at the time of listing, with sizes ranging from two to 300 individuals (63 FR 49006, p. 49009). Currently, according to an analysis by the SBNF, there are approximately 24 meadows that contain 24 occurrences of *Taraxacum californicum*.

To date, no systematic surveys have been conducted on *Taraxacum californicum*. This species is primarily identified and distinguished from the nonnative *T. officinale* (common dandelion) when flowering. In 2002, the SBNF developed suitable habitat criteria and survey requirements for *T. californicum* in their Meadow Habitat Management Guide (SBNF 2002). According to the management guide, *T. californicum* individuals are perennial and occur in the same locations year to year. However, detecting plants outside the flowering season may be impossible in areas which have thick meadow grass vegetation because the basal leaves are hidden. The flowering period for *T. californicum* spans approximately one month and the start of the flowering period varies widely year to year due to climate variation. Furthermore, the flowering period varies geographically within years based on elevation and meadow moisture. In very dry years, the plant may not flower at all (SBNF 2002, pp. 149-150). Therefore, planning and carrying out systematic surveys throughout the range in any one year would be difficult, if not impossible.

Surveys were conducted by the SBNF from 1999 to 2002 at 21 meadows, although not all sites were visited each year. (See Table 1 for survey results within each year). Overall, the highest count of individuals seen range-wide and in a single year was in 2000, with about 925 plants in the sixteen meadows that were surveyed that year. In at least one year during the surveys, six meadows each had a minimum of 100 individuals, with a maximum of 187 individuals detected at one of these meadows. One meadow had approximately 53 individuals. However, five meadows surveyed were never found to have more than 36 plants and another five meadows were never found to have more than 10 plants. No plants were found in four meadows that historically supported *Taraxacum californicum*. The status of the species is unknown in an additional 10 meadows that historically supported *T. californicum* as they were not surveyed. Seven of the occurrences that were not surveyed are on private land. At Cienega Seca Meadow, almost 1,000 plants were observed in 1983, but only 15 were found in 2007 (CNDDB 2007, p. 2; R. Hawke, Los Angeles County Education Foundation, pers. comm. 2007, p. 1). At an occurrence in Fish Creek Meadows, about 50 plants were found in 1989; no plants were found in 2000 (Butler 2000, p. 56). These low numbers of individuals suggest a decline in these occurrences and may reflect a trend across the range of *T. californicum*.

At the time of listing, *Taraxacum californicum* was considered an outcrossing species (not selfing) (Lyman and Ellstrand 1998, p. 287). Many details of the breeding system and seed viability of *T. californicum*, however, remain unknown. Rancho Santa Ana

Botanic Garden (RSABG) currently has three seed collections of *T. californicum*: two collected from wild occurrences and one collected from plants grown out at RSABG. According to Michael Wall, the Seed Program Manager of the RSABG Seed Bank, they suspect that the seeds were fairly viable because both wild collections had good germination; however, they do not have notes or counts regarding seed viability and percent seed set. In addition, they found that *T. californicum* set seed well even in instances where they did not consistently hand-pollinate, leading them to suspect local generalist pollinators or the possibility that there may be some self-pollinating. Again, there are no data to test these hypotheses (M. Wall, Rancho Santa Ana Botanic Garden, pers. comm. 2007, p. 1). Until we have a better understanding of the breeding system of *T. californicum*, it may be difficult to develop effective conservation strategies to maintain genetic diversity of small populations of *T. californicum* and prevent extinction.

In summary, there is very little consistent range-wide information about abundance, population trends, demographic features or demographic trends in *Taraxacum californicum*. At the time of listing, we had little information on the size of occurrences of *T. californicum*. Direct survey information accumulated since the listing indicates that there are about 925 plants across the range in 16 meadows. Occurrences may be declining across its range in a trend following those at Cienega Seca Meadow and Fish Creek Meadows, as described above. Because we have no information on age class structure, pollen and seed dispersal, seedling establishment, or adult mortality of any of the occurrences, it may be difficult to develop effective conservation strategies preventing extinction of the smaller scattered populations of *T. californicum*.

Genetics, Genetic Variation, and Trends in Genetic Variation

We are not aware of any paper published or information available that addresses this topic.

Taxonomic classification or changes in nomenclature

We are not aware of any papers published or new information available that proposes to change the name, the taxonomic status, or systematic position of *Taraxacum californicum.*

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

2.3.2.1. Factor A. Present or threatened destruction, modification or curtailment of its habitat or range: Threats identified under this factor in the listing rule include: alteration of hydrological conditions; urbanization; off-highway vehicle (OHV) activity; road maintenance; campground development; mining; and vandalism (63 FR 49006, pp. 49012-49014).

Alteration of Hydrological Conditions

The listing rule identified alteration of hydrological conditions as a significant threat to *Taraxacum californicum*, noting potential impacts from roads and OHV activity (63 FR 49006, pp. 49012-49013).

The SBNF identified alteration of hydrological conditions as a threat in their Meadow Habitat Management Guide (SBNF 2002). According to the management guide, meadows exist as a function of hydrology. Alteration of the local hydrology is, therefore, perhaps the greatest threat to this habitat. Any activities that affect site hydrology (*e.g.* lowering of water table, water diversion, overgrazing, off-road driving, roads, trails, mining, and historical or recent grazing) pose threats to meadow habitat and meadow plants (SBNF 2002, pp. 22, 24). These activities are discussed below and in section 2.3.2.5.

Urbanization

The listing rule identified the relatively unrestricted development of privately owned parcels in the Big Bear area outside the boundaries of the SBNF as a continuing threat. Half of the *Taraxacum californicum* occurrences at the time of listing—10 out of 20—were reported to be located within, or adjacent to, urbanized areas such as Big Bear City, Big Bear Lake Village, and Sugarloaf (63 FR 49006, p. 49009). Of these, four occurrences in Metcalf Meadows (north occurrence), China Gardens/Eagle Point Meadows, Pan Hot Springs Meadow, and Rathbun (also known as Moonridge) Meadow fell within areas depicted as residential, commercial or flood plain on a zoning map for the City of Big Bear Lake (63 FR 49006, p. 49013). The listing rule noted the apparent extirpation of the occurrence at Rathbun Meadow (T. Krantz, University of Redlands, pers. comm. 1993, p. 4).

Unrestricted development remains a significant threat to six occurrences in the Big Bear area. In addition to directly removing meadow habitat, development degrades meadow habitat by altering site hydrology, increasing access to foot and vehicular traffic, and introducing nonnative plant species.

Geographic information system (GIS) data provided by the SBNF was used to identify and calculate ownership within each meadow. Currently, over 93 percent of each of the meadows within the City of Big Bear Lake—except Metcalf Meadow at 55 percent—are privately owned and threatened by development. The three remaining occurrences within the City of Big Bear Lake (north Metcalf Meadows, China Gardens/Eagle Point Meadows, and Pan Hot Springs Meadow) appear to be extirpated or have little protection. According to an analysis by the SBNF, the habitat supporting the north occurrence at Metcalf Meadows was identified as partly "not functioning" and partly destroyed (Eliason, pers. comm. 2007d, p. 4). The occurrence is entirely on private lands and was likely extirpated by residential development, but it has not been confirmed (Butler 2000, p. 56).

Many of the China Gardens plants of the China Gardens/Eagle Point Meadow occurrence may be extirpated for the same reason. The Eagle Point Meadow plants of the China Gardens/Eagle Point Meadow occurrence are within the Eagle Point Estate open space, which was set aside as mitigation for the development. However, it lacks a formal deed restriction or conservation easement protecting the area (SBNF 2002, pp. 61-62). The plants at Pan Hot Springs Meadow occur on Big Bear Community Services District property which is under a deed-restriction to protect co-occurring federally listed species *Thelypodium stenopetalum* (slender-petaled mustard) and *Sidalcea pedata* (pedate checker-mallow). The water source, however, was not included in the deed restriction and is on privately owned lands. The inability to control the water source could pose a threat to the associated meadow habitat (SBNF 2002, p.25).

Other occurrences in the Big Bear Valley threatened by development are within Erwin Meadows, Shay Meadow, and an unnamed meadow near the town of Sugarloaf. Eighty-four, 96, and 100 percent respectively of the meadows are privately owned. As noted in the listing rule, Krantz (pers. comm. 1993, p. 4) stated that occurrences in Erwin Meadows and near the town of Sugarloaf appeared to be extirpated. Since listing, the SBNF noted that the occurrence in Erwin Meadows needs to be surveyed, but it is threatened by development of Hamilton Ranch and that no protection or restoration measures exist (SBNF 2002, p. 50). The SBNF also noted that the meadow near the town of Sugarloaf was being developed for residential housing. Shay Meadow has an occurrence that had 100-200 individuals in 1988 and it is still undeveloped, but it is all privately owned (Butler 2000, pp. 57, 58).

Development poses a significant threat to six occurrences on privately owned lands in the Big Bear area. The current status of these occurrences is largely unknown. In addition, seven occurrences are adjacent to urbanized areas and are threatened by indirect effects related to development including OHV use, dispersed recreation, and introduction of nonnative plants. These threats are discussed in the section below and section 2.3.2.5.

Roads and Unauthorized Vehicular (OHV) Use

The listing rule identified OHV activity and road maintenance as threats to *Taraxacum californicum*, noting habitat degradation from OHV use at North Baldwin Meadow, Wildhorse Meadow, and Holcomb Valley. No specific areas were discussed where road maintenance was a concern (63 FR 49006, p. 49013).

Since listing, the SBNF identified authorized vehicular use as a threat in addition to OHV use in their Meadow Habitat Management Guide. According to the management guide, authorized and unauthorized vehicular use causes soil compaction and increases vulnerability to erosion. The sinking of the roadbeds has been observed over the past several years in areas where roads cross hydrological systems, suggesting that soil compaction and alteration of surface

hydrology are occurring. Additionally, vehicles can introduce seeds of invasive nonnative plants, which can then colonize meadow habitats (SBNF 2002, p. 22-23). Threats from introduced species are discussed below in section 2.3.2.5. Driving off classified roads remains a threat in Holcomb Valley, though the SBNF has taken steps to fence and close roads (SBNF 2002, pp. 22, 37, 51). Upper Wildhorse Meadow and North Baldwin Meadow are fenced and protected from vehicles (Butler 2000, p. 56; SBNF 2002, pp. 33, 69). The SBNF identified OHV use as a threat to Bluff Meadow, Broom Flat, North Baldwin Meadow, and North Shore Meadows in addition to the meadows mentioned above (SBNF 2002, pp. 33, 41, 42, 46, 48). The SBNF identified OHV use as a "significant threat" to Broom Flat Meadow. Some areas of the meadow have been fenced, but the fence was in poor condition (SBNF 2002, p. 46). The SBNF identified road maintenance activities as a threat to Hitchcock Meadow and Pan Hot Springs Meadow (SBNF 2002, pp. 51, 61). Impacts to meadow habitat can occur when heavy equipment is used to clear debris off the roadway, create drainage leadouts, or clear culverts. Erosion control efforts may affect hydrology (Service 2005, p. 23). In several areas of Hitchcock Meadow chronic maintenance problems with Forest Roads are "adversely affecting meadow species and habitat" (SBNF 2002, p. 51). Roads were identified as a general threat by the SBNF to Bluff Meadow, Hitchcock Meadow, Horse Meadow, Metcalf Meadow, and Red Ant Meadow (SBNF 2002, pp. 41, 42, 51, 54, 57, 64).

Roads and unauthorized vehicular use continue to threaten *Taraxacum californicum* across its range. Nine of 21 occurrences within, or partially within, SBNF lands are currently threatened by these activities. In addition, six occurrences entirely within private land in the Big Bear area are likely threatened by these activities due to lack of protection and close proximity to roads.

Developed and Dispersed Recreation

The listing rule identified campground development as a threat to *Taraxacum californicum* at meadow sites in Cienega Seca Meadow (also referred to as Blue Sky Meadow) and North Shore Meadows (63 FR 49006, p. 49013).

Since listing, the SBNF identified dispersed recreation as a threat in addition to developed recreation (campgrounds) in their Meadow Habitat Management Guide. According to the SBNF, impacts from developed and dispersed recreation include direct removal of meadow habitat from maintenance and construction activities, soil compaction, devegetation from frequently used sites, escaped campfire threats, development of trails that may alter meadow hydrology, trampling, introduction of invasive nonnative plants, and burial of plants with litter (Butler 2000, p. 102; SBNF 2002, p. 23). Introduction of invasive nonnative plants is discussed below in section 2.3.2.5. As mentioned above, GIS data provided by the SBNF was used to determine ownership within each meadow. Currently, 82 percent of Cienega Seca Meadow is privately owned by the Los Angeles County Education Foundation (LACEF) and is used as an outdoor

science education camp (LACEF 2007). The occurrence is entirely on LACEF land. The LACEF employs a Preserve Manager who enforces rules restricting access to the meadow that are communicated to each arriving group. There is a road on the perimeter of the meadow and one trail that bisects the meadow. Foot traffic on the meadow is not allowed; however, there are no fences or signs. About 15 *Taraxacum californicum* individuals were observed in 2007, a comparatively low number (almost 1,000 plants in 1983) (CNDDB 2007, p. 2; Hawke, pers. comm. 2007, p. 1). The North Shore Meadows show impacts from social trails connecting the shoreline to Serrano Campground, lakeshore trails by Juniper Point, and social trails from the Alpine Pedal Path to the shoreline. Frequent use of the area has led to soil compaction and devegetation (SBNF 2002, p. 23). Signs have been posted at one meadow site and there is some fencing, but most of the meadows are unprotected (SBNF 2002, pp. 47, 48, 56, 59, 68). Very few *T. californicum* individuals remain (S. Eliason, SBNF, pers. comm. 2007c).

Other meadows with *Taraxacum californicum* occurrences near campgrounds include Bluff Meadow, Hitchcock Meadow and Belleville Meadow in Holcomb Valley, Red Ant Meadow, and Merriman Meadow. Forty-four percent of Bluff Meadow is privately owned by the Wildlands Conservancy, and currently leased to the San Bernardino County Regional Parks Division as an outdoor science education camp (Wildlands Conservancy 2005). According to the SBNF, several large gates and signs were installed by the Wildlands Conservancy in 2001 at access points around their property. However, there are no protective measures in place for the eastern portion of Bluff Meadow on SBNF land (SBNF 2002, p. 42). Eighty-three percent of Hitchcock Meadow in Holcomb Valley is privately owned by the Boy Scouts of America (BSA) and is currently a recreational and educational activity camp (BSA 2006). As noted above, *T. californicum* is also threatened by OHV use in the area. Some protective measures were taken by the SBNF in 1999 when the Mountain Man event was relocated to avoid sensitive habitat in that area, and camping permits for the area were discontinued (SBNF 2002, pp. 50-51). Nearly all of Belleville Meadow in Holcomb Valley is owned by the SBNF; however, several areas of the meadow are currently heavily utilized for dispersed recreation, including vehicle use along the classified roads through the site, hiking along the Gold Fever Trail, mountain biking, and use of the BSA campground near the western portion of the meadow. The SBNF reported mountain bike and hiking trespass within fenced areas in Belleville Meadow and mountain biking off of classified trails (SBNF 2002, pp. 36-37). All of Red Ant Meadow is owned by the SBNF. However, it is adjacent to Deer Group Camp and is threatened by ongoing dispersed recreation (SBNF 2002, pp. 63-64). Seventy-three percent of Merriman Meadow is privately owned by the Angeles Girl Scout Council (AGSC) and is currently a recreational and educational activity camp (AGSC 2007). Although the only known *T. californicum* occurrence in Merriman Meadow is on SBNF land, it is immediately adjacent to private land and there are no known existing protection or restoration measures (SBNF 2002, p. 58).

Dispersed recreation has the potential to affect all occurrences of *Taraxacum californicum*. As mentioned above, impacts from dispersed recreation include soil compaction and trampling of plants. Occurrences near roads and concentrated dispersed use areas are more likely to be affected (USFS 2005a, p. 354). In Metcalf Meadow, a popular dispersed campsite on the SBNF (referred to as Yellow Post Site 25) threatens adjacent *T. californicum* habitat. Because it is at the end of an upland area that extends into the meadow, foot traffic and OHV activity into the meadow occur despite efforts by the SBNF to discourage these activities by erecting signs and slashing vehicle tracks (S. Eliason, SBNF, pers. comm. 2007b, p.1). Occurrences at Fish Creek Meadows and South Fork Meadows are within the San Gorgonio Wilderness and are relatively well-protected in that they are subjected to fewer and less concentrated recreation impacts. However, hiking and camping in the Wilderness is permitted and occasional impacts do occur (Service 2005, p. 215).

Developed and dispersed recreation continues to threaten *Taraxacum californicum* across its range. Dispersed recreation has the potential to affect all occurrences of *T. californicum*, including occurrences entirely within private land in the Big Bear area. Seven, or nearly one-third of *T. californicum* occurrences, are recognized by the SBNF as particularly vulnerable to these threats due to their close proximity to campgrounds and concentrated use areas.

Mining Activities

Mining activities in the vicinity of Holcomb Valley were identified as a threat to *Taraxacum californicum* at the time of listing. Specifically, meadows associated with Arrastre Flat and North Baldwin Lake were noted as threatened by mining activities (63 FR 49006, p. 49014).

Since listing, threats from mining activities were further described by the SBNF in their Biological Assessment for the Revised Management Plans (USFS 2005a). According to the biological assessment and an analysis using GIS data by the SBNF, Belleville Meadow is a popular prospecting site and several gold claims overlap approximately 4 acres (1.6 hectares) of occupied *Taraxacum californicum* habitat (USFS 2005a, p. 357; Eliason, pers. comm. 2007d, p.7). According to the Forest Service Locatable Minerals Regulations (36 CFR 228A), mining-related activities on National Forest System lands that may cause significant disturbance of surface resources (including impacts to any threatened or endangered species), must have a Plan of Operations approved by the Forest Service. The approval of a Plan of Operations is subject to consultation requirements under section 7 of the Endangered Species Act (ESA) (36 CFR 228A, pp. 138, 141-143). Therefore, any proposed mining-related activities that may affect *T. californicum* in Belleville Meadow would be subject to consultation under the ESA. However, effects from unauthorized prospecting may still occur (USFS 2005a, pp. 357, 359).

Habitat Fragmentation

Although not mentioned in the listing rule, habitat fragmentation poses a threat to *Taraxacum californicum.* Habitat fragmentation increases the spatial isolation of *T. californicum* occurrences and has been shown to have negative effects on plant-pollinator interactions and genetic diversity (Rathcke and Jules 1993, p. 273; Lopez-Pujol et al. 2003, p. 504). There are no data on pollen and seed dispersal mechanisms or distances for *T. californicum*. However, it is likely that due to the inherently isolated distribution of its occurrences, each with frequently small numbers of individuals, *T. californicum* is particularly vulnerable to the threat posed by habitat fragmentation. This may have been exacerbated by the significant historical loss and fragmentation of meadow habitat in the Big Bear Valley. See section 2.3.2.4 below for a discussion of the threat of limited number of individuals. All the threats discussed above contribute to the increased fragmentation of *T. californicum* habitat.

Vandalism

Vandalism was identified as a threat to *Taraxacum californicum* in the listing rule; however, no specific cases of vandalism were discussed (63 FR 49006, p. 49012). Since listing, we have no evidence of vandalism affecting *T. californicum*.

Summary of Factor A

Alteration of hydrological conditions, urbanization, roads, unauthorized vehicular use, developed recreation, dispersed recreation, and habitat fragmentation continue to significantly threaten *Taraxacum californicum* and/or its habitat. Conservation actions taken by the SBNF since listing include protecting two occurrences from unauthorized vehicular use and relocating recreational activities away from one occurrence. However, nine of 21 occurrences within, or partially within, SBNF lands remain threatened by roads and unauthorized vehicular use. Seven, or nearly one-third of *T. californicum* occurrences, are recognized by the SBNF as vulnerable to developed recreation and dispersed recreation.

Mining threatens one occurrence of *Taraxacum californicum*. We have no evidence that vandalism is a current threat.

2.3.2.2. Factor B. Overutilization for commercial, recreational, scientific, or educational purposes: The potential threat from unrestricted collection by curiosity seekers was noted in the listing rule (63 FR 49006, p. 49014). However, we have no evidence that this threat has continued.

2.3.2.3. Factor C. Disease or predation: Disease is not known to be a threat. Predation of *Taraxacum californicum* individuals as a result of grazing may reduce genetic diversity in small occurrences and pose a threat to the species.

Threats from genetic loss due to limited numbers of *T. californicum* are discussed below in section 2.3.2.5. Other effects of grazing, such as trampling and alteration of site hydrology, on *T. californicum* and its habitat are discussed below in section 2.3.2.5.

2.3.2.4. Factor D. Inadequacy of existing regulatory mechanisms: At the time of listing, regulatory mechanisms thought to have some potential to protect *Taraxacum californicum* included: the California Environmental Quality Act (CEQA); U.S. Forest Service management policies; conservation provisions under section 404 of the Clean Water Act; and land management by Federal, State, or local agencies, or by private groups and organizations. The final listing rule (63 FR 49006, pp. 49015, 49020, 49021) provides an analysis of the level of protection that was anticipated from those regulatory mechanisms; it was concluded that they did not provide adequate protection to *T. californicum*. This analysis is still current, except the discussion of U.S. Forest Service management policies, which is updated below.

About 44 percent of functioning meadow habitat occupied by *Taraxacum californicum* is on SBNF lands. Seventy-five percent (18 of 24) of the occurrences fall within or partially within the SBNF (Eliason, pers. comm. 2007d, p. 4). In 2001, we issued a non-jeopardy biological and conference opinion (Service 2001) on the continued implementation of Land and Resource Management Plans for the four southern California national forests and for some ongoing activities. This opinion included an analysis of the potential impacts of recreation, road and trail use, and mining on *T. californicum* habitat (Service 2001, pp. 294–296). Since the 2001 opinion, the Forest Service has acquired an additional 0.04 acres (0.02 hectares) of *T. californicum* habitat at Broom Flat (Service 2005, p. 214).

As mentioned above in section 2.3.1, in 2002 the SBNF developed suitable habitat criteria and survey requirements for *Taraxacum californicum* in a Meadow Habitat Management Guide (SBNF 2002). In addition, the management guide defined the characteristics of meadow habitat, established standardized environmental protection and mitigation procedures for protecting meadow species and their habitat, and envisioned long-term management strategies that will provide for the recovery of *T. californicum* (USFS 2005a, p. 351). In some cases significant management actions have been implemented by the Forest Service, for example the hiring of a full-time resource patrol officer for the Big Bear area of the SBNF and recreational trail closures in Belleville Meadow (SBNF 2002, p. 5; USFS 2005a, p. 352). However, protection measures identified in the management guide and other plans depend on funding and staffing (USFS 2005a, p. 352).

In 2005, we issued a non-jeopardy biological and conference opinion (Service 2005) that addressed the Revised Land and Resource Management Plans (Revised LRMP, USFS 2005b) for the four southern California national forests. These

plans (USFS 2005b) described the strategic direction for these four forests at a broad program-level for land and resource management. Included in these plans were: land use zones that identified management intent and anticipated level of public use in any area of the forests; and standards which are fundamental requirements that defined the parameters for the activities that the Forest Service anticipated. In the biological opinion for the Revised LRMP, the Service concluded the following: (1) No new permanent loss of occupied habitat is expected. New projects will be implemented so that they promote the recovery of *Taraxacum californicum.* Expansion of facilities or new facilities will be designed to focus public use away from *T. californicum* habitat. (2) Existing ground disturbance due to facilities and infrastructure such as utility lines, special use permit sites, and roads overlap 6 acres (2.4 hectares) (3 percent) of occupied habitat within the SBNF, and potential impacts are expected to be minor or negligible due to the lack of direct impacts and/or the low impact nature of the activities involved. (3) The Forest Service has implemented measures to reduce potential impacts to occurrences due to recreation and hydrological changes from roads and trails. This direction to keep vehicles on designated roads and trails should help minimize ground disturbance and expansion of the nonnative *Taraxacum officinale* (Service 2005, pp. 218-219). 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 (USFS 2005b, p. 6). We are not aware of any new information that would change our conclusion. The Revised LRMP standards can be changed by a forest plan amendment (USFS 2005b, p. 1). Although the plans set important parameters for authorization of specific projects, the plans do not themselves authorize the projects. Actual authorization of projects depends on analysis of site-specific effects, project-level section 7 consultation under the ESA, and consistency with appropriate management direction and applicable legal requirements (Service 2005, p.8).

In summary, existing regulatory mechanisms may be adequate to protect *Taraxacum californicum* occurrences on federally owned land, if fully enacted. However, activities on the SBNF depend on funding, staffing, and agency priorities, and therefore full implementation of the Meadow Habitat Management Guide is not guaranteed. Regulatory mechanisms are not adequate to protect the 41 percent (1,033 acres (417 ha)) of functioning meadow habitat occupied by *T. californicum* on private lands (as mentioned above in sections 2.3.1 and 2.3.2.1), as the additional potential protection provided by other Federal, State, and local laws and ordinances is discretionary, incomplete, subject to funding availability and changing missions, and/or largely dependant on the federally listed status of *T. californicum*.

2.3.2.5. Factor E. Other natural or manmade factors affecting its continued existence: The final listing rule (63 FR 49006, pp. 49016-49017) identified other threats to *Taraxacum californicum* including: trampling by livestock and humans; indirect effects of grazing and browsing; hybridization with the nonnative *T. officinale*; competition with other plant species; and limited numbers of *T.*

californicum individuals. Threats from trampling by humans as related to recreation are discussed above in section 2.3.2.1.

Grazing

In the listing rule, trampling by livestock and indirect effects of grazing and browsing was identified as a threat to *Taraxacum californicum* (63 FR 49006, pp. 49016-49017). As mentioned above in section 2.3.2.1, trampling of meadow habitat by livestock may alter meadow hydrology. In addition, trampling degrades habitat, compressing the soil and creating conditions favorable to plants that withstand trampling, usually nonnative species (63 FR 49006, p. 49016). Further, deposition of animal waste creates conditions favorable to nonnative plants through the introduction and spreading of nonnative seed, and alteration of nutrient cycling patterns (63 FR 49006, p. 49017). As mentioned in section 2.3.2.3 and in the section below, in addition to direct trampling of *T. californicum* individuals, predation as a result of grazing may reduce genetic diversity and pose a threat to the species.

At the time of listing, grazing by cattle, horses, and wild burros was recognized as a continued threat to *Taraxacum californicum* at meadow sites on or near private land such as Hitchcock Meadow in Holcomb Valley, Shay Meadow and Bluff Meadow (63 FR 49006, pp. 49012, 49013, 49016).

Since listing, the SBNF noted that voluntary landowner agreements were made to relocate equestrian activities away from sensitive meadow habitat in Shay Meadow (SBNF 2002, p. 35). Grazing was not considered a threat to Bluff Meadow in 2002; however, horse grazing still occurred in private land in Hitchcock Meadow and was listed as a threat to privately owned Pan Hot Springs Meadow (SBNF 2002, pp. 51, 61).

On the SBNF, there are currently no active cattle grazing allotments within occupied *T. californicum* habitat (USFS 2005a, p.357). Unauthorized cattle grazing associated with the Rattlesnake allotment has affected Broom Flat Meadow; however, was fencing installed by the Bureau of Land Management (BLM) in recent years that has reduced the incidence of cattle trespass off the allotment (S. Eliason, SBNF, pers. comm. 2007e, p. 1; SBNF 2002, p. 46).

In 1998, burros were removed from Big Bear Valley; however, Broom Flat Meadow is within the wild burro herd management area (Eliason, pers. comm. 2007e, p. 1; USFS 2005a, p. 352). In 1997, we issued a biological and conference opinion (Service 1997) in response to the Wild Burro Management Plan, allowing burros in Broom Flat Meadow. The presence of *T. californicum* at Broom Flat Meadow was not known at the time (Service 1997, pp. 6, 8-9). Burros have been occasionally reported in this area and at Wildhorse Meadows (Eliason, pers. comm. 2007e, p. 1). Occupied habitat of *T. californicum* outside of Broom Flat Meadow is managed for "no burro presence" by the SBNF. If burros move into

these areas, they are removed; however this will depend on funding and staffing, so some low level of grazing impacts may periodically occur if burros stray into the habitat (USFS 2005a, p. 352).

Grazing continues to threaten 17 percent (4 of 24) of *Taraxacum californicum* occurrences. Horse grazing continues to threaten *T. californicum* and its habitat at two occurrences on private land. Significant steps were taken by the BLM and the SBNF to reduce cattle and burro grazing within habitat occupied by *T. californicum*. However, burro grazing continues to threaten *T. californicum* and its habitat at two occurrences within the SBNF.

Hybridization with the Nonnative *Taraxacum officinale*

In the listing rule, hybridization with the nonnative common dandelion, *Taraxacum officinale*, was identified as a threat to *T. californicum* (63 FR 49006, pp. 49016-49017). Although no specific areas were discussed in the listing rule where this is a concern, hybridization was a known threat at Cienega Seca Meadow at the time of listing (CNDDB 1992, p. 2).

Since listing, hybridization with *Taraxacum officinale* continues to be a threat. According to the Meadow Habitat Management Guide, habitat invaded by *T. officinale* may result in hybridization with *T. californicum* and prevent population growth. Although *T. officinale* reproduces apomitically (production of viable seeds is not dependent on fertilization), it does produce fertile pollen which can fertilize *T. californicum* (SBNF 2002, pp. 24, 113). Moreover, the SBNF reported that *T. officinale* is present at all *T. californicum* occurrences and plants that appear to be hybrids between the two species have been observed by U.S. Forest Service botanists (SBNF 2002, p. 113; Eliason, pers. comm. 2007d, p. 4). Some biologists contend, however, that observations of hybridization are not conclusive and could use further study (N. Ellstrand, University of California, pers. comm. 2007, p. 1); for example, individuals that appear to be hybrids could be a result of morphological variation within *T. californicum*.

Competition with Other Plant Species

In the listing rule, competition with other plant species was identified as a threat to *Taraxacum californicum*; however, no specific areas were discussed where other plant species are a concern (63 FR 49006, pp. 49016-49017).

Since listing, the SBNF identified invasion of invasive nonnative plants as a threat to *Taraxacum californicum* in their Meadow Habitat Management Guide. According to the management guide, invasive nonnative plants are present in every known meadow occurrence. Currently, the most abundant nonnative species in meadow habitat are *T. officinale*, *Poa pratensis*, *Bromus tectorum* (cheatgrass), *Erodium cicutarium* (red-stemmed filaree), *Elytrigia repens* (quackgrass), and *Melilotus alba* (no common name) (SBNF 2002, p. 24).

Invasion of cheat grass and other invasive nonnative plants was identified by the SBNF as a "primary threat" to Big Meadow (SBNF 2002, p. 40). In Bluff Meadow, the establishment of invasive nonnative plants is noted as a threat (SBNF 2002, p. 42). In addition to invasive nonnative plants, competition with native species may be a threat. If *T. californicum* prefers open patches of meadow habitat, as discussed above in section 2.3.1, native grasses that dominate meadow habitat may choke it out. Accumulation of thatch due to years of fire suppression may also contribute to the loss of open areas in meadows.

Limited Numbers of *Taraxacum californicum* Individuals

In the listing rule, limited numbers of *Taraxacum californicum* individuals was identified as a threat to *T. californicum*; however, no specific meadow areas or population densities were identified (63 FR 49006, pp. 49016-49017).

As mentioned above in section 2.3.1, surveys were conducted by the SBNF since listing. Fewer than 925 plants across the species' range were found in the sixteen meadows surveyed in 2000 (see Table 1). Additionally, there is evidence of a decline in the populations at Cienega Seca Meadow and Fish Creek Meadows that may be indicative of a range-wide trend. Barrett and Kohn (1991) have discussed the consequences of small population size in plants. They stress the need for maintaining genetic diversity, especially for rare alleles (different forms of a gene). Maintaining diversity of alleles in self-incompatible (outcrossing) plants is important to ensure production of fertile seeds, and thus is important for the survival of plant populations. The likelihood of maintaining diversity decreases in smaller populations (Barrett and Kohn 1991, pp. 9, 10, 13). Thus, factors that negatively affect *Taraxacum californicum* individuals are more likely to threaten the survival of the species as a whole. Factors that negatively affect *T. californicum* individuals include all of the threats discussed in this section, section 2.3.2.1, and section 2.3.2.3.

Summary of Factor E

Threats from grazing were reduced since listing; however, grazing continues to threaten at least 17 percent (4 of 24) of *Taraxacum californicum* occurrences. Hybridization with the nonnative *T. officinale*, competition with other plant species, and limited numbers of *T. californicum* individuals significantly threaten the continuing existence of this species across its range.

2.4. Synthesis

The entire known range of *Taraxacum californicum* is limited to vernally wet montane meadows or other montane wetland areas from 5,300 to 9,000 feet (1,600 to 2,800 meters) within the San Bernardino Mountains. The current geographical range is the same as it was at the time of listing. The current threats to this species are essentially the

same as they were at the time of listing including alteration of hydrological conditions, urbanization, unauthorized vehicular use, developed recreation, mining, grazing, hybridization with the nonnative *T. officinale*, competition with other plant species, and limited numbers of *T. californicum* individuals. Since the listing, roads, dispersed recreation, and habitat fragmentation have been identified as additional significant threats to *T. californicum*.

At the time of listing, records indicate that there were 21 occurrences of *Taraxacum californicum*. Currently, there are 24 occurrences. Although three occurrences of *T. californicum* were newly discovered within the extant range since listing, the degree of threat to this species is still high. About one-half (11 of 24) of *T. californicum* occurrences are within or adjacent to urbanized areas. Additionally, 41 percent of functioning meadow habitat occupied by *T. californicum* is on private land and is not subject to management. Alteration of hydrological conditions, roads, unauthorized vehicular use, and dispersed recreation continue to fragment *T. californicum* habitat in these areas and across the range of the species. Although three new occurrences of *T. californicum* were found within the extant range of the species, six occurrences on private land in the Big Bear area may have been extirpated by development, or indirect effects of development, since listing. Half of the extant occurrences within, or partially within, SBNF lands (9 of 18) are currently threatened by roads and unauthorized vehicular use; nearly one-third (7 of 24) of all *T. californicum* occurrences are recognized by the SBNF as particularly vulnerable to impacts from developed and dispersed recreation.

The potential for recovery of *Taraxacum californicum* is low. Direct survey information accumulated since the listing indicates that there are fewer than 925 plants across the range in the sixteen meadows surveyed. This may indicate that the number of individuals is declining across the range of *T. californicum*. Because of apparent low numbers of *T. californicum* individuals, lack of information on demography and establishment requirements is a significant concern. Moreover, hybridization with the nonnative *T. officinale* and competition with other plant species are of particular concern, yet much remains unknown regarding the nature of these threats. Furthermore, meadow habitat may require continual intervention and management to prevent extinction of *T. californicum*.

Activities that could help conserve *Taraxacum californicum* include working with the SBNF to write a recovery plan, expand and systematize the existing seed bank, and implement a program to study means and efficacy of controlling *T. officinale* in targeted areas. Other activities that could benefit the species are outlined below in section 4.

Due to the threats mentioned above, *Taraxacum californicum* remains in danger of extinction throughout its range. We recommend that the current listing status for *T. californicum* remain unchanged, as endangered.

3. RESULTS

3.1. Recommended Classification

I recommend that no change in listing status be undertaken at this time.

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

3.2. New Recovery Priority Number

5 (no change). Based on this review, this plant still faces a high degree of threat and there is a low potential for recovery.

4. RECOMMENDATIONS FOR FUTURE ACTIONS

Expand existing seed bank at Rancho Santa Ana Botanic Garden to include samples from populations determined to be key by the SBNF and the Service to buffer the species from genetic loss, should small populations become extirpated. These efforts may facilitate the reintroduction of extirpated populations and augmentation of extant populations, if deemed advisable after further study.

Determine the breeding system of *Taraxacum californicum* and confirm the nature and extent of introgression with *T. officinale*.

Work with the SBNF to identify appropriate sites and protocols to control *Taraxacum officinale*.

Support SBNF efforts to identify additional key areas to close to human access (e.g. Yellow Post Site YP25 at Metcalf Meadows).

Create a threats-based recovery plan for the species. Coordinate with experts to incorporate the above recommendations into a recovery plan for the species that will provide specific guidance on what must be accomplished to ameliorate threats and recover this species.

5. REFERENCES

AGSC (Angeles Girl Scout Council). 2007. Website accessed on May 11, 2007 (http://www.angeles.org/GScampoutdoor.htm).

Barrett, S.C.H. and J.R. Kohn. 1991. Genetic and Evolutionary Consequences of Small Population Size in Plants: Implications for Conservation, pp. 3-30. In: D.A. Falk and K.E. Holsinger, Genetics and Conservation of Rare Plants. Oxford University Press, New York, NY.

Bill, J. 2007a. Email from Jason Bill, Botanist, San Bernardino National Forest. (June 28, 2007). Re: Descriptions.

Bill, J. 2007b. Email from Jason Bill, Botanist, San Bernardino National Forest. (May 29, 2007). Re: New areas Taca found since 1998.

BSA (Boy Scouts of America). 2006. Website accessed on April 12, 2007 (http://www.obcbsa.org/camp/index.htm).

Butler, R.A. 2000. Biological assessment for the San Bernardino National Forest Meadow Plant Species. Unpublished document submitted to the U.S. Fish and Wildlife Service, 147 pp.

CFRES (California Forest and Range Experiment Station). 1932. [map] Vegetation Types of California (Exclusive of Deserts and Cultivated Lands), San Gorgonio Quadrangle. "Wieslander vegetation type maps".

CNDDB (California Department of Fish and Game, Natural Diversity Data Base). 1992. Element Occurrence Reports for *Taraxacum californicum.* Unpublished cumulative data accessed October 16, 1992, 26 pp.

CNDDB (California Department of Fish and Game, Natural Diversity Data Base). 2007. Element Occurrence Reports for *Taraxacum californicum.* Unpublished cumulative data accessed May 10, 2007, 42 pp.

Denslow, M. et al. 2002. 2002 Meadow Surveys, San Bernardino National Forest. Unpublished document submitted to the U.S. Fish and Wildlife Service, 23 pp.

Eliason, S. 2007a. Email from Scott Eliason, Mountaintop District Botanist, San Bernardino National Forest. (June 7, 2007). Re: Taca and Poat in wetter areas & negative surveys.

Eliason, S. 2007b. Email from Scott Eliason, Mountaintop District Botanist, San Bernardino National Forest. (June 11, 2007). Re: Yellow post site YP25.

Eliason, S. 2007c. Interview with Scott Eliason, Mountaintop District Botanist, San Bernardino National Forest in Fawnskin, California (March 28, 2007).

Eliason, S. 2007d. Email from Scott Eliason, Mountaintop District Botanist, San Bernardino National Forest. (July 13, 2007). Re: Meadows with populations of TACA.

Eliason, S. 2007e. Email from Scott Eliason, Mountaintop District Botanist, San Bernardino National Forest. (September 26, 2007). Re: grazing.

Ellstrand, N.C. 2007. Telephone interview with Dr. Norman C. Ellstrand, Director of Biotechnology Impacts Center, University of California, in Riverside, California (June 11, 2007).

Hawke, RT. 2007. Telephone interview with RT Hawke, Preserve Manager at Blue Sky Meadow, Los Angeles County Education Foundation, in Big Bear City, California (June 11, 2007).

Krantz, T. 1990. A Guide to the Rare and Unusual Wildflowers of the Big Bear Valley Preserve. 23 pp.

Krantz, T. 1993. Letter from Dr. Timothy Krantz, University of Redlands. (February 28, 1993). Re: Response to Request for Information on Ten Plants, Two Mammals, etc.

LACEF (Los Angeles County Education Foundation). 2007. Website accessed April 11, 2007 (http://www.blueskymeadow.com/about.html).

Leiberg, J.B. 1900. The San Bernardino Forest Reserve, pp. 429-454, Pl. CXLVII-CLIII. In: C.D. Walcott, Twentieth annual report of the United States Geological Survey to the Secretary of the Interior. Government Printing Office, Washington, D.C.

Lopez-Pujol, J., M.R. Orellana, M. Bosch, J. Simon, and C. Blanche. 2003. Effects of Habitat Fragmentation on Allozyme Diversity and Conservation Status of the Coastal Sand Dune Plant *Stachys maritime* (Lamiaceae) in the Iberian Peninsula. Plant biol 5:504-512.

Lyman, J.C. and N.C. Ellstrand. 1998. Relative contribution of breeding system and endemism to genotypic diversity: the outcrossing endemic *Taraxacum californicum* vs. the widespread apomict *T. officinale (sensu lato)*. Madrono 45:283-289.

Munz, P.A. and I.M. Johnston. 1925. Miscellaneous notes on plants of Southern California –IV. Bulletin of the Torrey Botanical Club 52:221-228. [p. 227-228, publ. May 1925, *Taraxacum californicum* Munz & I.M. Johnst.]

Rathcke, B.J. and E.S. Jules. 1993. Habitat Fragmentation and Plant-Pollinator Interactions. Current Science 65(3):273-277.

SBNF (San Bernardino National Forest). 2002. Meadow Habitat Management Guide. Unpublished document submitted to the U.S. Fish and Wildlife Service, 108 pp.

Service (U.S. Fish and Wildlife Service). 1997. Biological/Conference Opinion on the Wild Burro Management Plan for the San Bernardino National Forest, California (1-6-97-F-4), 11 pp.

Service (U.S. Fish and Wildlife Service). 2001. Biological and Conference Opinions on the Continued Implementation of Land and Resource Management Plans for the Four Southern California National Forests, as Modified by New Interim Management Direction and Conservation Measures (1-6-00-F-773.2), 357 pp.

Service (U.S. Fish and Wildlife Service). 2005. Biological and Conference Opinions on the Revised Land and Resource Management Plans for the Four Southern California National Forests, California (1-6-05-F-773.9), 339 pp.

Stebbins, G.L. 1993. *Taraxacum*. p.350. In. The Jepson Manual: higher plants of California. J.C. Hickman, ed. Berkeley: Univ. of California Press.

USFS (U. S. Forest Service). 2005a. Biological assessment for the revised Land Management Plans (Forest Plans) for the four southern California national forests. Unpublished document submitted to the U.S. Fish and Wildlife Service, 386 pp.

USFS (U. S. Forest Service). 2005b. Land Management Plan. Part 2 San Bernardino National Forest Strategy. Document prepared by the U.S. Forest Service, 159 pp.

Wall, M. 2007. Telephone interview with Michael Wall, Seed Program Manager, Rancho Santa Ana Botanic Garden, in Claremont, California (June 11, 2007).

Wildlands Conservancy. 2005. Website accessed April 11, 2007 (http://www.wildlandsconservancy.org/twc_youth.html).

Table 1.

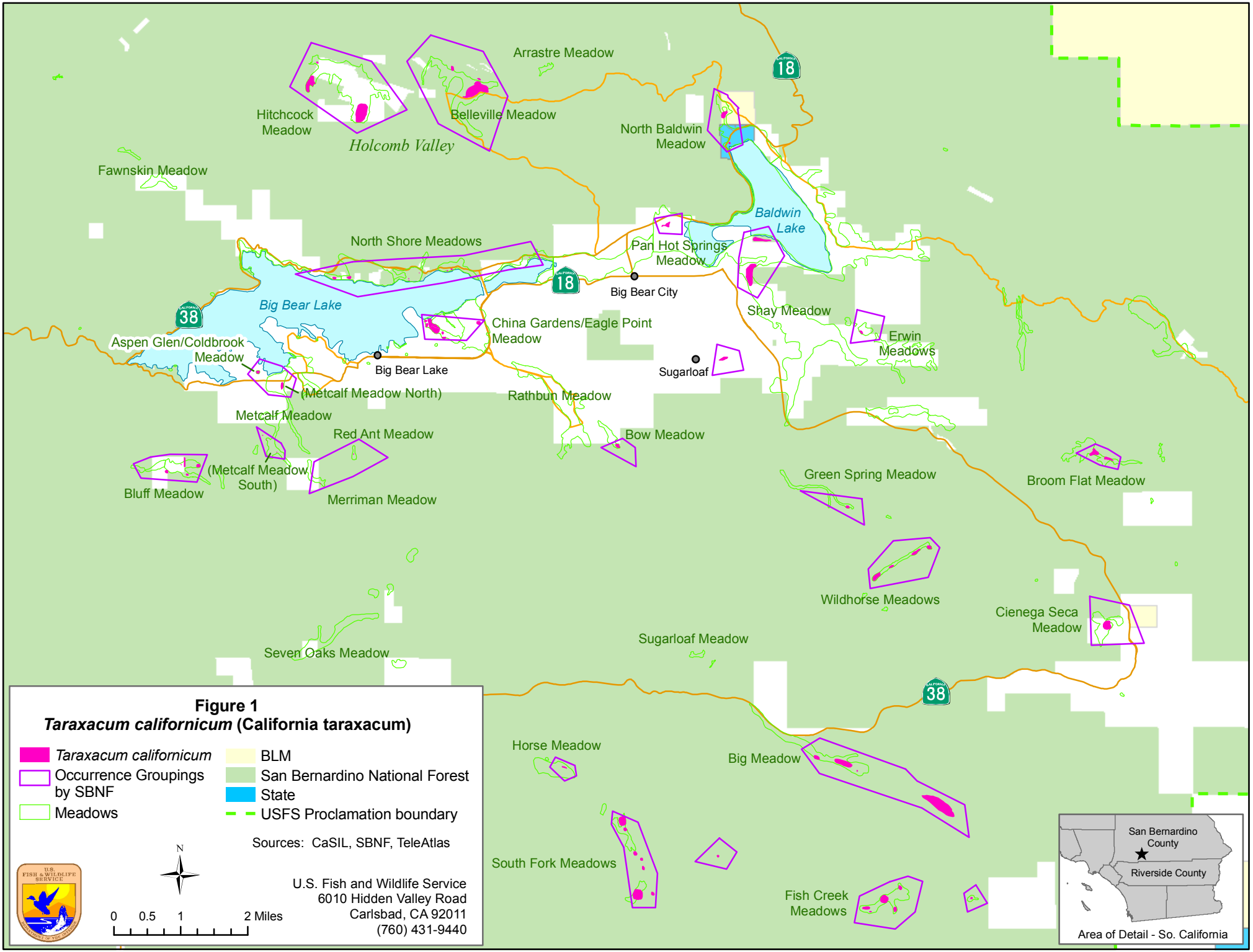
Occurrence	Extant	Meadow	Acres	% of total occupied meadow habitat	% remaining meadow habitat unaltered	GIS IDs		Plant # in census year						Ownership	Threats
						Butler OCC#	CNDDB EO#	Highest # Pre-listing	1999	2000	2001	2002	2007		
	N	Aspen Glen/Coldbrook Meadows	x	x	x	x	16	?						PVT	
1	Y	Belleville Meadow (Holcomb Valley area)	184	6.5	0	8,9,60	25	?		>105				SBNF	1,3,4,5,6,8,9
2	Y	Big Meadow	180	6.4	100	17,16, 45,66	4,36	?		5				SBNF	1,8,9,10
3	Y	Bluff Meadow (Bluff Lake System)	80	2.8	0	50,49, 11,30,	13	?	30	153				PVT/SBNF	1,3,4,5,8,9
4	Y	Bow Meadow[1]	3.4	0.1	0	39	33	?		2				SBNF	1,8,9,10
5	Y	Broom Flat Meadow[1]	76	2.7	0	69, 58	32	?		15	100			SBNF	1,3,7,8,9
6	Y	China Gardens/Eagle Point Meadows	180	6.4	0	3,6,7,2 ,34,29	21	?						PVT	1,2,3,8,9,10
7	Y	Cienega Seca Meadow	49	1.8	0	63	2	<1000				0*	15	PVT	1,3,4,5,8,9,10
8	Y	Erwin Meadows	15	0.5	0	64	26	?						PVT	1,2,3,8,9,10
	N	Fawnskin Meadow	x	x	x	x	45	?			0			PVT/SBNF	
9	Y	Fish Creek Meadows	71	2.5	100	18		50		0				SBNF	8,9
						55,54, 56,57	6,31,37	?		187					
10	Y	Green Spring Meadow	34	1.2	0	23	12	?		0		0		SBNF	1,8,9,10
11	Y	Hitchcock Meadow (Holcomb Valley area)	286	10.2	0	24,5,1 0	20	?	2					PVT/SBNF	1,3,4,5,7,8,9,10
12	Y	Horse Meadow	74	2.6	100	35	5,44	?		19		35		SBNF	3,8,9,10
13	Y	Merriman/Red Ant Meadows (Merriman)[1,2]	19	0.7	100	51	39	?		22				SBNF	4,5,8,9,10
		Merriman/Red Ant Meadows (Red Ant)[1,2]	6.4	0.2	100	37	38	?		4					3,8,9,10
14	Y	Metcalf Meadow (south occurrence)	145	5.2	0.1	46,47, 59	29	?		10				SBNF	1,3,5,8,9,10
15	Y	Metcalf Meadow (north occurrence)				13,14	16	?						PVT	1,2,3,8,9,10

Table 1.

Occurrence	Extant	Meadow	Acres	% of total occupied meadow habitat	% remaining meadow habitat unaltered	GIS IDs		Plant # in census year						Ownership	Threats
						Butler OCC#	CNDDB EO#	Highest # Pre-listing	1999	2000	2001	2002	2007		
16	Y	North Baldwin Meadow	159	5.7	0	25, 26	17, 27	?	2	20				SBNF/STATE	1,8,9,10
17	Y	North Shore Meadows (Division)	295	10.5	0	38	41	?		1				PVT/SBNF	1,3,4,5,8,9,10
		North Shore Meadows (East/West Observatory)				4,32	30	?	2	0					
		North Shore Meadows (Juniper Point)				42,41, 40	43	?		27					
		North Shore Meadows (Minnelusa)				44,43	42	?		5					
18	Y	Pan Hot Springs Meadow	227	8.1	0	27	24	<10						PVT	1,2,3,7,8,9,10
	N	Seven Oaks Meadow	x	x	x	x	14	?				0		PVT/SBNF	
19	Y	Shay Meadow	595	21.2	0	62	28	100-200		0*				PVT/SBNF	1,2,3,8,9
						36	40	?		158					
20	Y	South Fork Meadows	77	2.8	100	19		?		0				SBNF	1,8,9,10
						20		1		0					
						21		?		0					
						22		1		0					
						31,52, 53	1,3	2?		53					
	N	Sugarloaf Meadow	x	x	x	x	7	?				0		SBNF	
21	Y	Unnamed Meadow (E of Southfork Meadow)	0.7	0.02	100	65	11	?						SBNF	8,9,10
22	Y	Unnamed Meadow (west of Shay Meadow in town of Sugarloaf)	3.3	0.1	0	28	9	?	1					PVT	1,2,3,8,9,10
23	Y	Unnamed Meadow (E of Fish Crk Meadow)	15	0.5	100	67	10	?						SBNF	8,9,10
24	Y	Wildhorse Meadows	32	1.2	100	1	34	?	50	40				SBNF	1,7,8,9
						15		?		0					
						61	35	?		95					

Table 1.

Occurrence	Extant	Meadow	Acres	% of total occupied meadow habitat	% remaining meadow habitat unaltered	GIS IDs		Plant # in census year						Ownership	Threats
						Butler OCC#	CNDDB EO#	Highest # Pre-listing	1999	2000	2001	2002	2007		
		Notes:													
		[1]New occurrence (since listing) found in meadow not previously known to support *Taraxacum californicum* .													
		[2]Grouped into one occurrence by SBNF. Merriman Meadow and Red Ant Meadow discussed separately in section 2.3.1.													
		[*]Survey on SBNF only. Known occurrence on private land not visited.													
		Ownership Key:				Threats Key:									
		PVT - private				1 - Alteration of hydrological conditions									
		SBNF - San Bernardino National Forest				2 - Urbanization/Development									
		STATE - State				3 - Roads and unauthorized vehicular use									
						4 - Developed recreation									
		Sources:				5 - Dispersed recreation									
		Bill 2007b, pp. 1-2				6 - Mining									
		Butler 2000, pp. 56-59				7 - Grazing									
		CNDDB 2007				8 - Hybridization with *Taraxacum officinale*									
		Denslow et al, 2002				9 - Competition with other plant species									
		SBNF 2002				10 - Limited numbers of *T. californicum* individuals									


Arrastre Meadow
Hitchcock Meadow
Belleville Meadow
Holcomb Valley
North Baldwin Meadow
Fawnskin Meadow
Baldwin Lake
North Shore Meadows
Pan Hot Springs Meadow
Big Bear City
Big Bear Lake
Shay Meadow
China Gardens/Eagle Point Meadow
Erwin Meadows
Aspen Glen/Coldbrook Meadow
Big Bear Lake
Sugarloaf
(Metcalf Meadow North)
Rathbun Meadow
Metcalf Meadow
Red Ant Meadow
Bow Meadow
Green Spring Meadow
Broom Flat Meadow
(Metcalf Meadow South)
Bluff Meadow
Merriman Meadow
Wildhorse Meadows
Cienega Seca Meadow
Sugarloaf Meadow
Seven Oaks Meadow
Horse Meadow
Big Meadow
South Fork Meadows
Fish Creek Meadows
Figure 1
Taraxacum californicum (California taraxacum)
Taraxacum californicum
Occurrence Groupings by SBNF
Meadows
BLM
San Bernardino National Forest
State
USFS Proclamation boundary
Sources: CaSIL, SBNF, TeleAtlas
N
0 0.5 1 2 Miles
U.S. Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, CA 92011
(760) 431-9440
San Bernardino County
Riverside County
Area of Detail - So. California
/TACA/maps/Figure1.mxd 26 Sept 2007

U.S. FISH AND WILDLIFE SERVICE
Five-YEAR REVIEW of *Taraxacum californicum* (California taraxacum)

Current Classification ___Endangered_____
Recommendation resulting from the 5-Year Review

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
_X__No change is needed

Appropriate Listing/Reclassification Priority Number, if applicable _____

Review Conducted By __Stacey Love_____

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve _____ Date 3-27-08

REGIONAL OFFICE APPROVAL:

Lead Regional Director, Fish and Wildlife Service

Approve _____ Date 3/31/08